PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE IRON DOME DEFENSE SYSTEM – ARMY

And

DRAFT FINDING OF NO SIGNIFICANT IMPACT

Prepared by

UNITED STATES ARMY ENVIRONMENTAL COMMAND
JOINT BASE SAN ANTONIO - FORT SAM HOUSTON, TEXAS

November 2021

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Table of Contents

List of Figures

List of Tables

IRON DOME DEFENSE SYSTEM - ARMY

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The Iron Dome Defense System - Army (IDDS-A) addressed in this Programmatic Environmental Assessment (PEA) is based on an Israeli developed system that has been used to enhance their air defenses. The purchase and fielding[1] of Iron Dome will fulfill a congressionally directed requirement of section 112 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (2019 NDAA) (Public Law 115-232) that the Army deploy an interim missile defense capability.

In 2019, the United States (U.S.) Army published the Army Modernization Strategy (AMS) that describes how it will transform into a multi-domain force by 2035, meeting its enduring responsibility as part of the Joint Force (all U.S. military services plus our allies) to provide for the defense of the U.S. and retain its position as the globally dominant land power. The primary end state of the 2019 AMS is a modernized Army capable of conducting Multi-Domain Operations (MDO) as part of an integrated Joint Force in a single theater by 2028, and ready to conduct MDO across an array of scenarios in multiple theaters by 2035. The MDO concept describes how the Army will support the Joint Force in the rapid and continuous integration of all domains of warfare – land, sea, air, space, and cyberspace – to deter and prevail as we compete short of conflict, and fight and win if deterrence fails. The 2019 AMS is required to support the 2018 National Defense Strategy that states that we must prioritize long-term strategic competition with China and Russia, while deterring regional adversaries and sustaining irregular warfare competency. Political, economic, social, and technological changes will continue to create challenges and opportunities for the U.S. Army as we maintain our land dominance. Future warfare will only expand in geographic scale, domains, and types of actors while decision cycles and reaction times compress.

In support of the AMS and MDO capability, the Army has six priorities driving development:

- Long Range Precision Fires
- Next Generation Combat Vehicles
- Future Vertical Lift
- Network Technology
- Air and Missile Defense
- Soldier Lethality

[1] "Field" – refers to sending new equipment and technology to an installation(s). As part of the fielding action, Soldiers will be stationed at an installation(s) to train with and maintain the IDDS-A capability.

The IDDS-A is a key interim component of Air and Missile Defense (AMD) modernization. The Army has been developing an Indirect Fires[2] Protection Capability (IFPC) in multiple increments for a number of years. Since March 2018, the Army has evaluated existing air defense systems in order to rapidly acquire and field an interim capability while concurrently evaluating enduring solutions for the IFPC to meet the full spectrum of requirements and threats. An assessment of the final enduring IFPC solution cannot be completed at this time since the configuration and components are not yet finalized. The IDDS-A is the interim capability selected by the Army. It is a ground-based weapon system intended to defend fixed and semi-fixed sites, such as an airfield or forward operating base (FOB). The Army procurement of two Iron Dome batteries[3] and deployment as IDDS-A 1 and IDDS-A 2 will meet the statutory schedule requirements of the 2019 NDAA which required the Army to deploy an interim missile defense capability.

1.2 PURPOSE AND NEED

The purpose of the action is to field two batteries of IDDS-A in fiscal year (FY) 2022 and improve the defense of fixed and semi-fixed sites. The IDDS-A will enhance cruise missile defense (CMD), counter unmanned aerial systems (C-UAS), and counter rocket, artillery, and mortar (C-RAM) fire.

The Army is developing but has not yet achieved a final, enduring solution for IFPC and the proposed action would provide an interim solution. The overarching IFPC goal is a multi-mission system, anchored by the Integrated Air and Missile Defense Battle Command System (IBCS) and Sentinel radar, capable of providing protection from future aerial threats, up to but not including close range ballistic missiles[4] (CRBM). The 2019 NDAA directed the Army to deploy two batteries of an interim CMD capability no later than 30 September 2020 with deployment waiver authority granted to the Secretary of the Army if there were not sufficient funds appropriated to meet the deadline. Based on an analysis of cost, schedule, and performance the Army plans to field two batteries of IDDS-A in FY 2022 to meet the NDAA requirement. The Army will continue developing and evaluating a complete system solution - IBCS, radar, launcher, and interceptor - for an enduring IFPC capability. While IDDS-A provides a complete solution it is not compatible with the IBCS but maintains the current non-integrated construct where a specific sensor supports a specific shooter. The IDDS-A would enhance protection from future aerial threats, up to but not including CRBM. It would provide early warning of cruise missile (CM), UAS, and rocket, artillery, and mortar (RAM) threats; sensors that provide a capability to detect and identify aerial threats; and shooters capable of defeating advanced aerial

[2] Indirect Fires refers to aiming and firing a weapon, such as a mortar, missile, or artillery, without relying on a direct line-of-sight to the target.
[3] A battery is a company-size unit in a field artillery or air defense artillery battalion. Army Doctrine Publication No. 3-90, July 2019.
[4] CRBMs have a range less than 300 km. BALLISTIC AND CRUISE MISSILE THREAT, National Air and Space Intelligence Center in collaboration with the Defense Intelligence Ballistic Missile Analysis Committee, June 2017

threats. In addition, the capabilities of IDDS-A would allow the battery to destroy enemy CM, UAS, and RAM, while retaining the ability to shoot down airplane and helicopter threats.

1.3 PROPOSED ACTION

In line with these modernization efforts and to comply with the 2019 NDAA, the Army plans to field two batteries of IDDS-A to enhance the defensive capability of fixed and semi-fixed assets against CM, UAS, and RAM threats. The Army has contracted with the Israeli Ministry of Defense to acquire two complete batteries of the Iron Dome system. The Iron Dome is a mobile all-weather air defense system. The system can intercept short-range rockets and artillery shells fired from distances of up to approximately 70 km but is also effective against CM, UAS, airplane, and helicopter threats.

The two Iron Dome systems would field as two IDDS-A batteries to one or two of the assessed installations in FY 2022. Approximately 60 soldiers would staff each battery. The battery organization would be similar to current Air Defense Artillery (ADA) batteries, consisting of a small HQs section, a launcher section, and a fire control/radar section. This structure would support IDDS-A test and evaluation operations, has a limited lifespan, and will serve as an interim organizational solution, pending a final Army solution to meet IFPC requirements. The IDDS-A battery would be assigned to and occupy facilities of a current ADA battalion, Division Artillery or Field Artillery at the assigned installation. As an interim solution, an exception to standards of the required facility space may be utilized and the need for construction of facilities to support IDDS-A is not anticipated.

Soldiers in the IDDS-A battery would be equipped with a selection of individual equipment such as small arms, communications gear, and vehicles that are standard throughout the U.S. Army. The quantities of such gear added by fielding the IDDS-A are very small compared to the amounts already in use on each installation and will not be discussed in this document.

The IDDS-A serves a similar purpose using similar technologies but makes improvements to the capabilities of a number of current Army systems. The range and size of the IDDS-A missile falls between those of the PATRIOT and Hellfire missiles used by the Army for many years. The IDDS-A radar operates in the same band as a number of current Army radars. An environmental analysis utilizing the known impacts of similar U.S. Army systems will adequately determine environmental impacts of deploying the IDDS-A.

Each IDDS-A battery consists of the following new equipment and transport vehicles shown in Table 1.3-1 and Figure 1.3-1.

Table 1.3-1 IDDS-A New Equipment and Transport Vehicles per Battery

New Equipment	Quantity	Transport vehicle*
Missile Firing Unit	6	M1120A4
Multi Mission Radar	1	M977A4
Radar Control Station	1	M977A4
Battle Management and Control	1	M1120A4
Communication Shelter	1	M1120A4
Generator	1	M977A4
Reload Vehicle	1	M985A4
Maintenance Vehicle	1	M985A4
* The Transport vehicles are standard U.S. Army HEMTT.		

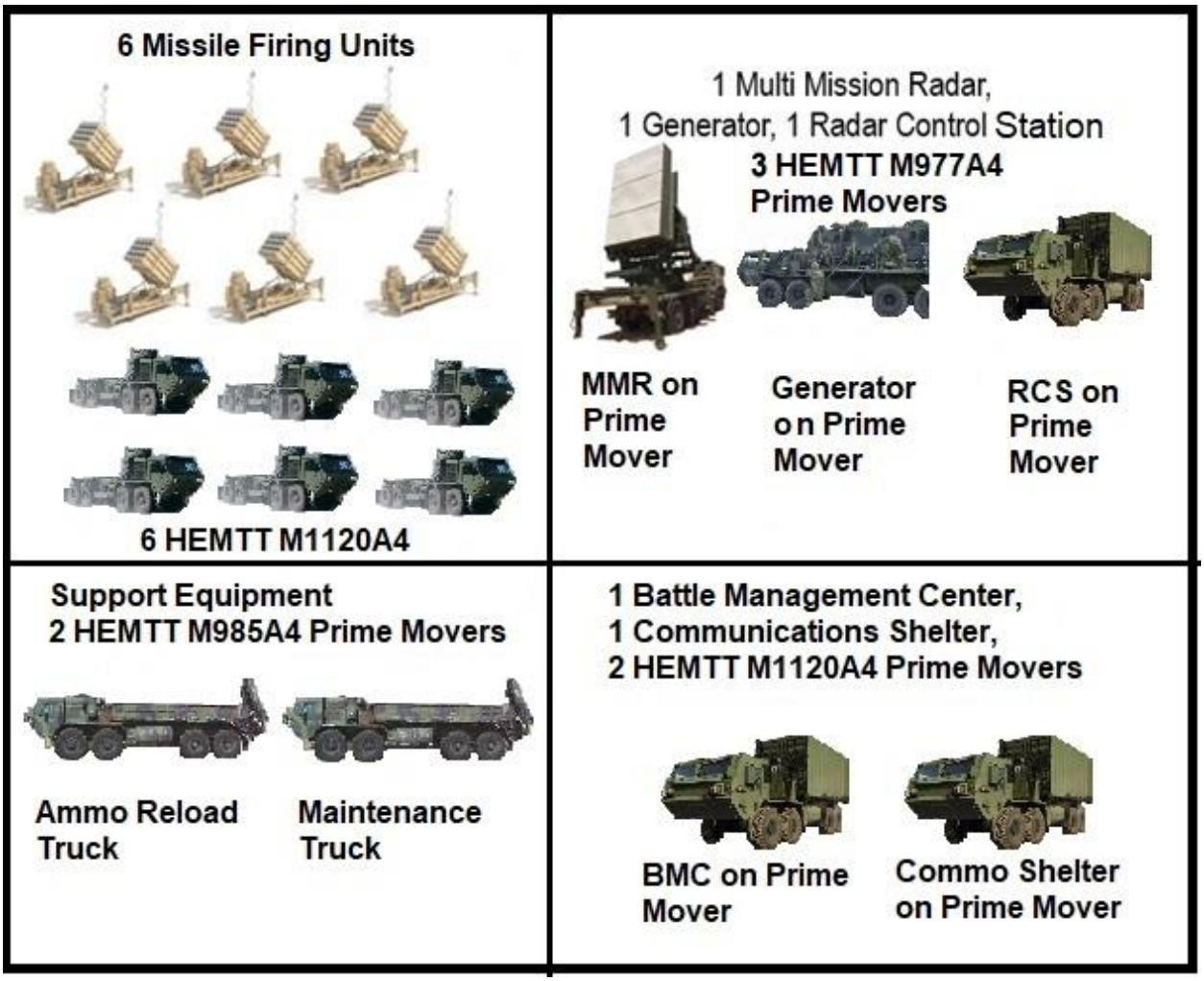

Figure 1.3-1 IDDS-A New Equipment and Transport Vehicles per Battery

The IDDS-A combines capability and capacity required to defend fixed assets while retaining the mobility necessary to defend key semi-fixed sites. Thirteen standard U.S. Army HEMTT in three variants shown in Table 1.3-1 and Figure 1.3-2 would move the IDDS-A.

Figure 1.3-2 IDDS-A Transport vehicles

The Missile Firing Unit (MFU) is a self-contained storage, magazine, and launcher device. It is mounted on the M1120A4 transporter which is already in use at all potential locations. The missiles contained within the MFU would interact with the environment if fired by emitting by-products of propellant combustion and warhead explosion, and metallic debris. Each MFU contains up to 20 Tamir Missiles that provide the capability to shoot down threats. Table 1.3-2 lists Tamir missile information.

Table 1.3-2 Approximate Tamir Missile Specifications

Missile	Length (m)	Diameter (cm)	Mass (kg)	Warhead mass (kg)	Guidance	Range (km)
Tamir	3	16	90	11	Ground command & onboard radar terminal homing	17

The ELM-2084 Multi Mission Radar (MMR), the Radar Control Station (RCS), and the Battle Management Center (BMC) provide the target search and tracking functions of the IDDS-A. The RCS controls the operation of the MMR. The BMC compiles the tracking data from the MMR and RCS to control firing of the Tamir missile for the IDDS-A. Some details of the MMR are compared to U.S. Army systems with similar capabilities and missions in Table 1.3-3.

Table 1.3-3 Comparison of the IDDS-A MMR to common U.S. Army radars

Radar	Emission Band	Configuration	Detection Range Up to Approximately (Artillery[5]) (km)
ELM-2084 MMR	S	Truck Transportable	100
AN/TPQ-53	S	Truck Transportable	60
AN/TPQ-37	S	Truck Transportable	50

All radars operate by emitting electromagnetic energy (i.e. radio waves) which is reflected by objects in the path of that energy. The radar system then collects the reflected energy and processes it to determine information about those objects such as location, distance, altitude, direction of travel, and speed. The detection range of a radar is primarily determined by the output power and the capability of the system to process the energy reflected by objects. The longer range of the IDDS-A MMR as compared to the listed U.S. Army systems may be the result of higher output power or better signal processing. If the output power of the MMR is higher it could require constraints on the use of the MMR at the installation.

All radars could affect the environment because of the emission of electromagnetic energy that then could be absorbed, scattered, or refracted as well as reflected by objects in its path. These interactions are generally benign unless the radar has a very high power output or it is operated too close to a susceptible object. The standard operating methods used by the IDDS-A battery will ensure adequate clearance from susceptible objects when the radar is operating. The S-band where all three of the radars in Table 1.3-3 operate is used for a variety of functions besides military radars. It is common for airport surveillance radars and weather radars to operate in the

[5] The maximum detection range for artillery shells was chosen for comparison. The detection range is dependent on the radar cross section of the target with larger items being detectable at longer ranges.

S-band. In addition, some common household products operate in the S-band such as Bluetooth connections, Wi-Fi connections, garage door openers, and keyless door locks on cars. The S-band is sub-divided into many channels and those channels are assigned to specific functions to allow multiple uses without interference.

The Communications Shelter houses the radio systems that allow the IDDS-A system and soldiers to communicate with higher HQ and the supported units in battle. It emits standard communication radio signals that are a form of electromagnetic energy and could affect the environment. The Generator provides electrical power needed to run the IDDS-A. The Reload Vehicle will carry spare magazines of Tamir missiles that can be loaded into a MFU and provide additional defensive capability. The Maintenance Vehicle will carry spare parts, tools, and supplies to maintain and repair the IDDS-A.

When deployed, the IDDS-A would be moved into appropriate tactical positions near the defended asset. The MFUs are dismounted from the HEMTT for use. The remaining components would remain truck mounted during employment. The IDDS-A uses both wired and secure wireless communications to connect the battery components and secure wireless communications to higher headquarters.

Each IDDS-A battery is capable of operating as a stand-alone expeditionary unit or as a battery aligned with a higher echelon AMD command. Therefore the Army may field the IDDS-A to an installation as a stand-alone, expeditionary unit or incorporate it into existing AMD force structure. Regardless of how the IDDS-A battery is fielded, the new equipment shown in Table 1.3-1 would be new to the installation, employed by soldiers, and require an assessment of the potential impact to the environment. The HEMTTs and other IDDS-A battery vehicles, systems, and equipment soldiers would train with and utilize are already in use at Army installations and any increases in quantity will be small.

The IDDS-A battery would complete training events and exercises as individual soldiers and collectively in groups as large as the full battery of approximately 60 soldiers. Battery soldiers would train to employ individual and IDDS-A weapons effectively, drive and maintain assigned vehicles properly, utilize assigned sensors and communications equipment effectively, and integrate into the supported units to defend fixed and semi-fixed assets.

At the assigned home station, IDDS-A battery soldiers and their families would reside in barracks, on post housing, or in the nearby communities. Soldiers and their families would utilize the facilities, shopping, and support services on post and in the local community in a manner similar to non-military residents providing economic benefit to the community.

1.4 SCOPE AND METHODOLOGY

This PEA evaluates potential direct, indirect, and cumulative effects of fielding the IDDS-A at Army installations in the U.S. to support defense of fixed and semi-fixed sites and enhance CMD, C-UAS, and C-RAM capabilities during conflict. Both active and reserve components make up the Army. The reserve component consists of the Army Reserves and Army National Guard (ARNG). If the consideration and analyses in this PEA are applicable to local conditions and if no additional issues are identified, requirements of the National Environmental Policy Act of 1969 (NEPA) can be met through the use of this PEA and the completion of an installation specific Record of Environmental Consideration (REC). Consistent with Title 32 of the Code of Federal Regulations (32 CFR) Part 651.19, a REC can be used for the installations discussed in this PEA, if the analysis fully addressed the proposed action and was sufficient to determine the environmental impacts. A PEA REC checklist is located in Appendix A.

Tiering by adopting this PEA and preparing an abbreviated EA is most appropriate if specific information regarding the fielding, stationing, training, and maintenance of the IDDS-A is not currently available for adequate analysis of environmental effects at the installations discussed in this PEA. In addition, tiering from this PEA can be done for installations that were not discussed in this document, including Army Reserve and ARNG installations, should the mission and needs of the Army require fielding IDDS-A to other installations. The PEA REC checklist is a tool to determine the need for tiering.

At installations receiving the IDDS-A or where the IDDS-A may conduct training, this PEA will facilitate compliance with the Army's NEPA regulations (32 CFR Part 651 *Environmental Analysis of Army Actions*). It will provide: (1) a framework to address the impacts of this type of action, (2) a procedure to certify a complete understanding for all impacts addressed in this PEA using an installation-specific REC, and (3) a procedure to facilitate the preparation of a focused, tiered, or supplemental NEPA document if needed.

1.5 REGULATORY AUTHORITY

This PEA is prepared in compliance with NEPA, as implemented by the President's Council on Environmental Quality (CEQ) regulations governing NEPA (40 CFR Part 1500-1508 (1978, as amended in 1986 and 2005)) and the U.S. Army's rule governing NEPA, *Environmental Analysis of Army Actions* (32 CFR Part 651). The CEQ issued a final rule on July 16, 2020 revising the NEPA regulation. Based on a start date prior to September 14, 2020 effective date for the revised rule, this PEA will be completed under the previous NEPA regulations.

1.6 PUBLIC AND AGENCY INVOLVEMENT

In accordance with 32 CFR Part 651, the Army provides opportunities for the public and agencies to participate in the NEPA process to promote open communication and improve the

decision-making process. Persons and organizations having potential interest in the proposed action are encouraged to participate in the PEA process.

On March 3, 2022, a Notice of Availability (NOA) was published in the Federal Register and local newspapers announcing a 30-day public review and comment period for this PEA and the draft Finding of No Significant Impact (FONSI).

Electronic copies of the PEA and draft FONSI are available for download from the U.S. Army Environmental Command's website at https://aec.army.mil/index.php?cID=352. Local libraries near the affected installations were provided copies of this document in an electronic version or hard copy, depending on the library preference.

Please send electronic comments via email to usarmy.jbsa.imcom-aec.mbx.nepa@army.mil with the subject line IDDS-A Public Comment or mail written comments to:

U.S. Army Environmental Command
Attn: IDDS-A Public Comments
2455 Reynolds Road, Mail Stop 112
Joint Base San Antonio-Fort Sam Houston, TX 78234-7588

Inquiries may also be made via phone by calling the U.S. Army Environmental Command Public Affairs Office at 210-466-1590 or 210-488-6061, or via email to usarmy.jbsa.imcom-aec.mbx.nepa@army.mil. Comments submitted within the 30-day public comment period will be made part of the administrative record and will be considered before a final decision is made.

1.7 DECISION TO BE MADE

This NEPA process will end with the results of this assessment documented in a FONSI or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS). The decision-maker will consider the environmental and socioeconomic impacts analyzed in this PEA and public issues of concern identified during the comment period. If the decision-maker determines there are no significant environmental impacts, the final FONSI will document that decision and be signed no earlier than 30 days after the publication of the NOA for this PEA and the draft FONSI. The Army may initiate an NOI for an EIS if new information warrants the need for additional analysis of potentially significant environmental impacts. Prior to making a final decision on which installation(s) of the Action Alternative to field the IDDS-A, or implement the No Action Alternative, the decision-maker will also consider other relevant information, such as deployment time, cost, and strategic considerations. The Army decision-maker for this PEA is the Department of Army's Deputy Chief of Staff, G-9.

2 ALTERNATIVES

This section discusses the screening criteria used to identify installations for analysis, as well as alternatives carried forward and not carried forward for analysis in Section 3.

2.1 SCREENING CRITERIA

The Army established screening criteria to identify the range of potential alternatives that would support the purpose of and the need for the Proposed Action and to assess whether an alternative was reasonable and would be carried forward for evaluation in this PEA. Reasonable alternatives must meet the following four criteria:

1. Installations must have assets requiring air defense that deploy to fixed or semi-fixed positions in battle or the installation must host an ADA Brigade (Bde) or Battalion (Bn).

   The primary purpose of the IDDS-A is to provide defense against CM, UAS, and RAM threats to fixed or semi-fixed assets in battle. Co-location with supported forces enhances training and effectiveness of the supporting and supported force and is desired for the initial fielding actions. An ADA Bde or Bn is not always collocated with supported combat units and the IDDS-A batteries may be incorporated into an ADA Bde or Bn. Incorporation into an existing ADA Bde or Bn would present fewer organizational and logistical challenges.

2. Adequate live-fire ranges and related munition Surface Danger Zones (SDZs) are available to support the minimum requirements for the IDDS-A battery training and certification as designated in authoritative Army training documents[6]. The training requirements are measured in range days (RD)[7]; and can be met on existing ranges, new ranges under construction or planned, or through selective scheduling as facilitated by the Sustainable Readiness Model (SRM) or the Regionally Aligned Readiness and Modernization Model (ReARMM) as discussed in section 2.2. In addition, certain live-fire training may be accomplished through appropriate simulations.

[6] The IDDS-A battery live-fire training requirements are derived from a review of Army training requirements and Army Force Management System data. Using this information a scenario was built in Army Range Requirements Model (ARRM) using elements of existing batteries similar to the IDDS-A battery missions and equipment to derive the live-fire requirements from authoritative Army doctrine and training requirements.

[7] Requirements are measured in range days (RD). RDs are computed by multiplying the number of required training days on the range times the number of iterations a training event is required each year. For example, a six RD requirement may be 6 one-day events, 3 two-day events, or 12 half-day events.

Installations must have the range types required to accommodate the live-fire training events of the IDDS-A battery. The ranges may be the primary range type or one or more of the alternate range types for each live-fire training event. Table 2.1-1 shows the expected annual live-fire range requirements for one IDDS-A battery derived from a review of a single Patriot Missile battery[8]. The Patriot battery requirements were reduced by 20% to account for the lower manning level in an IDDS-A battery. Acceptable alternate range types are listed in Appendix B.

Table 2.1-1 Expected Annual Live-fire Range Requirements for One IDDS-A battery

Range Type	Requirements (RD)[1]	Minimum Standard Range area[2]
BASIC 10M-25M FIRING RANGE (ZERO)	**2.95**	**0.8 acres**
AUTOMATED RECORD FIRE (ARF) RANGE	**3.20**	**23.7 acres**
AUTOMATED MULTIPURPOSE MACHINE GUN (MPMG) RANGE	**1.54**	**370 acres**
MULTIPURPOSE RANGE COMPLEX-HEAVY (MPRC-H), AUTOMATED	**2.40**	**4942 acres**
AIR DEFENSE MISSILE FIRING RANGE	**3.20**	**463 acres**
HAND GRENADE QUALIFICATION COURSE (NONFIRING)	**0.80**	**N/A[3]**
HAND GRENADE FAMILIARIZATION RANGE (LIVE)	**0.40**	**2.5 acres**
GRENADE LAUNCHER RANGE	**1.58**	**8.65 acres**

Data from ARRM and TC 25-8. ARRM Fiscal Year 2020 Data accessed on 23 May 2020.

[1]Requirements are measured in range days (RD). RDs are computed by multiplying the number of required training days on the range times the number of iterations a training event is required each year. For example, a six RD requirement may be 6 one-day events, 3 two-day events, or 12 half-day events.

[2]A Standard Range meets the size, configuration, targetry, and instrumentation requirements of TC 25-8 and can accommodate all normal training days per Army doctrine. If the Army provides an exception to standard, smaller areas or different configuration, targetry, or instrumentation are acceptable.

[3]No minimum range area specified per Army doctrine.

3. Adequate Protected Airspace of lateral and vertical extent.

Tactics and weapons of the IDDS-A require training using aerial targets that would be detected, tracked, engaged, and destroyed. Targets must be free to maneuver in a manner similar to an enemy threat. The IDDS-A must be free to bring sensors and weapons to

[8] The Patriot missile battery is organized in a manner similar to the planned IDDS-A battery and was used to approximate the live-fire training requirements for IDDS-A.

bear on the target. The airspace must overlay the ground footprint of ranges where the training would occur and extend vertically to a minimum of 25,000-30,000 feet above ground level (AGL). Such activity must be contained within airspace that is monitored by the governing range control or land/airspace governing agency visually or with radar so non-participating aircraft can be detected. The controlling agency must have communications capability to warn and prevent the entry of non-participating aircraft or suspend IDDS-A operations if a non-participating aircraft is detected within the protected airspace. All training events involving live fire of Tamir missiles or the flight of Unmanned Aerial Vehicles (tactical or targetry) would require airspace clearance uniquely established by the governing range control or land/airspace governing agency.

4. Adequate cantonment facilities for administrative, maintenance, motor pool, housing, and personnel support. Facilities with an exception to standard are also considered adequate.

The installation must have adequate vacant or vacatable facilities or the ability to modify facilities prior to occupancy to meet the requirements. Construction of appropriate facilities may be planned in the future.

Infrastructure that meets Army standards required for a single IDDS-A battery includes:

- One Battery HQ facility of 25,776 gross square feet (GSF) including personally owned vehicle (POV) parking.
- One Tactical Equipment Maintenance Facility (TEMF) of 28,304 GSF including POV parking.
- Tactical Vehicle Parking of 12,555 GSF.
- One Hazardous Material Storage Facility with 60 GSF
- Sufficient Ammunition Supply Point facilities for IDDS-A munitions
- At least 8,420 GSF of available barracks space including POV parking to accommodate approximately 20 (33%[9] of the approximately 60) IDDS-A battery soldiers.

The estimated area for facilities is 75,115 GSF (1.7 acres).

Please note that, at this time, no range or facility construction is planned to support the IDDS-A. The Army intends to use the range scheduling flexibility afforded by SRM or ReARMM and the ability to use exceptions to standard to house and train the IDDS-A batteries in less facility and range space than is required by Army doctrine.

[9] The Department of Defense Selected Military Compensation Tables of 1 January 2019 show 33% of military personnel live on base receiving quarters in kind.

Table 2.1-2 provides a list of Army installations that meet the criteria mentioned above for IDDS-A fielding. All listed installations meet the selection criteria. This table, however, may not represent an all-inclusive list.

Table 2.1-2 Army Installations which meet IDDS-A Fielding Requirements

Installation Name and State
Fort Bliss, Texas
Fort Campbell, Kentucky
Fort Hood, Texas
Fort Riley, Kansas[1]
Fort Sill, Oklahoma
Fort Stewart, Georgia
Joint Base Lewis-McChord, Washington[2]
[1]Fort Riley includes facilities at Smoky Hill Range, Kansas [2]Joint Base Lewis-McChord includes facilities at Yakima Training Center, Washington

2.2 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

No Action Alternative: The IDDS-A batteries would not be fielded to any installation. Training and operations at the assessed installations would continue in the current manner and rate. This would not meet the objectives of the AMS or the intent of the 2019 NDAA and leave Army fixed and semi-fixed assets without enhanced air defense capability.

Action Alternative: Field IDDS-A batteries to one or two of the assessed installations at which the unit can be accommodated within existing temporary or permanent infrastructure and training can be accomplished through live fire or approved simulations. Training requirements can also be met through flexible scheduling as facilitated by SRM or ReARMM as discussed below. Facility requirements can be met by using an exception to standard.

If both IDDS-A batteries are fielded to a single installation the requirements of the screening criteria for live-fire ranges and cantonment facilities (i.e.: RD and GSF) would be doubled. The decision-maker may choose to field both IDDS-A batteries to one installation because of factors such as cost, available facilities, or the synergy derived from multiple units to improve the tactics, techniques, and procedures to employ the IDDS-A.

Table 2.2-1 shows which facilities meet the screening criteria and which facilities may require modification or construction at each installation. Please note that an “N” under the “Currently meets screening criteria” column does not mean the installation is not suitable for fielding the

IDDS-A. The Army intends to use the range scheduling flexibility afforded by SRM or ReARMM and the ability to use exceptions to standard to house and train the IDDS-A batteries in less facility and range space than is required by Army doctrine.

Table 2.2-1 Summary of IDDS-A Screening Criteria vs Installation Facilities

Screening Criteria	Currently meets screening criteria Y or N		Facility or range construction may be required Y or N	
	One Battery	Two Batteries	One Battery	Two Batteries
Fort Bliss				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	Y	Y	N	N
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y
Fort Hood				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	N	N	Y	Y
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y
Fort Campbell				
Air defense requirement or ADA Bn	Y		N/A	
Live-fire Ranges	N	N	Y	Y
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y
Fort Riley & Smoky Hill Range				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	N	N	Y	Y
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y
Fort Sill				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	N	N	Y	Y
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y
Fort Stewart				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	Y	Y	N	N
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y

Screening Criteria	Currently meets screening criteria Y or N		Facility or range construction may be required Y or N	
	One Battery	Two Batteries	One Battery	Two Batteries
Joint Base Lewis-McChord & Yakima Training Center (JBLM & YTC)				
Air defense requirement or ADA Bde	Y		N/A	
Live-fire Ranges	N	N	Y	Y
Air Space	Y		N/A	
Cantonment Facilities	N	N	Y	Y

N/A indicates that construction is not applicable to the listed requirement

The current unit training strategy is the Sustainable Readiness Model (SRM). The SRM places each unit, such as an IDDS-A battery or Battalion Headquarters, into a Unit Model. Unit models are comprised of a series of modules that specify the training cycle that a unit follows to achieve and maintain a Readiness Level (RL) prescribed by Army Senior Leaders. A RL denotes a unit's ability to deploy, complete their assigned mission, and support U.S. military objectives. The modules are grouped along a timeline of multiple years that ends at the Unit Readiness Objective (URO), a specific future date when the unit is required to be at the prescribed RL.

The two primary Unit Models are the Unit Readiness Cycle (URC) and Unit Deployment Cycle (UDC). The URC modules follow a progressive path that builds to and maintains the prescribed RL or a sustained path where a unit is required to maintain the prescribed RL. The UDC is comprised of modules that take a unit from a Dwell Phase when they have just returned from a deployment to be ready to deploy again in the next Deployment Phase. Units in the Dwell Phase will undergo personnel changes and equipment maintenance and upgrades. As these changes occur the UDC unit begins a training cycle where the unit capabilities improve to reach the prescribed RL.

The Army has developed a new unit training strategy to replace the SRM. The Regionally Aligned Readiness and Modernization Model (ReARMM) will align Army units to a region such as Europe or the Indo-Pacific region. This will aid units in developing expertise in the parts of the world to which they could likely deploy during a conflict. Units would also acquire new and theater-specific equipment for potential operations. The model is also intended to provide soldiers more predictability so units would have time to refine doctrine, and reorganize units if necessary based on theater-specific requirements. ReARMM will allow the Army to deploy troops overseas to meet currently assigned missions while preparing the force for the future.

While active-duty units will cycle through eight-month phases of modernization, training, and mission, National Guard and Reserve units will have extended phases to match total requirements to personnel. In the modernization phase, units may conduct a variety of activities

including divestiture of older equipment; new equipment fielding and training; lateral transfers; Soldier touchpoints and experimentation with new systems; specialized training for Soldiers to build advanced capabilities; and block leave. While in the training phase, units will sharpen their skills employing both new equipment received for modernization and retained equipment. The training missions and exercises will aid the unit in developing the teamwork and unit cohesiveness required to excel during deployment in the mission phase.

Units will transition from the SRM to ReARMM beginning October 1, 2021. Please note that the assessment of live-fire ranges in this PEA is based solely on Army training doctrine, which does not account for the SRM or ReARMM. Army Senior Leaders, unit commanders, and installation commanders have flexibility to alter training by increasing, decreasing, or changing the timing of the training events within the installation's training limits. These changes cannot be known as they are subject to the assessment of a unit's readiness and progression toward their URO. Units in the Sustained URC or nearing their URO will have a higher priority to complete their required training. Unit commanders and installation staff will prioritize them for training time and space with lower priority units completing training later.

Table 2.2-2 provides information regarding installation facilities available and how the IDDS-A can be incorporated into the installation cantonment and range facilities. Detailed information regarding each installation follows Table 2.2-2. As a reminder, the Action Alternative screening criteria are:

- Appropriate unit types at the installation.
- Live fire or approved simulations for all weapons.
- Adequate airspace at the installation.
- Permanent or temporary infrastructure in the cantonment.

Table 2.2-2 Overview of Alternatives by Installation

Installation	Action Alternative
Fort Bliss	Screening Criteria Applied: • Air defense requirement and ADA Bde are present • Live-fire range shortages[10] [11] per IDDS-A battery: → One battery: ▪ No range shortages ▪ No shortage of range acreage → Two batteries: ▪ No range shortages ▪ No shortage of range acreage • Existing restricted airspace[12] → max altitude: Unlimited → land area overlaid: 4,136 km^2 (1,022,006 acres) • Cantonment Facilities: four facilities of 1.1 acres exist and one facility of 0.6 acres may require construction for each battery.
	Current Constraints Biological Resources: → No digging or collection of any plants, even for camouflage. → All excavations must be approved and backfilled. → Hunting prohibited by personnel during training exercises. → Destruction of nests or disturbance of bats or birds prohibited. → Illegal to collect or harm animals w/o state and DPW-ED permit. Leave all wildlife alone, even snakes. Cultural Resources: → No digging permitted without prior clearance → All caves and cave-like structures are off-limits → All new construction locations and plans and alterations to historic structures require review by Cultural Resources → Military units are required to follow the SOP for the inadvertent discovery of cultural resources, esp. possible human remains → Training requests are vetted through expert staff on archaeology and historic preservation → Training activities are re-routed to avoid off-limits areas and other culturally sensitive areas → Cultural resources staff will consult with units to assist in compliance

[10] IDDS-A training is based on Army training doctrine and will occur on eight primary ranges. The shortage of range types and acreage is based on an analysis using the Army Range Requirements Model (ARRM) and takes into account extra training days available on weekends and alternate range types that can substitute for the primary range type.

[11] A shortage of a range type indicates that an expansion of an existing range or construction of a new range may be required.

[12] Airspace must overlay the ground footprint of ranges where the training will occur and extend vertically to 25,000 to 30,000 feet above the ground.

	Wetlands/Floodplains: → 676 acres wetlands (5 acres delineated) exist → No net loss of wetland and floodplain acreage → Arroyo riparian buffers along waterways [activities limited]
Installation	**Action Alternative**
Fort Hood	<u>Screening Criteria Applied</u>: • Air defense requirement and ADA Bde are present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ Shortage of one range type ▪ Shortage of range acreage not determined[13] → Two batteries: ▪ Shortage of one range type ▪ Shortage of range acreage not determined • Existing restricted airspace: → max altitude: 45,000 feet → land area overlaid: 705 km^2 (174,206 acres) • Cantonment Facilities: two facilities of 0.3 acres exist and three facilities of 1.4 acres may require construction for each battery.
	<u>Current Constraints</u> Biological Resources: → 60ft radius buffer around migratory bird nests when found at ground level → 30ft radius buffer around migratory bird nests when found at low tree height → For two or more nests: 100ft buffer for ground level; 60ft buffer for low trees → Bald & golden eagle: off-limit buffers during nesting season Cultural Resources: → 30 meter (m) buffer for all historic properties and documented in "no digging" and "no staking/ grounding rod" maps → Access to Leon River Medicine Wheel restricted to Native Americans for traditional observances Wetlands/Floodplains: → 750 acres wetlands (60 delineated) exist → Buffers required for riparian areas (size of buffer not provided)
Installation	**Action Alternative**
Fort Campbell	<u>Screening Criteria Applied</u>: • Air defense requirement and ADA Bn are present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ Shortage of two range types

[13] Certain ranges are terrain dependent and have no size specified; therefore an acreage cannot be determined.

	▪ Shortage of 2,140 range acres → Two batteries: ▪ Shortage of two range types ▪ Shortage of 2,189 range acres • Existing restricted airspace: → max altitude: 27,000 feet → land area overlaid: 319 km^2 (78,825 acres) Cantonment Facilities: one facility of 0.3 acres exists and four facilities of 1.4 acres may require construction for each IDDS-A battery
	<u>Current Constraints</u> Biological Resources: → Migratory Bird Management Strategy focuses management and protection efforts on 22 Birds of Conservation Concern (BCC) found on the installation → Endangered Species Management Components of the INRMP tailored to the Indiana bat, gray bat, and northern long-eared bat to ensure compliance with the Endangered Species Act (ESA) → All caves and cave-like structures are off limits → Clearing of forested tracts restricted to no larger than 20 acres → Tree removal activities are seasonally restricted → Specific management for conservation and protection of the timber rattlesnake and Bachman's and Henslow's sparrows → Locations of regionally rare state-listed plant species are buffered with signs and are off-limits to military excavation or vehicular activity Cultural Resources: → Historic era cemeteries are fenced and marked in GIS Wetlands/Floodplains: → Approximately 682 acres exist on Fort Campbell → 100 foot wide vegetated buffer along perennial streams, lakes, and ponds → 50 foot wide vegetated buffer along intermittent streams
Installation	**Action Alternative**
Fort Riley & Smoky Hill Range	<u>Screening Criteria Applied</u>: • Air defense requirement is present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ Shortage of one range type ▪ Shortage of 1,683 range acres → Two batteries: ▪ Shortage of one range type ▪ Shortage of 1,732 range acres • Existing restricted airspace: → max altitude: 29,000 feet → land area overlaid: 361 km^2 (89,203 acres) at Fort Riley → max altitude: 23,000 feet

	→ land area overlaid: 240 km^2 (59,304 acres) at Smoky Hill Range • Cantonment Facilities: two facilities of 0.5 acres exist and three facilities of 1.2 acres may require construction for each IDDS-A battery.
	Current Constraints Biological Resources: → Piping plovers: no disturbance buffers → Topeka shiner: no stream, ground or vegetation disturbance within 50 feet of designated streams → Whooping cranes: no fly buffers at 2,000 feet AGL and 0.5-1.5 nm → Bald eagles: 200m flight altitude buffer & buffer of roosts and nests → No tree removal 100m of nests; buffer at 200m during breeding season Cultural Resources: → Archaeological sites identified which disturbance must be avoided, minimized or mitigated → ground disturbance review protocols with the Cultural Resources Manager → Protection and monitoring measures for known sites → Identification of facilities that require evaluation to determine application of preservation measures Wetlands/Floodplains: → 1,536 acres wetlands (0 delineated) exist; riparian buffers
Installation	**Action Alternative**
Fort Sill	Screening Criteria Applied: • Two ADA Bde's are present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ Shortage of three range types ▪ Shortage of 1,150 range acres → Two batteries: ▪ Shortage of three range types ▪ Shortage of 1,205 range acres • Existing restricted airspace: → max altitude: 60,000 feet → land area overlaid: 1,298 km^2 (320,736 acres) • Cantonment Facilities: three facilities of 1.1 acres exists and two facilities of 0.6 acres may require construction for each IDDS-A battery.
	Current Constraints Biological Resources: → Prescribed burns are used for habitat improvement → Cowbird trapping to improve nesting success of migratory birds Cultural Resources:

	→ Screen training missions through a database to ensure compatibility → Review of projects affecting facilities planned in the ranges → Buffer zones → SOPs provided in the Integrated Cultural Resources Management Plan (ICRMP) Wetlands/Floodplains: → 1,174 acres wetlands (0 delineated) exist → 200m buffer for ponds and lakes
Installation	**Action Alternative**
Fort Stewart	<u>Screening Criteria Applied</u>: • Air defense requirement is present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ No range shortages ▪ No shortage of range acreage → Two batteries: ▪ No range shortages ▪ No shortage of range acreage • Existing restricted airspace: → max altitude: 29,000 feet → land area overlaid: 1,060 km^2 (261,926 acres) → Fort Stewart can establish an Altitude Reservation with the Federal Aviation Administration providing protected airspace up to 45,000 feet • Cantonment Facilities: two facilities of 0.5 acres exist and three facilities of 1.2 acres may require construction for each IDDS-A battery.
	<u>Current Constraints</u> Biological Resources: → Frosted flatwoods salamander: 100 foot buffer around breeding sites → Bald eagle nests with military training nearby: firing only blank ammunition, no flight activity within 1000 feet during nesting season Cultural Resources: → Applicable SOPs within the ICRMP for avoidance of marked historic sites and cemeteries → Review of construction, renovation, and repair plans that affect facilities and training exercises planned outside of "Free Dig" areas Wetlands/Floodplains: → 85,796 acres wetlands (0 delineated) and one conservation bank exist → Approximately 1,000 acres exist in training area (TA) E-4 maintained as conservation bank → Streamside Management Zone buffers: 20 feet for slopes <20%; 35 feet for slopes 21-40%; and 50 feet for slopes >40%

Installation	Action Alternative
	Screening Criteria Applied: • Air defense requirement is present • Live-fire range shortages per IDDS-A battery: → One battery: ▪ Shortage of two range types ▪ Shortage of 4,307 range acres → Two batteries: ▪ Shortage of two range types ▪ Shortage of 4,356 range acres • Existing restricted airspace: → max altitude: 14,000 feet → land area overlaid: 148 km^2 (36,557 acres) at JBLM → max altitude: 55,000 feet → land area overlaid: 1,194 km^2 (294,932 acres) at YTC Cantonment Facilities: one facility of 0.3 acres exists and four facilities of 1.4 acres may require construction for each IDDS-A battery.
Joint Base Lewis-McChord (JBLM) & Yakima Training Center (YTC)	Current Constraints Biological Resources JBLM: → Endangered Species Management Components for 11 listed species → Coordination with regulators for listed four species → Specific waterfowl management actions → Buffers and minimum flight altitudes for eagles Biological Resources YTC: → Wildlife shall not be harassed, touched, captured, or killed → In sage-grouse protection areas during breeding season use of specific ranges is limited to 0900-2359; between 0000 and 0900 ammunition guards are permitted if required, travel is limited to main supply routes (MSR) or other designated roads, and aircraft are not permitted to fly below 300 feet AGL on the flight routes over the protection areas → During sage-grouse nesting and brood rearing season sage-grouse protection areas are off-limits to military training and travel with some exceptions, travel is limited to authorized MSRs or designated roads → Year-round in sage-grouse protection areas no digging and no bivouacking → Specific training exercises can be approved by the I Corps G3 except during the sage-grouse protection period → Road use restrictions and flight altitude restrictions within designated eagle protection areas for specific times of the year Cultural Resources JBLM: → Vehicle travel is mostly on existing roads and trails → Dig permits require a cultural resources review of area → Vandalism is minimized through soldier awareness training → Restrictions to Traditional Cultural Property (TCP) sites are temporary → Continued coordination with the tribes and advanced scheduling limit TCP conflicts

	Cultural Resources YTC: → Dig permits are required → Excavations must be filled and leveled → Utility dig permit required for digging or installation of stakes or grounding rods in the cantonment → Inadvertent cultural resource encounters must stop training and digging, protect the site, and report the site → Vehicle travel or digging in Seibert stake areas is prohibited but foot traffic is allowed in most of these areas Wetlands/Floodplains JBLM: → 50m buffer around all wetlands including reservoirs, lakes, marshes, ponds, and riparian zones → Water crossings by wheeled/tracked vehicles restricted to authorized fords → Continue past reclamation efforts to control invasive species Wetlands/Floodplains YTC: → Use of water purification systems must be coordinated and restrictions on disposal of by-products → River crossing and amphibious operations require prior coordination and limited to July through November → Off road maneuver restricted when soil is saturated → Vehicle movement parallel to drainages no closer than 60m → Bivouacking and POL vehicle parking minimum 100m from drainages → Avoid sharp and neutral steer turns → Use hardened areas for assembly → Use existing roads when possible
Installation	**No Action Alternative**
All Installations	The IDDS-A batteries would not be fielded to any installation. Training and operations at the assessed installations would continue in the current manner and rate. This would not meet the objectives of the AMS or the intent of the 2019 NDAA and leave Army fixed and semi-fixed assets without the desired air defense capability. All current constraints listed would remain applicable at the specified installation.

2.2.1 Fort Bliss

Fort Bliss hosts the 11th ADA Bde and numerous assets requiring air defense.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on all range types or one or more alternate range types.

The sole facility type per battery that Fort Bliss lacks is the TEMF with an approximate minimum footprint of 28,304 sq. ft. and 0.6 acres. An exception to standard, expansion, or construction of the facility would be required.

Fort Bliss currently has protective measures in place that will aid in minimizing impacts to the affected environment from fielding the IDDS-A. These include restricting vehicle movement around arroyos, sinkholes, and steep slopes, as well as protecting habitats of exceptional biological value by establishing protective buffers and maintaining healthy and diverse arroyo riparian zones. Measures to protect wildlife and vegetation on Fort Bliss are placed by Range Operations and the Directorate of Public Works – Environmental Division (DPW-ED) and are emphasized during the area access and activity approval process. In addition to the constraints listed in Table 2.2-2 for biological resources the following protective measures are also included in the SOP:

- Pack out all trash. Dispose of it in dumpsters at designated sites.
- Burning or burying trash prohibited.
- No excavations dug on Otero Mesa.
- Commanders will ensure that smoke grenades, trip flares, or any other fire-causing devices are used only in areas approved in the Fort Bliss Integrated Wildland Fire Management Plan (IWFMP). Live devices will not be abandoned or discarded anywhere on Fort Bliss.
- Range Operations clearance is required prior to using tracers or pyrotechnics.
- Units must check in with Range Operations prior to occupation of training areas.
- Remove all wire and tactical obstacles after training is completed.
- Remove all ammunition, simulators, explosives, and pyrotechnics after training is completed.
- Contact Range Operations and conduct a clearance inspection before leaving the range.

Other measures protecting biological resources at Fort Bliss include:

- Maintain vegetative buffers on waterways/riparian corridors by inclusion within limited use areas (LUAs).
- Sustain healthy arroyo riparian buffers along waterways by limiting activities in these areas.
- The Fort Bliss Mitigation and Monitoring Plan provides program-level guidance for implementing mitigation measures based on scientific information and proven methods, principles, and standards.
- Fort Bliss has developed 1,116,595 acres of ecological management units as a tool for maintaining ecological connectivity between Fort Bliss and the surrounding lands and help with developing goals for ecosystem management.

Fort Bliss implements the following policies to protect cultural resources against adverse effects from training, construction, and other ground-disturbing activities:

- No digging permitted without prior clearance
- All caves and cave-like structures are off-limits
- All new construction locations and plans and alterations to historic structures require review by Cultural Resources
- Military units are required to follow the SOP for the inadvertent discovery of cultural resources, esp. possible human remains
- Training requests are vetted through expert staff on archaeology and historic preservation
- Training activities are re-routed to avoid off-limits areas and other culturally sensitive areas
- Cultural resources staff will consult with units to assist in compliance

2.2.2 Fort Hood

Fort Hood hosts the 69th ADA Bde and numerous assets requiring air defense.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on seven of eight range types or one or more alternate range types. The need to accommodate the additional training on the range types with a shortage would require close attention to scheduling and prioritization of units based on the SRM or ReARMM. Alternately, additional range space could be constructed to accommodate the additional training.

The facility types per battery where Fort Hood lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one TEMF with a total footprint of approximately 28,304 sq. ft. and 0.6 acres
- soldier housing with a total footprint of approximately 8,420 sq. ft. and 0.2 acres

Fort Hood has many protective measures in place that will help minimize impacts caused by fielding the IDDS-A. Expanding on the entries in Table 2.2-2:

- Maintain vegetated watersheds and riparian buffers to protect water quality, aquatic habitat, and biological communities, including fisheries. Maintain riparian vegetative zones to reduce erosion along drainages as well as filter and catch sediment before it enters the drainage system.
- Limit activities within the buffer zone to those causing little or no impact on water quality and aquatic habitats.

- For construction outside the cantonment area restrictions for Migratory Bird Treaty Act (MBTA) covered birds are:
    - If a nest is discovered within the work site at ground level (0 to 10 feet above grade), the site containing the nest is flagged or marked, a 60-foot radius buffer around the site delineated, and the area avoided.
    - If a nest is discovered at low tree height (10 to 20 feet above grade), it is marked, a 30-foot radius buffer is established around the area of the nest, and the area avoided.
    - If two or more nests are observed at one site location, the buffer increases to a 100-foot radius for ground and a 60-foot radius for low tree height nesting locations.
    - If three or more nests are observed at one site location, the buffer is a 100-foot radius for both ground and low tree nesting sites.
- In cantonment construction areas an initial site visit is conducted either: 1) prior to MBTA nesting season (15 March); or 2) no fewer than 14 working days before the start of construction activities. Buffering distances start at the same level as range and non-cantonment project sites above, but may be reduced based on both the initial and follow-up site visits.
- Motor pool actions are not considered a military readiness activity, as such active nests that occur within motor pools are not eligible for take authorization under the existing Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (USFWS). All active nests in motor pools must be reported to the Natural and Cultural Resources Management Branch for species identification, nesting stage determination, and conservation management implementation.
- Bald and golden eagles protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d): establish an “off-limits” area around the nest site during the nesting season.
- Mitigation for biological resources includes limiting construction to land maintenance, repairs, restoration, and reconfiguration, during the endangered species and migratory bird nesting seasons when feasible. These measures would minimize adverse effects to these species as a result of vegetation thinning and clearing projects.
- Cultural Resources: 30m buffer is added to all historic properties and incorporated into Integrated Training Area Management (ITAM) “no digging” and “no staking/ grounding rod” maps.
- Leon River Medicine Wheel access is restricted to Native Americans for traditional observances.

- Three sites identified as being culturally important to the Comanche people: Sugarloaf Mountain (National Register of Historic Properties (NRHP) eligible), Comanche Trail, and the site designated 41BL0146

2.2.3 Fort Campbell

Fort Campbell hosts numerous assets requiring air defense.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on six of the eight listed range types or one or more alternate range types. The need to accommodate the additional training on the range types with a shortage would require close attention to scheduling and prioritization of units based on the SRM or ReARMM. Alternately, additional range space of 2,140 acres for one battery or 2,189 acres for two batteries could be constructed to accommodate the additional training.

The facility types per battery where Fort Campbell lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one TEMF with a total footprint of approximately 28,304 sq. ft. and 0.6 acres
- one Hazardous Material Storage Facility of 60 GSF which would be constructed on the tactical vehicle parking area
- soldier housing with a total footprint of approximately 8,420 sq. ft. and 0.2 acres

Protective measures in place at Fort Campbell will aid in minimizing negative environmental impacts from fielding the IDDS-A. Expanding on the entries in Table 2.2-2

- Endangered Species Management Components for three bat species to coordinate projects to eliminate negative effects and establish goals and objectives to maintain and enhance habitat
- Conducting maternity roost surveys for the northern long-eared bat
- All caves and cave-like structures are off-limits, persons entering must complete the USFWS/ White-Nose Syndrome decontamination protocols
- DoD Species at Risk are managed for conservation and protection
    - timber rattlesnake – surveys to delineate and protect occupied habitat
    - Bachman’s sparrow – seasonal management restrictions
    - Henslow’s sparrow – seasonal mowing restrictions to protect nest sites
- A Migratory Bird Management Strategy (MBMS) to protect and manage 22 BCC species at Fort Campbell by evaluating habitat quality and conservation plans and implementing mitigation measures

- Restrictions on clearing of forested tracts to no larger than 20 acres
- Tree removal activities are seasonally restricted
- Locations of regionally rare state-listed plant species are buffered with signs and are off-limits to military excavation or vehicular activity
- Historic era cemeteries are fenced and marked in GIS and off-limits to military activity
- Training site locations are coordinated with the Fort Campbell Environmental Division to screen for and avoid sensitive areas
- Detailed post-exercise habitat recovery plans agreed upon by the units training and Range Division
- 100 foot wide vegetated buffer along each side of perennial streams (first-order and larger), lakes, and ponds
- 50 foot wide vegetated buffer is maintained along each side of intermittent streams

2.2.4 Fort Riley and Smoky Hill Range[14]

Fort Riley hosts numerous assets requiring air defense. Smoky Hill Range does not host any active Army units and is a training area (TA) predominately for the Kansas National Guard and Air National Guard. Units from Fort Riley can access the training areas at Smoky Hill and those lands are included in this analysis.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on seven of the eight listed range types or one or more alternate range types. The need to accommodate the additional training on the range types with a shortage would require close attention to scheduling and prioritization of units based on the SRM or ReARMM. Alternately, additional range space of 1,683 acres for one battery or 1,732 acres for two batteries could be constructed to accommodate the additional training.

The facility types per battery where Fort Riley lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one TEMF with a total footprint of approximately 28,304 sq. ft. and 0.6 acres
- one Hazardous Material Storage Facility of 60 GSF which would be constructed on the tactical vehicle parking area

Fort Riley has many protective measures in place currently that will assist in minimizing the environmental impacts of fielding the IDDS-A. Expanding on the entries in Table 2.2-2:

[14] Smoky Hill does not list constraints or protective measures.

- Piping plovers - Establish a "no disturbance" buffer zone to protect nesting piping plovers, if found
- Topeka shiner - no stream, ground or vegetation disturbance within 50 feet of designated streams
- Whooping cranes - A "no fly" buffer zone will be established and maintained around the area being used by one or more whooping cranes. An altitude restriction of 2,000 feet AGL will be in effect for the “no fly” zone, with the width ranging from 0.5 nm (nautical miles) to 1.5 nm
- Bald eagles - A 200m buffer with a minimum flight altitude will be established over the “minimum disturbance” buffer zones when eagles are in the Fort Riley area. “No disturbance” buffer zones will be maintained around communal bald eagle roosts and nests
- Avoid clear cutting or removal of overstory trees within 100m of a bald eagle nest at any time
- Timber harvesting operations, including road construction and chain saw operations, will be avoided within 200m of a bald eagle nest during the breeding season
- Fort Riley has multiple protective measures for cultural resources, to include physical barriers, buffer zones, signage, off-limits map indicators, awareness training, and compliance with the Secretary of the Interior's *Standards and Guidelines for the Treatment of Historic Properties*

2.2.5 Fort Sill

Fort Sill hosts the 30th and the 31st ADA Bde.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on five of the eight listed range types or one or more alternate range types. The need to accommodate the additional training on the range types with a shortage would require close attention to scheduling and prioritization of units based on the SRM or ReARMM. Alternately, additional range space of 1,150 acres for one battery or 1,205 acres for two batteries could be constructed to accommodate the additional training.

The facility types per battery where Fort Sill lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one Hazardous Material Storage Facility of 60 GSF which would be constructed on the tactical vehicle parking area

Fort Sill has a number of protective measures in place to help minimize the environmental impacts of fielding the IDDS-A. Expanding on the entries in Table 2.2-2:

- Prescribed burns are used to control the extent of red cedar and provide improved habitat for migratory birds.
- Cowbird trapping enhances the nesting success of migratory birds.
- Fort Sill has surveyed the entire trainable area and screens training mission actions via the Range Facilities Management Support System in coordination with Range Control within training areas. Described actions take place on existing ranges, established roads, and training areas with existing missions. There are no known constraints for these actions.
- Review of projects affecting facilities planned in the ranges
- Buffer zones around cultural resources
- SOPs provided in the ICRMP
- 1,174 acres wetlands (0 delineated) exist
- 200m buffer for ponds and lakes

2.2.6 Fort Stewart

Fort Stewart hosts numerous assets requiring air defense.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on all range types or one or more alternate range types. Fort Stewart has one non-standard range that can accommodate certain required IDDS-A training events[15].

The facility types per battery where Fort Stewart lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one TEMF with a total footprint of approximately 28,304 sq. ft. and 0.6 acres
- one Hazardous Material Storage Facility of 60 GSF which would be constructed on the tactical vehicle parking area

Protective measures are in place at Fort Stewart that will help minimize negative environmental consequences of fielding the IDDS-A. Expanding on the entries in Table 2.2-2:

- Bald eagle nests with military training nearby - firing only blank ammunition, no flight activity within 1000 feet during nesting season.

[15] Personal communication, Mr D. Brown, Fort Stewart Range Division, 14 January 2021.

- Frosted flatwoods salamander - Cypress ponds and other potential salamander breeding sites located within timber harvest areas will be delineated by signs at the borders of these wetlands, including a 100 foot buffer.
- Monitor archaeological sites susceptible to vandalism and looting.
- Prohibit use of metal detecting devices to recover artifacts without an Archaeological Resources Protection Act (ARPA) permit.
- Location of archaeological resources are not graphically depicted in public documents.
- Wetland mitigation set-asides – Training Area E-4 (1,236 acres) has been designated as a wetland mitigation bank.
- Streamside Management Zones are buffer strips: 20 foot for slopes <20%, 35 foot for slopes 21-40%, and 50 foot for slopes >40%.

2.2.7 Joint Base Lewis-McChord and Yakima Training Center

Joint Base Lewis-McChord (JBLM) consists of the former Fort Lewis and McChord AFB located near Tacoma, and Yakima Training Center (YTC) which is approximately 170 miles east. The Joint Base Lewis-McChord (JBLM) Army installation in the Tacoma area, JBLM – Lewis hosts numerous assets requiring air defense. JBLM – Yakima Training Center (JBLM – YTC) is the military's premier training destination in the Pacific Northwest. It hosts a small number of units that support its training mission, but none that would normally require air defense provided by IDDS-A. Units from JBLM – Lewis can access the training areas at JBLM – YTC and those lands are included in this analysis.

After taking into account additional days that may be available on weekends and the use of alternate range types listed in TC 25-8, the required IDDS-A live-fire training and related munition SDZs can be accommodated on six of the eight listed range types or one or more alternate range types. The need to accommodate the additional training on the range types with a shortage would require close attention to scheduling and prioritization of units based on the SRM or ReARMM. Alternately, additional range space of 4,307 acres for one battery or 4,356 acres for two batteries could be constructed to accommodate the additional training.

The facility types per battery where JBLM lacks the available capacity and may require an exception to standard, expansion, or construction are:

- one Battery HQ with a total footprint of approximately 25,776 sq. ft. and 0.6 acres
- one TEMF with a total footprint of approximately 28,304 sq. ft. and 0.6 acres
- one Hazardous Material Storage Facility of 60 GSF which would be constructed on the tactical vehicle parking area
- soldier housing with a total footprint of approximately 8,420 sq. ft. and 0.2 acres

Protective measures are in place at JBLM that will help minimize negative environmental consequences of fielding the IDDS-A. Expanding on the entries in Table 2.2-2:

JBLM – Lewis

- Endangered Species Management Components (ESMCs) for Taylor's checkerspot, Oregon spotted frog, Northern spotted owl, streaked-horned lark, mazama pocket gopher, bull trout, Chinook salmon, steelhead trout, Bocaccio rockfish, canary rockfish, and yelloweye rockfish
- Coordination with USFWS or National Oceanic and Atmospheric Administration (NOAA) Fisheries for marbled murrelet, yellow-billed cuckoo, southern resident killer whale, and humpback whale populations nearby
- Restrict vehicular traffic to established roads within 50-meter buffers along all bodies of water
- Maintain existing snags, retention of damaged trees for future snags, and creation of snags to provide habitat for cavity nesting species
- Implement a nest box program to supplement existing natural cavities for cavity nesting species
- Control efforts for invasive non-native wetland plants
- Manage Spanaway, Hardhack, Johnson, and Halverson Marshes for 50% open water
- Eagle nest and roost sites have a primary (400-meter radius) and secondary (800-meter radius) protection zones
- All aircraft will fly no lower than 365m (1,200 feet) mean sea level (msl) over an area extending 400m (1,312 feet) in radius from nest sites with some exceptions
- Projects within 660 feet of a nesting site may require permitting from the USFWS
- Vehicle travel would continue to be almost entirely on existing roads and trails
- The dig permit process requires a cultural resources review of an area before digging
- Incidents of vandalism by soldiers are minimized through soldier awareness training
- Restrictions to TCP site access would continue to be temporary, lasting only as long as the training activity
- Continued coordination with the tribes and advanced scheduling would help to limit the degree of conflict
- Enforcement of the 50-meter buffer around all wetlands including reservoirs, lakes, marshes, ponds, and riparian zones that restrict vehicle traffic to established roads
- Continuation of the current practice restricting water crossings involving wheeled/tracked vehicles to authorized fords
- Continuation of past reclamation efforts designed to maintain, monitor, and control new populations of invasive non-native species on marshes and lakes

JBLM – YTC

- Wildlife shall not be harassed, touched, captured, or killed under any circumstances
- During sage-grouse breeding season designated ranges are usable only from 0900-2359 daily. Only ammunition guards may be stationed from 0000 to 0900 for multi-day exercises on designated ranges
- During the sage-grouse nesting and brood rearing period specific areas are off-limits to all military training activities except for gunnery training on designated ranges. Also, travel through sage-grouse protection areas is limited to authorized major supply routes or designated roads to these ranges
- Digging or bivouacking is not permitted within sage-grouse protection areas at any time. Military training in the sage-grouse protection areas is restricted to those training exercises approved by the I Corps G3
- During eagle breeding and nesting season vehicle traffic on Hanson Creek road is prohibited between 1500 and 0900 between specific points without prior approval by DPTMS and the DPW ED
- Between 8 December and 24 March aircraft are not permitted to fly below 300 feet AGL on the flight routes over the designated protected areas between 0000 and 0900 for eagle protection
- Dig permits are required on JBLM – YTC prior to any excavation in the range or cantonment area
- Digging is prohibited within 50m of improved roads and utility lines
- Digging is prohibited within 100m of wet or dry drainages
- Digging is prohibited in sage-grouse protection areas
- All excavations must be filled and leveled and will be inspected
- A utility dig permit is required prior to conducting any digging activities or installation (e.g., insertion or pounding in) of stakes or grounding rods in the cantonment area
- Vehicle travel or digging in Seibert stake areas is prohibited but foot traffic is allowed in most of these areas
- An inadvertent encounter with a cultural resource site requires:
    - Stop all training and digging activities at the site immediately and report the discovery to Range Operations
    - Protect the site from further disturbance and ensure no artifacts are removed until a representative from JBLM – YTC assumes responsibility of the site
- Reverse Osmosis Water Purification Unit and Tactical Water Purification System training must coordinate in advance with Range Operations and the DPW ED. Backwash water may only be disposed of by approved methods. If flocculants are used, the backwash water must be captured and transported back to the cantonment area for disposal into the sanitary sewer system. If sumps are required, units must receive an approved dig permit

- Units planning to conduct river crossing or amphibious training activities must begin coordination with Range Operations and DPW at least six months in advance. River crossing or amphibious training activities will be limited to July through November
- Off road maneuver will be temporarily suspended or redirected during periods of soil saturation
- Vehicle movement parallel to drainages should remain 60m from the riparian area
- Bivouacking and POL vehicle parking must remain 100m from drainages
- Vehicle operators should avoid sharp and neutral steer turns
- Use hardened areas to administratively assemble or bivouac when possible
- Use existing roads to the greatest extent possible to avoid creating new roads

2.3 ALTERNATIVES NOT CARRIED FORWARD FOR FURTHER ANALYSIS

An alternative not carried forward for further analysis would field IDDS-A batteries to installations at which the unit can be accommodated within existing infrastructure and training can be accomplished with minimal constraints on activity, time, and space.

- Activity- Installation can accommodate live fire of the Tamir missile and there are no constraints on the use of the MMR due to electro-magnetic interference
- Time- Non-availability, delays, or interruptions of live-fire ranges of no more than 2 weeks per year
- Space- Training done in a contiguous area unencumbered by buffer zones to avoid protected resources[16]

A review of the installations listed in Table 2-2 determined that none could meet the criteria described in section 2.3 and required more flexibility such as use of simulations or alternative scheduling systems to accommodate fielding the IDDS-A.

[16] Protected resources include cultural, wetland, migratory birds, and threatened and endangered species.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section begins with an explanation of the analytical approach of this PEA and introduces the general considerations for each resource element, including cumulative effects applicable to all installations. The remainder of the section is organized by installation, including information specific to its affected environment and analysis of effects of the Action Alternative and the No Action Alternative.

3.1 APPROACH FOR ANALYZING IMPACTS

As stated in Section 1.5, based on a start date prior to September 14, 2020 this PEA will be completed under the previous NEPA regulations. Context and intensity are taken into consideration in determining the significance of a potential impact, as defined in 40 CFR 1508.27(a), *Significantly (Jan 3, 1979)*. The context and intensity of impacts to respective environmental resources provides the basis for making significance determinations. Loss of a small number of trees in an arid area with few trees could be significant, while the loss of the same number of trees in a forested area might not. The context of the affected environment at a given installation may mean that a site-unique threshold is applicable. The regions of influence (ROI) for environmental resource categories may also vary at installations because of specific circumstances. Any variation in the significance criteria is stated in the discussion of impacts for specific locations. The Army may be able to reduce some impacts that exceed significance thresholds to "less-than-significant" through mitigation actions. The severity of an environmental impact is characterized as none, negligible, minor, moderate, or significant and either adverse or beneficial in effect as described:

- **None** – There is no impact to the resource due to either the resource or the impact not being present or through full avoidance.
- **Negligible** – No measurable impacts are expected to occur. A negligible impact may locally alter the resource, but would not measurably change its function or character.
- **Minor** – Primarily short-term but measurable impacts are expected. Impacts on the resource may be slight.
- **Moderate** – Noticeable impacts that would have a measurable effect on a wide scale (e.g., outside the footprint of disturbance or on a landscape level). If moderate impacts were adverse, in order to be less than significant, they could not exceed the limits of applicable local, state, or federal regulations.
- **Significant** – A significant impact may exceed limits of applicable local, state, or federal regulations or would untenably alter the function or character of the resource. These impacts would be considered significant unless managed by mitigation efforts to a less than significant level.

- **Adverse** – The impacts would have a negative impact on the resource/issue. Unless otherwise stated, all impacts in this PEA are considered adverse.
- **Beneficial** – The impacts would benefit the resource/issue.

The affected environment has been categorized into 12 resource elements, to enable a managed and systematic analysis. To maintain consistent evaluation of impacts in this PEA, the Army established thresholds of significance for each resource area as denoted by the severity levels above. The Army developed these thresholds to take into account substantive environmental regulations and ensure an objective analysis of anticipated impacts. Although some thresholds have been so designated based on legal or regulatory limits or requirements, others reflect some discretionary judgment on the part of the Army. Quantitative and qualitative analyses have been used, as appropriate, in determining whether and the extent to which a threshold is exceeded.

However, remember that significance is a matter of context and intensity. Loss of a small number of trees in an arid area with few trees could be significant, while the loss of the same number of trees in a forested area might not. Any variation in the significance criteria is set out in the discussion of impacts for specific locations. Additionally, an impact may trigger one of these thresholds, but mitigation could reduce the impact to "less-than-significant." Also, note that regions of influence (ROI) may vary at installations because of specific circumstances. The context of the affected environment at a given installation may mean that a site-unique threshold is applicable.

Based on the alternative, the Army would conduct additional installation site-specific analyses as required to address actions described in section 3 necessary for the installation to support IDDS-A fielding and operation (e.g., MILCON, range/facility upgrades). Implementation of the alternative may require site-specific follow-on NEPA analysis to evaluate local siting considerations and other site-specific environmental issues.

Table 3.1-1 presents each resource element and corresponding ROI and thresholds of significance. The table also identifies which resource elements are analyzed in this PEA and which are dismissed from further analysis with an accompanying rationale. In conducting this analysis, a qualified subject matter expert (SME) reviewed the potential direct and indirect effects of the Action Alternative and the No Action Alternative to each resource element. The SME carefully analyzed and considered the existing conditions of each resource element within the Action Alternative's ROI.

Table 3.1-1 Summary of ROIs and Significance Thresholds by Resource Element

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Air Quality, Greenhouse Gasses, and Climate Change	Air Quality Control Region(s) that contain the installation.	An impact on air quality would be considered significant if the Action Alternative were to generate emissions which: Did not meet CAA conformity determination requirements to conform with the State Implementation Plan (SIP)/Tribal Implementation Plan, or Contribute to a violation of any federal, state, or local air regulation, or Generate significant quantities of greenhouse gasses.	Dismissed	The addition of up to two IDDS-A batteries would result in population increases of less than 1% on the installation and within the ROI and increases in the number of vehicles of less than 2% on the installation. Such small increases would have a negligible impact on air quality. The impacts to GHGs and climate change are limited to negligible effects on CO_2 and N_2O emissions and no effect on CH_4 emissions. They are not calculated or reported in this PEA. The Final Rule: Mandatory Reporting of Greenhouse Gases (74 FR 56260) requires reporting from engine and vehicle manufacturers, not fleet operators. In addition, the U.S. Army tactical vehicles assessed in the action alternative are not certified under or subject to 40 CFR Parts 89, 1039, or 1065 as required for reporting by 74 FR 56260.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Airspace	Restricted Area Special Use Airspace above and nearby the installation and under the installations' control.	An impact on airspace would be considered significant if the Action Alternative violates Federal Aviation Administration safety regulations or causes a substantial infringement on general aviation or commercial flight.	Dismissed	The addition of up to two IDDS-A batteries would potentially result in the firing of missiles that would require exclusive-use airspace at the selected installations. All analyzed installations have a restricted area complex of exclusive-use airspace. Application of the screening criteria determined the airspace is of adequate lateral and vertical extent and adequate training time within the airspace can be scheduled. Increases in airspace use as a result of the Action Alternative are expected to be minimal and therefore impacts would be negligible.
Biological Resources	Biological Resources within the installation.	Impacts to biological resources would be considered significant if Army actions were to result in: Substantial permanent conversion or the net loss of habitat Long-term loss or impairment of a substantial portion of local habitat (species-dependent), Loss of populations of species, or Unpermitted or unlawful "take" of ESA protected threatened or endangered species or species protected under the BGEPA or MBTA.	Analyzed	The Action Alternative and related construction, if undertaken, and training activities could adversely impact biological resources at the installation from increased ground disturbance and the potential for related vegetation loss, habitat degradation, and potential spread of invasive species. As a result, this resource area is further discussed in each installation section.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Cultural Resources	Cultural Resources within the installation.	Impacts to cultural resources would be considered significant if they cause an unmitigated alteration of the characteristics that qualify a property for inclusion on the NRHP (physical destruction, damage, alteration, removal, change in use or character within the setting, and negligence causing deterioration, transfer, lease, or sale). Alteration of properties or access to properties of religious or cultural significance to Indian tribes would also be significant.	Analyzed	The Action Alternative and related construction, if undertaken, and training activities could adversely impact cultural resources.
Geology and Soils	Geology and Soils within the installation.	Impacts on geology, topography, and soils would be considered significant if: The landscape could not be sustained for military training over a wide area, or Substantial soil losses were to impair plant growth, cause detrimental increases in stream sedimentation, or result in the violation of a regulatory limit such as the total maximum daily load of sediment in a water body.	Soils analyzed, geology dismissed	Training would be similar to existing air defense missile batteries training at the installations and completed in designated training areas. Both construction, if undertaken, and training activities have the potential for surficial (soil) impacts, but impacts to geological resources are not anticipated. As a result, no further analysis is required for geology. Soil resources are further discussed in each installation section.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Hazardous Materials and Solid Waste	All areas within the installation.	Impacts to hazardous materials and hazardous waste would be considered significant if a substantial additional risk to human health or safety would be attributable to Army actions, including direct human exposure or a substantial increase in environmental contamination.	Dismissed	The increase in hazardous materials and hazardous and solid waste resulting from fielding up to two IDDS-A batteries at the analyzed installations would not be appreciable. All of these materials are managed under strict requirements of federal, state, Army, and installation regulations. Proper transport, storage, use, and disposal are mandated within the regulations. Also, construction-related debris associated with facility construction, if undertaken, or improvements would be non-substantial and re-used or recycled per applicable best management practices or disposed of per applicable regulations in approved landfills. Therefore, no further analysis of hazardous materials and hazardous and solid waste is required.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Land Use and Compati-bility	Land use within the installation and on adjacent properties.	Impacts to land use would be considered significant if the land use were incompatible with existing military land uses and designations (including recreation). These impacts may conflict with Army land-use plans, policies or regulations, or conflict with land use off-post.	Analyzed	Fielding up to two IDDS-A batteries would not pose conflicts with off-post land uses. Required garrison construction, if undertaken, to support up to two IDDS-A batteries would occur within existing cantonment areas. Live-fire training activities would be similar to the types of training already occurring at the installations and occur within existing range and training lands but may require expansion of areas around protected resources.[17] Sustainability of training lands would continue to be managed and monitored according to current range management programs.

[17] Protected resources include cultural, wetland, migratory birds, and threatened and endangered species

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Noise	Areas adjacent to and within the installation.	Impacts would be considered significant if noise from Army actions were to cause harm or injury to on- or off-post communities, or exceed applicable environmental noise limit guidelines.	Dismissed	All installations in the analysis currently host substantial equipment with expansive noise profiles. Fielding up to two IDDS-A batteries and the live-fire training associated with the Action Alternative would occur on the range and training lands already used for similar activities. Adding up to two IDDS-A batteries would introduce launching the Tamir missile but much of the training would involve simulated launches of the Tamir missile, greatly reducing noise impacts. The specifications of the Tamir missile fall between the Patriot and Hellfire missiles which are accounted for in installation noise profiles. Adding up to two IDDS-A batteries would not change existing noise zones within on-post communities or communities adjacent to the installation. Increases in training frequency are less than four range days per IDDS-A battery. Changes to the sources of noise and frequency of training range use would have negligible effects on the installation noise impacts. Garrison construction activities, if undertaken, would be temporary, and both construction and training activities would abide by the installation's Noise Management Plan.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Socio-economic and Environ-mental Justice	Socioeconomic and Environmental Justice factors within the installation and immediate surrounding communities and counties.	Impacts to socioeconomics and environmental justice would be considered significant if they were to cause: Substantial change to the sales volume, income, employment, or population of the surrounding ROI; Disproportionate adverse economic, social, or health impacts on minority or low-income populations; or Substantial disproportionate health or safety risk to children.	Dismissed	Fielding up to two IDDS-A batteries and the associated soldiers and families would result in population changes within the ROI of less than 0.5% and would have a negligible impact on socioeconomic conditions. No adverse human health impacts are expected from fielding the IDDS-A, therefore there are no environmental justice or disproportionate health or safety risks to children.
Traffic and Transpor-tation	Public roadways and key access points within and near the installation; roadways within installation boundaries.	Impacts to traffic and transportation would be considered significant if Army actions: Cause a reduction by more than two levels of service at roads and intersections within the ROI Substantially degrades traffic flow during peak hours, or Substantially exceed road capacity and design.	Dismissed	Fielding up to two IDDS-A batteries and the associated soldiers and families would result in population changes within the ROI of less than 0.5% and would have a negligible impact on traffic conditions and the integrity of local roadways.
Utilities, Facilities, and Energy Systems	Utilities and energy systems within the installation and immediate surrounding communities. Facilities within the installation.	Impacts to utilities, facilities, and energy systems would be considered significant if the Action Alternative were to cause an impairment of service to the installation and local communities, homes, or businesses.	Facilities analyzed, Utilities and Energy dismissed	Fielding up to two IDDS-A batteries may result in the construction of new facilities within the cantonment area and are further discussed in each installation section. Utilities and energy systems would only require short, insignificant extensions to connect the new facilities to the existing network which may result in short periods of service interruption and are not analyzed.

Resource Element	ROI	Threshold of Significance	Analyzed or Dismissed	Rationale for Analyzing or Dismissing
Water Resources	Watersheds, state-designated stream segments, and groundwater aquifers associated with the installation; U.S. Army Corps of Engineers (USACE) jurisdictional waters of the U.S. (WOUS) and wetland resources within the installation; Federal Emergency Management Agency (FEMA) designated floodplains	Impacts to water resources would be considered significant if Army actions: Result in an excess sediment load in installation waters, affecting impaired resources, Substantially affect surface water drainage or stormwater runoff, including floodwater flows, Substantially affect groundwater quantity or quality.	Surface water, groundwater, wetlands, and floodplains analyzed	Fielding up to two IDDS-A batteries could adversely impact surface water, groundwater, wetlands, and floodplain resources within the installation from construction activities, if undertaken, and training generating ground disturbance. Surface water quality could be directly impacted by the Action Alternative and indirectly by sedimentation/erosion. As a result, these resource areas are further discussed in each installation section. Incidental spills from any equipment would be managed through the installation's Spill Prevention Control and Countermeasures Plan.

For the purposes of the PEA, analysis of effects are discussed in Section 3.2 for each resource element where the impacts from implementing the Action Alternative would be the same for all installations. Cumulative effects of this action and other known, future, or reasonably foreseeable actions are discussed in Section 3.3. Impacts unique to a particular installation are discussed in Sections 3.4 to 3.10.

There are two potential impact sources from implementing the Action Alternative: construction of new facilities or training areas and increased live-fire training. Currently, no construction activities are planned to support the IDDS-A fielding. Impacts from construction are discussed in this PEA as it may occur in the future. Increases in personnel are small, approximately 0.5% or less at each installation. Impacts caused by the increase in soldiers will be negligible, except when determining housing requirements.

Data from the Department of Defense Selected Military Compensation Tables of 1 January 2019 was used to estimate the housing requirements of the Action Alternative. The data show 33% of all military personnel live on base and receive quarters in kind, i.e., they are living in a barracks-type facility. The remaining military personnel receive a cash allowance for housing and live off post or in privatized housing on post. This PEA assumes one-third of 60 soldiers would live in barracks. The need to construct barracks is assessed under the facilities resource element. The remaining two-thirds of soldiers (and their families) would live in privatized housing on post or off post in the local area.

A systematic approach to the analysis of impacts has been developed for this assessment. This approach consists of a description of the components of each alternative; identification of each resource element; development of methods to analyze impacts; identification of significance criteria to determine the intensity of direct, indirect, and cumulative impacts; and development of mitigation measures that may be applied to reduce or eliminate impacts. Each of these components is described in the sections that follow.

Text supporting these conclusions is presented, and mitigations are listed for all adverse impacts, where mitigation is available. There may be both adverse and beneficial impacts within a single resource category; for instance, a project could interfere with a pre-existing land use such as recreation (an adverse impact) while expanding public access to different recreational resources (a beneficial impact). Where there are both adverse and beneficial impacts, both are listed on the tables and in the text.

3.2 DESCRIPTION OF THE RESOURCE ELEMENTS

3.2.1 Biological Resources

3.2.1.1 Affected Environment

Biological resources refer to the living landscape and include vegetation and wildlife, both of which have species classified as threatened and endangered. The purpose of biological resource management within installation lands is to maintain high-quality lands for training, biodiversity, and recreation. The Army makes management decisions based on the best available science and attempts, where practical, to mimic the natural, historical disturbance regimes for the installation ecoregion (ecosystem management). Monitoring programs performed by natural resources managers indicate the effectiveness of measures and strategies in achieving intended objectives. The Army's adaptive management approach preserves natural resources while providing the optimum environmental conditions required to sustain the military mission and realistic training conditions.

The Endangered Species Act of 1973 (16 U.S.C. §1531 et seq. (Dec. 1973)) (ESA) was passed to address concerns about the decline in populations of many species. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. The ESA offers two classes of protection for rare species in decline: endangered (16 USC § 1532(6)) or threatened (16 USC § 1532(20)). *Endangered* means a species is in danger of extinction throughout all or a significant portion of its range. *Threatened* status indicates a species is likely to become endangered within the foreseeable future. Every newly listed threatened species must have a species-specific rule in accordance with section 4(d) of the ESA that defines prohibited actions and protections on a case-by-case basis (84 FR 44753).

Under the ESA, it is illegal to "take" (16 USC § 1532(19)) threatened and endangered species. As defined in the ESA, the term take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary of the Interior has defined the term "harm" as "an act which actually kills or injures wildlife."[18] Such an act may include significant habitat modification or degradation where it kills or injures wildlife, or by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Because most threatened and endangered species are not often hunted or collected, habitat degradation is the primary reason for population declines of ESA-listed species.

The ESA contains provisions for the designation of "critical habitat" (16 USC § 1532(5)) for listed species when deemed essential for the conservation and recovery of a species. The ESA defines critical habitat to include geographic areas "on which [threatened or endangered species] are found those physical or biological features essential to the conservation of the species and

[18] The Secretary of the Interior's regulation defining "harm" was upheld by the U.S. Supreme Court in the decision Babbitt v. Sweet Home Chapter of Communities. for a Greater Ore., 515 U.S. 687, 692 (1985).

which may require special management considerations or protection." Areas not occupied by the species at the time of listing but are considered essential to the conservation of the species can be designated as critical habitat. Critical habitat designations are limited to federal agency actions or federally funded or permitted activities. However, under section 4(a)(3)(B)(i) of ESA, the Secretaries of the Departments of Commerce and the Interior are prohibited from designating as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DoD)—or designated for its use—that are subject to an Integrated Natural Resources Management Plan (INRMP) prepared according to 16 U.S. Code § 670a - *Cooperative Plan for Conservation and Rehabilitation* (Sept 15, 1960, as amended) also known as the Sikes Act. This restriction applies if either Secretary determines in writing that a given INRMP provides a benefit to the species for which critical habitat is proposed for designation.

The USFWS and the NOAA Fisheries are jointly responsible for administering the ESA. As of March 12, 2020, 2,638[19] federally listed species (over 1,800 plants and over 700 animals)[20] were listed under the ESA.

All federal agencies (including the Army) are required to protect threatened and endangered species while projects are carried out and to preserve threatened and endangered species habitats on federal land. Federal agencies whose actions may affect listed species must consult with the USFWS or NOAA Fisheries under Section 7 of the ESA. Under the Sikes Act, installations must also develop, maintain, and implement an INRMP, which includes provisions for the conservation of these species and their habitats.

As a Federal agency, the DoD is required to comply with the MBTA and Executive Order (EO) 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds* (177 FR 192 (October 3, 2002)). The MBTA is an international treaty protecting migratory birds and their habitats. The MBTA prohibits take of migratory birds (and their nests, eggs, feathers, etc.) without a specific permit from the USFWS. EO 13186 states that Federal agencies must identify adverse effects of their actions on migratory birds, and develop a Memorandum of Understanding with the USFWS that promotes conservation of migratory bird populations and their habitats. Under the 2003 NDAA, the Secretary of the Interior was required to authorize incidental take of migratory birds during military readiness activities. The proposed exemption states that if the DoD determines that a proposed or ongoing military readiness activity has a measurable negative effect on a population of a migratory bird species of concern, the DoD must confer and cooperate with the USFWS to develop reasonable conservation measures to minimize or mitigate effects. Non-

[19] Source: USFWS, https://ecos.fws.gov/ecp0/reports/species-listed-by-state-totals-report?status=listed&statusCategory=Listed. Accessed on March 12, 2020

[20] Sources: USFWS, https://ecos.fws.gov/ecp/listedSpecies/speciesListingsByTaxGroupTotalsPage. Accessed on March 12, 2020.

military readiness activities are not exempt from the MBTA or EO 13186. The DoD must obtain a Special Purpose Permit for non-military readiness actions involving take of migratory birds.

The PEA includes the following designations of wildlife and plants with special protected status:

- Federally Listed Threatened and Endangered Species, as defined above.
- Designated Critical Habitat, as defined above.
- Migratory Bird Species, including migratory birds and their nesting locations protected under the MBTA. The military is required to follow current DoD guidance designed to minimize incidental take.
- Bald and golden eagles and their nests are protected under the BGEPA.

Figure 3.2-1 shows the number of federally listed species, by garrison, discussed in this PEA. Installations manage and monitor federally protected species and other priority species within their boundaries in compliance with the ESA. Management practices for federally protected species are often prescribed in biological opinions or agreements with the USFWS. Minimization measures to reduce the potential for the take (e.g., mortality or harm) of federally protected species often include coordinating with military units, implementing land-use controls, habitat improvement projects, conducting surveys, and avoiding impacts to federally listed species sites.

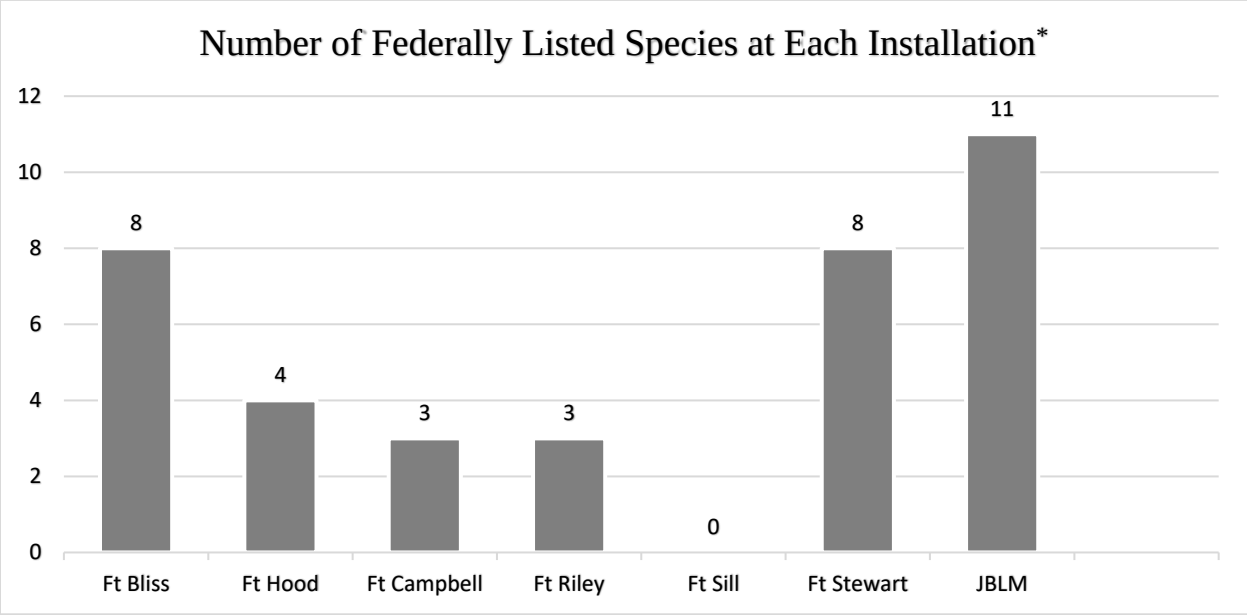

Figure 3.2-1 Number of Federally Listed Species at Each Installation
*Excludes candidate and rare species, species under review, and state listed species

Significant impacts to biological resources would include:

- Substantial permanent conversion or a net loss of habitat;

- Long-term loss or impairment of a substantial portion of the local habitat (species dependent); or
- Loss of populations of species, or
- Unpermitted "take" of threatened and endangered species, migratory birds, or bald and golden eagles.

3.2.1.2 Common Environmental Consequences as a Result of the Action Alternative

Impacts from range construction and live-fire training would occur primarily in areas that have been previously disturbed. Most impacted areas contain common native plants or nonnative vegetation, primarily grasses and shrubs, which typically colonize denuded areas quickly and thoroughly. General wildlife and habitats would be affected by range construction and training activities. Limited intact, native habitats may be affected. Overall, impacts to general wildlife and habitats are expected to be none to minor and less than significant since no construction is planned and training will increase a minor amount (less than 4% at any assessed installation)[21].

Construction and training activities would increase the potential to introduce or spread noxious weeds and increase the possibility of accidental ignition of a wildland fire. Impacts from all activity groups would be expected to affect the introduction and spread of invasive species through the movement of troops and equipment, construction, and fires. Impacts from noxious weeds is expected to be none to minor and less than significant since no construction is planned and training will increase a minor amount.

Construction and training may impact threatened and endangered species and their habitats. Construction is not planned. Training levels would increase a minor amount, would be widely distributed across the installations, and most impacts would be in disturbed or existing training areas, impacts are expected to be none to minor and less than significant for all areas.

<u>Impacts from Construction</u>

The installations assessed in this PEA do not have current plans and funding for construction of cantonment or range facilities to support the IDDS-A.

Impacts from construction within the cantonment area. The construction of facilities designed to support IDDS-A, if undertaken, could negatively impact biological resources at any of the seven installations potentially proposed for fielding. Construction in the cantonment could consist of buildings and infrastructure to support the system. Direct impacts could include displacement of wildlife, removal of vegetation, and habitat fragmentation. Indirect impacts from construction could include avoidance of built-up areas because of the construction activity, human presence during and after construction, and a potential increased loss of wildlife caused by collisions with

[21] Based on an analysis of Army training doctrine, stationing both IDDS-A batteries at one installation would increase training requirements measured in Range Days by a maximum of 3.7%.

vehicles. If construction were to occur, such impacts are not expected to be significant because the cantonment area is not an important source of biological resources due to previous disturbance and higher human density.

Impacts to vegetation. If funded, range construction to alleviate the shortages identified in Section 2.2 could occur in the future. Vegetation within the proposed footprints of these projects, which primarily includes grasses, trees, and shrubs, would be removed. Impacts to these areas would include trampling and disturbance from vehicles and military personnel. Indirect impacts could include habitat fragmentation and increased erosion. Following the construction of the proposed ranges, the Army would seed disturbed areas with native or non-invasive vegetation. Impacts to vegetation from range construction are expected to be minor and less than significant.

Impacts to general wildlife and habitats. Human presence and elevated noise levels would displace various wildlife species during construction; however, impacts from range construction to wildlife would not differ from the impacts from normal operations and activities occurring in the anticipated construction footprints. While some noise such as sonic booms and low altitude aircraft overflight may negatively affect long-term success, the increased noise from construction is not expected to adversely affect native wildlife. Field surveys have shown that it is not a significant factor in behavior and does not affect reproductive success. [22,23,24] Impacts to general wildlife and habitats from range construction, if it occurred, are expected to be negligible to minor and less than significant.

Impacts to Threatened and Endangered Species. The Action Alternative could result in short- and long-term impacts to listed species within the installation's ROI due to construction activities, human presence, and noise. If adverse effects are known or anticipated, the installation would consult with the USFWS or the NOAA Fisheries to minimize species impacts.

Introduction and spread of invasive plants and noxious weeds. Construction can introduce invasive species and other weeds with soil, sand, and gravel that contains nonnative plant seeds. Nonnative plant seeds can "hitch-hike" on construction equipment. The use of roads and trails would also affect the introduction and spread of invasive species. The introduction of more invasive species to the area would have short- and long-term impacts to sensitive plants and wildlife. Increases in invasive species can have adverse effects on native plants and wildlife by competing for resources. Invasive species often benefit from fires due to their ability to colonize areas following a burn. Also, the presence of invasive species often provides fuel for wildland

[22] Effects of road construction noise on golden-cheeked warblers: An update, https://wildlife.onlinelibrary.wiley.com/doi/10.1002/wsb.777, accessed January 24, 2021.
[23] Avian Noise Disturbance Study, https://webapps.usgs.gov/mrgescp/documents/Dillon-and-Moore_2020_Avian-Noise-Disturbance-Study.pdf, accessed January 24, 2021.
[24] Noise Effect, https://noisequest.psu.edu/noiseeffects-wildlife.html, accessed January 24, 2021.

fires, makes fires larger, and facilitates the spread of fire. With no construction currently planned or funded to support IDDS-A there are no effects expected.

Impacts from Live-Fire Training

The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not normally have extensive ground explosions. If fired, the missile would emit the byproducts of propellant combustion which would be widely distributed in the atmosphere and eventually deposited on the ground in low concentrations. Missiles that intercept a target would detonate and damage or destroy the target resulting in explosives byproducts and debris, possibly burning, falling to the ground. Missiles that miss their target would normally self-destruct by exploding in flight but could impact the ground after propellant exhaustion that may result in a ground based explosion spreading explosives byproducts and debris across the ground.

Impacts to vegetation. Direct adverse effects on vegetation would occur from trampling, either on foot or in vehicles, and live-fire hitting and damaging any remaining trees or larger bushes. Indirect effects from live-fire training could be the occasional wildland fire outbreak from munitions discharge and the deposition of undesirable chemicals and compounds in the soil. An increased incidence of wildland fire may require improving or additions to the existing firebreak system. More frequent prescribed burns in the range areas or adjacent areas may be required to decrease wildland fire intensity and increase chances of containment. Each of the assessed sites have in-place IWFMPs that would be applied to address risk management/mitigation and fire management considerations. Each of these sites has active wildland fire management programs available to address any resulting wildland fires or use of prescribed fire needed for vegetation control/fuel reduction to maintain maneuver-training areas. At all assessed installations the maximum increase in live-fire range usage from IDDS-A training is 4%, as measured in RD. Since IDDS-A training will not involve extensive maneuver or ground clearing activities, most IDDS-A live-fire training will be simulations, and air and ground level ordnance explosions are expected to be rare, the impacts are expected to be minor and less than significant.

Impacts to general wildlife and habitats. Wildlife will generally avoid live-fire areas that are frequently used. For wildlife that remains, they may be flushed by the presence of humans, nearby impacts and explosions, and the sounds of weapons discharged. Those that are not flushed may risk being injured or killed by trampling or weapons discharge. Wildlife within the impact area and associated surface danger zones could be directly affected by being struck by ordnance or other munitions. Ordnance fired by the IDDS-A batteries is not likely to cause below ground disturbance. The likelihood of impacts occurring is low because species will depart the area or burrow below ground. In addition, IDDS-A training would only increase the number of RD that live-fire ranges are used by a maximum of 4% at the assessed installations. Minor, less

than significant impacts are expected since IDDS-A training will not involve extensive maneuver or ground clearing activities, most IDDS-A live-fire training will be simulations, and air and ground level ordnance explosions are expected to be rare.

Impacts to Threatened and Endangered Species. The types of impacts would be similar to what is described under general wildlife and habitat impacts. If adverse effects are known or anticipated, the installation would consult with the USFWS or the NOAA Fisheries to minimize species impacts.

Introduction and spread of invasive plants and noxious weeds. In general, invasive plant species pose a threat to ecosystems. The potential impacts of live-fire training could increase the introduction and spread of invasive species through the increased risk of wildland fire. In addition, activities that remove native vegetation could facilitate the introduction and spread of invasive species. Since IDDS-A training will not involve extensive maneuver or ground clearing activities, most IDDS-A live-fire training will be simulations, and air and ground level ordnance explosions are expected to be rare, the impacts are expected to be minor and less than significant.

3.2.2 Cultural Resources

3.2.2.1 Affected Environment

Cultural resources encompass archaeological, paleontological, and architectural resources, including historic properties, cultural items, historic and prehistoric archeological resources, and archeological collections. Army Regulation 200-1 *Environmental Protection and Enhancement* (AR 200-1, Chapters 3-3, Important Environmental Aspects, and 6-4(b) National Historic Preservation Act compliance) guides the management of cultural resources on Army installations. AR 200-1, Chapter 6 et seq. is the section specific to the Army's cultural resources programs. Cultural resources include:

- Historic properties, as defined by the National Historic Preservation Act (NHPA),
- Cultural items, as defined by the Native American Graves Protection and Reparation Act (NAGPRA),
- Archeological resources, as defined by ARPA,
- Sacred sites, as defined in EO 13007 to which access is afforded under the American Indian Religious Freedom Act (AIRFA), and
- Archeological collections, as defined in 36 CFR 79.

The NHPA of 1966, as amended, states that historic resources are "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on NRHP, including artifacts, records, and material remains related to such property or resource."

Applicable Statutes, Executive Orders, and Regulations

Under AR 200-1, Chapter 1-24(b) the Garrison Commander is responsible for managing the cultural resources on the installation in compliance with federal laws, regulations, and standards. The Garrison Commander typically delegates this authority to a Cultural Resource Manager (CRM) (See, AR 200-1, Chapter 6-4(a)(3)). The laws, EOs, and regulations that prescribe how the installation identifies the potential impacts to cultural resources that may occur from the Action Alternative (described in Section 2 above) are summarized in the following paragraphs. Other legal historic preservation requirements for each installation are contained in the Integrated Cultural Resources Management Plan (ICRMP) and are not repeated here.

National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 et seq.)

The NHPA establishes a national program for historic preservation. The overarching policy of the act is to find "conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations" (NHPA, Section 2). Specifically, it:

- Allows for the expansion and maintenance of a NRHP (Section 101);
- Requires all federal agencies to consider the effects of their actions on the nation's historic properties (Section 106);
- Directs federal agencies, such as an Army garrison, to assume responsibility for the management of historic properties that they own or control (Section 110).

The NHPA requires that the federal agency make these decisions in cooperation with state and local governments, federally recognized tribes, and the public. The NHPA acknowledges that not all cultural resources are significant. Only cultural resources significant to American history, architecture, archaeology, engineering, and culture can be listed on or determined eligible for listing on the NRHP. A cultural resource must meet one or more of the following criteria (See *Parks, Forests, and Public Property, National Register of Historic Places, Criteria for Evaluation* (July 1, 2000)) to be eligible for listing in the NRHP:

- A property associated with events that have made a significant contribution to the broad patterns of our history;
- A property associated with the life of a person significant in our [nation's] past;
- A property that embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction;
- A property that has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting this significance test, the property must also possess integrity. *Integrity* means that the property contains the physical characteristics that existed during the resource's historic or prehistoric occupation or use.

Cultural resources that meet this significance test are called "historic properties" or "historic districts"—when multiple historic properties lie nearby and relate to each other. Under Section 106 of the NHPA, a federal agency is obligated to consider the effects of its undertakings on historic properties. Cultural resources that are not eligible for the NRHP are not "historic properties" and not considered further under Section 106.

> Protection of Historic Properties, 36 CFR 800 (incorporating amendments effective August 5, 2004)

Protection of Historic Properties regulations, 36 CFR 800, outlines how federal agencies meet their responsibilities under Section 106 of the NHPA. The CFR defines the roles of the agency, the Advisory Council on Historic Preservation (ACHP) (36 CFR 800.16(g)), the State Historic Preservation Officer (SHPO) (36 CFR 800.16(v)), the Tribal Historic Preservation Officer (THPO) (36 CFR 800.16(w)), and interested parties or the public. The process for compliance with Section 106 consists of the steps below, all of which are made by the installation Historic Preservation Officer (HPO) in consultation with the SHPO, THPO, and interested members of the public. At times, the ACHP may also be a consulting party to a proposed undertaking.

- *Identification of the Area of Potential Effects of the undertaking*. The Area of Potential Effects (APE) (36CFR 800.16(d)) is the geographic area within which an undertaking may affect a historic property. For example, the construction of a FOB during an exercise on the location of an archaeological site that has been determined eligible for the National Register would be an effect that could cause dramatic changes to that historic property if portions of the designated FOB site need to be leveled. The APE for the Action Alternative would be the areas directly impacted by each undertaking within each alternative of the three categories. This APE includes the footprints for the new ranges or training facilities, FOB sites, new buildings in the cantonment, off-road vehicle training in areas where this has not been allowed, and other proposed undertakings that were not analyzed in previous environmental documents. In most cases, these footprints are not known at this time. As each footprint is identified, its APE would be defined by the installation HPO. It also includes training areas where the type of training or the intensity of training would change.
- *Identification of historic properties within the APE*. Each cultural resource identified on the installation is evaluated against the NRHP criteria. If an undertaking does not affect any properties determined to be eligible for the NRHP, it is not subject to further review under Section 106. If no historic properties are found in the APE, the federal agency documents that no historic properties are present, gets concurrence from SHPO/THPO,

and then has completed its compliance under Section 106. If the undertaking affects properties eligible for the NRHP that are within the APE, the installation would review them under the next step.

- *Determination of effect*. The installation would determine if the proposed undertaking would have an adverse effect on historic properties in the APE. An undertaking has an "effect" on a historic property when the undertaking may alter the characteristics that may qualify the property for listing on the NRHP. An undertaking is considered to have an "adverse" effect when the effect may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. One of the following effect findings will be made: adverse effect or no adverse effect. If the proposed undertaking would have no adverse effect, the installation documents this determination, gets concurrence from the SHPO/THPO, and has completed its responsibilities under Section 106.
- *Resolution of adverse effect/mitigation*. When the effects are found to be adverse, the installation examines the proposed undertaking to determine if it can be modified to avoid adverse effects. If the proposed undertaking cannot be modified to avoid adverse effects, the installation would consult about developing mitigation measures to resolve the adverse effects.

The DoD has Programmatic Memorandums of Agreement (MOA) with the ACHP and the National Conference of SHPOs regarding the demolition of World War II era temporary buildings and Cold War era unaccompanied personnel housing. The MOAs allow DoD installations to demolish covered facilities without further Section 106 consultation. Other similar agreements are DoD-wide Program Comments that have been implemented covering additional building types. They include the following: Capehart and Wherry-era (1949-1962) housing, World War II and Cold War-era (1939–1974) Army ammunition production facilities and plants, and Army Airfields (AAFs).

In addition, installations may have streamlined processes to complete the required Section 106 reviews. Programmatic Agreements allow implementation of a particular agency program or the resolution of adverse effects from complex projects or multiple undertakings similar in nature through negotiation of an agreement between the installation, ACHP, SHPO, THPO, and other stakeholders. Army Alternate Procedures allow the installation to complete Section 106 consultations using standard operating procedures developed in consultation with the ACHP, SHPO, and THPO and other stakeholders, without project-by-project consultation.

Native American Graves Protection and Repatriation Act of 1990[25]

The NAGPRA requires federal agencies to consult with tribes about the discovery and disposition of Native American human remains found on federal land. It also provides a process for repatriation to tribes of burial objects not associated with human remains, objects considered sacred to a tribe, and objects considered of great importance to tribal traditions or customs. Installations may have one or more comprehensive agreements with federally recognized tribes, outlining roles and responsibilities as related to NAGPRA.

American Indian Religious Freedom Act[26]

The AIRFA affirms American Indians' right of freedom to believe, express, and exercise their traditional religions. It also provides their right to access sites on federal land, use and possess sacred objects, and the freedom to worship through ceremonies. It requires federal agencies to consult with tribes about whether agency undertakings would affect tribal religious activities.

EO 13007—Indian Sacred Sites (61 FR 104 (May 24, 1996))

The EO 13007 regarding Indian Sacred Sites requires federal agencies responsible for federal land management to accommodate access and ceremonial use of Indian Sacred Sites. It also requires that the federal agency avoid adversely affecting the physical integrity of sacred sites "to the extent practicable, permitted by law and not clearly inconsistent with the essential agency functions" and provide notice to the tribe of any action that may affect the site or access to the site. Where appropriate, the agency will also maintain the confidentiality of such sites. Sacred sites are identified by a tribe, within their religious tradition, as places of religious significance or ceremonial use. It is important to note that while all cultural resources on an installation are evaluated against the National Register criteria, some properties determined not eligible under that process may be identified as a sacred site by a tribe. In such a case, the site will be managed as a sacred site by the installation.

EO 13084—Consultation and Coordination with Indian Tribal Governments (63 FR 27655 (May 14, 1998))

The EO 13084 states that there exists a unique legal relationship between the United States and Indian tribal governments. It stresses that federal agencies must collaborate with Indian tribal governments when formulating policies that would uniquely affect such governments, their treaty rights, or other rights.

Significant cultural resource impacts would occur with any adverse effect to an eligible property (may include physical destruction, damage, alteration, removal, change in use or character within the setting, neglect causing deterioration, transfer, lease, or sale) without appropriate mitigation. This includes concerns raised by Indian Tribes or Native Hawaiian Organizations regarding

[25] 25 USC 32, et seq, Native American Graves Protection and Repatriation, (Oct, 1992)
[26] 42 U.SC 1996 , et seq, Protection and preservation of traditional religions of Native Americans (Aug, 1978)

adverse effects to eligible properties of religious and cultural significance to those tribes or organizations without appropriate mitigation.

3.2.2.2 Common Environmental Consequences as a Result of the Action Alternative

Currently no construction of cantonment or range facilities is planned at any assessed installation. The Action Alternative could result in inadvertent impacts to cultural[27] resources or restrict access to known Tribal resources if construction of facilities or ranges were funded and executed in the future.

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

If executed in the future, cantonment and range construction could involve clearing vegetation, grading site surfaces, subsurface excavations, and moving heavy construction equipment. All of these activities, particularly excavation, could result in direct damage to or destruction of cultural resources. Destruction, damage, or restricted access to previously unknown properties of traditional Native American importance could occur. Surveys would be conducted to identify cultural resources within the area of potential effect, thereby reducing unintended impacts to unknown resources during earth-disturbing activities. Installations may have alternative means to avoid impacts as established through existing procedures or Programmatic Agreements for compliance with Section 106 of NHPA. During construction, if the disturbance of any potential cultural resource is noted, the construction activities would cease, and a qualified staff member would be called in to assess the potential cultural resource and determine a course of action to minimize impacts. Therefore, less than significant impacts that are minor or less are expected.

If construction were undertaken in the future, there is a potential for impact to documented sites. These impacts are expected to be mitigated to less than significant by the implementation of appropriate treatment plans. Mitigation in the project area would include avoidance of known sites during construction design to minimize impacts. There would be regular monitoring of known sites by installation cultural resource personnel during construction to ensure that the site protection measures are working and adjusted if needed. Per Army-wide Programmatic MOAs, Program Comments, the Installation's Programmatic Agreement, or through consultation with their state's SHPO and consultation with associated tribes or THPO, if sites cannot be avoided during design and construction, appropriate mitigation measures would be implemented. Mitigation measures could include protection through buffers or avoidance, documentation, or artifact and data recovery. Therefore, impacts that are minor or less are expected.

[27] Cultural resources includes the sub-categories of archaeological, paleontological, and architectural resources.

Impacts from Live-Fire Training

All live ordnance would be expended on existing or newly constructed range areas. Known cultural resource sites within the footprint of ranges have been mitigated during construction; therefore, less than significant effects are anticipated. For ranges that were constructed prior to the existence of an Army Cultural Resources Program (typically before 1990), cultural resources may not have been surveyed. If it is safe and feasible, these areas may be surveyed in the future and appropriate mitigations would apply. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not normally have extensive ground explosions. If a missile was fired it may miss the target and would normally self-destruct by exploding in flight. If the self-destruct function failed, a rare occurrence, it could impact the ground after propellant exhaustion that may result in a ground based explosion potentially disturbing an area of the ground within a designated range area. Minor, less than significant impacts are expected since IDDS-A training will not involve extensive maneuver or ground clearing activities, most IDDS-A live-fire training will be simulations, and ground level ordnance explosions are expected to be rare and would occur on a designated range.

3.2.3 Soils

3.2.3.1 Affected Environment

Erosion is the gradual wearing away of land by water, wind, and other general weather conditions. Erosion can be influenced by many military and human activities within a given landscape. Erosion impacts can be influenced by the types of soils, vegetative cover, topography, weather, and climate and may be amplified by the frequency and types of training. Soil erosion can be an important concern on military lands where training involving large vehicles (tracked and wheeled) and large- and small-arms fire occurs. It can undermine the ability of the natural environment to support the Army mission, and once the erosion process has started, the direct effects are difficult to reverse.

The Army has numerous programs and management initiatives to reduce environmental damage to training lands. The principal mechanism for this management is the ITAM Program, which provides a comprehensive means to address the cumulative effects of soil erosion on Army training lands.

Significant impacts to soils would occur if the landscape could not be sustained for military training over a wide area; or substantial soil losses were to impair plant growth, cause detrimental increases in stream sedimentation, or result in the violation of a regulatory limit such as the total maximum daily load (TMDL) of sediment in a water body.

3.2.3.2 Common Environmental Consequences as a Result of the Action Alternative

Impacts to soils resulting from fielding up to two IDDS-A batteries are driven by construction and training. These impacts are expected to be less than significant due to the small increases in training, use of existing facilities, and the control measures employed by the Army. At the present time none of the assessed installations plan to construct facilities or ranges to support IDDS-A.

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

If completed in the future, construction within the cantonment area could involve clearing vegetation, grading site surfaces, subsurface excavations, and moving heavy construction equipment. This construction may occur in previously disturbed or undisturbed areas. These activities can result in soil compaction or soil erosion. Increased stream sedimentation and wind erosion could be indirect impacts. Converting natural soil to paved or solid surfaces increases stormwater runoff and may impact groundwater recharge. Design and construction adherence to the required stormwater management plan and best management practices would minimize soil erosion, stormwater runoff, and sediment production. After construction is complete, the site would be landscaped with native plants or desirable non-native species. Therefore, impacts are expected to be no greater than minor and less than significant.

Construction at live-fire ranges, if undertaken, would consist of firing points, training aids such as buildings and bunkers, trench lines, stationary and moving targets, other typical range features, and the associated range support facilities such as control stations[28], bleachers, and latrines. Construction could occur in undisturbed or previously disturbed areas but the use of standard construction BMPs for stormwater and erosion control are expected to reduce soil impacts to no greater than minor and less than significant.

Construction would result in short- and long-term adverse impacts to soil resources. Short-term impacts may include soil compaction from construction equipment activities and temporary displacement of soil to facilitate construction activities. Long-term impacts could include soil removal to provide proper site grading and soil loss due to erosion. The Army would construct stormwater runoff control structures as part of required erosion control measures and standard BMPs, which would divert water from the construction sites. Other standard range maintenance BMPs implemented under the Action Alternative include road grading, target repair, and berm re-contouring would also reduce erosion. Compared to existing conditions, increased soil erosion resulting from range construction activities is expected to be localized, no greater than minor, and less than significant.

[28] Control stations allow the Range Control Officer to oversee the range activities to ensure safe and effective training.

Impacts from Live-Fire Training

Weapons training would increase under the implementation of the Action Alternative. Live-fire training would increase less than 4% at each of the assessed installations as measured in RD. Although weapons training events would be periodic, minor long-term impacts are expected due to the deposition of minor amounts of munitions constituents resulting in minor amounts of soil contamination. Implementation of the soil erosion control measures and standard BMPs are expected to result in less than significant, minor impacts.

Training-related activities can initiate wildland fires. Wildland fire could remove large areas of vegetation that normally protect soil from erosion by slowing surface runoff, intercepting raindrops before they reach the soil surface, and anchoring the soil with roots. Vegetation removal resulting from wildland fires could result in increased soil erosion by water and wind, indirectly causing removal and re-deposition of soils, gullying, or unstable slopes in areas of steep slopes and rapid runoff. The impact would be directly proportional to the size of the fire. Fire and loss of soil could reduce native plant species and encourage fast-growing nonnative species that recover quickly after fires. Removing grassland vegetation by fire would temporarily expose soils to increased water erosion, but perhaps even more so to wind erosion. Areas with flowing streams and wind erosion could transport soil further from its original location. Based on the expected rarity of firing an actual missile in training and the type of ordnance fired by the IDDS-A system, as discussed in section 3.2.1.2 and 3.2.2.2, the risk of wildland fire outbreaks is relatively low. Also, the installation's IWFMP would help reduce adverse effects. Since the IDDS-A training will not involve extensive maneuver, ground clearing activities, or ground level ordnance explosions impacts are expected to be minor and less than significant.

Munitions are fired from firing points downrange and into the range impact areas. The Army restricts access to these areas by soldiers or members of the public because of the explosive risk to safety they represent. It is unlikely, therefore, that military personnel or off-post residents would come into contact with the constituents of these munitions in the downrange impact area soils. The risk to military personnel who use the ranges would be low because contact with downrange impacted soils is unlikely and there are relatively few areas with high chemical constituent concentrations. There would be no risk to the general public from munitions constituents related to range use because there would be no public access to these areas. Exposure to soil contaminants during live-fire training activities is considered a less than significant, negligible impact.

3.2.4 Land Use and Compatibility

3.2.4.1 Affected Environment

Land use refers to the planned development of property to achieve its highest and best use and to ensure compatibility among adjacent uses. In the Army, land-use planning is the mapping and

planned allocation of the use of all installation lands based on established land-use categories and criteria. The land-use planning process is iterative because it needs feedback and ideas from the installation unit, tenant organizations, and residents. Land-use planning is used continuously as a component of real property master planning.

An installation's Real Property Master Plan (RPMP), which typically covers a 20-year planning horizon, is focused on the management and development of real property resources. This plan should contain information that is vital for addressing cumulative effects on land use. The RPMP analyzes and integrates the plans prepared by the Director of Public Works and other garrison staff, mission commanders, and other tenant activities, higher headquarters, and those of neighboring communities to provide for orderly development, or in some cases, realignment and closure of real property resources (Department of the Army, Army Regulation 210-20, *Real Property Master Planning for Army Installations*, (16 May 2005)).

Change to land use under the Action Alternative could occur if additional land has to be converted to use for training or land currently used for buildings is converted to another use when the buildings are eliminated or when buildings are constructed on training land. Such changes would be reflected through changes to the master plan.

Significant impacts would occur if the Action Alternative caused a land use to be incompatible with existing military land uses and designations (including recreation). These impacts may conflict with Army land use plans, policies or regulations, or conflict with land-use off-post.

3.2.4.2 Common Environmental Consequences as a Result of the Action Alternative

Impacts to land use and compatibility resulting from fielding up to two IDDS-A batteries are driven by construction and training. These impacts are expected to be less than significant due to the limited need to change land-use type and there would not be a notable increase in the intensity of existing land uses. Currently none of the assessed installations plan to construct facilities or ranges to support IDDS-A.

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

The exact locations of any future facilities supporting the IDDS-A system at the assessed installations is not known yet. However, for this analysis, it is assumed that land uses related to fielding up to two IDDS-A batteries would remain consistent with the installation's RPMP.

If a land designated for training has not supported activities similar to those required to support IDDS-A in the past, some construction may be required such as creating sites to deploy IDDS-A components, bivouacs[29], or forward operating bases. This may generate small amounts of dust,

[29] Bivouacs are a temporary camp without tents or cover, used especially by soldiers.

require removal of vegetation, and increase compaction of soils and erosion potential. Such changes are expected to be of minimal extent and therefore negligible and less than significant.

During any range construction, if the presence of munitions and explosives of concern (MEC)[30] is known or suspected, appropriate steps to ensure any MEC is detected and safely removed would be taken. Also, ordnance health and safety monitoring would occur during construction to reduce potential exposure and impacts of this project. If MEC is detected during construction, nearby occupants within the danger zone would be notified and evacuated. If needed, road closures and coordination with local law enforcement agencies, fire departments, and transportation agencies would occur. The Army would continue to educate soldiers on identifying MEC and the proper safety procedures for handling MEC. With continued implementation of standard Army regulatory and administrative requirements, this impact is expected to be negligible and less than significant.

Construction of ranges at the installations could indirectly affect nearby land uses due to increased noise, dust, odors, human presence, and activity in the construction sites. These impacts would be localized, temporary, and are expected to be negligible and less than significant.

Impacts from Live-Fire Training

Access to adjacent training lands and the associated surface danger zones could be restricted during range use. Land use and compatibility impacts would be associated with short- or long-term changes in ambient conditions, such as increased noise, dust, or odors and may result in indirect effects to land uses or quality of recreation in the vicinity of the training area.

Under the implementation of the Action Alternative, additional live-fire training would occur due to an increased number of soldiers training at both the existing and possible new ranges. The potential requirement for new ranges could result in a loss of prime farmland, wetlands, maneuver areas, or recreational lands. If this is required, it would be addressed in the installation-specific analyses for land use and compatibility.

In addition, weapons new to a particular training range may be used, but these weapons are very similar to those currently in use. The cumulative amount of munitions fired could increase. Increased noise, dust, or other indirect effects associated with this alternative are not expected to affect off-post land uses since these weapons are similar to what is currently in use. Prior to the use of any new weapon on a specific range, surface danger zones are reviewed to ensure compatibility with adjacent ranges and nearby non-range lands. The presence of MEC would only occur within the impact areas, which are posted as restricted to public access. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities.

[30] Munitions and explosives of concern (MEC) consist of specific categories of military munitions that may pose unique explosive risks, including: unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (e.g., TNT, RDX), present in high enough concentrations to pose an explosive hazard.

Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not normally have extensive ground explosions. If fired, the missile would emit the byproducts of propellant combustion which would be widely distributed in the atmosphere and eventually deposited on the ground in low concentrations. Missiles that intercept a target would detonate and damage or destroy the target resulting in explosives byproducts and debris falling to the ground. Missiles that miss their target would normally self-destruct by exploding in flight but could impact the ground after propellant exhaustion that may result in a ground based explosion spreading explosives byproducts and debris across the ground. With continued implementation of current Army SOPs to minimize potential noise and safety impacts, impacts are expected to be minor and less than significant.

3.2.5 Facilities

3.2.5.1 Affected Environment

Facilities encompass all aspects of Army real property management. Army real property includes lands, facilities, and infrastructure. The ROI for facilities includes the Army installations in which the proposed activities would be located. In addition, the ROI includes the regional infrastructure and utilities serving the installations.

Lands include Army-owned land (real estate), leaseholds, and other interests in land. Military real property master plans provide the framework for facilities management, including design and construction activities for land development on military installations. Land is discussed in the Land Use and Compatibility section.

Facilities are buildings, structures, and other improvements to support the Army's mission, such as cantonment areas, training ranges, housing, schools, and recreational facilities.

Infrastructure is the combination of supporting systems that enable the use of Army land and facilities. Infrastructure includes roadways and equipment needed to supply water, sewer, and power for facilities. Roadways and other transportation infrastructure, utilities, and energy systems would not require modification or only require short, insignificant extensions to connect the new facilities to the existing network and are not analyzed.

Impacts to facilities would be considered significant if the Action Alternative were to cause an impairment of service to the installation and local communities, homes, or businesses.

3.2.5.2 Common Environmental Consequences as a Result of the Action Alternative

Facilities at the installations assessed include buildings and improvements, such as housing, community support facilities, unit support facilities, installation support facilities, and training and range facilities. The facilities potentially impacted by the Action Alternative include

barracks[31], unit support facilities[32], and training and range facilities[33]. None of the assessed installations have plans to construct facilities and ranges to support the IDDS-A at the present time.

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

Table 3.2-1 below summarizes the facilities required for fielding one or two IDDS-A batteries and whether or not a given installation may need to undertake modification or construction of the required facilities at some future date. If both batteries were fielded to one installation the facility requirements would double. A review of existing facility data determined if there was an excess or deficit of the required facility type and if the excess would be enough to accommodate one or two IDDS-A batteries. The review shows the same facility shortages for either one or two batteries at each installation. Where required, the total square feet and total acres include any needed personally owned vehicle parking. Please note that, although there may be a shortage of the required facility space, the Army may use an exception to standard to allow a unit to occupy less space than the standard calls for. More details of the specific facilities are addressed in each installation section.

If construction is undertaken in the future, impacts could include land clearing, grading, re-contouring, paving areas, installation of utilities, and erecting buildings. Impacts from constructing the required facilities in Table 3.2-1 are expected to be less than significant since all are below the 5-acre threshold or would most likely be in previously disturbed areas[34]. Any construction greater than 5 acres of undisturbed terrain that has not been analyzed in sufficient detail in this document would require a separate analysis tiering from or supplementing this PEA. There is no anticipated need to construct family housing to support the IDDS-A system at any of the assessed installations, and it is not addressed in this PEA.

[31] Barracks are a common name for Unaccompanied Personnel Housing, where soldiers without families would normally reside on the installation.
[32] Unit support facilities include buildings such as battery headquarters, equipment maintenance and storage facilities, and their associated parking.
[33] Training and range facilities include structures such as range control buildings, bleachers, latrines, parking areas, targets, and bunkers.
[34] See, 32 CFR 651, Appendix B (Sec II(c) , Environmental Analysis of Army Actions, which grants a Categorical Exclusion to the requirements under NEPA for "Construction of an addition to an existing structure or new construction on a previously undisturbed site if the area to be disturbed has no more than 5.0 cumulative acres of new surface disturbance.

Table 3.2-1 IDDS-A Expected Facility Requirements FY 2021 Data

Existing facilities meet requirements – Y or N										
Facility	**# req'd**	**Total sq ft**	**Total acres**	**Ft Bliss**	**Ft Hood**	**Ft Campbell**	**Ft Riley**	**Ft Sill**	**Ft Stewart**	**JBLM**
Battery HQ	1	25,776	0.6	Y	N	N	N	N	N	N
TEMF	1	28,304	0.6	N	N	N	N	Y	N	N
Tactical Vehicle Parking	1	12,555	0.3	Y	Y	Y	Y	Y	Y	Y
Haz Mat'l Storage*	1	60	0.0	Y	Y	N	N	N	N	N
Barracks	1	8,420	0.2	Y	N	N	Y	Y	Y	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.										

An assessment of the live-fire ranges required for training one or two IDDS-A batteries was completed to determine if a given installation may need to undertake modification or construction of the designated ranges to meet the requirement. A review of existing range data determined if there are an adequate number of Range Days (RD) available on existing primary or alternate range types to accommodate IDDS-A live-fire training. Any shortage of RD, a measurement of time, was converted to Standard Ranges (SR), a measurement of area, by dividing the shortage of RD by the number of normal training days per Army doctrine. The review shows the same types of ranges have shortages for either one or two batteries at each installation. Fielding two batteries to one installation may require a greater expansion of the same range type. Please note that, although there may be a shortage of the required ranges, the Army may use the scheduling flexibility allowed in the SRM or ReARMM to meet the necessary training requirements of IDDS-A. Also, there are extensive simulation capabilities planned for IDDS-A which can be used to reduce the live-fire training requirements. More details of the specific ranges are addressed in each installation section.

If construction of live-fire ranges were to occur, impacts could include land clearing, grading, re-contouring, and construction of range equipment, including targets, buildings, obstacles, and bunkers at live-fire ranges. Impacts from the construction of live-fire ranges are expected to be minor and less than significant because a substantial portion would be constructed on previously disturbed areas. Also, the proportion of land disturbed compared to the total area of ranges within the installation is very small. Finally, the actual construction activities would usually occur on a small subset of any range area.

Impacts from Live-Fire Training

Impacts from the use of the live-fire ranges could include accumulation of contaminants associated with ammunition and ordnance, impacts to vegetation and topographic features, and erosion of impact locations within the range. Impacts are expected to be no greater than minor and less than significant because the primary ordnance used by the IDDS-A system is an aerial missile, the amount of small arms ammunition fired by IDDS-A soldiers is a negligible increase beyond that already fired at each assessed installation, and the Army performs routine monitoring of range conditions and implements maintenance and rehabilitation when required.

3.2.6 Water Resources

3.2.6.1 Affected Environment

Water resources include surface water, groundwater, wetlands, and floodplains, as well as other conservable resources such as estuaries and watersheds. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Stormwater flows, which may be exacerbated by high proportions of impervious surfaces (e.g., buildings, roads, and parking lots), are important to the management of surface water. Stormwater is also important to surface water quality because of its potential to introduce sediments and other contaminants into lakes, rivers, and streams.

The Clean Water Act (CWA) gives the EPA the authority to regulate the discharge of pollutants into the waters of the United States. It set the ground rules for implementing pollution control programs as well as continuing the requirement to set water quality standards for all surface water contaminants. The EPA establishes thresholds for pollution and contaminants to water bodies that are referred to as TMDL. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. If these thresholds are exceeded, the water body is classified as impaired.

Army activities subject to CWA regulation include activities involving the collection and discharge of effluents (e.g., discharging pollutants from a point source into waters of the U.S.) or construction activities near waterways or wetlands. Several compliance responsibilities under the CWA result from the types of facilities used by the Army and the range of activities at Army installations.

Significant impacts would include the exceedance of TMDLs for sediments that causes a change in surface water impairment status or cause an unpermitted direct impact on a U.S. body of water.

Groundwater consists of the subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Significant impacts to groundwater would occur if demand outpaced recharge rates leading to an unsustainable drawdown on the quantity of water available or if there were substantial adverse effects to water quality.

For regulatory purposes under the CWA, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" [40 CFR 232.2(r)]. There are many different kinds of wetlands to include swamps, marshes, bogs, and similar areas. Wetlands definitions can vary by agency, regulations, and policy. Wetlands are of value to the sustainable management of military lands because of the ecological functions they provide in addition to training realism. Three wetland functions applicable to sustainable management are flood attenuation, groundwater recharge, and improvement of water quality by filtering sediment, nutrients, and toxics.

The National Wetlands Inventory (NWI) of the USFWS has identified and mapped most of the known wetlands in the conterminous United States, including those on military installations. DoD Instruction 4715.3 (DoDI 4715.3, *Natural Resources Conservation Program* (March 18, 2011 Incorporating Change 2, August 31, 2018)) states that installations will manage for "no net loss" of wetlands. In order to manage wetlands properly, installations have used the NWI and have conducted planning level surveys to determine the extent and location of wetlands across their installation. By identifying wetlands early in the NEPA process, and utilizing a "Go/No-Go" approach where avoidance is preferred to direct or indirect impacts, installations have the ability to avoid costly mitigation and potential delays in implementation of the Action Alternative.

Significant impacts to wetlands would include unpermitted loss or destruction of more than one acre of jurisdictional wetlands

A floodplain is defined in EO 11988, *Floodplain Management*, (42 FR 26951 (May 21, 1977)) as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding in any given year" (Id at Sec 3(6)(b)). The 100-year floodplain represents those areas that could be inundated in the event of high flood water levels from the combination of heavy rainfall, high tides, and storm surges. Based on existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) and an engineering-level analysis, the Army would determine if the Action Alternative is within the 100-year floodplain.

Federal, state, and local regulations generally limit development in floodplains to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

3.2.6.2 Common Environmental Consequences as a Result of the Action Alternative

No construction is planned at any of the assessed installations to support the IDDS-A range or facility requirements. All IDDS-A support would be provided through existing facilities.

3.2.6.2.1 Surface water

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

If construction occurred in the future at the assessed installations it could impact surface water quality from nonpoint source runoff from disturbed areas or spills and leaks from construction equipment. During ground preparation for construction sites, grading, excavating, and trenching may expose erodible soils to stormwater runoff and increase the potential for sediments to contaminate surface waters. Similarly, accidental spills, or broken or leaking fluid lines on heavy equipment could release chemicals, solvents, and paints. The resulting stormwater runoff could carry sediments or contaminants to adjacent waterways. These impacts are expected to be negligible to minor and less than significant because Army installations must follow the Stormwater Management Plan (SWMP) guidelines to minimize runoff and impacts to surface water. Also, the Army would incorporate BMPs that would reduce runoff and sedimentation to aquatic environments per the CWA regulations for stormwater runoff at construction sites. Spills would be addressed effectively through required procedures including reporting, containment, and cleanup as soon as possible under the installation Spill Prevention, Control, and Countermeasures Plan (SPCCP).

Dust control measures such as wetting graded areas are routinely used during construction to ensure minimal impacts to the sediment loads of nearby surface waters. Dust control measures are expected to have a minor short-term impact to water quality.

The new facilities and improvements to existing facilities could increase impervious surfaces. The increase in impervious surfaces may result in increased stormwater runoff and non-point source pollution. These impacts are expected to be no greater than minor and less than significant because control measures for stormwater runoff must be incorporated in design plans. The Army requires Low Impact Development principles to be used in facility designs to reduce runoff.

Impacts from Live-Fire Training

Live-fire training could result in impacts to surface water quality from the introduction of munitions chemical residues present in soils from ordnance use. Other chemical pollutants, such as fuels, lubricants, or solvents, may be inadvertently spilled or released as an indirect result of military activities. The potential increase in the intensity of range use may cause slight increases in the erosion of soils to surface waters from the unpaved roads within the range. Accidental wildland fires may increase the amount of debris and soils accumulating in surface waters. The risk of wildland fires is not expected to change as a result of the Action Alternative. However, if a fire breaks out on a live-fire range, it is extinguished in areas where it can be safely accomplished or controlled to minimize damage in areas containing dangerous ordnance.

Impacts to surface water quality from live-fire training are expected to be negligible to minor and less than significant since the IDDS-A training will not involve extensive maneuver, ground clearing activities, or ground level ordnance explosions. The Army routinely monitors the accumulation of munitions chemical residues and when required takes steps to prevent leaching or erosion to surface water. Range areas are regularly maintained to minimize soil erosion that could impact surface waters. Also, all soldiers must immediately respond to known spills to prevent or minimize the impact to the environment.

3.2.6.2.2 Groundwater

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation.

Future construction, if executed, at the assessed installations could impact groundwater quality caused by contamination from accidental spills and leaks from construction equipment. Accidental spills or broken or leaking fluid lines on heavy equipment could release chemicals, solvents, and paints. The resulting contaminants could infiltrate into groundwater. These impacts are expected to be no greater than minor and less than significant because the Army would quickly contain and address the contaminants under the SPCCP at all construction sites under the Action Alternative.

During ground preparation for construction sites, grading, excavating, and trenching may decrease surface water infiltration to the groundwater. Also, any new facilities and improvements to existing facilities may require increases in impervious surfaces. The increase in impervious surfaces may result in decreases in infiltration rates. No greater than minor, less than significant impacts are expected because the Army employs BMPs including Low Impact Development and the use of materials that allow infiltration through paved surfaces. Also, site designs should retain precipitation on site so that it can infiltrate to groundwater or evaporate to the air and not increase stormwater runoff.

Impacts from Live-Fire Training

Live-fire training could result in impacts to groundwater quality caused by the leaching of munitions chemical residues present in soils to the groundwater. Other chemical pollutants, such as fuels, lubricants, or solvents, may be inadvertently spilled or released as an indirect result of military activities. Impacts to groundwater quality from live-fire training are expected to be less than significant, no greater than minor since IDDS-A training will not involve extensive maneuver, ground clearing activities, or ground level ordnance explosions. The Army routinely monitors the accumulation of munitions chemical residues and when required takes steps to prevent leaching to groundwater. Also, all soldiers must immediately respond to known spills to prevent or minimize the impact on the environment.

3.2.6.2.3 Wetlands and Floodplains

Impacts from Construction

Currently no construction of cantonment or range facilities to support IDDS-A is planned at any assessed installation. If construction is undertaken in the future the potential impacts to wetlands and floodplains are described below.

Wetlands

Construction at the assessed installations could result in impacts to wetlands. Facilities for IDDS-A command, operations, maintenance, and training or housing soldiers may be constructed at one or more installations at a future date if funding is available. Potential impacts to wetlands from construction include excavation, placement of fill within a wetland, and changes in the volume, temperature, and quality of water flowing into the wetland. The wetland impacts from construction projects are based on delineated wetland areas within the project footprint. Before site design and construction begin an assessment and delineation of wetlands would be completed within the expected project footprint, if it has not already occurred.

As a rule, the Army would avoid construction in wetland areas. If avoidance were not possible, a Finding of No Practicable Alternative (FONPA) would be completed per EO 11990, *Protection of Wetlands* (42 FR 26961 (May 24, 1977)). In addition, the Army would comply with the Section 404 permitting process of the CWA. Depending on the type(s) of impact, CWA regulations require mitigation of wetland losses. There are four ways to accomplish mitigation: (1) construct a new wetland for no net loss of wetlands; (2) restore a degraded wetland for no net loss of wetlands; (3) deduct credits from an existing installation managed wetland mitigation bank; and (4) purchase credits from a privately owned wetlands mitigation bank. The type of mitigation selected will vary by installation based on the type of resources and opportunities available.

On-site wetland protection efforts also focus on erosion prevention and stormwater control, including the establishment of filter strips adjacent to bodies of water, terracing, seeding and mulching bare soil, and planting cover vegetation, among others. Erosion and sedimentation impacts to wetlands during construction, operation, and maintenance are minimized through compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit, an activity-specific Stormwater Pollution Prevention Plan (SWPPP), and an Erosion and Sediment Control Plan.

Based on the previously stated requirements and practices, impacts to wetlands from construction are expected to be no greater than minor and less than significant.

Floodplains

Construction at the assessed installations could occur within a floodplain. The Army would determine if the proposed construction is within a floodplain based on existing FEMA FIRMs and an engineering-level analysis. Construction within a floodplain could make flooding worse, pose a greater risk to soldier safety, increase the risk of inundation and facility damage, and result in contaminants entering floodwaters.

Typically, the Army also avoids construction within floodplains. If this is not possible, a FONPA would be completed per EO 11988, *Floodplain Management,* (Section 2(a)). In addition, the Army complies with Section 438 of the Energy Independence and Security Act of 2007 (EISA). This requires projects involving a federal facility with footprints exceeding 5,000 square feet to use site planning, design, construction, operation, maintenance, and maintenance strategies for the property to maintain or restore—to the maximum extent technically feasible—the predevelopment hydrology of the property concerning the temperature, rate, volume, and duration of flow. During the design stage for each action, more precise studies would be conducted to analyze the capacity of the existing stormwater conveyance systems and what additional measures should be implemented as a result of new construction.

Impacts to floodplains are expected to be no greater than minor and less than significant. The Army would avoid floodplains if possible, and use site design and construction standards and BMPs to minimize impacts at any site constructed within the floodplain.

Impacts from Live-Fire Training

Wetlands and Floodplains

The Army will take precautions not to deploy the IDDS-A on, or adjacent to wetlands to the maximum extent practicable. In the event of an unavoidable encroachment on a wetland, live-fire training could impact wetlands from the firing of munitions into or near wetland areas and the deposition of munitions debris and the leaching of chemical residues into the wetland. Other chemical pollutants, such as fuels, lubricants, or solvents, may be inadvertently spilled or released as an indirect result of military activities. Impacts to wetlands from live-fire training are expected to be minor at worst and less than significant. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The Army routinely monitors the accumulation of munitions debris and chemical residues and when required takes steps to address the problem. Also, all soldiers must immediately respond to known spills to prevent or minimize the impact on the environment.

Negligible impacts to floodplains as a result of live-fire training are expected. Live-fire training does not involve construction, extensive vehicle maneuvering, or any alteration of floodplain topography.

3.2.7 Common Environmental Consequences to Resource Elements from the No Action Alternative

Implementing the No Action Alternative would result in minimal effects to the assessed resource elements at each installation. The IDDS-A batteries would not be fielded. No construction would be required and no additional live-fire training would occur to support the IDDS-A. Please note that other activities and actions at each installation are occurring and will continue to occur. These other actions may affect the resource elements but are not evaluated in this assessment. Table 3.2-2 provides information regarding the impacts of the No Action Alternative to each resource element. The impacts of the No Action Alternative to these resource elements are fully addressed here and will not be discussed in the installation-specific sections.

Table 3.2-2 Common Environmental Consequences from the No Action Alternative

Resource Element	Level of impact	Impact description
Biological Resources	Negligible	Installations would continue to adhere to existing resource management plans to minimize and monitor any potential effects. Units are briefed before each training event regarding sensitive areas and activities that are prohibited within those areas to protect listed species, migratory birds, and bald and golden eagles.
Cultural Resources	Negligible	Before initiating ground disturbing activities, installation Cultural Resources Managers would evaluate activities to identify resources that might be affected, determine effects, and initiate the consultation processes as required. Activities with the potential to affect cultural resources are monitored and regulated through various preventative and minimization measures. Units are briefed before each training event regarding sensitive areas and activities that are prohibited within those areas to protect cultural resources.
Soils	Negligible	Installations would continue to adhere to existing resource management plans to monitor and minimize any potential effects. Units are briefed before each training event regarding sensitive areas, such as highly erodible soils, and activity prohibitions within specific areas. Training lands would continue to be assessed, maintained, and rehabilitated as current protocols require
Land Use and Compatibility	No Effect	Current land uses would continue and no compatibility issues would arise.
Facilities	Minor	No new facilities would be required. Any ongoing facility shortages, excesses, or required repair and refurbishment would continue as the status quo.
Water Resources	Negligible	No construction would be required and no additional live-fire training would occur. Any current Army responses to going issues related to surface waters, groundwater, wetlands, and floodplains would continue as the status quo.

3.3 CUMULATIVE EFFECTS ANALYSIS

Cumulative effects analysis is required to assess the effects of the Action Alternative when combined with the effects of other past, present, and reasonably foreseeable future projects that would affect the same resource element(s), regardless of what entity is implementing the other project(s). The Army is undertaking a modernization effort as described in Section 1 that would result in numerous changes to personnel, weapons, and capabilities at the installations assessed in this PEA.

The Army modernization projects planned for FY 2021 through FY 2026 are listed below with a short description:

1. Indirect Fires Protection Capability (IFPC) is a mobile, ground-based weapon system designed to defeat unmanned aircraft systems (UAS) and cruise missiles. The system will use an existing sensor and interceptors. A missile launcher is in development. An existing vehicle platform will transport the system. The system will use the Army Integrated Air and Missile Defense (AIAMD) open systems architecture, and will use the AIAMD Integrated Battle Command System as its mission command component. The IFPC is to be transported on wheeled vehicles. There may be an additional 90 soldiers and 18 wheeled vehicles when a unit receives the IFPC system. In some instances an existing ADA Bn may be re-configured to field the IFPC system with minimal change in personnel. Live-fire training requirements are unknown at this time.
2. Future Tactical Unmanned Aerial System (FTUAS) is a new Drone to replace the Army's medium size drones such as the RQ-7 Shadow. This platform will enable multi-domain capabilities for brigade air-ground operations via significant improvements in operational capability, survivability, reliability, availability, maintainability and mobility. Since FTUAS is replacing an existing system no change in manning levels or number of vehicles is expected. The FTUAS is not expected to be armed.
3. Extended Range Cannon Artillery 1 and 2 (ERCA 1 and ERCA 2) will deliver integrated cannon artillery technology solutions to increase lethality for U.S. Army 155 mm indirect fire systems. It will increase the systems range to over 60 km, minimize weight growth over current armaments, increase the rate of fire and reduce crew burden through automation. The ERCA 1 & 2 is expected to field to existing artillery batteries and no change in manning levels or number of vehicles is expected. It is assumed that ERCA 1 & 2 training can be accomplished with simulated firing, firing munitions with a shorter range that will not exceed installation range boundaries, or firing at a range on a different installation that can accommodate the munition.
4. Optionally Manned Fighting Vehicle (OMFV) is a tracked vehicle and is the planned replacement for the Bradley Fighting Vehicle. It can operate as a crewed vehicle but will also have the ability to conduct remotely controlled operations while the crew is off

platform. Since OMFV is replacing an existing system no change in manning levels or number of vehicles is expected.

5. Army Integrated Air and Missile Defense System (AIAMD) will develop a unified air defense, by providing the ability for soldiers to connect various air defense weapons and systems to a single command and control network, allowing the air defense soldier to control all the various weapons and sensors that form an air defense network through a single battle command system. AIAMD is predominately a computer and networking system housed in an Engagement Operations Center facility that is transported on wheeled vehicles. Fielding of AIAMD is expected to be to existing units and no change in manning levels or number of vehicles is expected.
6. The Armored Multi-Purpose Vehicle (AMPV) is the replacement for the M113 Family of Vehicles (FoV) within the Armored Brigade Combat Team. The AMPV provides significant capability improvement over the M113 FoV in force protection, survivability, mobility and power generation to incorporate the Army's inbound network and other future technologies. The AMPV is a tracked vehicle based on the Bradley Fighting Vehicle chassis that is larger, heavier than the M113. The equipment replacement ratio is expected to be one for one and no change in manning levels or number of vehicles is expected.
7. The Maneuver Short Range Air Defense (M-SHORAD) system will be a Stryker vehicle based, multi-mission mobile air defense system developed to improve the protection of tactical maneuver forces from current and future aerial threats. The M-SHORAD is expected to field as a new battalion with approximately 550 soldiers and 235 wheeled vehicles in the battalion.
8. Precision Strike Missile (PrSM) will be a surface-to-surface, all weather, precision-strike guided missile fired from the M270A1 Multiple Launch Rocket System (MLRS) tracked vehicle and the M142 High Mobility Artillery Rocket System (HIMARS) wheeled vehicle. The baseline missile will be developed and fielded to engage a wide variety of targets at ranges up to 499 km. The PrSM is expected to field to existing units and no change in manning levels or number of vehicles is expected. It is assumed that PrSM training can be accomplished with simulated firing, firing munitions with a shorter range that will not exceed installation range boundaries, or firing at a range on a different installation that can accommodate the munition.
9. Directed Energy SHORAD (DE SHORAD) will use the same chassis as the M-SHORAD and replace select weapons with a directed energy system to accomplish the same mission. The DE SHORAD is expected to field to existing units and replace equipment on a one for one basis, no change in manning levels or number of vehicles is expected. It is assumed that the DE-SHORAD training can be accomplished with simulated firing, firing at targets with an appropriate backstop to intercept the directed energy beam before

it leaves the firing range, or if the required airspace is available at the installation the directed system may be fired for training without constraints.

10. Long Range Hypersonic Weapon (LRHW) will consist of a maneuverable hypersonic warhead launched by missile from a truck transported launcher. The LRHW is expected to field as a battery of an existing unit and will add approximately 50 soldiers and 10 wheeled vehicles. It is assumed that LRHW training can be accomplished with simulated firing, firing munitions with a shorter range that will not exceed installation range boundaries, or firing at a range on a different installation that can accommodate the munition.
11. Strategic Long Range Cannon (SLRC) will fire rocket assisted projectiles for extended range. It will be movable and transported by the M1070 Heavy Equipment Transport (HET) and a system specific wheeled trailer. The SLRC is expected to field as a battery of an existing unit and will add approximately 75 soldiers and 15 wheeled vehicles. It is assumed that SLRC training can be accomplished with simulated firing, firing munitions with a shorter range that will not exceed installation range boundaries, or firing at a range on a different installation that can accommodate the munition.
12. Lower Tier Air and Missile Defense Sensor (LTAMDS) is an advanced radar sensor array about the same size as the Patriot Air and Missile Defense System, but with enhanced capabilities. It is planned to be incorporated into the AIAMD system once developed and fielded. It will be transported on a trailer towed by truck. Fielding of LTAMDS is expected to be to existing units and no change in manning levels or number of vehicles is expected.
13. The Multi-Domain Task Force (MDTF) would integrate the IFPC, PrSM, LRHW, and SLRC capabilities discussed in paragraphs 1, 8, 10, and 11 above into a brigade sized unit. Additional capabilities planned in the MDTF include an Intelligence, Information, Cyber and Electronic Warfare, and Space (I2CEWS) Battalion and a Brigade Support Battalion (BSB). The IFPC capability would be an ADA battalion. The PrSM, LRHW, and SLRC will be part of a Strategic Fires Battalion (SFB) that includes other capabilities such as the current HIMARS or MLRS weapons. In total the MDTF is planned to have four battalions and about 2,100 soldiers. Standing up an MDTF may not require an installation to grow by 2,100 soldiers; the Army may activate new units, inactivate existing units, convert existing units to a new mission, or re-station units to a new location.

The first two systems are assessed for fielding to all seven installations to allow Army senior leader's flexibility in their fielding decisions. The remaining systems are discussed in the relevant installation discussions of the PEA.

Table 3.3-1 lists Army modernization projects that may be fielded between 2021 and 2026 at the installations assessed in this PEA.

Table 3.3-1 Army Modernization Projects 2021-2026

System is expected to be stationed at the installation – Y or N							
Project Number and Name	**Fort Bliss**	**Fort Hood**	**Fort Campbell**	**Fort Riley**	**Fort Sill**	**Fort Stewart**	**JBLM**
1 - IFPC	Y	Y	Y	Y	Y	Y	Y
2 - FTUAS	Y	Y	Y	Y	Y	Y	Y
3 - ERCA 1 or 2	Y	Y	Y	Y	Y	Y	N
4 - OMFV	Y	Y	N	Y	Y	Y	N
5 - AIAMD	Y	Y	N	Y	Y	Y	Y
6 - AMPV	Y	Y	N	Y	Y	Y	N
7 - M-SHORAD	Y	Y	N	Y	Y	Y	N
8 - PrSM	Y	Y	N	N	Y	N	Y
9 - DE-SHORAD	Y	Y	N	Y	Y	Y	N
10 - LRHW	N	N	N	N	Y	N	Y
11 - SLRC	N	N	N	N	Y	N	Y
12 - LTAMDS	Y	Y	N	N	Y	N	N
13 – MDTF	N	N	N	N	N	N	Y

3.3.1 Cumulative Effects of the Action Alternative and the Three Common Systems

Table 3.3-2 lists the cumulative effects of the Action Alternative and the Action Alternative plus the two systems slated to be fielded to all seven installations.

Table 3.3-2 Cumulative Effects of the Action Alternative and the Three Common Systems

	Effects of Action Alternative	Cumulative Effects: IFPC + FTUAS	Cumulative Effects of the Action Alternative and the two systems
Biological Resources	Less than significant adverse effects	Negligible adverse effect	Less than significant adverse effects
Cultural Resources	Less than significant adverse effects	No change	Less than significant adverse effects
Soils	Less than significant adverse effects	Minor adverse effect	Less than significant adverse effects
Land Use and Compatibility	Less than significant adverse effects	Minor adverse effect	Less than significant adverse effects
Facilities	Less than significant adverse effects	Minor adverse effect	Less than significant adverse effects
Water Resources	Less than significant adverse effects	Minor adverse effect	Less than significant adverse effects

Biological Resources

The effects to biological resources caused by the addition of the two systems addressed in Table 3.3-2 consist of negligible increases in damage to vegetation during training activities. These changes are due to slight increases in the number soldiers. Since the new systems would field to existing facilities or replace existing systems no construction is expected to support the two new systems. The effects of the additional actions, when combined with those of the Action Alternative, are expected to result in less than significant minor cumulative effects to biological resources.

Cultural Resources

There are no anticipated changes to effects to cultural resources caused by the addition of the two systems addressed in Table 3.3-2. The new systems are expected to be one-for-one replacements of existing systems or the addition of new systems that would field to existing units. No facility construction is expected to support the three new systems. All systems addressed would likely use already designated training areas, and known cultural resources would be avoided to the maximum extent practicable. With the systems in place at each installation and adherence to applicable directives by the training units, both known and unknown significant cultural resources should be protected or effects mitigated. The impacts of these new systems, when

added to the Action Alternative, are expected to result in no greater than minor, less than significant cumulative effects to cultural resources.

Soils

The effects to soils caused by the addition of the two systems addressed in Table 3.3-2 consist of minor increases in compaction and erosion during training activities. These changes are due to slight increases in the number of vehicles and replacement vehicles being larger and heavier than the original vehicles used. No facility construction is expected since the new systems would field to existing units or replace existing systems. The effects of the additional actions, when combined with those of the Action Alternative, are expected to result in less than significant, minor cumulative effects to soils.

Land Use and Compatibility

The effects to land use and compatibility caused by the addition of the two systems addressed in Table 3.3-2 consist of minor increases in the intensity of land use in the training areas caused by slight increases in the number of vehicles and replacement vehicles being larger and heavier than the original vehicles used. The effects of the additional actions, when combined with those of the Action Alternative, are expected to result in less than significant, minor cumulative effects to land use and compatibility.

Facilities

The effects to facilities caused by the addition of the two systems addressed in Table 3.3-2 consist of a slight increase in required housing to accommodate a slight increase of up to 90 soldiers with their families at the installations. The effects of the additional actions, when combined with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to facilities.

Water Resources

The effects to water resources caused by the addition of the two systems addressed in Table 3.3-2 consist of minor increases in sediments and runoff from the training areas. These changes are due to slight increases in the number of vehicles and replacement vehicles being larger and heavier than the original vehicles used. The effects of the additional actions, when combined with those of the Action Alternative, are expected to result in less than significant, minor cumulative effects to water resources.

3.4 FORT BLISS, TEXAS[35]

3.4.1 Background

Fort Bliss is a U.S. Army post located in the states of New Mexico and Texas, with its headquarters located in El Paso, Texas (Figure 3.4-1). The installation has an area of about 1,120,000 acres (453,247 hectares [ha]). Fort Bliss is used by all branches of the military for training.

Fort Bliss provides the largest contiguous tract (1,500 square miles or mi^2, or 3,900 square kilometers or km^2) of restricted airspace in the continental U.S., used for missile and artillery training and testing, and at 992,000 acres (401,448 ha), has one of the largest maneuver areas. The following units are associated with Fort Bliss and have permanent facilities in the cantonment area:

- U.S. Army 1st Armored Division (1st AD)
- 1st Brigade Combat Team (BCT), 1st AD
- 2nd BCT, 1st AD
- 3rd BCT, 1st AD
- Combat Aviation Brigades (CAB)
  - 3-6 Cavalry
  - 1AD CAB 2-501st
- 1st AD Sustainment Brigade (Bde)
- 31st Combat Support Hospital
- 32nd Army Air and Missile Defense Command
- 11th ADA Bde
- 93 Military Police Battalion
- 5th Armor Bde

The training areas are collectively known as the Fort Bliss Training Center (FBTC). The FBTC is a Strategic Deployment Platform (Joint Mobilization Force Generation Installation and Army Power Projection Platform) that executes deployment/redeployment/training operations for all DoD services.

[35] Information on the Affected Environment for Fort Bliss is taken primarily from the Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement (FEIS) March 2010.

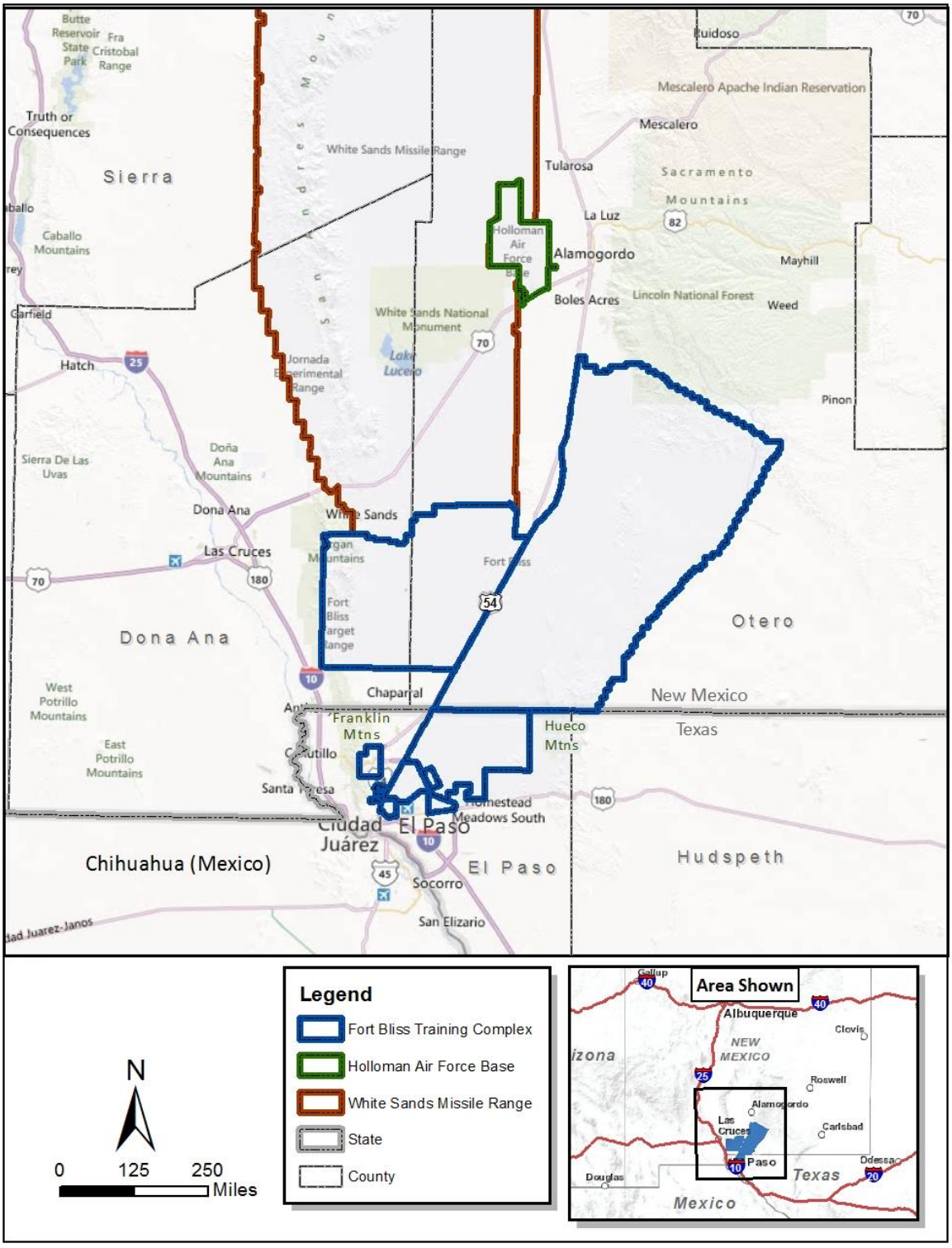

Figure 3.4-1 Location of Fort Bliss

3.4.2 Biological Resources

3.4.2.1 Affected Environment

The ROI for this analysis encompasses Fort Bliss and the surrounding area, including the Franklin and Organ Mountains to the west, the Sacramento Mountains to the northeast, the Hueco Mountains to the southeast, the Otero Mesa to the east, and the Tularosa Basin. Important habitats within the region include grasslands and woodlands that cross ecoregions or watershed boundaries, such as the Chihuahuan Desert, Arizona-New Mexico Mountains, and Southern Shortgrass Prairie Ecoregions. Most of Fort Bliss lies within the Chihuahuan Desert ecoregion, except for the north end that lies within the Arizona-New Mexico Mountains ecoregion. The Chihuahuan Desert Ecoregion covers approximately 174 million acres (70,415,300 ha) from Mexico to southwestern Texas and southern New Mexico. It is one of the most biologically diverse desert ecoregions of the world with a high degree of endemism (i.e., a substantial number of species are unique to the region) (Fort Bliss, 2016).

The locally important natural resources (LINRs) are considered to be the grasslands (more specifically mesa grasslands), shinnery oak islands, sand sagebrush communities, and arroyo-riparian drainage areas (inclusive of playas). Some resources, such as arroyo-riparian drainage areas, water, or soil, are described in more detail in other sections of this document.

The ROI for this analysis encompasses Fort Bliss and the surrounding area, including the Franklin and Organ Mountains to the west, the Sacramento Mountains to the northeast, the Hueco Mountains to the southeast, the Otero Mesa to the east, and the Tularosa Basin. Important habitats within the region include grasslands and woodlands that cross ecoregions or watershed boundaries, such as the Chihuahuan Desert, Arizona-New Mexico Mountains, and Southern Shortgrass Prairie Ecoregions. Most of Fort Bliss lies within the Chihuahuan Desert ecoregion, except for the north end that lies within the Arizona-New Mexico Mountains ecoregion. The Chihuahuan Desert Ecoregion covers approximately 174 million acres (70,415,300 ha) from Mexico to southwestern Texas and southern New Mexico. It is one of the most biologically diverse desert ecoregions of the world with a high degree of endemism (i.e., a substantial number of species are unique to the region) (Fort Bliss, 2016).

3.4.2.1.1 Flora

Plant communities on the installation range from the Chihuahuan Desert in the Tularosa Basin to Rocky Mountain conifer forests in the Organ Mountains (Fort Bliss, 2007). Fort Bliss' large size and varied topography (which spans from desert basins to montane peaks) allow for a high degree of biodiversity. There are estimated to be 300 nonvascular and 1,200 vascular plant species that occur on Fort Bliss, with more than 800 species in the Organ Mountains alone. Additional forest and woodland communities of ponderosa pine and piñon-juniper are found in

the Organ and Sacramento Mountains and are described and discussed in detail in the 2000 FEIS and 2007 Supplemental Environmental Impact Statement (SEIS) (Fort Bliss, 2000 and 2007).

Shrubland makes up 67% of the land cover, while approximately 31% is grassland, and 0.94% is montane woodland and riparian. Approximately 0.3% of Fort Bliss consists of military facilities (Fort Bliss, 2007). Each general vegetation category is composed of a diverse list of plant species. Generally, alluvial fan, piedmont, desert shrub, and grassland plant communities dominate the Tularosa Basin. In the Organ and Sacramento Mountains, grasslands of sideoats grama, shrublands of mountain mahogany or sotol, and forest and woodland communities of ponderosa pine, mixed conifer, and piñon-juniper are the predominant vegetative categories in the uplands. Grassland communities dominate the Otero Mesa.

Fort Bliss maintains restrictions to protect the diversity of plant life such as: no digging or collection of any plants, even for camouflage and all excavations must be approved and backfilled. A complete list of the plants making up the vegetative categories found on Fort Bliss can be found in the Fort Bliss INRMP (Fort Bliss, 2016).

3.4.2.1.2 Fauna

Fort Bliss supports a relatively high faunal diversity with 334 species of birds, 58 species of mammals, 39 species of reptiles, and eight species of amphibians. Many of the birds and mammals and a good proportion of the reptiles and amphibians found on Fort Bliss are those generally found in the Intermountain West, with a substantial Great Plains influence (Fort Bliss, 2016). In order to maintain a diverse faunal population Fort Bliss prohibits hunting by personnel during training exercises, destruction of nests or disturbance of bats or birds, and collection of or harm to animals without state and DPW-ED permits. Detailed lists of species are available in previous Fort Bliss environmental documentation (Fort Bliss, 2000; USACE, 2005), SOPs for Weapons Firing and Training Area Use at Fort Bliss Training Complex (Fort Bliss 2005).

Birds

As of 2016, Fort Bliss has had 334 species of birds recorded on the installation (Fort Bliss, 2016). Eighty bird species are year-round residents of Fort Bliss and much of the ROI, 129 species are seen only during the spring and fall migration, 42 species are spring and summer residents, and the remaining 83 species occur principally during the winter (Fort Bliss 2000). Approximately 140 species are rare to very rare, 72 are uncommon, 89 are fairly common, and 32 species are common. Many species of water birds have been observed on playa lakes and stock tanks in the South Training Areas, the Doña Ana Range – North Training Areas, and McGregor Range as well as the El Paso Oxidation Ponds near the cantonment. Most of the birds on Fort Bliss are migratory and are protected primarily by the MBTA[36]. The Director of the

[36] https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php

Army Staff Policy Memo, dated February 6, 2018, clarifies that the prohibition on "taking" or "killing" of migratory birds only applies to deliberate actions intending to take migratory birds, their nests, or their eggs. Further, it requires military departments to minimize, to the extent practicable, incidental take of migratory birds without diminishing military readiness activities. Threatened and endangered species are addressed in the Protected Species section.

Mammals

A total of 58 species of mammals have been documented on Fort Bliss and an additional 20 species have the potential to occur thereon, including 17 species of bats (Fort Bliss, 2016). Within the ROI, predators and prey species occur across Fort Bliss. Predators include black bears, coyotes, foxes, badgers, bobcats, and cougars. Prey species include grazers like elk, deer, pronghorn, introduced oryx and barbary sheep, and numerous species of rodents, cottontail rabbit, and black-tailed jackrabbit. Specifically, the mesa grasslands are an important pronghorn habitat. Therefore, the pronghorn are primarily found on the Otero Mesa, south of Highway 506, the southeast McGregor Range, and the southern boundary of the northeast McGregor Range, north of Highway 506 (part of the Otero Mesa Ecological Management Unit [EMU]). Rodent surveys completed in 1997 and 1998 in the McGregor Range show the largest number of individuals and species in the swale and the acacia scrub habitat, and the lowest number was in the mesquite dunes. The montane habitats of the Huecos, Organs, and the Sacramento Foothills are significant as they provide different rodent species than are found in the grasslands and basin, including the Organ Mountains and gray-footed chipmunks.

3.4.2.1.3 Protected Species

The Fort Bliss INRMP contains a list of the 53 sensitive species of flora and fauna of protected status known to occur or have the potential to occur on Fort Bliss (Fort Bliss, 2016). Because of the diversity of habitats on Fort Bliss, there is the potential that species may occur that have not been identified or confirmed on post. Continued monitoring and improved documentation of Fort Bliss' natural environment ensures that sensitive species receive adequate protection if a new population is discovered. Protected species occurring on Fort Bliss property are managed by guidance contained within the Endangered Species Management Plan (ESMP) component of the INRMP.

Of the 53 sensitive plant and animal species, eight have federal protection status (Table 3.4-1). Three of these eight species are federally listed as endangered, four species are federally listed as threatened, and the Sprague's pipit is a candidate for federal listing. Of the federally endangered species, the Sneed's pincushion cactus, yellow-billed cuckoo, and the northern Aplomado falcon have been documented to occur on Fort Bliss. The other four federally protected species may occur on Fort Bliss, however, they have not been identified or confirmed on post. The survey and monitoring of existing populations of Sneed's pincushion cactus have occurred continuously since

1980—on South Hill, North Hill, and Webb Gap on Fort Bliss (Fort Bliss, 2016). The least tern was recently delisted by the USFWS.

Table 3.4-1 Federally Listed Species That May Occur on Fort Bliss

Common Name	Scientific Name	Federal Status
Northern Aplomado falcon	*Falco femoralis*	E
Southwestern willow flycatcher	*Empidonax traillii extimus*	E
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Yellow-billed cuckoo	*Coccyzus americanus*	T
Piping plover	*Charadrius melodus*	T
Sneed pincushion cactus	*Coryphantha sneedii var. sneedii*	E
Kuenzler cactus	*Echinocereus fendleri var. kuenzleri*	T
Sprague's pipit	*Anthus spragueii*	C

Northern Aplomado Falcon

The northern Aplomado falcon has a significant local interest. A special species status was designated in 2006, resulting in experimental releases of captive-reared birds within the states of New Mexico and Arizona. Currently, the northern Aplomado falcon is a transient species on Fort Bliss (Fort Bliss, 2000; Young et al., 2005). One to two Aplomado falcons have occurred for brief periods, mostly in the northern portion of Otero Mesa on McGregor Range. The most recent observation was of a first year male seen near Mesa Horse Camp in December 2017. Potential Aplomado habitat does occur on Fort Bliss (Figure 3.4-2).

Southwestern Willow Flycatcher

No confirmed observations and an appropriate nesting habitat does not exist on Fort Bliss.

Mexican Spotted Owl

An appropriate breeding habitat may exist in the mountains near Fort Bliss. Uncommon, only two sightings were reported near Fort Bliss.

Yellow-Billed Cuckoo

This species was observed in a survey in Soledad Canyon in the Organ Mountains and on the Otero Mesa (Fort Bliss, 2016).

Piping Plover

The species was observed in 1997 at the Fort Bliss sewage ponds.

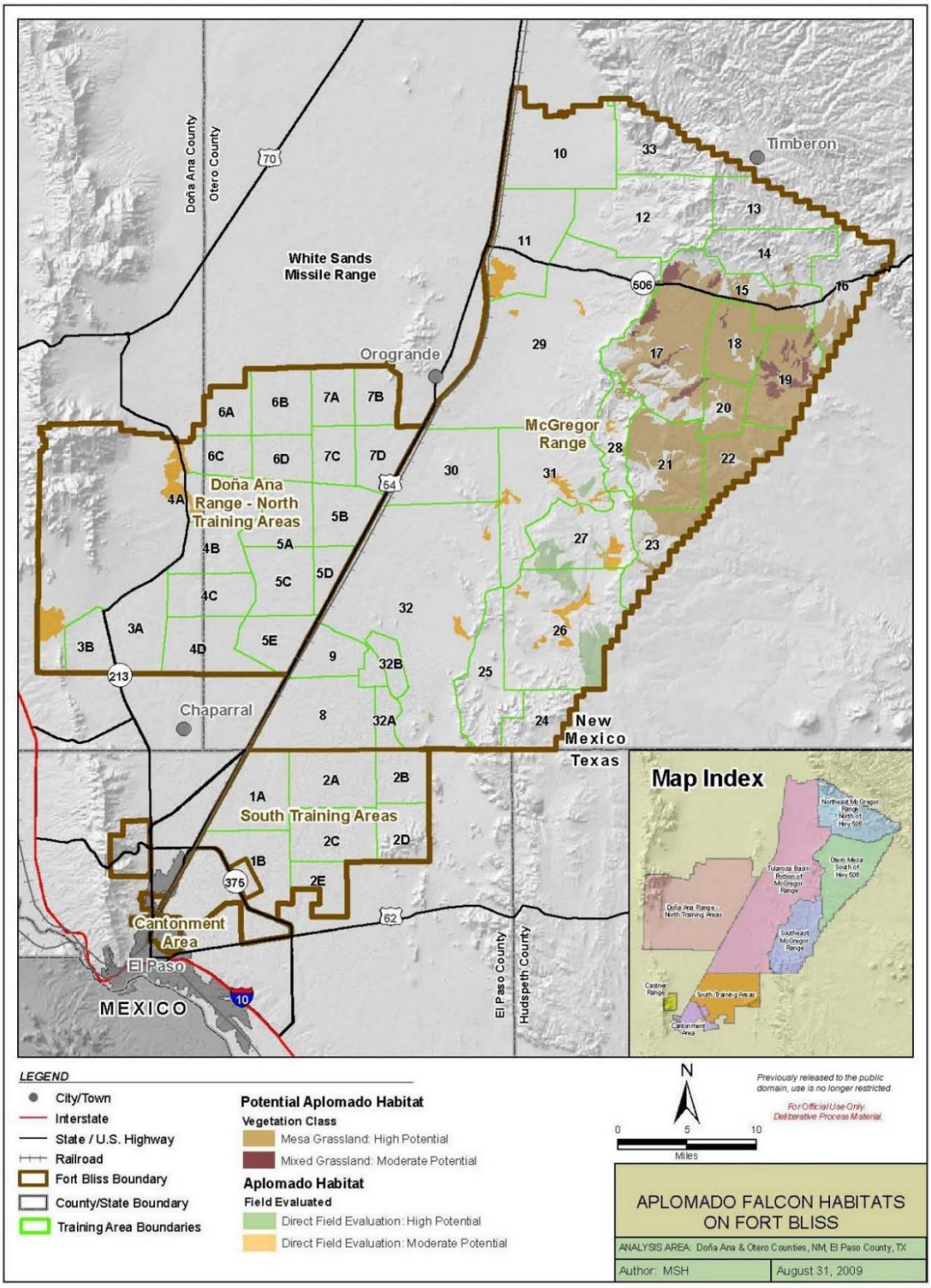

Figure 3.4-2 Aplomado Falcon Habitats on Fort Bliss

Sneed Pincushion Cactus

This species is both a federal and states of New Mexico and Texas endangered species. The Sneed pincushion cactus populations are located on specific limestone habitats in the Doña Ana Range – North Training Area. The areas are off-limits to all entry and military use.

Kuenzler Cactus

The Kuenzler cactus is listed as both a federal and state of New Mexico endangered species. A large survey within Fort Bliss is underway but no cacti have been found. The Northeast McGregor Range appears to be the most suitable habitat.

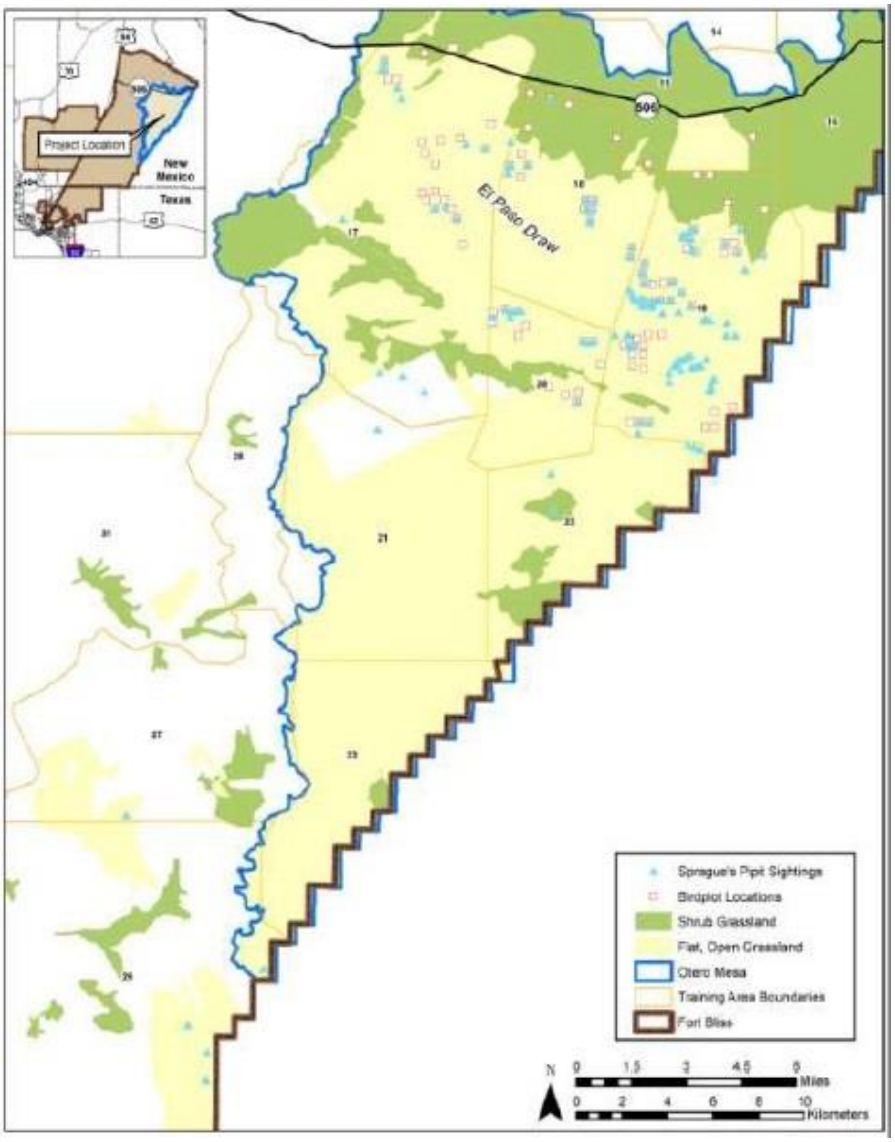

Figure 3.4-3 Sprague's Pipit Sightings on Fort Bliss

Sprague's Pipit

Sprague's pipit is associated with prairie habitat and breeds in the north-central United States. Texas is within its wintering range and it has been observed on Fort Bliss (Figure 3.4-3).

Bald Eagles

Bald eagles *(Haliaeetus leucocephalus)* are no longer listed under the ESA but are still protected by the BGEPA. Observations indicate that bald eagles using the northern portion of McGregor Range roost at a known roost site within the Lincoln National Forest, about 5 miles north of the FBTC boundary (Fort Bliss, 2001). Bald eagles will forage in winter within the Sacramento Mountains and occasionally occur on Fort Bliss.

Desert Night-Blooming Cereus

The desert night-blooming cereus *(Peniocereus greggii)* is a federal species of concern (SOC) and a state of New Mexico sensitive species. There have been more than 80 individuals documented within shrubland communities on Fort Bliss. It generally occurs in Chihuahuan Desert shrubland communities. Populations on Fort Bliss are documented on Doña Ana Range but are not documented in the Doña Ana Range – North Training Area. Fort Bliss has developed a threatened and endangered species management plan for the desert night-blooming cereus (Corral and Bill, 2000; Corral et al., 2000b-e). Areas with known populations of this species are restricted from Fort Bliss maneuver activities. Additional populations may occur outside of firing ranges and buffers, but that is unlikely due to lack of suitable habitat.

Fort Bliss Special Protection Species

Fort Bliss has designated three species of invertebrates as deserving special attention (U.S. Army Data, 2008). They are the Boulder woodland snail *(Ashmunella auriculata)*, Maple Canyon woodland snail *(Ashmunella todseni)*, and the Organ Mountains woodland snail *Ashmunella organensis)*. These snails are known to occur in the Organ Mountains and Doña Ana Range in the Doña Ana Range – North Training Area of Fort Bliss (NM Cooperative Fish and Wildlife Research Unit, 2001). Recent studies have refined the understanding of the species' distribution, but several questions regarding their taxonomy remain.

3.4.2.2 Environmental Consequences

Fort Bliss does not plan to construct new facilities or ranges to support the IDDS-A. Live-fire range usage is predicted to increase by 0.9%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and

endangered species at Fort Bliss. Impacts to biological resources at Fort Bliss are also addressed in section 3.2.1.2 and are expected to be at worst negligible and less than significant.

3.4.2.3 Cumulative Effects

Fielding of all 10 planned systems listed in section 3.3 may require construction of facilities to support the M-SHORAD. Other systems are expected to be fielded to existing units or replace existing equipment and may require expansion or renovation of existing facilities. Fort Bliss has identified a potential location for the M-SHORAD but funding is not available to execute the construction yet. There are expected to be less than significant impacts from the construction because the site is in a heavily built up area. An expected increase of soldiers of approximately 1.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. Adding up to 760 soldiers, 402 spouses, and 684 children at Fort Bliss is about 0.17% of the ROI population, a negligible amount. Overall cumulative impacts to biological resources are will be like those described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

3.4.3 Cultural Resources

3.4.3.1 Affected Environment

3.4.3.1.1 Cultural Resources Present

Fort Bliss contains over 20,600 identified archaeological sites and approximately 4,340 structures. Of those, 3,567 archaeological sites and 507 buildings and structures are listed or eligible for listing on the NRHP (Fort Bliss, 2017). Fort Bliss has three archaeological sites that are listed on the NRHP: Hot Well Pueblo, the Sgt. Doyle Site (pueblo), and Fusselman Canyon (rock art). The installation also contains one historic district, the Fort Bliss Main Post Historic District, listed into the National Register of Historic Places. Five additional historic districts separate and distinct from the Main Post are also eligible for listing; Army Field Forces Board No. 4 Historic District, 1st Guided Missile Group Training Facilities Historic District, Early Cold War Guided Missile Instruction Historic District (Areas A-F), 7000 Area Residential Community Historic District, and the Firebee/Towbee Drone Launch Complex Historic District..

Fort Bliss implements several measures to protect cultural resources against adverse effects from training, construction, and other ground-disturbing activities. Prior clearance is required before any digging. All caves and cave-like structures are off-limits. All new construction locations, plans, and alterations to historic structures require review by cultural resources staff. Military units are required to follow the SOP for the inadvertent discovery of cultural resources, especially possible human remains. Expert archaeology and historic preservation staff review training requests. Training activities are re-routed to avoid off-limits areas and other culturally sensitive areas. Cultural resources staff will consult with units to assist in compliance.

3.4.3.1.2 Consultation and Coordination with Indian Tribal Governments

Fort Bliss, the New Mexico and Texas SHPOs, and the ACHP operate under a Programmatic Agreement (PA) (2015–2025) which details how Fort Bliss meets cultural resources requirements under Sections 106 and 110 of the NHPA. The PA streamlines compliance under Section 106, outlining undertakings that do not require project-by-project review by SHPOs; however, 36 CFR 800 is followed when addressing Section 106 with federally recognized tribes. The PA includes standard operating procedures that provide for consistent, day-to-day management of mission undertakings carried out on the installation that may affect historic properties, including those resulting from training activities (Fort Bliss, 2017).

Fort Bliss maintains an ICRMP to protect and manage the installation's cultural resources in compliance with various federal laws and regulations. It integrates those management responsibilities with the installation's military training, construction, maintenance, and other mission-related activities. The ICRMP also includes an action plan whose goals include integrating preservation compliance requirements with planning and conducting military training and surveying for and evaluating sites on McGregor Range and other areas where the change in military training will have the greatest impact. The goals also include minimizing and mitigating adverse effects on all eligible properties in concert with the execution of military training and support activities (Fort Bliss, 2017).

3.4.3.2 Environmental Consequences

Since Fort Bliss does not plan on constructing ranges or facilities to support IDDS-A no impacts to cultural resources from construction are expected. The increase in range usage is predicted to be 0.9%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.2.2.

3.4.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the 10 planned systems listed in section 3.3 are described in section 3.2.2.2. They are expected to be negligible and less than significant for the same reasons stated in section 3.4.2.3.

3.4.4 Soils

3.4.4.1 Affected Environment

The ROI for soil impacts of the project is defined as all areas in which project-related activities may occur, including the footprint of each training and construction area and the corridors of the military vehicle roads. It would also include adjacent areas that may be affected by actions in the project area. For example, if a project area road cut or embankment experiences slope failure, adjacent affected downslope areas become part of the ROI. The ROI for soils is the area that may

be affected by proposed changes from facility construction and changes in training or intensity. It includes all Fort Bliss land other than the area within Lincoln National Forest and Castner Range.

The Earth Resources section in the SEIS (Fort Bliss, 2007) includes extensive descriptions of physiography, geology (including stratigraphy, structure, and mineral and energy resources), seismicity, and soils. The existing descriptions for these resources are descriptive of the entire Fort Bliss project area and are not specific to facilities or training areas within the project area. Resource data specific to facilities or training areas are presented for the cantonment area and the FBTC under each general resource type of physiography, geology, and soils, as appropriate. There have not been any substantive changes in the condition of the physiography, geology, and seismicity of the project area. They are not expected to be affected by the Proposed Action and alternatives considered in this document; therefore, this document will not address the physiography, geology, and seismicity in the project area. Soils have the greatest potential to be affected by the Proposed Action and the alternatives and are therefore addressed in detail. The description for each soil type emphasizes soil characteristics that would affect and be affected by construction and ground-disturbing training activities, especially off-road vehicle maneuvers in the FBTC.

In general, soils on Fort Bliss are well drained to excessively drained, with depth to bedrock ranging from shallow to very deep. Most soils on the North and South Training Areas are highly susceptible to wind erosion, while McGregor Range contains soils that are highly susceptible to both water and wind erosion. The Fort Bliss Soil Survey (U.S. Department of Agriculture [USDA], 2003) provides descriptions of general soil map units, grouped by landscape position, that are suitable for characterizing soils over a large area. The eight general soil map units are displayed in Figure 3.4-4. The basic characteristics of each of these general soil map units are shown in Table 3.4-2. Each soil map unit on Fort Bliss is a soil association, which is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps.

In arid and semi-arid lands throughout the world, vegetation cover is often sparse or absent. Nevertheless, in open spaces between the higher plants, the soil surface is generally not bare but covered by biological soil crusts, a complex mosaic of living organisms—algae, cyanobacteria (blue-green algae), bacteria, lichens, mosses, liverworts, and fungi—that grow on or just below the soil surface. Biological soil crusts function as living mulch by retaining soil moisture and discouraging annual weed growth. They reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (BLM, 2001). These areas are susceptible to becoming either coppice dunes surrounding vegetation or bare ground resulting in accelerated wind erosion if the time for recovery is not allowed after surface disturbance.

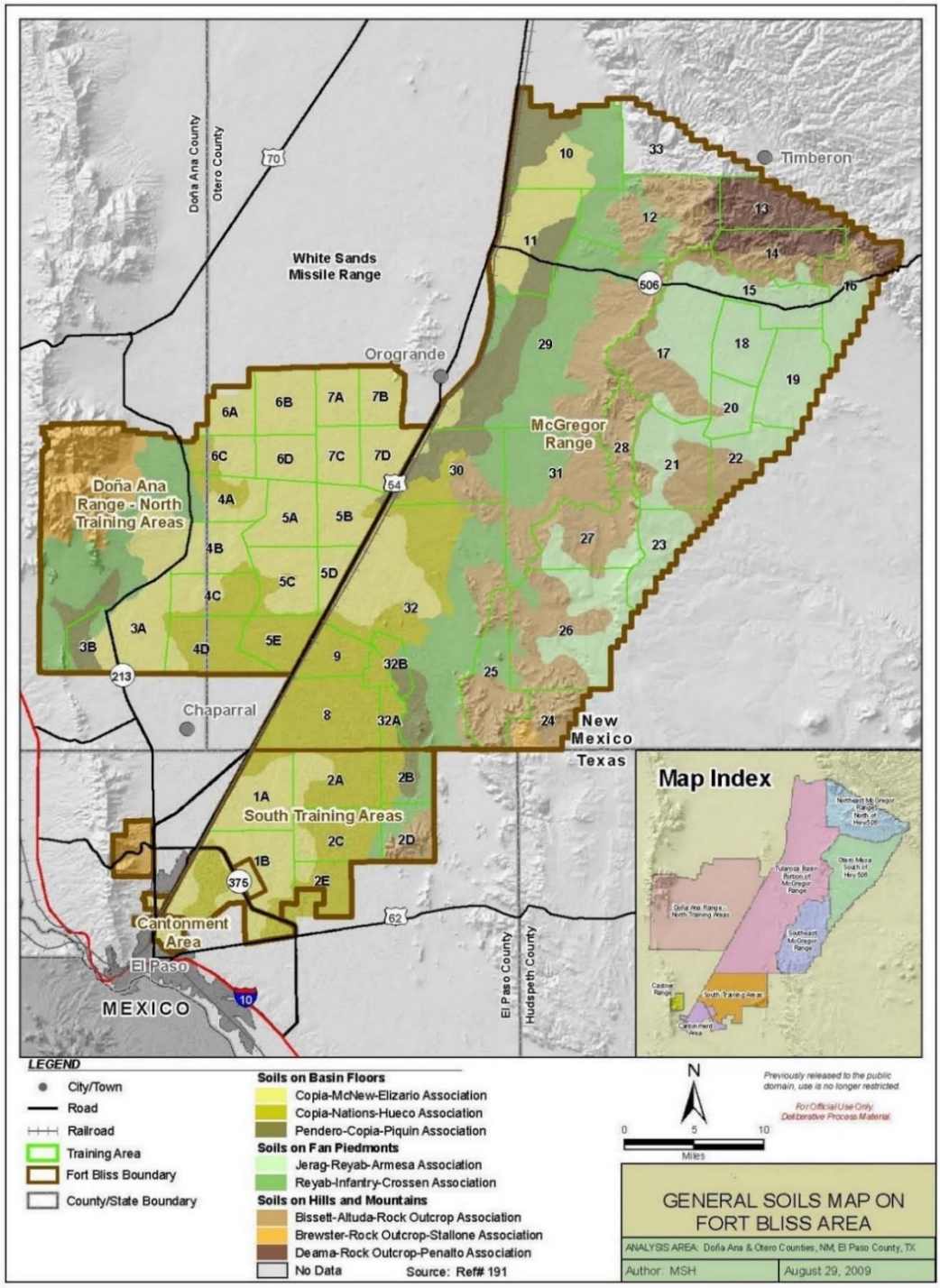

Figure 3.4-4 General Soils Map on Fort Bliss Area

The wind erosion hazard on Fort Bliss is high. The soil surface is dry, sandy, and sparsely vegetated, particularly in areas that have been denuded by military vehicle traffic. These soils are susceptible to dust generation and dune formation. Wind speeds in the El Paso area are relatively

moderate but can raise considerable dust and sand. The annual average wind speed in the El Paso area is 9.0 miles per hour (mph). Sandstorms occur most frequently during March and April, which have the highest average wind speeds—11.3 mph.

Table 3.4-2 Soil Characteristics on Fort Bliss

Landscape Position	Soil Association Map Name	% of Fort Bliss*	Physical Properties
Basin Floors	Copia-Mcnew-Elizario Association	22	2–5% slopes, very deep, well drained to excessively drained, a high proportion of sand on surface
	Copia-Nations-Hueco Association	15	0–5% slopes, very deep to moderately deep, loamy fine sand surface texture
	Pendero-Copia-Piquin Association	6	2–15% slopes, very deep, excessively drained, loamy fine sand to very gravelly sandy loam surface texture
Subtotal	Basin Floors	43	
Fan Piedmonts	Jerag-Reyab-Armesa Association	14	0–5% slopes, well drained, very deep to shallow, very fine sandy loam and silt loam surface texture
	Reyab-Infantry-Crossen Association	20	0-10% slopes, well drained, very deep to very shallow, surface texture mixed (silt loam, very gravelly loam, or gravelly fine sandy loam)
Subtotal	Fan Piedmonts	34	
Hills and Mountains	Bissett-Altuda-Rock Outcrop Association	16	5–65% slopes, well drained, shallow and very shallow, very gravelly or very cobbly loam surface texture
	Brewster-Rock Outcrop-Stallone Association	4	5–90% slopes, well drained, very deep to very shallow, very gravelly loam to extremely bouldery sandy loam surface texture and rock outcrop
	Deama-Rock Outcrop-Penalto Association	3	5–65% slopes, well drained, shallow and very shallow, very cobbly or gravelly loam surface texture
Subtotal	Hills and Mountains	23	

* Excluding Castner Range and Training Area 33 (Grapevine).
Source: USDA 2003

Fort Bliss Soil Survey

The Fort Bliss Soil Survey (USDA, 2003 and 2004) provides interpretations for specific military land uses. These include suitability ratings for construction and maintenance of buildings and roads, erosion hazards, and soil trafficability using a range of vehicles under wet and dry conditions. Table 3.4-3 summarizes the wind and water erosion and trafficability limitations, based on the vehicle classifications of light (L), medium (M), and heavy (H), of the soils on Fort Bliss.

Table 3.4-3 Wind and Water Erosion and Trafficability Ratings of Soils on Fort Bliss

Soil Erosion and Trafficability		Wind and Water Erosion and Trafficability Ratings of Soils[3]				
		Excellent/ Slight Limitations	Good[1]	Fair/ Moderate Limitations	Poor/ Severe Limitations	Not Rated[2]
Wind Erosion		1 %	N/A	0 %	99 %	0 %
Water Erosion		61 %	N/A	22 %	17 %	0 %
Trafficability, L-Classification	wet	0 %	65 %	0 %	11 %	24 %
	dry	58 %	0 %	9 %	11 %	22 %
Trafficability, M-Classification	wet	0 %	57 %	9 %	11 %	23 %
	dry	57 %	0 %	9 %	11 %	23 %
Trafficability, H-Classification	wet	22 %	58 %	1 %	15 %	1 %
	dry	70 %	10 %	1 %	15 %	1 %

[1] Applies only to vehicle trafficability ratings.
[2] Includes miscellaneous map units such as rock outcrops, pits, and dumps.
[3] Trafficability ratings are based on 50 vehicle drive-overs.
Source: USDA 2004

Trafficability refers to the capacity of soils to support military vehicles. Trafficability is affected by soil strength, slope, stickiness, slipperiness, vegetation, and natural obstacles. The degree of trafficability is determined by vehicle type, which is dependent on the contact pressure of tires or tracks and vehicle weight and the effect to the surface soil layer under wet or dry conditions. The ratings listed in Table 3.4-3 are for 50 vehicle drive-overs. An excellent rating means that soil features are very favorable for the vehicle to pass. A good rating indicates moderately favorable soil conditions. A fair rating indicates soil limitations that are likely to require adjustments to vehicle spacing or route. A poor rating indicates soil features that cannot be overcome. Areas with fair to poor trafficability may result in more vehicle wear and tear and thus requires greater vehicle maintenance (USDA, 2003).

The Fort Bliss Soil Survey also describes ecological sites (ecosites), which are a classification unit that represents an area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. The ecosites can be correlated with soil map units. Each ecosite

describes a typical plant community and uses a threshold concept to characterize changes in the system. The standard indicators used to determine thresholds are described in the 2007 SEIS and are not repeated in this analysis. These indicators primarily include measures of erosion by water and wind, plant community composition and production, and land cover (landscaping, pavement, buildings, gravel).

Soil Resources Management

An erosion and sediment control plan must be implemented as required by AR 200-1, AR 210-20 (*Real Property Master Planning for Army Installations)*, the INRMP, the New Mexico Administrative Code (NMAC) Title 20.1 Environmental Protection, General; and the Doña Ana County Erosion Control Regulations. New Mexico has enacted the Watershed District Act (New Mexico Statute 73-20-1), which authorizes the state conservation agency and the districts to develop and execute soil erosion and sediment control plans or programs. Texas Commission on Environmental Quality authorizes the General Permit to Discharge Wastes, which includes provision for erosion control from construction activities.

Soil management is coordinated through the Fort Bliss DPW-ED and ITAM – Directorate of Plans, Training, Mobilization, and Security. Plans to control or mitigate water or wind erosion must consider effects on the vegetative community, grazing, cultural resources, and natural resources, especially threatened and endangered species. Land Rehabilitation and Maintenance (LRAM) is one of the four components of the ITAM program. The purpose of LRAM is to repair damaged lands to facilitate military activities and to prevent further degradation of resources, including soil, in areas designated for military activities. The primary focus of LRAM is maneuver areas to include trails. Areas that need to be rehabilitated have been and will continue to be identified and restoration methods assessed.

Soil erosion and sediment control are managed in part through the LRAM program projects, which consist of strategies and resource allocations for resting and repairing training lands on a rotational basis as well as repairing damaged training areas as the need arises. LRAM seeks to stabilize soils and provide long-term vegetative cover to support military land use. The program involves using cost-effective technologies, such as revegetation, erosion control structures, site hardening, blockades, and dust palliatives to prevent training site degradation, soil erosion, and excessive trail damage.

Fort Bliss resource management objectives for ecosystems include the comprehensive goal to prevent deterioration of highly erodible soil resources (U.S. Army Data 2008).

3.4.4.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Bliss and range usage is expected to rise by only 0.9%, which is negligible. Therefore impacts to soils are expected to be negligible and less than significant and are addressed in section 3.2.3.2

3.4.4.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Action Alternative, may require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. Fort Bliss has identified a potential location for the M-SHORAD facilities but funding is not available to execute the construction yet. Impacts from construction are expected to be less than significant because appropriate measures would be taken to protect soil resources. Other systems are expected to be fielded to existing units or replace existing equipment so facility construction is not expected. An expected increase of soldiers of approximately 1.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The impacts are similar to those described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to soils.

3.4.5 Land Use and Compatibility

3.4.5.1 Affected Environment

Land use encompasses the general land-use patterns, land ownership, land management plans, and special use areas on Fort Bliss. The land use ROI includes the installation and areas adjacent to Fort Bliss boundaries in El Paso County, Texas, and Doña Ana and Otero Counties, New Mexico.

The installation presents two major settings: the developed cantonment adjacent to the urban and suburban areas of the city and county of El Paso, Texas, and the FBTC, with extensive open training areas, surrounded primarily by undeveloped, publicly owned lands. The FBTC encompasses approximately 98% of the installation's areal extent (Table 3.4-4).

Table 3.4-4 Fort Bliss Installation Components

Component	Square Kilometers (km^2)	% of Total
Cantonment Area including Biggs Army Airfield (AAF)	96	>2
Castner Range	27	<1
South Training Areas	373	8
Doña Ana Range – North Training Areas	1,196	27
McGregor Range	2,814	62
Total	4,506	100

Source: Fort Bliss 2010

Non-military land uses on Fort Bliss include livestock grazing and public recreation. Livestock grazing is permitted on McGregor Range. The FBTC issues recreation access permits and allows limited public access. Public access must be compatible with the military activities onsite at the

time. Examples of recreational activities include hunting, hiking, and bird watching. There are approximately 300 recreational passes issued annually, approximately 25% of which are for recreational activities other than hunting. The most frequented areas for recreation are the South Training Areas, in particular, TAs 1A and 1B (Locke, 2009). Recreational vehicular traffic is limited to designated roads and trails. When military activities are incompatible with public use, the entire training area is closed to public access.

3.4.5.1.1 Cantonment

The cantonment, presented in Figure 3.4-5, contains the heaviest concentration of facilities and mission support activities on Fort Bliss. It covers 1% of the total acreage of Fort Bliss and includes all of the installation south and west of Loop 375, and a portion east of Loop 375. Support services in the cantonment include administration, maintenance, service, storage, and supply buildings, housing, medical and community facilities and Biggs AAF.

The cantonment is designated for a single mixed-use land-use designation, as opposed to having specific areas designated for individual land-use categories. Facilities siting and development would continue to follow Army land-use compatibility criteria. In the cantonment, single-use "tactical campuses" accommodate the BCTs. As presented in the 2007 SEIS, a single mixed-use land designation supports the Army's transformation to a modular force by enabling BCT facilities to be planned as integrated enclaves, and also provides greater flexibility in responding to the evolving mission and facility requirements. Furthermore, the proximity of the BCT campuses to the South Training Areas reduces travel distances for training and minimizes the intrusion of BCT vehicular activity into the remaining cantonment area.

3.4.5.1.2 Range Complex

<u>South Training Areas</u>

The South Training Areas consists of seven training areas (TAs 1A-1B; 2A-2E).

Military Land Use. The South Training Areas are used primarily for on- and off-road vehicle maneuvers and close-in military training ranges.

Non-Military Land Uses. The South Training Areas contain public utility infrastructure, including water treatment facilities, deep-well injection sites, water wells, and gas and water pipelines. The Fred Hervey Water Reclamation Plant, Kay Bailey Hutchinson Desalination Plant, and the Fort Bliss Rod and Gun Club are located in the South Training Areas.

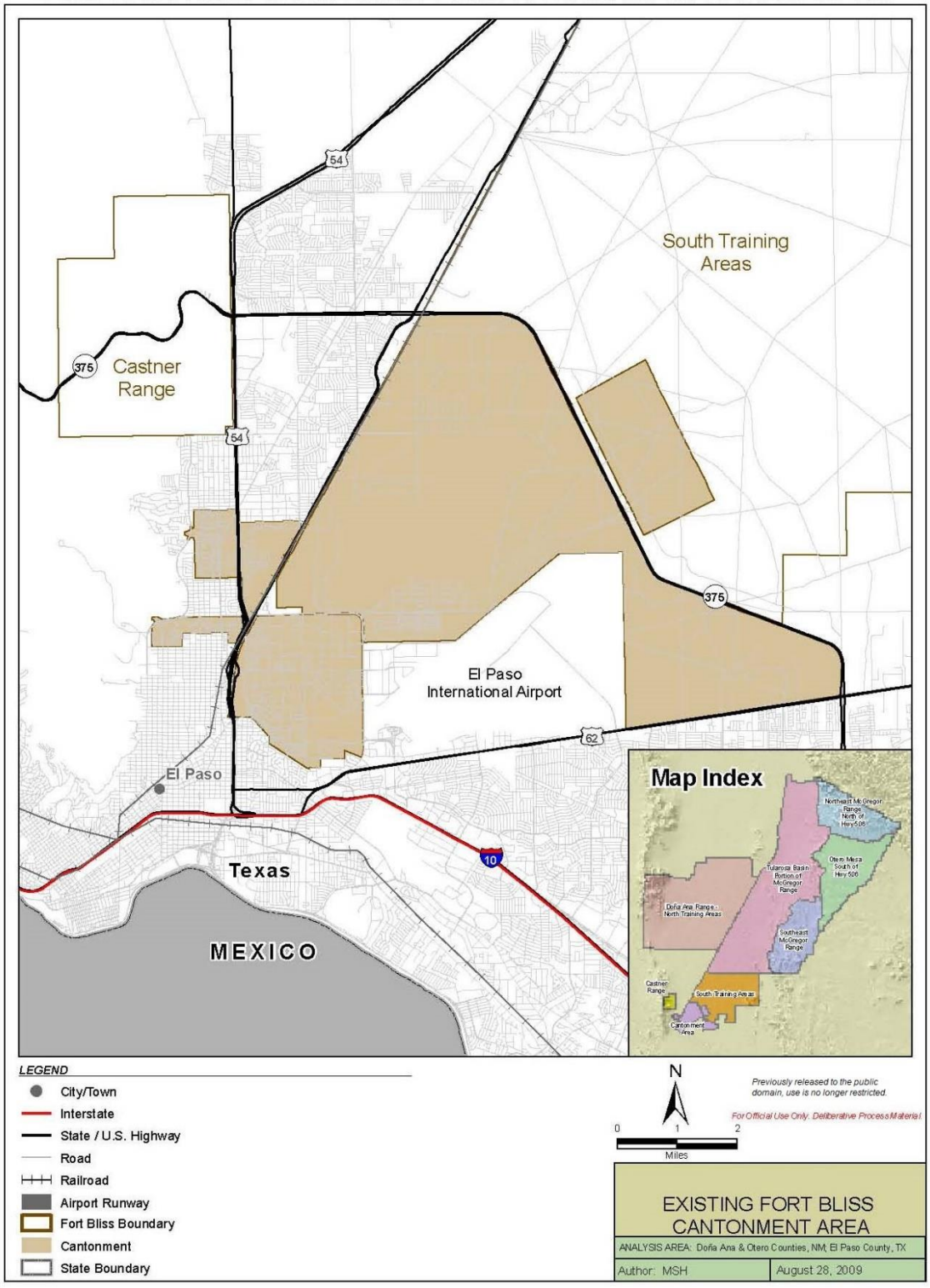

Figure 3.4-5 Existing Fort Bliss Cantonment Area

Doña Ana Range – North Training Areas

The Doña Ana Range – North Training Areas consists of 19 training areas (TAs 3A-3B, 4A-D, 5A-E, 6A-D, and 7A-D). War Highway (New Mexico Route 213) divides the Doña Ana Range complex from the North Training Areas. The majority of the Doña Ana – North Training Area is land withdrawn under Public Land Order 833 (circa 1952), and all management of the surface acreage is under the jurisdiction of the Army.

Military Land Use. A complex of weapons firing ranges is located to the west of War Highway, with their impact areas located in the foothills of the Organ Mountains. The North Training Areas are used primarily for on- and off-road vehicle maneuvering. Aerial drop zones and artillery firing areas are located in the western part of the North Training Areas. Two range camps, the Orogrande and the Doña Ana Range Camps, provide mission support facilities.

Non-Military Land Uses. War Highway (New Mexico Highway 213 and Ranch Road 3255 in Texas), a public access road, serves as the primary link between the city of El Paso and the White Sands Missile Range. Utility easements crossing portions of the Doña Ana Range – North Training Areas include above ground electric lines and underground gas pipelines. There is limited recreation in the Doña Ana – North Training Areas. The public's recent level of use of the Doña Ana – North Training Areas is low and can only be permitted when military activities are not using the training areas. In accordance with current Federal law, Fort Bliss is assessing options to allow some public use of Fillmore Canyon, in the northwest corner of the Doña Ana Range, in conjunction with military uses.

McGregor Range

McGregor Range is approximately 62% of the total Fort Bliss land area and contains 26 training areas occupying roughly 2,833 km^2 (700,000 acres). Approximately 87% of McGregor Range (more than 2,428 km^2 or 600,000 acres) is public land administered by the Bureau of Land Management (BLM) and co-managed by Fort Bliss and the BLM under a Memorandum of Agreement, per congressional withdrawal of public lands for military use (Public Law [PL] 106-65). Per the Memorandum of Agreement between BLM and Fort Bliss, Fort Bliss controls the construction and maintenance of improvements in hazardous and Army fee-owned areas, to include the boundary fence for McGregor Range. Approximately 10% (287 km^2 or 71,000 acres) is land owned-in-fee by the Department of Army. The remainder of McGregor Range, approximately 3% (73 km^2 or 18,000 acres), is part of the Lincoln National Forest, which is public land managed by the U.S. Forest Service (USFS).

Military Land Use. McGregor Range is used for a variety of missile testing and training programs, individual and collective training ranges, and unit field maneuvers. Two complexes of ranges exist: Orogrande Range Complex, east of the town of Orogrande, and Meyer Range Complex adjacent to the McGregor Range Camp, north of the Texas/New Mexico border. Wilde

Benton, a 2-mile long dirt airstrip, exists slightly north and east of the Orogrande Range Complex. Approximately half of McGregor Range, 1,425 km^2 (352,000 acres), permits heavy off-road vehicle maneuvers (i.e., tracked vehicles or large units). Controlled field training exercise activities (allowing concentrations of personnel and vehicles at fixed sites, and digging) are designated in areas where off-road vehicle maneuver is not permitted, except TA 33. Under a Memorandum of Understanding (MOU) between the USFS and the Army, military uses are permitted on TA 33 with the concurrence of the USFS (Fort Bliss 1999). Per the USFS Travel Management Policy, military activities are limited to dismounted maneuvers throughout TA-33 and off-road vehicle use is prohibited off designated routes except for traveling up to 300 feet (90m) from designated routes to access dispersed campsites (U.S. Forest Service, 2009).

Holloman Air Force Base uses the Centennial Bombing Range, consisting of approximately 21 km^2 (5,200 acres) on Otero Mesa south of Highway 506 (occupying portions of TAs 17 and 21), for air-to-ground target training.

Non-Military Land Uses. Non-military uses are allowed on McGregor Range, provided they do not conflict with military uses or pose safety risks to the public. The BLM's Record of Decision (ROD) and Resource Management Plan Amendment (RMPA) for McGregor Range, May 2006, details the most recent management plan for the 2,453 km^2 (606,233 acres) of public land now withdrawn from the public domain for military use (BLM, 2006). The RMPA details the co-management responsibilities of BLM and Fort Bliss on withdrawn lands and Army-fee owned lands with regard to lands, rangeland management, and recreation, as well as habitat management and special species management, cultural resources, and fire management. In May 2006, Fort Bliss signed a MOU with the BLM regarding the RMPA for McGregor Range. This document includes BMPs that, when applied properly, minimize adverse impacts on the McGregor Range ecosystem, and retains the reclamation potential of the disturbed area while accommodating land-user objectives.

Below is a summary of some key BLM/Fort Bliss responsibilities concerning land use on McGregor Range, inclusive of the RMPA MOU:

- *Public Road Access and Utility Easements.* The BLM authorizes rights-of-way (ROWs) on a case-by-case basis with the concurrence of Fort Bliss (BLM, 2006). Fort Bliss is responsible for authorizing right-of-way and short-term leases and permits on the Army fee-owned lands. Highway 506 provides access to the southeastern portion of Otero County and to Dell City, Texas, as well as to communities in the southern part of the Sacramento Mountains. For certain training activities, Fort Bliss closes Highway 506. Smaller range roads provide the only ingress to some grazing allotments in the northern part of McGregor Range on USFS land and in the Culp Canyon Wilderness Study Area (WSA). The RMPA designates two linear corridors to accommodate future utilities (e.g., power line, pipeline,

fiber optics) and identifies 171,948 acres to be excluded from consideration for any type of ROW unless otherwise mandated by law (ROW exclusion areas).

- *Public Recreation.* Fort Bliss and the BLM share responsibilities for access permits on both the withdrawn lands and the Army fee-owned lands. The BLM does not allow recreational off-road vehicle use on McGregor Range. (Per EO 11644, amended by EO 11989, this prohibition does not apply to combat or combat support vehicles when used for national defense purposes.) The New Mexico Department of Game and Fish (NMDGF), Fort Bliss, and the BLM share responsibilities for hunting on McGregor Range. The NMDGF authorizes hunts for deer, antelope, and other big game on McGregor Range in the joint-use areas.
- *Livestock Grazing.* The BLM is responsible for livestock grazing, including permitting/leasing and overall management on both the withdrawn lands and the Army fee-owned lands. The BLM and Fort Bliss share responsibilities for livestock water maintenance. The maintenance and construction of livestock control fences and water pipelines are the responsibility of the BLM for areas on McGregor Range outside impact areas. Fort Bliss is responsible for the maintenance and construction of livestock control fences inside impact areas on McGregor Range. The USFS manages livestock grazing on TA 33, also known as Grapevine Canyon.
- *Wilderness Study Areas (WSA).* The BLM and Fort Bliss share responsibilities regarding WSA management and compliance on the withdrawn lands. Pursuant to the Federal Land Policy and Management Act and the Wilderness Act of 1964, WSAs are roadless areas that the BLM manages so as not to impair their suitability for preservation as wilderness until Congress acts to either permanently protect them as Wilderness Areas or release them from WSA status to non-wilderness areas. Culp Canyon WSA consists of approximately 45 km^2 (11,000 acres) in TA 12. While Fort Bliss uses the WSA for military training, activity within the Culp Canyon WSA is limited to dismounted maneuver.
- *Area of Critical Environmental Concern (ACEC).* The 15 km^2 (3,718-acre) Black Grama Grassland ACEC is situated on four sites in the northeastern portion of McGregor Range. The BLM, Fort Bliss, and New Mexico State University share responsibility for the management of the Black Grama Grassland ACEC through a cooperative agreement among the three entities. The Black Grama Grassland ACEC is closed to motorized vehicle use.
- *Future Watershed and Habitat Plans*. The RMPA includes the future development of six watershed management plans and two habitat management plans (HMPs) for a total of 830 km2 (205,109 acres) in the Sacramento Mountains foothills on grasslands on Otero Mesa.

3.4.5.2 Environmental Consequences

Impacts to Land Use and Compatibility at Fort Bliss are described in section 3.2.4.2. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 0.9%, a negligible amount resulting in negligible, less than significant impacts.

3.4.5.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Proposed Action, may require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. Fort Bliss has identified a potential location for the M-SHORAD which does not change the land use, resulting in less than significant impacts from the construction. Other systems would field to existing units or replace existing equipment one-for-one. An expected soldier population increase of approximately 1.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The effects of the additional actions would be similar to those described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in minor, less than significant cumulative effects to Land Use and Compatibility.

3.4.6 Facilities

3.4.6.1 Affected Environment

The cantonment, also addressed briefly in the Land Use and Compatibility section, contains the heaviest concentration of facilities and mission support activities on Fort Bliss. Support services in the cantonment include administration, maintenance, service, storage, and supply buildings, housing, medical and community facilities, and Biggs AAF.

The cantonment has undergone major development and redevelopment to accommodate infrastructure and facility needs associated with changes in the Army structure and units, as per the 2007 ROD for the SEIS. The cantonment projects were identified from FY 2009 through FY 2015 on this programmed future development plan, dated December 11, 2008. Many of these projects renovated and upgraded existing facilities on the Main Post for reuse. Approximately 16 km^2 (4,000 acres) were developed within the cantonment and an additional 6 km^2 (1,500 acres) on the east side of Biggs AAF and along the existing ramp areas were developed. This acreage included approximately 5 km^2 (1,300 acres) of additional impervious surface area and 2 km^2 (21.9 million $feet^2$) of new building construction. The new development in the cantonment occurred to the north and east, up to and extending east of Loop 375.

Army facilities are built to meet the standards of the uniform facilities criteria using standard designs of MILCON requirements, standardization, and integration or similar documents.

Exceptions to the standard are available and if granted for a facility, it would be considered adequate.

3.4.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at Fort Bliss was assessed based on the Army Real Property Planning and Analysis System (RPLANS) records. Fort Bliss has a deficit of required facility space to support the IDDS-A TEMF as shown in Table 3.4-5.

Table 3.4-5 Facilities that may require construction at Fort Bliss

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Bliss available sq ft**	**One battery**	**Two batteries**
TEMF	1	28,304	0.6	(47,130)	N	N

Fort Bliss would plan to provide facilities for the IDDS-A battery on par with what other units stationed there typically receive. New construction is not needed to support this requirement. Most units on Fort Bliss are assigned less than the maintenance facility space required by doctrine. The IDDS-A would be provided the required vehicle maintenance space from existing facilities and this may require an exception to standard since it may be less than Army doctrine requires. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Fort Bliss has all range facilities needed to accommodate the live-fire training of one or two IDDS-A batteries. Live-fire range usage is predicted to increase by 0.9%, which is negligible.

Impacts to facilities are adequately addressed in section 3.2.5.2 and are expected to be negligible and less than significant.

3.4.6.3 Cumulative Effects

Fielding of the 10 planned systems, when combined with the Action Alternative, is expected to have less than significant, minor cumulative effects with minor or negligible increases of the impacts described in section 3.2.5.2. Additional facility requirements of the M-SHORAD have been accounted for in other analysis and are expected to be less than significant. Other systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities.

3.4.7 Water Resources

3.4.7.1 Affected Environment

3.4.7.1.1 Surface Water[37]

Surface water is rare and mostly ephemeral on Fort Bliss. There are a few perennial springs located within the Organ Mountains. These springs include Fillmore Spring, Globe Spring, Rock House Spring, Pine Spring, Dripping Spring, and Beasley Spring. Indian Spring is located on Castner Range in the Franklin Mountains. The only other semi-permanent surface water near Fort Bliss is the Rio Grande River, which is west and south of Fort Bliss. Surface water flows in the Rio Grande River vary greatly due to the upstream control of river water for irrigation and farming purposes. FBTC lands drain into closed basin systems[38]. Precipitation events in the surrounding mountains can lead to runoff water that collects in these basins. The result is trapped surface water in small, shallow lakes called playas.

The Doña Ana Range – North Training Areas and McGregor Range are located within two closed basin systems, the Tularosa Basin and the Salt Basin. The Salt Basin includes the eastern part of Otero Mesa and the southern slopes of the Sacramento Mountains foothills. The Tularosa Basin lies between the Sacramento Mountains to the east and the Organ and San Andres Mountains to the west. Both basins are characterized by small ephemeral streams that discharge toward the central areas of the basin.

3.4.7.1.2 Groundwater[39]

Most of the water used by Fort Bliss comes from underground aquifers drawn to the surface by wells. The El Paso area obtained an average of 24% of its potable water supply from the Rio Grande between 1967 and 2002 and the remaining 76% of its potable water supply from wells located in the intermontane-basin aquifers in the Hueco and Mesilla Bolsons (Fort Bliss, 2000).

Fort Bliss is located primarily in the Tularosa-Hueco Basin of the Basin and Range Physiographic Province with small portions in the Mesilla Basin and the Salt Basin. The principal aquifers in the Tularosa-Hueco Basin are the Hueco Bolson, which provides groundwater to the city of El Paso, the Fort Bliss Main Cantonment Area, and Ciudad Juárez, Mexico; and the Tularosa Basin, which underlies parts of Doña Ana, Otero, Lincoln, and Sierra Counties and portions of the Doña Ana Range – North Training Areas and McGregor Range.

The population and water use of El Paso and surrounding areas continue to expand and limited water supplies in the Hueco Bolson are drawing down. Water use would become more expensive

[37] Based on pg 2–36 of Fort Bliss 2016 INRMP.
[38] Personal communication. Garcia, E. Fort Bliss, 30 October 2020
[39] Based on pg 2–39 of Fort Bliss 2016 INRMP.

and may result in indefinite deliveries to customers. Contingency plans are in place for future water shortages. At present, water conservation policies are beneficial and necessary. Fort Bliss currently has a residential water conservation policy in effect that limits outdoor watering[40].

The Kay Bailey Hutchinson Desalination Plant has recently come online and is supporting the potable water requirements of Fort Bliss and El Paso by treating brackish groundwater that is too salty for consumption at a rate of up to 27.5 million gallons per day.

3.4.7.1.3 Water Quality[41]

Drinking water on Fort Bliss is obtained from groundwater sources. The Hueco Mesilla Bolson Aquifer is located east and west of the Franklin Mountains in far west Texas and is recognized as a major aquifer in Texas. Fort Bliss Water Services Company (FBWSC) currently owns and operates three community-based Public Water Systems (PWSs) within Fort Bliss.

Water distribution systems for Fort Bliss Main Post Area and Biggs AAF are self-sustaining systems, operating independently of one another. The primary water supply for these systems derives from wells located within the Fort Bliss Army Base property. None of this water is purchased from El Paso Water (EPW). East Biggs Water System is supplied by water that is purchased from EPW. In the event that the FBWSC water systems are incapable of providing sufficient supply, EPW water can be accessed via emergency interconnections to the FBWSC water distribution system.

3.4.7.1.4 Wetlands and Floodplains

Wetlands

All of the wetland habitats on Fort Bliss are regarded as important habitats for wildlife and protected accordingly.

Very few of the arroyo-riparian drainages and none of the playa lakes on Fort Bliss are regulated as jurisdictional wetlands as defined by the Army Corps of Engineers (USACE). The only known WOUS are on the west side of the Organ Mountains (part of the Rio Grande drainage), and some arroyos on McGregor Range that originate in New Mexico and cross into Texas and the Rio Grande drainage. One stormwater retention pond in the cantonment has been identified as a jurisdictional wetland by USACE (Fort Bliss, 2016). Whether federally regulated or not, Fort Bliss recognizes all arroyo-riparian drainages and playa lakes as important habitats for wildlife, limits activities along their borders, and maintains a no net loss of wetlands policy.

[40] Source: Fort Bliss Master Plan 2000.

[41] Fort Bliss Water Services Company, Inc. 2019. Water Quality Report - Fort Bliss PWS ID#: TX0710020, TX0710078, TX0710187. Fort Bliss Water Services Company, Inc. American States Utility Services, Inc.

Fort Bliss studies have identified 291 km^2 of arroyo-riparian drainage areas on the facility (Fort Bliss, 2000 and 2007). They were designated as LUAs in the ROD for the 2007 SEIS. These drainages are characterized by shrub, tree, and forb cover that is more diverse and dense than in the surrounding area. The highest species density and variety of shrubs, trees, grasses, and forbs is in the main channel rather than in adjacent areas. Montane riparian plant communities have a distinct mix of species, while the ephemeral drainages or dry arroyos that cross each of the other communities are less distinct. Canyons support diverse woodland and grassland riparian plant communities (Fort Bliss, 2010). These areas were mapped (U.S. Geological Survey, 1997) and tend to be inhabited more extensively by wildlife, particularly avian species, than adjacent upland areas (Kozma and Mathews, 1997).

Playa Lakes

A locally important natural resource, playa lakes are natural depressions that are ephemeral (seasonally flooded) and are typically wet in the summer and fall. These wetlands are usually ringed with vegetation and may be completely vegetated in the bottoms, or not vegetated at all. As with other wetland types, playa wetlands provide unique flora and fauna assemblages, important to the overall diversity and uniqueness of wildlife on the installation. The majority of the wetlands within Fort Bliss are playas, and occur mostly in the Basin Aeolian and Basin Alluvial areas of the Tularosa Basin of McGregor Range. A few widely distributed playas exist in the Foothill-Bajada and Otero Mesa EMUs. Playas are designated as LUAs, where concentrations of vehicles or personnel, fixed sites, and digging are not permitted.

There are a few springs in the Organ Mountains EMU and at least one in the Foothill-Bajada EMU on McGregor Range. The springs are in locations where off-road maneuvers do not occur. The vast majority of these wetland habitats are in the watershed of the Tularosa Basin of McGregor Range, a closed basin with no connection to jurisdictional waters of the United States.

Floodplains

Floodplains, by EO 11988 *(Supra)*, are “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a 1% or greater chance of flooding in any given year.” Figure 3.4-6 depicts the 100-year floodplains on Fort Bliss as defined by the FEMA. The majority of floodplain areas on Fort Bliss are in the FBTC. Only the far southwest corner of the cantonment area has a floodplain of approximately 310 acres that is not developed.

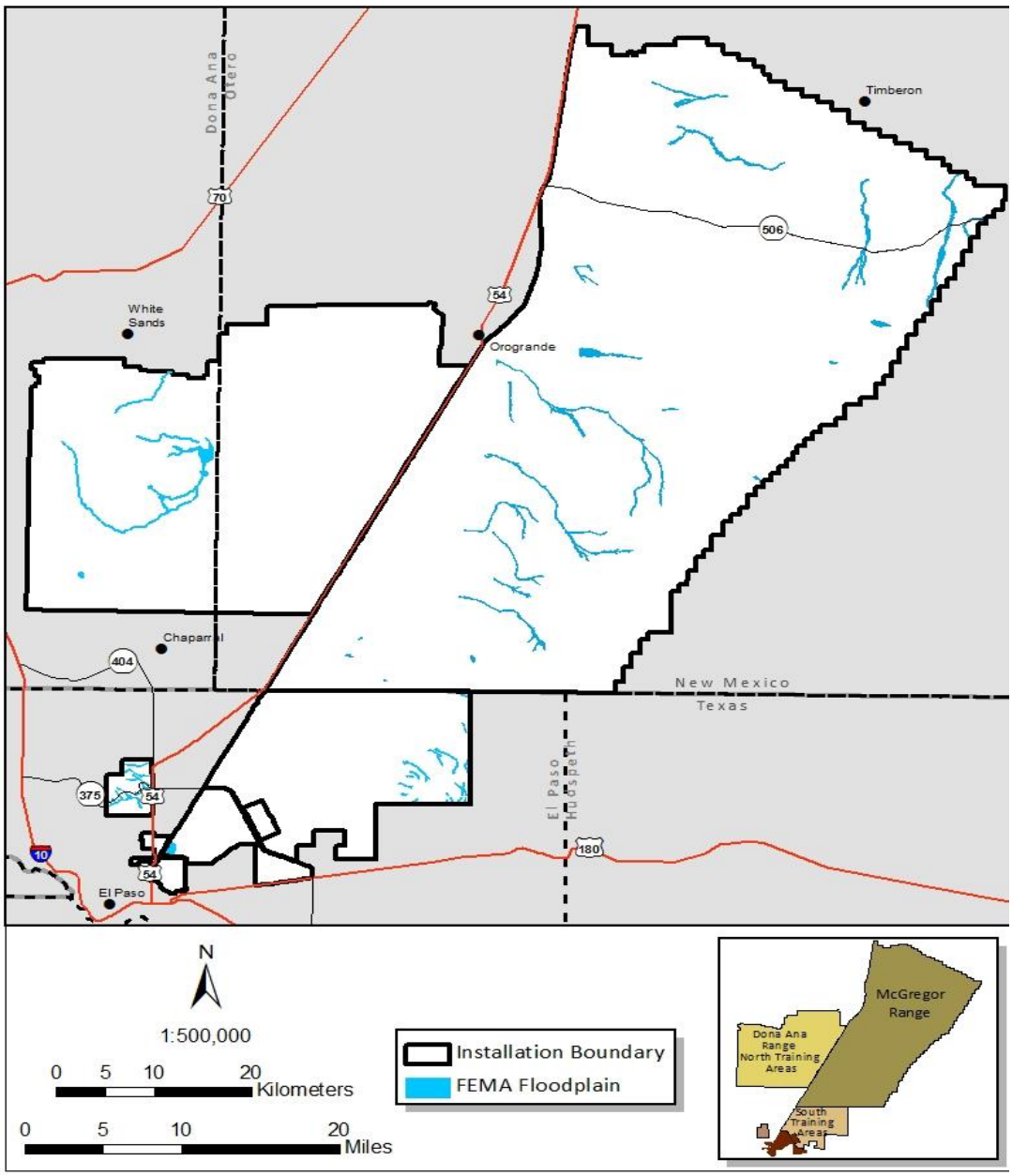

Figure 3.4-6 100-Year Floodplains on Fort Bliss

3.4.7.2 Environmental Consequences

The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. Fort Bliss does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 0.9%, which is

negligible. Impacts to water resources are adequately addressed in section 3.2.6.2 and are expected to be negligible and less than significant.

3.4.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the 10 planned systems is expected to have minor, less than significant cumulative effects to all water resources. The impacts are similar to those described in section 3.2.6.2. All the new systems except the M-SHORAD would be fielded to existing units with no additional facility requirements anticipated. The M-SHORAD impacts are also expected to be less than significant with a potential construction site having less than significant effects identified. The anticipated population increases of all 10 systems and IDDS-A is 1.6% for soldiers on Fort Bliss and including all family members is 0.17% within the ROI resulting in minor and negligible impacts, respectively, to waters, water use, and potential water quality degradation.

3.5 FORT HOOD, TEXAS[42]

3.5.1 Background

Fort Hood is an Army installation located in Bell and Coryell Counties, Texas, 60 miles (96.6 km) northwest of Austin and 50 miles (80.5 km) southwest of Waco (Figure 3.5-1). It covers more than 218,823 acres (88,555 ha), including 132,525 acres (53,631 ha) used for maneuver, 64,272 acres (26,010 ha) for a live-fire impact area, and 22,026 acres (8914 ha) for the installation's cantonment areas. There are three cantonment areas: the main cantonment, West Fort Hood (WFH), and North Fort Hood (NFH).

Units located at Fort Hood include:

- The III Corps,
- 1st Cavalry Division,
- Division West – First Army,
- 13th Sustainment Command (Expeditionary),
- 3rd Air Support Operations Group (Air Force),
- 3rd Cavalry Regiment,
- 36th Engineer Bde,
- 48th Chemical Bde,
- 69th Air Defense Artillery Bde,
- 89th Military Police Bde,
- 407th Army Field Support Bde,
- 504th Battlefield Surveillance Bde,
- U.S. Army Operational Test Command,
- Carl R. Darnall Medical Center,
- Warrior Transition Bde,
- 47th Explosive Ordnance Detachment (EOD),
- Criminal Investigation Command (CID), and the
- Network Enterprise Center.

Fort Hood exists to train its assigned units, as a mobilization station for Army Reserve and National Guard units, and as a strategic power projection platform.

[42] Affected environment descriptions for Fort Hood were taken from the Environmental Assessment for The Stationing Actions to Support the Grow the Army Initiative Fort Hood, Texas, dated 2009, prepared by the U.S. Army Environmental Command.

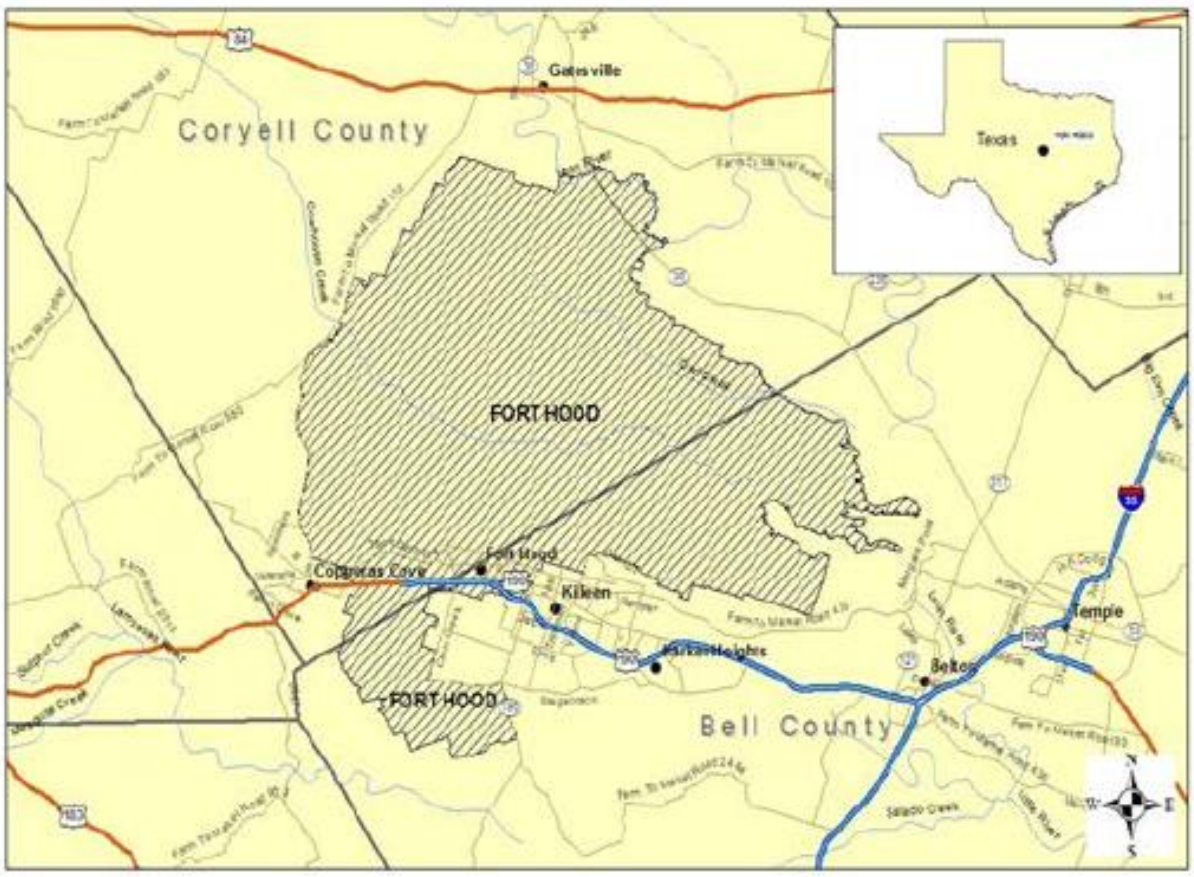

Figure 3.5-1 Location of Fort Hood

3.5.2 Biological Resources

3.5.2.1 Affected Environment

The ROI for biological resources is the entirety of Fort Hood.

3.5.2.1.1 Flora

The two dominant types of vegetation at Fort Hood are grasslands and forest and shrub communities (Figure 3.5-2). Historically, grasslands occurred in valleys and lowlands, and in isolated patches on hills where disturbance occurred. When taken as a whole: wooded mesas, hills, and canyons occupy a large land area of Fort Hood. Wildland fires, which are a natural component of grasslands, were suppressed to prevent impacts on structures and to minimize the risk to human life. With the suppression of fires and the loss of competitive grasses due to military training and livestock grazing, Ashe juniper *(Juniperus ashei)* and other woody vegetation of the rocky slopes encroached into the grasslands, forming dense thickets in many areas and reducing forage production (Fort Hood, 2006).

Grassland communities are found throughout the installation but are most common in the live-fire zone/impact area and the Western Maneuver Area. Wildland fires caused by various training activities in these areas likely reduce the woody vegetation and allow grasses to dominate. Grassland areas are composed primarily of perennial herbaceous species characteristic of mid-grass habitats. Common grass species include little bluestem (*Schizachyrium scoparium*), hairy grama (*Bouteloua hirsuta*), and sideoats grama (*Bouteloua curtipendula*). Common forbs are broomweeds (*Amphiachyris sp.*), ragweed (*Ambrosia artemisiifolia*), and snow-on-the-prairie (*Euphorbia bicolor*). Remnant patches of tallgrass prairie vegetation are dominated by yellow Indiangrass (*Sorghastrum nutans*) and big bluestem (*Andropogon gerardii*) (USACE, 1999).

Forest and shrub communities are a major component of the installation. The majority of these habitats are found on the rocky slopes and hillsides or mesas; smaller amounts of woodlands occur in narrow bands along streams. Over time, forest and shrub vegetation has expanded into areas that were once grasslands because of a combination of factors, including fire suppression, training disturbance, and continuous grazing by livestock (USACE, 2003).

Three distinct forest and shrub communities have been classified: coniferous forest and shrub, deciduous forest and shrub, and mixed forest and shrub. Small pockets of coniferous forest and shrub communities are found throughout the installation. They are primarily composed of Ashe juniper (*Juniperus ashei*, commonly referred to as "cedar"), a dominant coniferous species in the area (USACE 2003). Another relatively uncommon vegetation association throughout the installation is the deciduous forest and shrub community. This community is composed of broad-leaf trees and shrubs and is found near streams in lowlands and on protected slopes. Tree species representative of this community include plateau live oak (*Quercus fusiformis*), post oak (*Quercus stellata*), pecan (*Carya illinoinensis*), and sycamore (*Platanus occidentalis*) (Fort Hood, 2006).

The most common vegetation community on the installation is the mixed forest and shrub community. In some areas, Ashe juniper dominates over either plateau live oak or Texas oak (*Quercus buckleyi*), and in others, the oaks dominate over the Ashe juniper (USACE, 1999 and 2000). Lack of fire and overuse by livestock are primary factors leading to increases in Ashe juniper and other woody plants in the Edwards Plateau (Smeins et al., 1997).

Ashe juniper is a native plant. However, it was historically confined to steep slopes and ridges where naturally occurring fires did not reach. Following European settlement, fires were slowed or stopped. This plant has since encroached onto prairies and oak savannahs and replaced several woody and grass species. Stands of Ashe junipers can block the line of sight for training aid devices simulator and simulations (TADSS), the Army's primary non-live-fire training systems. Despite the encroachment of the Ashe juniper, it is an essential component of the endangered golden-cheeked warbler habitat.

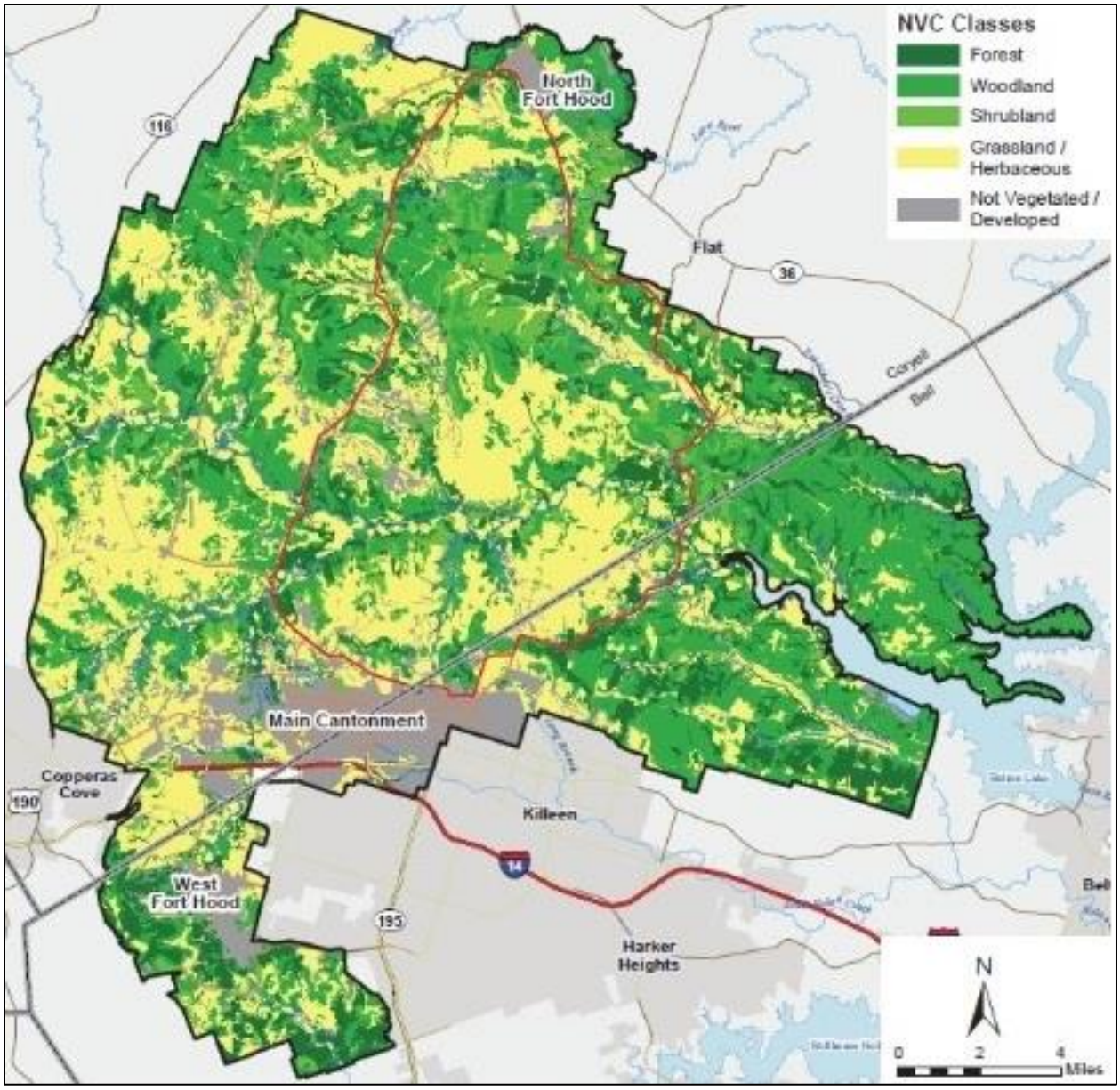

Figure 3.5-2 Fort Hood Land Cover
Source: Fort Hood 2019

3.5.2.1.2 Fauna

There are approximately 199,000 acres of mission land suitable for fish and wildlife management. There are 692 surface acres of lakes and ponds, 816 miles of rivers and permanent streams, and 43 miles of shoreline access to Belton Lake. Several projects are ongoing and planned to maintain or improve fish and wildlife habitat. Although not intended primarily for the benefit of wildlife, most of the planned elements being installed for other purposes would benefit fish and wildlife. Current fish habitat management includes lake renovation, shoreline

improvement, aquatic weed management, and dam and spillway repair. Fort Hood's animal species include most animals indigenous to this part of Texas. The wildlife management program at Fort Hood is targeted toward restoring the ecological health of the mission lands (Fort Hood, 2006).

Fort Hood coordinates with the USFWS on issues regarding fish and wildlife management, as well as for regulatory issues concerning the ESA or the MBTA. Buffers are maintained around nesting sites to assist in compliance with protective regulations.

3.5.2.1.3 Protected Species[43]

The Table 3.5-1 lists the federally listed threatened and endangered species that occur or may occur on Fort Hood. Figure 3.5-3 shows the extent of the endangered species habitat on Fort Hood.

Table 3.5-1 Protected Species on Fort Hood

Common Name	Scientific Name	Status
Whooping Crane	*Grus americana*	E
Golden-cheeked warbler	*Dendroica chrysoparia*	E
Salado Salamander	*Eurycea chisholmensis*	T
Smalleye Shiner	*Notropis buccula*	E
Sharpnose Shiner	*Notropis oxyrhynchus*	E
Texas fawnsfoot	*Truncilla macrodon*	C
Smooth pimpleback	*Quadrula houstonensis*	C

E= Endangered T=Threatened C=Candidate

Whooping Crane

The whooping crane is a rare migrant. Three whooping cranes were sighted in 2017, and this species was previously documented on Fort Hood. They may fly over or near Fort Hood during spring and fall migration. They may stop at Belton Lake during migration and have been observed at other wetland areas on Fort Hood.

Golden-cheeked Warbler

Research and conservation efforts for this species on Fort Hood have been numerous. Research projects have included nest survival rates, forest cover and its impacts on density, and nest predation. Current ongoing research includes a breeding range-wide geolocator study to determine migration corridors and overwintering site fidelity; impacts of geolocators on reproductive success, site fidelity, and survival; and source-sink population dynamics.

[43] Source: Fort Hood 2019 INRMP and FWS ECOS database access on May 1, 2020.

Monitoring and research activities for the warbler on Fort Hood were initiated in 1991 and continue through the present.

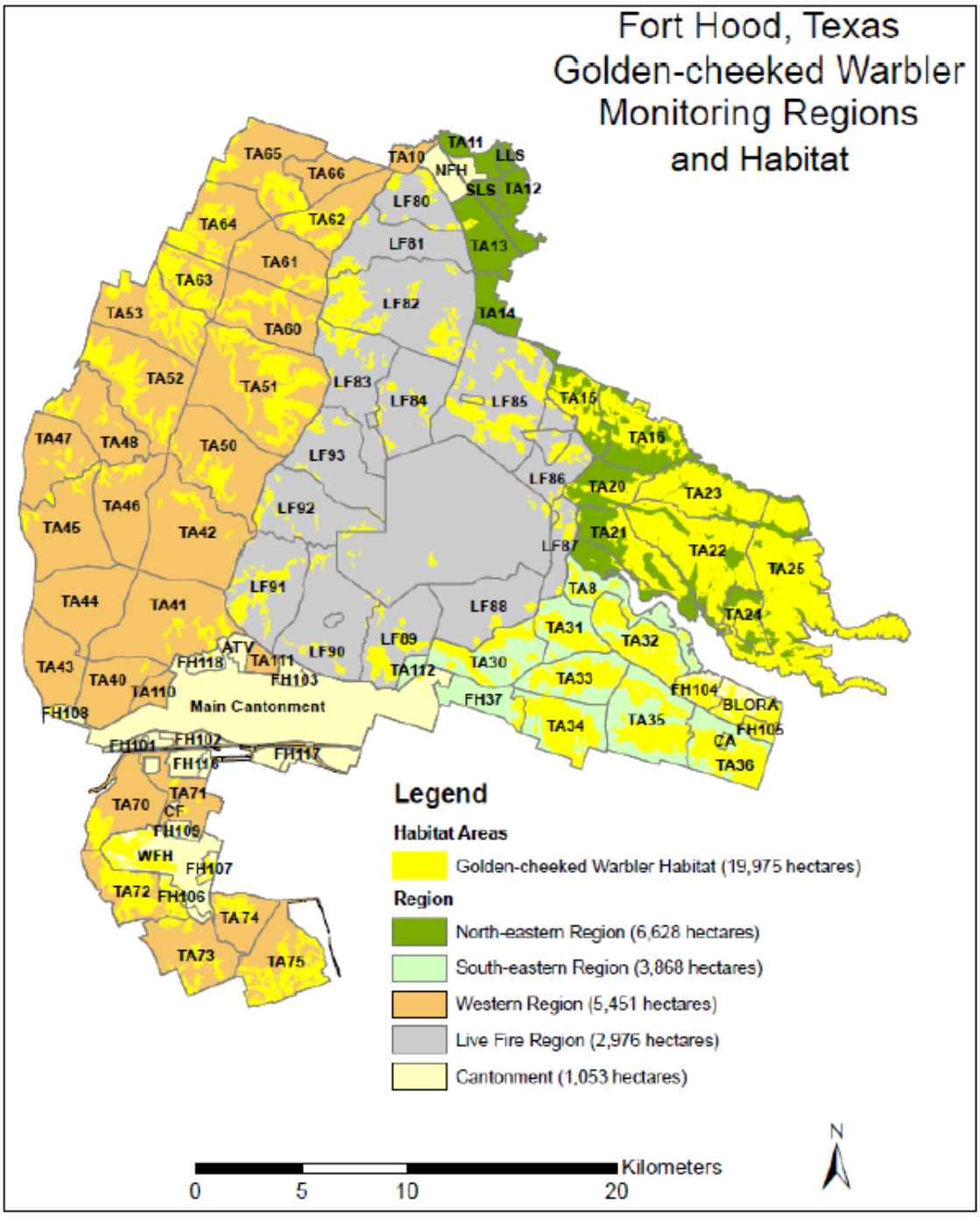

Figure 3.5-3 Golden-cheeked Warbler Monitoring Regions and Habitat
Source: August 31, 2020 Biological Opinion (02ETAR00-2020-F-0856)

Past monitoring (1991–2015) efforts include point count surveys to determine detection rate and trends, while current monitoring efforts employ distance sampling to determine population estimates and trends. Current and past research includes demographic monitoring in selected study sites, research in habitat selection, studies to determine the effects of habitat fragmentation and wildland fire on warbler demographics, and population viability analyses. Golden-cheeked warbler monitoring regions and habitat are shown in Figure 3.5-3

The USFWS issued a biological opinion (BO) in August 2020. This BO adds additional flexibility through an adaptive management approach which gives the Army the ability to manage project parameters within the guidelines outlined in the Incidental Take Statement.

The area of the proposed and ongoing actions in the 2020 BO is limited to the boundaries of Fort Hood. Training activities conducted at Fort Hood include maneuver exercises for units up to brigade level, live-weapons firing, and aviation training. The Proposed Action consists of ongoing military training and other activities, land management, range improvements, and other associated activities to support the military mission, including endangered species management. Additionally, this opinion includes a section on adaptive management. Incorporating an adaptive management framework is intended to provide additional flexibility to the Army and improve upon management and minimization techniques to endangered species.

The majority of the Proposed Action in the 2020 BO is composed of training range improvements and ongoing military training activities. Other minor actions include endangered species management, recreation, cattle grazing, and monitoring and research. Historically, military training activities have resulted in incidental take of the golden-cheeked warbler, which has been well documented. It is anticipated that incidental take would continue to occur on Fort Hood at slightly elevated levels due to the proposed permanent and temporary loss of habitat. Even at this elevated level, the years of monitoring and research conducted at Fort Hood indicate that the long-term population viability of the golden-cheeked warbler within the action area would be sustained. Most importantly, Fort Hood has committed to continue to monitor and manage their endangered species populations for long-term conservation.

Salado Salamander

The natural habitat of the Salado salamander is freshwater springs. They were found only from a few springs that feed Salado Creek in Bell County, Texas.

Smalleye Shiner

The smalleye shiner is a species of ray-finned fish. It is found only in the upper Brazos River basin of Texas.

Sharpnose Shiner

The sharpnose shiner has historically occurred on a tributary to the Leon River, which would not be affected by activities on Fort Hood.

Texas Fawnsfoot

The Texas fawnsfoot has a distribution straddling the Brazos River and the Colorado River in the San Saba, Lampasas, and Mills County regions.[44]

Smooth Pimpleback

The smooth pimpleback is found along the southern halves of the Colorado and Brazos Rivers in Texas. They may occur on Fort Hood in tributaries to the Leon River.

3.5.2.2 Environmental Consequences

Since Fort Hood does not plan on constructing ranges or facilities to support IDDS-A no impacts to biological resources from construction are expected. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species at Fort Hood. The increase in range usage is predicted to be 0.6%, a negligible amount that may result in negligible, less than significant impacts. More detailed impact information is in section 3.2.1.2.

3.5.2.3 Cumulative Effects

Fielding of all 10 planned systems listed in section 3.3 could require construction of facilities to support the M-SHORAD and may also require expansion or renovation of existing facilities. Fort Hood does not intend to construct facilities for M-SHORAD if it is fielded there. An expected increase of soldiers of approximately 2.1% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. Adding up to 760 soldiers, 402 spouses, and 684 children at Fort Hood is about 0.42% of the ROI population, a negligible amount. Overall cumulative impacts to biological resources are similar to those described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

The Army has plans and funding to construct Infantry Squad Battle Course (ISBC) and Infantry Platoon Battle Course (IPBC) ranges in the future at Fort Hood. Impacts from construction

[44] USFWS. 2016. https://www.fws.gov/southwest/es/Documents/R2ES/AUES_Mussels_DRAFT_maps_20160915.pdf

would be like those described in Section 3.2.1.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements and use of SOPs and BMPs will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.5.3 Cultural Resources

3.5.3.1 Affected Environment

The ICRMP for Fort Hood, Texas, provides a description of the history of the III Corps and Fort Hood (Fort Hood, 2015). The ICRMP includes the Historic Properties Component (HPC) for Fort Hood, Texas, (Fort Hood, 2015). The HPC contains a detailed description of the prehistoric and historic background for the land encompassed by the installation as well. Both documents are incorporated by reference.

Cultural resources are prehistoric and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on the condition and historic use, such resources may provide insight into living conditions in previous civilizations and may retain cultural and religious significance to modern groups. The land occupied by Fort Hood is associated with the history of American Indians, western settlement, and the military history of the United States. Numerous and varied cultural resources within the boundaries of Fort Hood have been documented through extensive and systematic investigations.

3.5.3.1.1 Cultural Resources Present

The Fort Hood Cultural Resource Manager currently has oversight responsibility for 218,823 acres of land at Fort Hood, including 196,791 acres designated range and training lands. Included within these training lands is 5,592 acres of USACE property around Belton Lake that Fort Hood currently manages under a land-use permit with the USACE.

All of the training and cantonment areas and the majority of the live-fire area have been systematically surveyed (Figure 3.5-4). The impact areas or surface danger zones account for the greatest portion of the unsurveyed areas of Fort Hood. The archeology sites that have been determined to be historic properties are located throughout the installation and are not indicated in Figure 3.5-4. The total amount of unsurveyed area within the installation is approximately 16,300 acres (Fort Hood, 2015).

Historic Sites Inventory

Fort Hood's archaeological inventory contains 2,258 archeological sites, including 1,130 historic and 1,128 prehistoric sites. Features within specific historic sites can include, but are not limited to, concentrations or scatters of specific artifact types, hearths or baking pits, burned rock middens and mounds (earth ovens), post molds, and burial grounds. Historic sites are those related to European settlement and usually have documentation associated with the land use. Prehistoric sites are those related to earlier Native American land use. These sites were identified by archaeologists conducting pedestrian surveys (Fort Hood, 2015).

Properties of Traditional Religious and Cultural Importance

Fort Hood has conducted an inventory of traditional cultural properties or sacred sites in FY 2014 for the Comanche Nation. Identified prehistoric archeological resources include one Native American sacred site. This site is actively used for ceremonial purposes regularly (Fort Hood, 2015).

Cemeteries

At least 19 cemeteries have been documented within installation boundaries at Fort Hood. In 1943 and 1953, several large cemeteries were disinterred, and the human remains were relocated to previously established cemeteries in local communities. Smaller cemeteries with less than 50 interments were allowed to remain (Fort Hood, 2006). Fort Hood Regulation 210-190 describes the Army's role in the upkeep and conditions for the interment of these remaining cemeteries.

Fort Hood manages the Comanche National Indian Cemetery (CNIC) which was established in 1991. The cemetery is located in a protected set-aside area, strictly for Native American use and reburial of NAGPRA-related remains and objects.

Buildings, Structures, Districts, Landscapes, and Objects

Fort Hood has inventoried all structures on the installation and is currently in the process of identifying and assessing the buildings and landscapes that are important to local and national heritage and may be eligible for listing in the NRHP. Fort Hood has recently identified seven historic landscapes within the cantonment areas: (1) the Capehart and Wherry family housing, (2) the Headquarters/Ceremonial Landscape, (3) the Hood AAF, (4) the Killeen Base, (5) the Motorpool Corridor, (6) the Railroad and Transportation Corridors, and (7) the Unaccompanied Personnel Housing. The original post chapel, Building 53, is a significant contributing element of the headquarters/ceremonial landscape. Buffers are maintained around all significant sites and documented on maps restricting activities such as digging or staking.

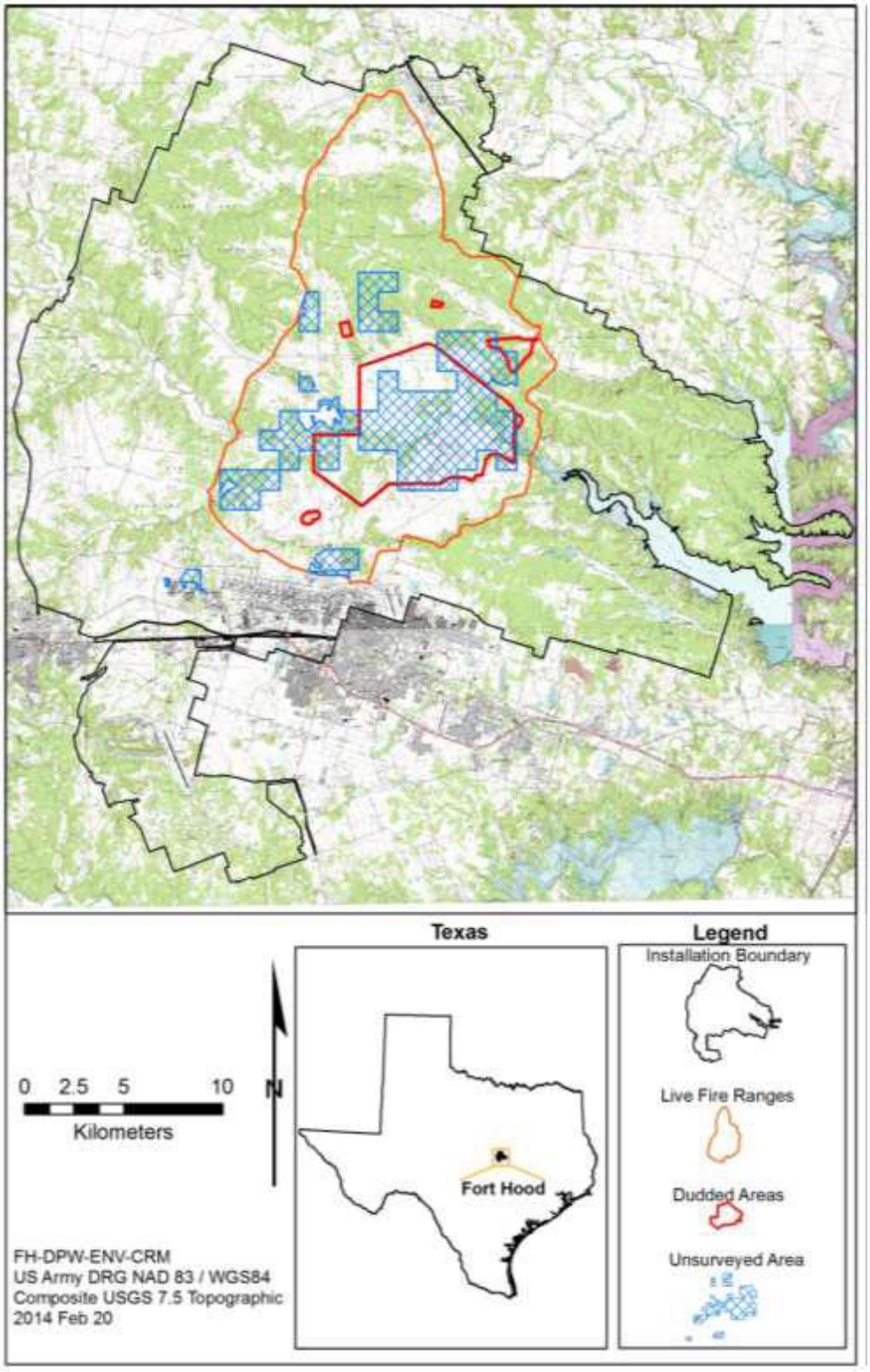

Figure 3.5-4 Installation Map Depicting Unsurveyed Cultural Resource Areas

3.5.3.1.2 Consultation and Coordination with Indian Tribal Governments

Native American Resources

There are seven federally recognized Native American tribes affiliated with the lands of the installation—the Apache Tribe of Oklahoma, Caddo Nation, Comanche Nation, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Tonkawa Tribe of Oklahoma, and Wichita and Affiliated Tribes (Keechi, Waco, and Tawakonie). There is one Native American TCP located at Fort Hood—the Leon River Medicine Wheel—which has been recognized by tribal representatives and is used for ceremonial activities. Access to the location of the Medicine Wheel is restricted to Native Americans and Fort Hood cultural resource personnel for condition monitoring. Fort Hood has not conducted a systematic inventory of traditional cultural properties or sacred sites. Another Native American resource at Fort Hood is the CNIC that was established in 1991 for the reburial of remains that had been recovered since the establishment of Fort Hood (Fort Hood, 2006).

3.5.3.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Hood and range usage is expected to rise by only 0.6%, which is negligible. Therefore impacts to cultural resources are expected to be negligible and less than significant and are addressed in section 3.2.2.2

3.5.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the 10 planned systems listed in section 3.3 would be similar to those described in section 3.2.2.2. They are expected to be at worst minor and less than significant for the same reasons stated in section 3.5.2.3.

The Army has plans and funding to construct ISBC and IPBC ranges in the future at Fort Hood. Impacts from construction would be like those described in Section 3.2.2.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements to account for historic properties and use of SOPs and BMPs will reduce anticipated impacts. Impacts from the construction and use of the new ranges are expected to be at worst minor and less than significant when combined with the Action Alternative.

3.5.4 Soils

3.5.4.1 Affected Environment

Fort Hood is located on a deeply dissected limestone plateau underlain by erosion-resistant limestone on higher ridges with less resistant limestone on rolling hills and mesa. Several deep valleys are present through which streams generally flow southeast in narrow strips of alluvial bottomland. Many steep slopes have little topsoil remaining.

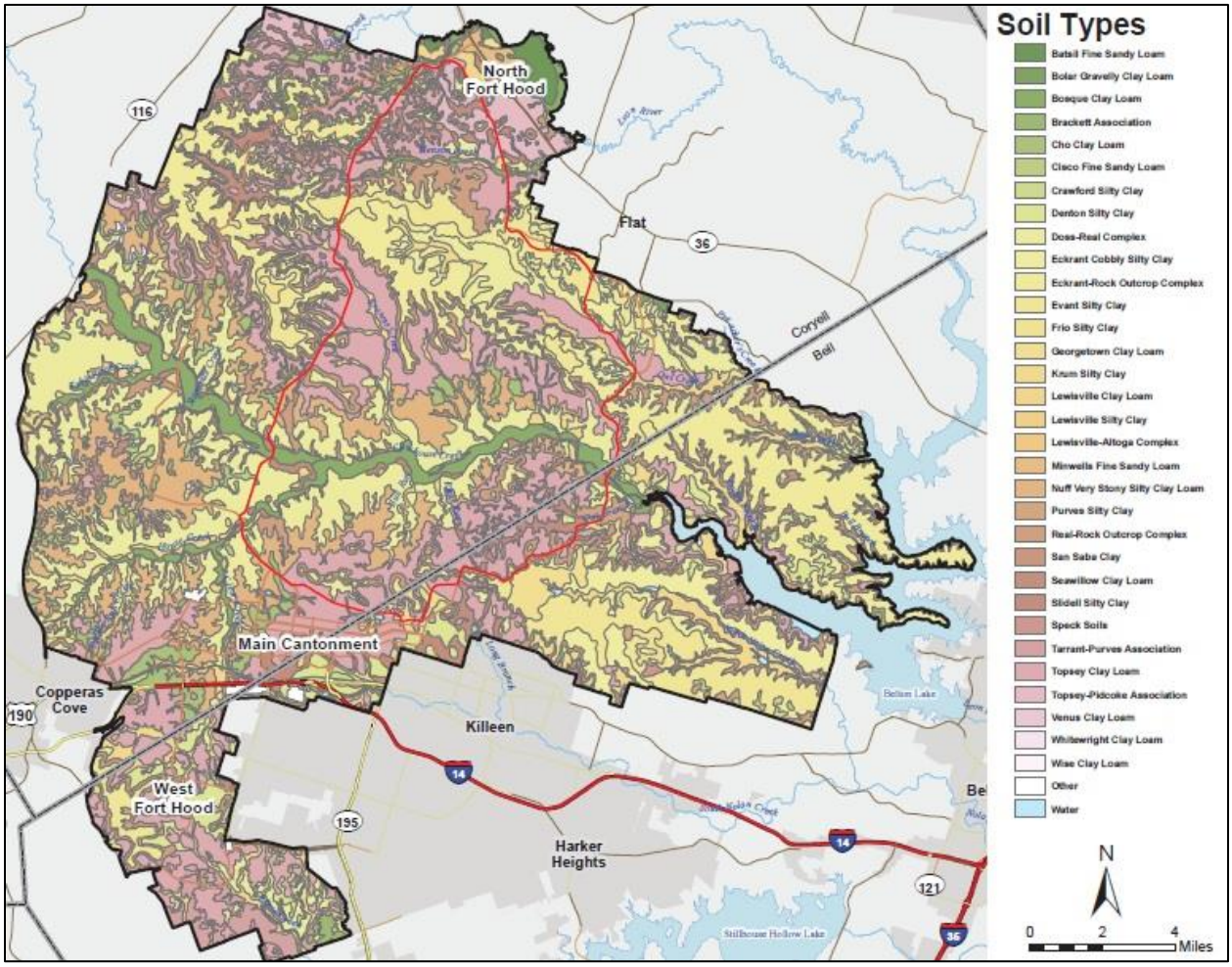

Figure 3.5-5 Soil Series on Fort Hood

Complete surface series descriptions and locations are available in Natural Resource Conservation Service (NRCS) published soil surveys of Bell and Coryell Counties and the 2019 INRMP. There are over 30 unique soil series on Fort Hood (Figure 3.5-5). In general, these soil series are well-drained and moderately permeable, but they can vary widely in other characteristics such as depth, parent material, and slope. Five soils that occur on Fort Hood are partially hydric soils, covering approximately 2.5% of the installation and are generally located

along the stream banks of Cowhouse, Nolan, and Leon Creeks and their tributaries (Natural Resource Conservation Service [NRCS], 2017). However, other soils can become hydric, exhibiting anaerobic conditions, as a result of periodic or permanent saturation or inundation. Seventeen soils that occur on Fort Hood are prime farmland soils, covering approximately 19% of the installation and are generally located near the main cantonment area, WFH, NFH, and on floodplains (NRCS, 2017).

Table 3.5-2 lists the names of each soil series found on Fort Hood, including the acreage, erodibility classification, drainage, landscape position, and parent material. Note that none are prime farmland.

Table 3.5-2 Soil Series on Fort Hood

Soil Series Name	Acres	Erodibility	Drainage	Landscape Position	Parent Material
Topsey CL, 3 to 8 % Slopes, Severely Eroded	40,113	PHE	Well Drained	gently sloping to moderately sloping sideslopes	surface: CL subsoil: Si (upper) shaley SiCL (lower)
Doss-Real Complex, 1 to 8 % Slopes	33,447	PHE	Well Drained	gently sloping to steeply sloping uplands	surface: gravelly SiC subsoil: gravelly C
Eckrant-Rock Outcrop Complex, 1 to 5% Slopes	26,374	PHE	Well Drained	Undulating to very steep uplands	surface: very gravelly C subsoil: limestone
Real-Rock Outcrop Complex, 12 to 40 % Slopes	22,294	HE	Well Drained	gently sloping to steeply sloping uplands	surface: gravelly CL subsoil: extremely gravelly CL (upper) cemented caliche (lower)
Nuff Very Stony SiCL, 2 to 6 % Slopes	19,359	PHE	Well Drained	gently sloping to moderately sloping uplands	surface: SiCL subsoil: SiCL (upper) Marly shaley SiL (lower)
Evant SiC, 1 to 3 % Slopes	12,756	PHE	Well Drained	Gently sloping uplands	surface: SiC subsoil: C

Note: HE = Highly Erodible, PHE = Potentially Highly Erodible, C = Clay, L = Loam, Si = Silt, CL = Clay Loam, SiC = Silty Clay, SiCL = Silty Clay Loam, SiL = Silty Loam
Sources: USDA 1977, 1985; USDA-NRCS, 2005.

Many of the soils on Fort Hood are naturally susceptible to water erosion (Figure 3.5-6). Five soils are categorized as having very high-water erosion potential, covering approximately 68,128 acres, or 31% of the installation. Nine soils are categorized as having a high to moderate water erosion potential, covering approximately 82,504 acres, or 38% of the installation. The remainder of the installation has a low to very low water erosion potential (NRCS, 2017).

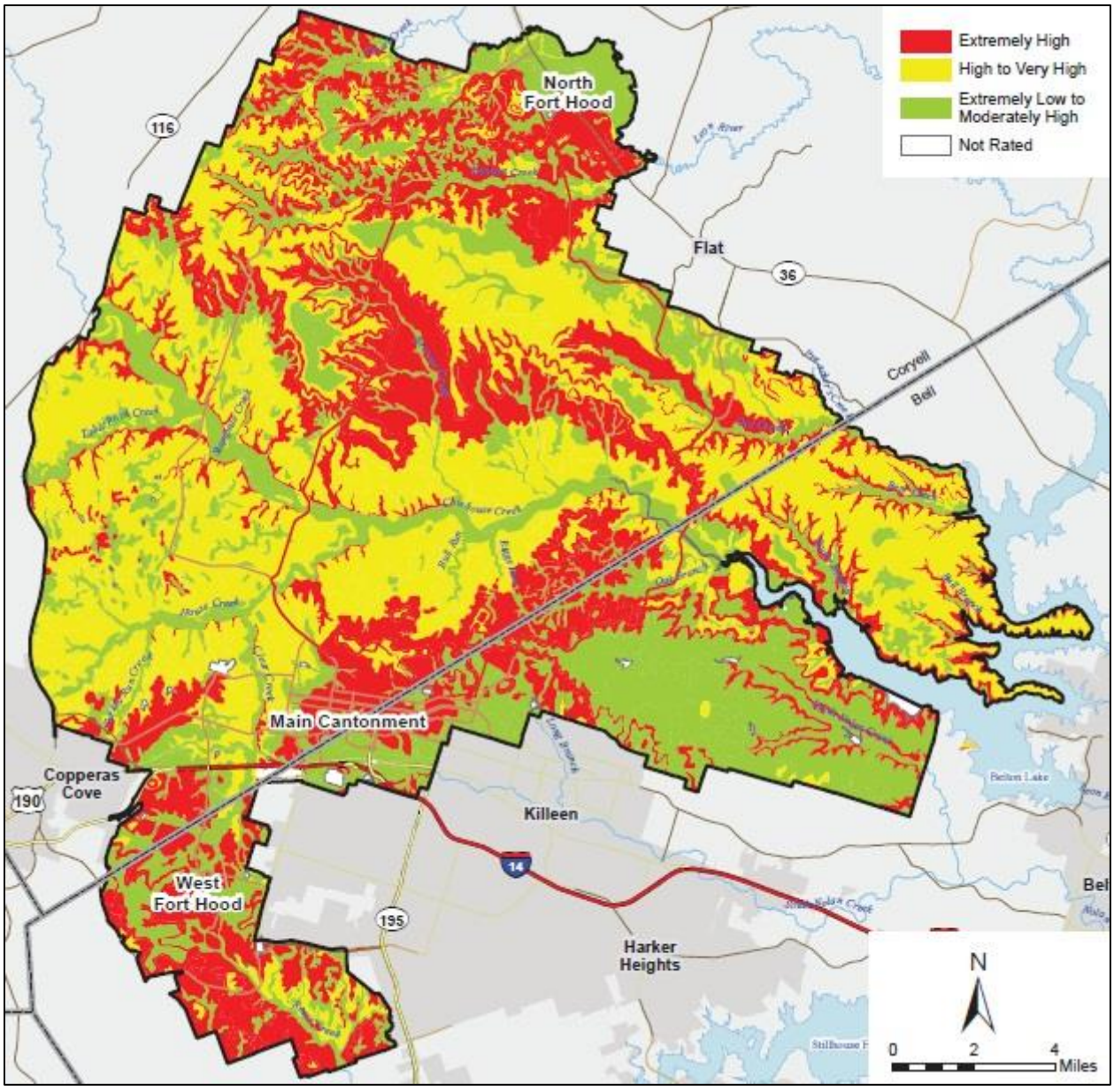

Figure 3.5-6 Water Erosion Potential on Fort Hood

Severe erosion areas are defined as areas with erosion rates exceeding tolerance limits established by the NRCS for each soil type according to its capability to maintain vegetative

cover. Soil tolerance levels on Fort Hood range from 1 to 5 tons per acre (USACE, 2003). Soils with higher tolerance values can hold soil or withstand erosion better than those with lower values. Soil loss exceeding the tolerance levels results in sheet, rill, and gully erosion, potentially limiting land availability for military training maneuvers. Erosion in areas already bare from previous activities, lack of ground cover, lack of woody vegetation, or overgrazing is exacerbated by continued effects from military vehicle tracks or wheels. Several areas of the installation, particularly training areas, have extremely high soil erosion rates due to high use by tracked vehicles and cattle grazing, resulting in high sheet, rill, and gully erosion. Loss of perennial vegetative cover (herbaceous and woody vegetation) has resulted in these high erosion rates and increased bare soil and annual plants in some areas.

Sedimentation is the most prevalent water quality threat at Fort Hood. Training exercises and land practices (e.g., cattle grazing) have resulted in erosion and sediment deposition in water bodies across the installation. To combat this erosion, Fort Hood has created 33 sediment retention structures to limit soil loss into Belton Lake, the installation's supply for drinking water. Construction and maintenance activities can also contribute to erosion and sedimentation. Stormwater runoff transports eroded soils into nearby water bodies. Erosion and sedimentation adversely affect the water quality of streams and lakes and reduce the capacity of lakes and ponds.

3.5.4.2 Environmental Consequences

Impacts to soils at Fort Hood are described in section 3.2.3.2 and are expected to be negligible and less than significant. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 0.6%, a negligible amount.

3.5.4.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Proposed Action, could require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. Fort Hood does not intend to construct facilities for M-SHORAD if it is fielded there. An expected increase of soldiers of approximately 2.1% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. The impacts are as described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to soils.

The Army has plans and funding to construct ISBC and IPBC ranges in the future at Fort Hood. Impacts from construction would be like those described in Section 3.2.3.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce

the negative impacts at any one location. Planning requirements, the use of SOPs and BMPs, and routine range assessments and maintenance will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.5.5 Land Use and Compatibility

3.5.5.1 Affected Environment

Fort Hood Military Reservation is located in central Texas within Bell and Coryell Counties adjacent to the City of Killeen. Fort Hood lies between the major cities of Waco, 39 miles to the northeast, and Austin, 60 miles to the south. Fort Hood is bounded on the east by Belton Lake and the south by the cities of Copperas Cove, Killeen, and Harker Heights. The City of Gatesville is located north of the installation. Fort Hood encompasses over 218,000 acres including the three cantonment areas, two instrumented airfields, and maneuver and live-fire training areas (Figure 3.5-7).

3.5.5.1.1 Cantonment[45]

The cantonment areas are primarily for urban uses. The main cantonment area and Hood AAF are located on the southern edge of the training area and adjacent to Killeen, Texas. West Fort Hood is located south of U.S. Highway 190, near the city of Copperas Cove, Texas, and includes Robert Gray AAF. North Fort Hood, located near Gatesville, Texas, is the primary site for Army Reserve and National Guard training, equipment service, and storage (USACE, 1999).

While the cantonment areas contain administrative, maintenance, industrial, supply/storage, operations, housing, community support facilities, medical, outdoor recreation, and open space land uses, the maneuver/live-fire training areas provide the locations for combat training activities, which is Fort Hood's primary purpose. A limited amount of cattle grazing is permitted throughout the training and live-fire areas. The airfields are located adjacent to the cantonment areas and house the fixed-wing and rotary-wing assets and support facilities (USACE, 1999). Various other land uses on Fort Hood include Belton Lake Outdoor Recreation Area and miscellaneous uses such as roadways and easements.

3.5.5.1.2 Range Complex

Fort Hood's training area consists of 132,525 acres of maneuver training area and 64,272 acres of range live-fire area (LFA). Maneuver training land comprises roughly 61% of the installation's total land acreage. Table 3.5-3 lists the breakdown of current land use on Fort Hood. Figure 3.5-7 shows the installation land use.

[45] Source: Environmental Assessment for the Stationing Actions to Support the Grow the Army Initiative at Fort Hood, Texas, July 2009.

Table 3.5-3 Fort Hood Land Use[46]

Primary Land Uses	Acreage	%
Training and Live-Fire Areas	**196,797**	**89.9**
Maneuver Land	132,525	60.6
Live-Fire Areas	64,272	29.4
Cantonment Areas and Belton Lake Outdoor Recreation Areas	**22,026**	**10.1**
Total Acreage	**218,823**	**100.00**

Training includes infantry, mechanized infantry, armored units, artillery, and air support with helicopters, fixed-wing tactical aircraft, high-speed interceptors, and large bombers (USACE, 1999). The post's training land is divided into two main areas: the Western Maneuver Area and the Eastern Training Area which are separated by the cantonment and impact areas. There are 120 individual ranges on Fort Hood.

The LFA and impact areas do not host much maneuver training, and traffic is limited primarily to vehicles moving to and from the ranges. Access to the impact area is restricted due to danger from direct and indirect fire from active ranges and unexploded ordnance.

The LFA has the second-largest acreage of the endangered species habitat of any management unit (MU). Also, the LFA MU has 252 miles of streams, including Cowhouse Creek, which empties into Belton Lake, the drinking water supply for Fort Hood and surrounding municipalities.

Both urban and rural areas surround Fort Hood. Urban areas include the cities of Killeen, Harker Heights, and Copperas Cove near the southern boundary, and the city of Gatesville north of the installation. Urban land uses are typically residential, business, and industrial. The rural areas surrounding Fort Hood support agricultural land-use practices such as farming and ranching.

Fort Hood is participating in the Army Compatible Use Buffer (ACUB) program to minimize incompatible land-use practices that could conflict with critical military training activities conducted on Fort Hood.[47] The ACUB program seeks to maintain current compatible uses through the purchase of agricultural conservation easements from willing landowners. Maintaining the current land use surrounding the installation boundary, primarily rural agricultural lands, would prevent potential conflicts from arising with future training conducted on Fort Hood.

[46] Fort Hood. 2019. Fort Hood Final 2019–2023 INRMP. Fort Hood, Texas.
[47] Source: U.S. Army Garrison Fort Hood Army Compatible Use Buffer Proposal, March 2017.

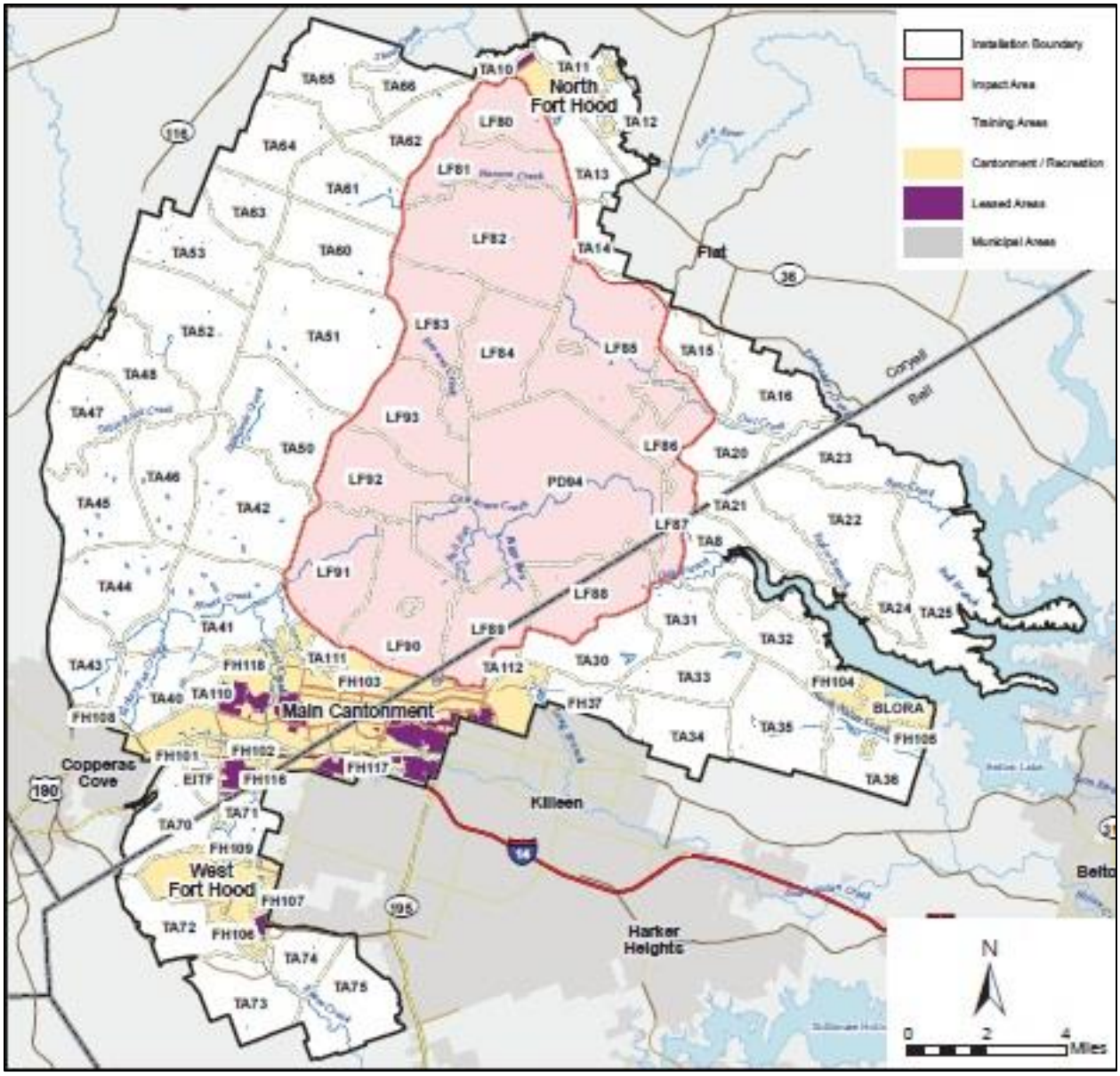

Figure 3.5-7 Fort Hood Land Use

The main concerns arising from incompatible land use practices developing adjacent to the installation boundary are the restrictions that could be imposed upon military training activities conducted on Fort Hood. These restrictions could result from noise (from ground maneuver, aviation, and live-fire training), night training, pyrotechnics use, and air quality degradation (from the use of training smoke, pyrotechnics, and maneuver generated dust).

The ACUB program at Fort Hood minimizes the necessity to establish internal buffers needed to conduct required training and ensure residential and commercial development does not encapsulate Fort Hood training land boundaries.

3.5.5.2 Environmental Consequences

Fort Hood does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 0.6%, which is negligible. Impacts to Land Use and Compatibility are adequately addressed in section 3.2.4.2 and are expected to be negligible and less than significant.

3.5.5.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Action Alternative, may require expansion or renovation of existing facilities. Fort Hood does not intend to construct facilities to support M-SHORAD if it is fielded there. Other systems would field to existing units or replace existing equipment one-for-one. An expected soldier population increase of approximately 2.1% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The effects of the additional actions are described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in minor, less than significant cumulative effects to Land Use and Compatibility.

The Army has plans and funding to construct ISBC and IPBC ranges in the future at Fort Hood. Impacts from construction would be like those described in Section 3.2.4.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers at that location. The new ranges will be constructed within the existing range complex, maintaining current land uses and away from incompatible uses. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.5.6 Facilities

3.5.6.1 Affected Environment

On-Post Unaccompanied Personnel Housing. Unaccompanied personnel accommodations at Fort Hood include enlisted barracks, guest quarters, and in-transit quarters (Fort Hood, 2004a).

Off-Post Housing. There were 169,286 housing units in the ROI in 2018. Most Fort Hood military and civilian personnel who live off post live in the cities of Killeen and Harker Heights within Bell County, and the city of Copperas Cove in Coryell County. The number of vacant units in the ROI in 2018 was 24,607 (U.S. Census Bureau, 2020[48]).

[48] Website accessed on March 19, 2020: https://data.census.gov/cedsci/all?q=Housing%20statistics%20bell%20county&g=0500000US48027&tid=ACSDP1Y2018.DP04&t=Housing&layer=county&cid=DP04_0001E&vintage=2018

The three cantonment areas, also addressed briefly in the Land Use and Compatibility section, contain the heaviest concentration of facilities and mission support activities on Fort Hood. Support services in the cantonment include administration, maintenance, service, storage and supply buildings, housing, medical facilities, community facilities, Robert Gray AAF, and Hood AAF.

Army facilities are built to meet the standards of the uniform facilities criteria using standard designs of MILCON requirements, standardization, and integration or similar documents. Exceptions to standard are available and if granted for a facility, it would be considered adequate.

3.5.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at Fort Hood was assessed based on the Army RPLANS records. Fort Hood has a deficit of required facility space to support the IDDS-A battery HQ, TEMF, and barracks as shown in Table 3.5-4.

Table 3.5-4 Facilities that may require construction at Fort Hood

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Hood available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(1,763,152)	N	N
TEMF	1	28,304	0.6	(145,062)	N	N
Barracks	1	8,420	0.2	(673,619)	N	N

Fort Hood would plan to provide facilities for the IDDS-A battery on par with what other units stationed at Fort Hood typically receive. New construction is not needed to support this requirement. Most units on Fort Hood are assigned between 50% and 70% of the HQ and maintenance facilities required by Army doctrine. The IDDS-A would be provided the required headquarters and vehicle maintenance from existing facilities. This may be less than the requirement by Army doctrine and require an exception to standard. The need for barracks would be accommodated through Army supported off-post housing if required. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Fort Hood also has a deficit of one range type required to support IDDS-A training. The specific range types are not being listed as an operational security measure. The deficit in acreage for the range types is shown in Table 3.5-5.

Fort Hood would not construct new ranges to support the IDDS-A. Training requirements would be met through the use of approved simulations or appropriate scheduling per the SRM or ReARMM. If funding becomes available the required ranges could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Table 3.5-5 Range acreage that may require construction at Fort Hood

Standard Range shortage[1]		**Standard Range acreage shortage[2]**	
One battery	Two batteries	One battery	Two batteries
0.86	0.86	N/A[3]	N/A[3]
[1]The Standard Range shortage is computed by dividing the shortage of RD by the number of normal training days per Army doctrine.			
[2] The Standard Range acreage shortage is computed by multiplying the Standard Range shortage by the minimum Standard Range area.			
[3]No minimum range area specified per Army doctrine.			

Since Fort Hood does not plan on constructing ranges or facilities to support IDDS-A no impacts to facilities from construction are expected. The increase in range usage is predicted to be 0.6%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.5.2.

3.5.6.3 Cumulative Effects

Fielding of the 10 planned systems, when combined with the Action Alternative, is expected to have less than significant cumulative effects with minor or negligible increases of the impacts described in section 3.2.5.2. Fort Hood does not plan on constructing facilities to support M-SHORAD. Other systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities.

The Army has plans and funding to construct ISBC and IPBC ranges in the future at Fort Hood. Impacts from construction would be like those described in Section 3.2.5.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity. Impacts are expected to be no greater than minor and less than significant when combined with the Action Alternative. The new ranges will distribute training across a greater number of ranges and reduce the use of any single range. Also, the Army performs routine monitoring of range conditions and implements maintenance and rehabilitation when required.

3.5.7 Water Resources

3.5.7.1 Affected Environment

3.5.7.1.1 Surface Water

There are 692 acres of lakes and ponds, 55 miles of rivers and permanent streams, and 43 miles of shoreline access to Belton Lake on Fort Hood. All water impoundments are manmade for purposes such as flood control, sediment retention, recreation, water supply, wildlife and livestock water, and fish habitat (Fort Hood 2006).

Fort Hood is divided into two major watersheds with numerous sub-watersheds. The major watersheds are the Leon River (including Belton Lake) and the Lampasas River. The Leon River drains most of the installation, including all maneuver training lands. Fort Hood watersheds are shown in Figure 3.5-9.

Water quality, discussed further below, is a major concern due to the sediment loads carried by the streams of the Leon River watershed. Cowhouse Creek and its sub-watersheds drain directly into Belton Lake. North and South Nolan Creeks drain into the Leon River below Belton Lake (Fort Hood, 2006).

A small portion of the southern end of Fort Hood, used primarily for dismounted training, drains into the Lampasas River. The river empties into the Stillhouse Hollow reservoir. Only dismounted training, which has a smaller impact on the environment than vehicular training, occurs in this area (Fort Hood, 2006).

3.5.7.1.2 Groundwater

The major aquifer that underlies Fort Hood is the Trinity Aquifer. Parts of both the outcrop and the depression are deeply buried below Fort Hood. The Trinity Aquifer extends through parts of 55 counties of central Texas (Fort Hood, 2019).

The Travis Peak formation is the deepest and hydrologically most important geologic unit in the Fort Hood region. This formation does not outcrop at the surface in Fort Hood. No major groundwater resources outside the installation are affected by recharge from within Fort Hood, and recharge that occurs within the installation affects only the small, shallow groundwater supplies that remain on the installation (Fort Hood, 2019). Potentially sensitive groundwater areas of the Fort Hood region are the outcrop areas of the Paluxy formation and recent alluvial materials within and adjacent to Cowhouse Creek, Henson Creek, and the Leon River, as well as the karst or cave systems found throughout the installation. The aquifers recharged by these areas are relatively shallow, and therefore they could be affected by hazardous material spills and seepage. However, these waters are rarely used (Fort Hood, 2019). Surface water, not groundwater, is the primary water supply for Fort Hood (Fort Hood, 2019).

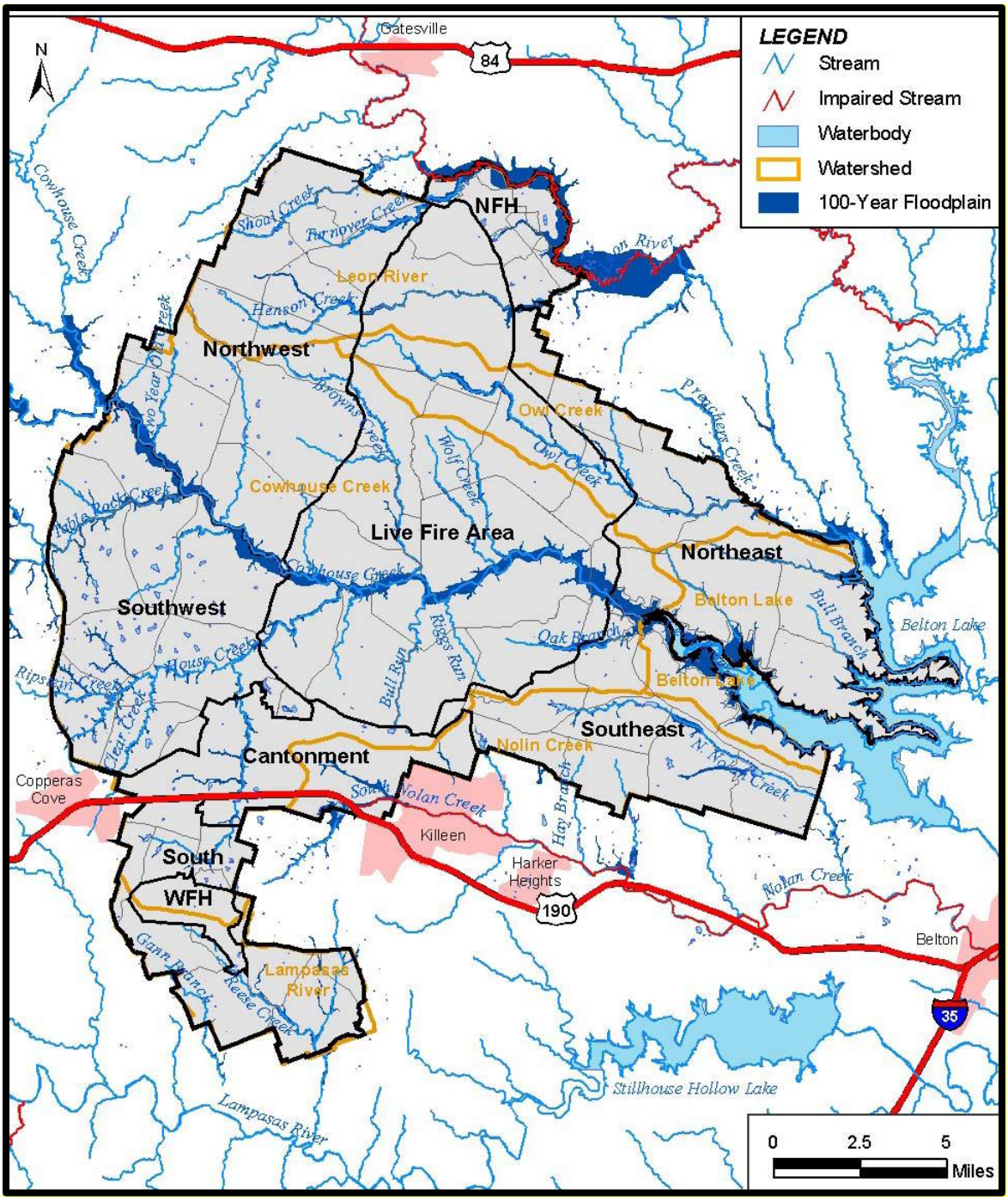

Figure 3.5-8 Fort Hood Watersheds
Source: Fort Hood 2006

Currently, there is no known usage of groundwater at Fort Hood. Groundwater studies have been conducted at Fort Hood, and the results do not show any critical issues directly attributed to the installation. A detailed discussion of these studies is provided in Section 4.6 of the INRMP (Fort Hood, 2019).

3.5.7.1.3 Water Quality

Water quality studies at Fort Hood include sedimentation and erosion studies, stormwater data collection, Texas Pollutant Discharge Elimination System (TPDES) permit monitoring, and studies of sediment, groundwater, and surface water in the Cowhouse Creek drainage basin. Figure 3.5-6 in the Soils section shows the highest potential of water erosion that could affect water quality.

The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), now the U.S. Army Public Health Center, examined munitions constituents (MC) on Fort Hood range sites and evaluated the effects and risks associated with water quality and other means of MC environmental movement. (USACHPPM, 2007) The environmental fate of MC indicates a very low risk to humans and sensitive species. Fort Hood ranges were assessed for MC transport off range in 2012 and 2018 and the risk continues to be low (U.S. Army, 2019). The cumulative effects of organic chemical and metal contamination are minimal.

Stormwater Management

Currently, Fort Hood operates under an industrial stormwater permit (TPDES Permit No. TXR05F998) that comes from the general permit, TXR050000. The EPA has published Phase II Storm Water permitting requirements that include Fort Hood as the owner and operator of a municipal separate storm sewer system (MS4). Therefore, upon adoption of Final TPDES Permit TXR040000, the Fort Hood DPW would be required to file its permit application, which must include a SWMP. The SWMP would direct Fort Hood's compliance efforts for a period of up to 5 years following issuance and would include the following five minimum control measures:

- Public education and outreach on stormwater impacts
- Public involvement/participation
- Illicit discharge detection and elimination
- Pollution prevention/good housekeeping for municipal efforts
- Construction site stormwater runoff control

Post-construction stormwater management in new development and redevelopment DPW has been implementing SWMPs under a general industrial permit, and a general construction permit since 1995 and has anticipated the Phase II Storm Water permitting requirements. Therefore, many necessary program management actions are already in place or planned for implementation. Although the program is now in draft format, once implemented, it should ensure that controls that would prevent or minimize water quality impacts are in place (Fort Hood DPW, 2005).

Sediment and Erosion

Sedimentation is the most prevalent water quality threat at Fort Hood. Training exercises and land practices (e.g., cattle grazing) have resulted in erosion and sediment deposition in water bodies across the installation. Stormwater runoff transports eroded soils into nearby water bodies. Erosion and sedimentation have adversely affected the water quality of streams and lakes and reduced the capacity of lakes and ponds. Total suspended solids (TSS) data for streams have been collected at several stations during stormwater events as an indicator of sediment input to streams. The physicochemical properties of water bodies, such as turbidity and TSS, can be affected by sedimentation. Across the installation, measurements of sedimentation have been collected in terms of TSS measurements and erosion inventories that were conducted in 1998 and 1999 indicate severe erosion. Most of the TSS values tend to increase with increasing stream level, indicating that high values might be due to storm runoff associated with precipitation. The Blackland Research and Extension Center Water Science Laboratory has been monitoring sediment losses at 13 sites on Fort Hood. To monitor restoration and sediment reduction efforts, monitoring included sites in the Shoal Creek watershed. The NRCS installed BMPs in the Shoal Creek watershed, which is in the Leon River drainage, to reduce erosion in this training area to acceptable levels and keep it open for training activities (Fort Hood, 2006).

The increases in TSS that correlate with higher streamflow levels have several elements: First, the surface and stream channel erosion increase from raindrop impact and subsequent runoff. Second, the increase of streamflow concentrates and creates gullies. This is supported when the gullies are associated with tank trails and other impacts such as cross-country driving. Increased runoff also comes from urbanized lands that have parking lots, roads, and building roofs. These runoff increases may not have initial high TSS concentrations, but they add to channel erosion as storm runoff rates increase and the streamflow impacts channel banks or creates other forces on the banks that detach soil.

3.5.7.1.4 Wetlands and Floodplains

Wetlands

The CWA protects water bodies and stream channels that are under its jurisdiction. WOUS, including wetlands, exist across the installation. WOUS range from small emergent wetlands associated with ephemeral streams to large forested wetland complexes adjacent to perennial channels. Currently, efforts are underway to delineate (map and describe) all water features, both jurisdictional and non-jurisdictional, within potential project areas on the installation

Jurisdictional wetlands in central Texas and at Fort Hood are most common on floodplains along rivers and streams (riparian wetlands), along the margins of lakes and ponds, and in other low-lying areas where the groundwater intercepts the soil (springs). An analysis of existing hydrology, hydric soils, vegetation, and floodplains was conducted to determine areas of high

probability for jurisdictional wetlands and waters of the United States. The results of this analysis indicated that potential jurisdictional wetlands within the boundaries of Fort Hood occur along the 692 surface acres of lakes and ponds, as well as tributaries of the WOUS, including all streams (Figure 3.5-9). Buffers are maintained around these riparian areas. There are numerous natural springs within the Fort Hood Military Reservation boundaries, but not all of their locations have been mapped. Several well-known springs from the area are Ransomer Springs, 8 kilometers north northwest of Nolanville; Mountain Springs, in the Owl Creek Mountains about 20 kilometers north-northwest of Belton; and Taylor Springs, 2 kilometers south of Mountain Springs (Brune, 1981).

It has been the practice of Fort Hood to minimize impacts to potential jurisdictional areas. These areas might be indirectly affected by ongoing installation activities such as military training activities, livestock grazing, hydrologic alterations, and urban and training area stormwater runoff. A survey of project areas has occurred but that effort has not been formally accepted yet as delineation. The 69th ADA campus layout has seven crossings of ephemeral stream channels. This design avoids direct impacts on larger areas of wetlands and stream channels.

The combination of soils, vegetation, and climate affect the current watershed characteristics. The soils are high in clay so the percolation rate within them is quite low. Vegetation provides little ground cover over most of the installation so the watersheds have only a small portion of moderate to heavy rainfall soak into soil. The net effect is that most Fort Hood stream channels are ephemeral or intermittent and flow only in direct response to rainfall. Many existing cantonment area stream channels are altered to accommodate urban runoff and protect the infrastructure.

Floodplains

EO 11988, “Floodplain Management,” was enacted on May 24, 1977, to set guidelines to avoid the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The FIRMs for Bell and Coryell Counties would be analyzed for any proposed future construction areas to evaluate any impact to floodplains.

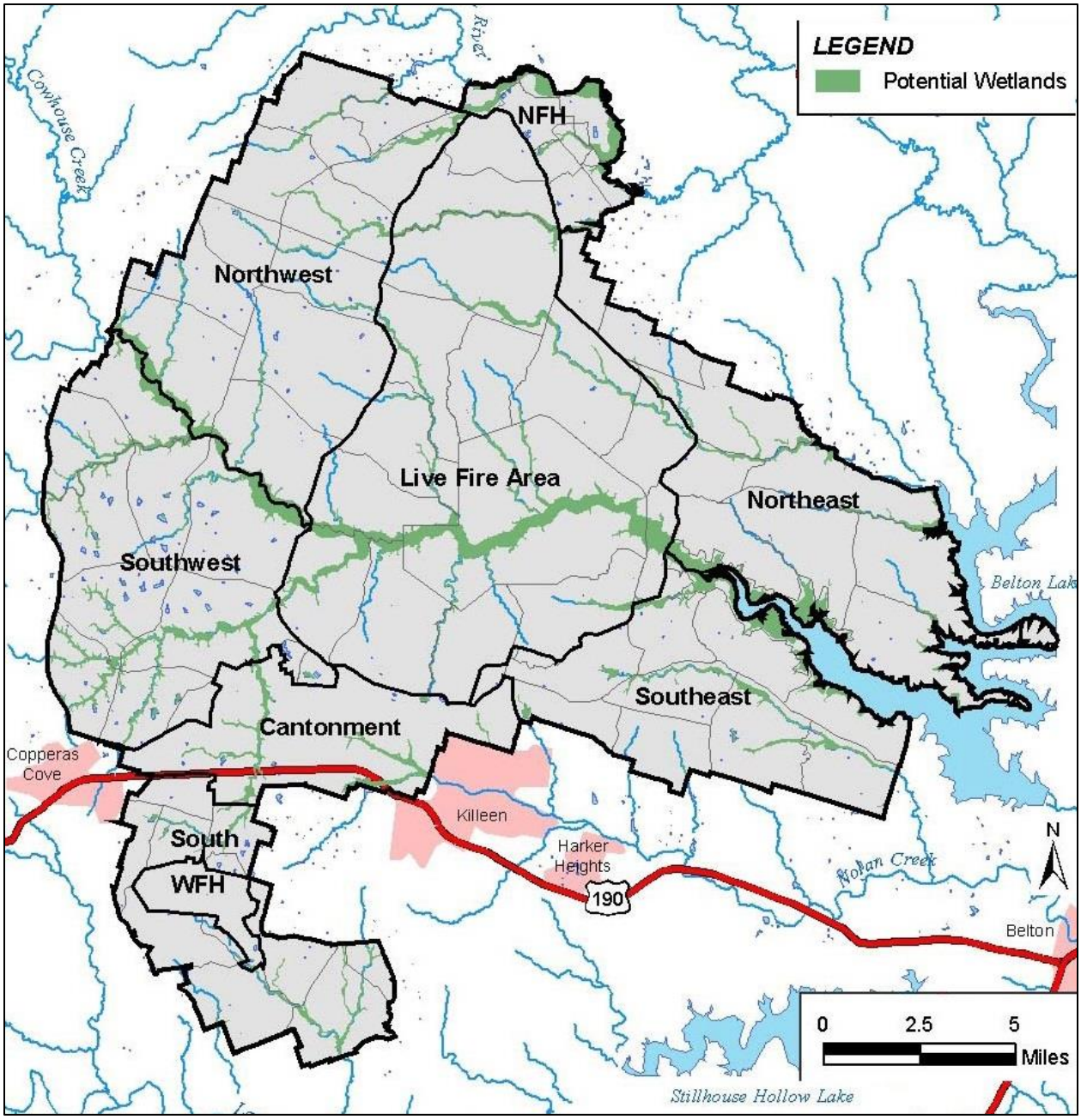

Figure 3.5-9 Potential Wetlands on Fort Hood
Source: Fort Hood 2006

3.5.7.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Hood and range usage is expected to rise by only 0.6%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by

IDDS-A is designed for air intercept and will not have extensive ground explosions. Therefore impacts to all water resources are expected to be negligible and less than significant and are addressed in section 3.2.6.2

3.5.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the 10 planned systems is expected to have less than significant cumulative effects to all water resources. The impacts are as described in section 3.2.6.2. All the new systems would be fielded to existing facilities or units with no additional facility requirements anticipated. The anticipated population increases of all 10 systems and IDDS-A is 2.1% for soldiers on Fort Hood and including all family members is 0.42% within the ROI resulting in minor and negligible impacts, respectively, to waters, water use, and potential water quality degradation.

The Army has plans and funding to construct ISBC and IPBC ranges in the future at Fort Hood. Impacts from construction would be like those described in Section 3.2.6.2. The IDDS-A system is not expected to use the new ranges. Soldiers from the IDDS-A battery may use the ranges for individual or small unit training. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Routine range assessments and maintenance will ensure undesirable chemicals and compounds are not migrating to water resources. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.6 FORT CAMPBELL[49]

3.6.1 Background

Fort Campbell covers 105,068 acres of land between Montgomery and Stewart counties in Tennessee, and Christian and Trigg counties in Kentucky (Figure 3.6-1). Approximately two-thirds of the installation's total land area is in Tennessee. Towns nearest to the installation are Clarksville, Tennessee and Hopkinsville, Kentucky. The closest major urban area is Nashville, Tennessee, which is located approximately 50 miles to the southeast. The four-county region surrounding Fort Campbell has a diversified economy with major sectors, including agriculture, manufacturing, government, and retail and wholesale trade. Fort Campbell represents a community of over 40,000 people, comprised of military and civilian personnel.

Fort Campbell is an Installation Management Command (IMCOM) installation that is home to:

- 101st Airborne Division (Air Assault (101ABN DIV (AASLT))), the
- 5th Special Forces Group,
- 160th Special Operations Aviation Regiment (SOAR),
- 2nd Bn, 44th ADA Regiment
- Other tenant units.

The mission of Fort Campbell is primarily to support and train the units stationed on the installation in preparation for a variety of assigned combat and combat-related missions:

- Support tenant U.S. Army Forces Command (FORSCOM) and U.S. Army Special Operations Command (USASOCOM) units.
- Support the training of off-post units that train on the installation to ensure that the units are prepared to accomplish assigned missions.
- Enable the operation, safety, security, administration, training, services, communication, information, management, maintenance, and supply of all individuals, units, and activities that are tenants on the installation.
- Provide base operations and other support to Army, DoD, Department of Homeland Security (DHS), Federal Bureau of Investigations (FBI), and other government agencies involved in national security actions.
- Plan, program, allocate, and supervise the use of resources and facilities for continuing the installation mission.

[49] Information on the Affected Environment for Fort Campbell is taken from the Fort Campbell Training Mission and Mission Support Activities Final Programmatic Environmental Impact Statement (FPEIS) October 2015, the Final Programmatic Environmental Assessment Cantonment Area Master Plan at Fort Campbell (FPEA) September 2020, the Draft Programmatic Environmental Assessment Fort Campbell Integrated Natural Resources Management Plan 2020-2025 (DPEA) June 2020, and the Fort Campbell Integrated Natural Resources Management Plan (INRMP).

In addition, the installation supports the training of other DoD units, Reserve Component units, and governmental agencies.

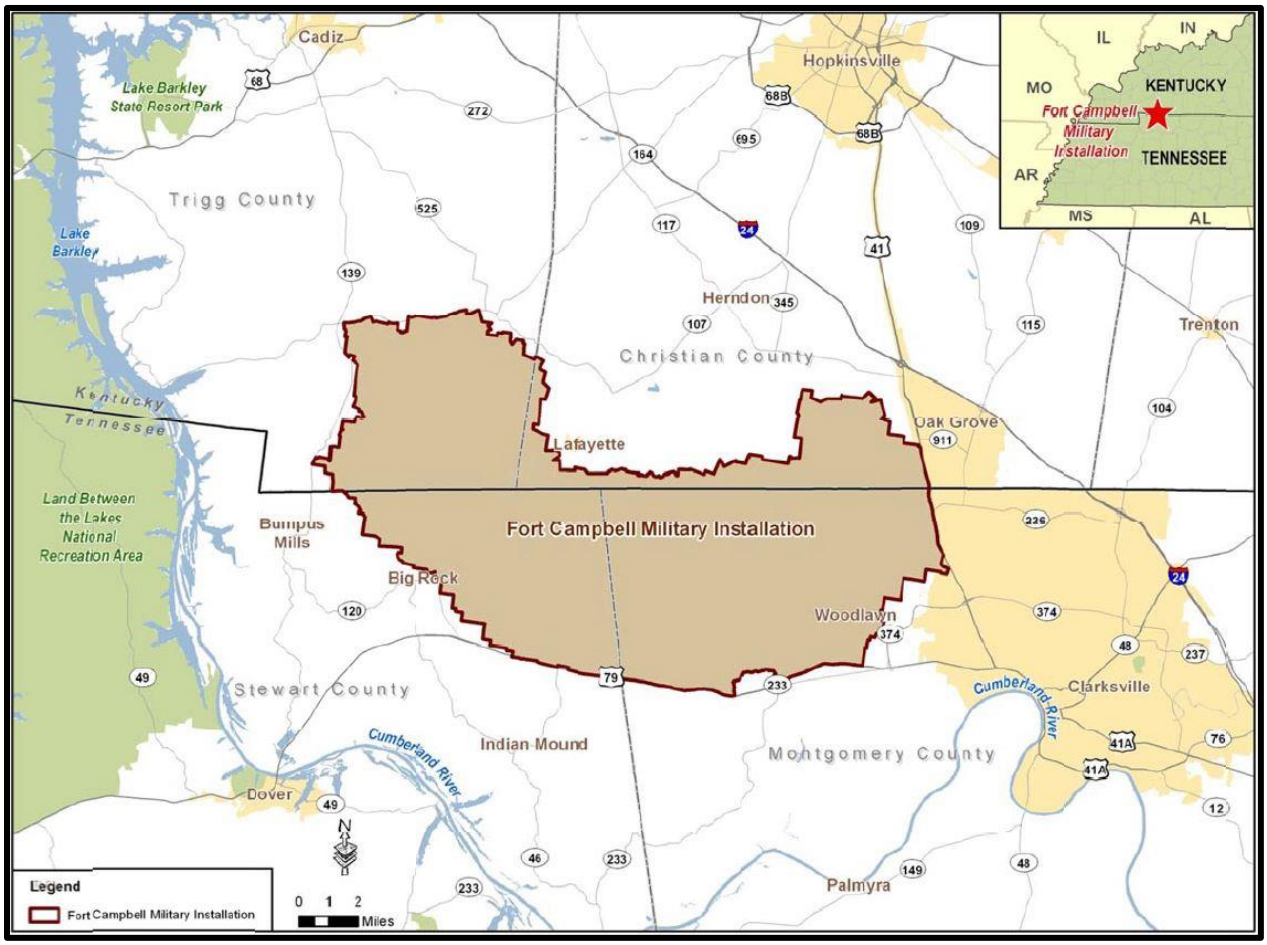

Figure 3.6-1 Location of Fort Campbell

3.6.2 Biological Resources

3.6.2.1 Affected Environment

Fort Campbell lies within the Interior Plateau ecoregion[50], which is locally characterized by the Western Pennyroyal Karst Plain (Francisco et al., 2011). Common biological communities

[50] Ecoregions are areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. This ecoregion framework is derived from Omernik (1987) and from mapping done in collaboration with EPA regional offices, other Federal agencies, state resource management agencies, and neighboring North American countries. Designed to serve as a spatial framework for the research, assessment, and monitoring of ecosystems and ecosystem components, ecoregions denote areas of similarity in the mosaic of biotic, abiotic, terrestrial, and aquatic ecosystem components with humans being considered as part of the biota. These regions are critical for structuring and implementing ecosystem management strategies across Federal agencies, state agencies, and nongovernmental organizations that are responsible for different types of resources within the same geographic areas (https://www.epa.gov/eco-research/ecoregions accessed 17Nov20).

include a mosaic of bluestem (*Andropogon/Schizachyrium* spp.) prairie and oak–hickory (*Quercus-Carya* spp.) forest with more mesic sites covered in mixed deciduous forest dominated by American beech (*Fagus grandifolia*) and oak. Upland woods are dominated by white oak (*Quercus alba*) with beech, red maple (*Acer saccharum)*, yellow-poplar (*Liriodendron tuliperfa*), and pignut hickory (*Carya glabra*). Fields of big bluestem (*A. gerardii*) and little bluestem (*S. scoparium*) also historically occur within this region. Scattered barrens (i.e., bluestem prairie dominated by little bluestem) are maintained at Fort Campbell and various nature preserves. On abandoned agricultural land, successional fields of broomsedge (*A. virginicus*) and sumac (*Rhus* sp.) and older successional forests of eastern redcedar (*Juniperus* v*irginiana*) and black locust (*Robinea pseudoacacia*) are common. Past and current anthropogenic influences within the local region include agricultural production (e.g., hay, cattle, cotton, corn, small grains, soybeans, and tobacco); expanding urban areas primarily surrounding Clarksville, Tennessee, and Hopkinsville, Kentucky; oil and gas production; and military reservation (Fort Campbell, 2012a).

Fort Campbell's training area consists of 89,687 acres. With the exception of roads, cleared areas, and structures associated with training and support facilities, most of the training area consists of natural habitat including forests, grasslands and barrens, old fields, fields leased for agriculture, streams, lakes, and wetlands. Fort Campbell's INRMP (Fort Campbell, 2012a) provides documentation of the natural resources within the installation and management guidance.

3.6.2.1.1 Flora

Undeveloped land on Fort Campbell consists of the following terrestrial habitat types, which are characterized by their plant communities: Grasslands and Barrens; Agricultural Fields; and Forest (Fort Campbell, 2012a). Fort Campbell also recognizes a "Riparian Zone" (riparian buffer) which correlates to higher functioning habitat associated with waterways. The distribution of these habitat types within the installation is presented on Figure 3.6-2. Appendix D of the INRMP contains a floristic inventory of Fort Campbell conducted in 1992, which inventoried 89 plant families and 423 species. General plant communities within three of the four main types of terrestrial communities are discussed in this section. Riparian Zones are discussed in the Section 3.6.7 Water Resources.

<u>Grasslands and Barrens</u>

The grassland barrens and old field communities (collectively referred to as open areas) includes 19,253 acres on Fort Campbell of non-forested areas that are not developed (built-up) and are not currently under agricultural outlease. These communities are characterized by primarily herbaceous-dominated communities with woody growth no taller than 21 inches high. Open areas demonstrate varying degrees of succession and can become overgrown by thick woody brush, which limits accessibility for training. As a result, a majority of open areas are maintained with prescribed fire to limit woody growth (Fort Campbell, 2012a).

Fort Campbell manages open areas using a four-tiered system to determine the value as training area, native grassland barrens community, or agricultural lease area. The following four tiers have been developed based upon presence of indicator floral species, and potential for restoration or cultivation (Fort Campbell, 2012a):

- Tier 1 is composed of high quality native grassland barren sites with high priority for management and preservation.
- Tier 2 is characterized by medium quality sites with potential for restoring a high quality barrens community with moderate levels of effort.
- Tier 3 sites are low quality, degraded barren communities in which restoration would require a significant effort and several prescriptions for treatment.
- Tier 4 is characterized by severely degraded fields not suitable for ecological restoration.

High and medium quality (Tier 1 and 2) native grassland barrens occupy 5,239 acres on Fort Campbell and are composed of moderate to tall perennial native warm season grasses such as big bluestem, broomsedge, two-edged panic grass (*Panicum anceps*), little bluestem, and Indian grass (*Sorghastrum nutans*). These communities have declined from historic levels due to cultivation, a lack of fire, invasive species, and development. Management of these communities at Fort Campbell has maintained one of the largest remaining remnant barrens east of the Mississippi River. Due to the uniqueness of these communities and the high level of endemic species, these grasslands are a high priority for protection by state and Federal agencies as designated natural areas. In 2001, Fort Campbell signed a Memorandum of Agreement with the Tennessee Wildlife Resources Agency (TWRA) and the Kentucky Department of Fish and Wildlife Resources (KDFWR) that establishes a cooperative means for re- establishing, enhancing, and protecting native warm season grasses on the installation, and allows the state agencies to harvest native warm season grass seeds from Fort Campbell.

Open areas on Fort Campbell that do not contain plant species associated with native grassland barrens are classified as old fields. Less than 500 acres of old field communities exist on Fort Campbell and are dominated primarily by grasses. Woody shrubs and trees, however, typically are present where fire has been absent for several years. These areas are often managed by prescribed fire to control growth of woody species to maintain conditions suitable for military training. In addition to training, old fields on Fort Campbell are used for hunting and provide wildlife habitat. Old fields containing patches of low-growing woody vegetation are an important component of habitat for wildlife.

Agricultural Fields

The agricultural fields within Fort Campbell consist of 6,185 acres of cropland (e.g., hay, wheat, corn, grain sorghum, and soybeans) managed by the Agricultural Lease Program. Hay fields typically contain perennial cool-season grasses and a variety of legumes (chiefly clover and alfalfa). The more abundant grasses include varieties of tall fescue (e.g., *Festuca arundinacea*),

bluegrass (*Poa* spp.), orchard grass (*Dactylis glomerata*), and timothy (*Phleum pretense*) (Fort Campbell 2012a). Due to the agricultural management of these areas, biological diversity would be lower than other non-developed biological communities.

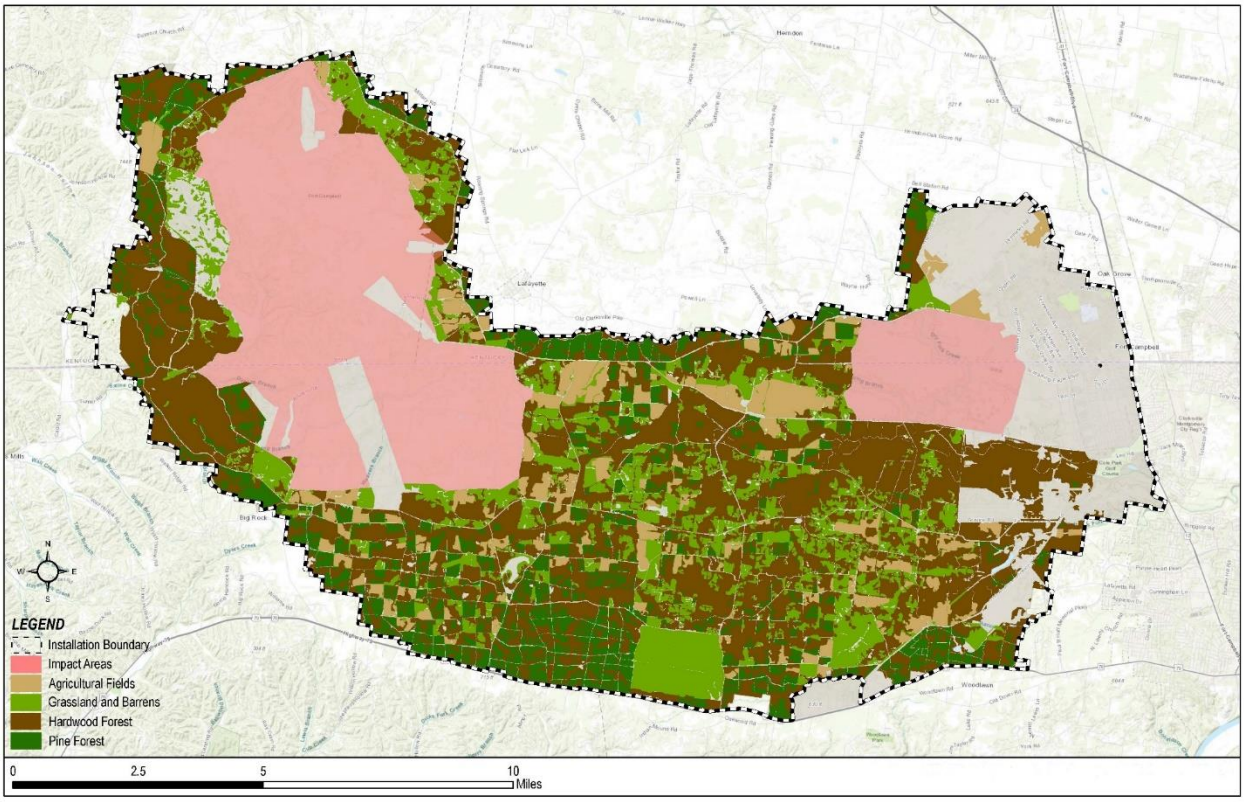

Figure 3.6-2 Distribution of Habitat Types on Fort Campbell
Note that gray areas near the east boundary are cantonment area and gray areas toward the west side are range areas.

Forest

Forested areas occupy 45,145 acres on Fort Campbell and consist primarily of deciduous (hardwood) communities with pine plantations predominant in the southwest part of the installation. The three dominant forest types found on Fort Campbell as detailed in the Forest Management Plan (Appendix K of the INRMP) are summarized below. Analyses show that the general forest health on Fort Campbell is comparable to that of forests of the surrounding region (Fort Campbell 2012a). Between 1990 and 2000, 4,074 thousand board feet (MBF) of hardwood timber and 160,282 tons of pine products were sold by contract. Since Fort Campbell was established, a total of 52,455 MBF of hardwood and 346,079 tons of pine products have been sold. Sales have been administered through the USACE, Louisville District, though Fort Campbell was given authority to manage sales in-house in 1997. The expansion of a hardwood pulp industry into the local market has recently opened opportunities to generate income from

additional forest management activities, including timber stand improvement (Fort Campbell, 2012a).

Upland Hardwood Forest

Upland hardwood forests are the dominant forest type on Fort Campbell and vary considerably in composition depending on topography, soil, and land use history. Dominant tree species include white oak, black oak (*Q. velutina*), northern red oak (*Q. rubra*), yellow poplar, hackberry (*Celtis occidentalis*), sweetgum (*Liquidambar styraciflua*), sugar maple, red maple (*A. rubrum*), American elm (*Ulmus americana*), and ash (*Fraxinus* sp.) (Fort Campbell, 2012a).

Bottomland Hardwood Forest

Bottomland hardwood forests are concentrated on broad floodplains and other poorly drained areas. Due to their position in the landscape, they are also associated with flooding regimes that range from periodic to permanent. Tree and shrub species characteristic of Fort Campbell's bottomland hardwood forests include sycamore (*Platanus occidentalis*), American elm, boxelder (*Acer negundo*), red maple, river birch (*Betula nigra*), white ash (*F. americana*), Japanese honeysuckle (*Lonicera japonica*), blackgum (*Nyssa sylvatica*), black cherry (*Prunus serotina*), white oak, multiflora rose (*Rosa multiflora*), blackberry (*Rubus* spp.), sassafras (*Sassafras albidum*), and coralberry (*Symphoricarpos orbiculatus*) (Fort Campbell, 2012a).

Pine Forest

Forests of planted pine trees (pine plantations) cover 10,500 acres of the installation. The forests consist primarily of loblolly pine (*Pinus taeda*) and other conifers including shortleaf pine (*P. echinata*), eastern white pine (*P. strobus*), and Virginia pine (*P. virginiana*). Of these, only Virginia pine and shortleaf pine are native to the region (Fort Campbell, 2012a). Due to the timber management of these areas, biological diversity would be lower than other forest communities as the even-aged pine stands are managed to only these few pine species.

3.6.2.1.2 Fauna

Fort Campbell provides habitat for numerous terrestrial and aquatic species. An inventory of wildlife and aquatic species documented on Fort Campbell are located within Appendices D, I and N of the INRMP. General distributions of common wildlife and aquatic life are discussed within this section.

Mammals

Forty species of mammals have been recorded and/or documented on Fort Campbell (Fort Campbell, 2012a). Mammals inhabiting the installation include species typically found in forest and grasslands in the region, including bats (e.g., *Myotis* spp., *Lasiurus* spp.), beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*) bobcat (*Lynx rufus*),

gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Small game species on the installation include coyote, gray fox, groundhog (*Marmota monax*), opossum (*Dasypus novemcinctus*), eastern cotton tail (*Sylvilagus floridanus*), raccoon, gray squirrel (*Sciurus carolinensis*) and fox squirrel (*Sciurus niger*). The white-tailed deer (*Odocoileus virginianus*) is the only large game mammal hunted recreationally on the installation. Most mammals found on Fort Campbell are locally common and are not protected by Federal or state law. Three federally-protected species are present on Fort Campbell; the Indiana bat (*Myotis sodalis*) and gray bat (*M. grisescens*) are listed as endangered, and the northern long-eared bat (*M. septentrionalis*) is listed as threatened and are covered in more detail in the Protected Species section below.

Birds

Fort Campbell has recorded 240 species of birds (Fort Campbell, 2012a). The installation supports diverse groups of songbirds, waterfowl, wading birds, and raptors. Certain species are present year-round, while others are present during limited seasons (e.g., nesting, wintering), or only occasionally during migration. Game birds found on Fort Campbell include the Wild Turkey (*Meleagris gallopavo*), Common Crow (*Corvus brachyrynchos*), Mourning Dove (*Zenaida macroura*), Northern Bobwhite (*Colinus virginianus*), and American Woodcock (*Philohela minor*); several species of waterfowl are also hunted. Great Blue Heron (*Ardea herodias*) rookeries are present in training areas 1, 11, 19, and within the Small Arms Impact Area near the Dry Fork Creek and Noah's Spring Branch confluence.

Migratory Birds

In 2005, Fort Campbell developed the MBMS, which is a conservation strategy for protecting and managing migratory birds on Fort Campbell. The MBMS describes Fort Campbell's duties under the MBTA and EO 13186, and provides management guidelines with respect to conservation planning, implementation and mitigation measures on the installation. Globally, 1,048 species are currently protected under the MBTA. The MBMS, however, focuses upon the 22 species of Birds of Conservation Concern (BCC) found on Fort Campbell. BCC are a subset of the species protected under the MBTA, and are designated by the USFWS as species deserving special consideration due to populations that are declining, small, restricted, or dependent upon vulnerable habitats. Most of the 22 species of BCC on Fort Campbell depend upon open grassland habitat. The Army has designated two species, Henslow's sparrow and Bachman's sparrow, as species at risk and are covered in more detail in the Protected Species section below.

Appendix I of the INRMP contains migratory bird species recorded on Fort Campbell and the installation's MBMS, including the process for evaluation of migratory bird habitat quality and conservation plans for 11 known breeding BCC species on Fort Campbell (Fort Campbell, 2012a). Two migratory bird nesting seasons occur within the Fort Campbell region; April 1

through July 15 for forest-dwelling nesting species, and April 15 through August 31 for ground nesting species (U.S. Fish and Wildlife Service [USFWS], 2013).

Fort Campbell examines the effect of land uses or management activities (e.g., training exercises, prescribed fire) within each habitat to identify effects to birds. Over 1,000 nests, representing several species of birds, have been monitored to investigate effects of training and management activities on productivity. Preliminary evidence suggests predation by snakes and mammals is the primary cause of nest failure. Training exercises appear to have a minor impact on nesting birds. The rate of nest predation on Fort Campbell is consistent with rates reported in other studies, and does not appear to be influenced by habitat suitability or activities specific to Fort Campbell (Fort Campbell, 2012a).

Reptiles and Amphibians

Previous surveys for reptiles and amphibians on Fort Campbell have identified 5 species of turtles, 4 species of lizards, 16 species of snakes (including two venomous species), 13 species of salamander, and 12 species of frogs and toads (Fort Campbell, 2012a). These species are recorded in Appendix D of the INRMP. Generally, the species of reptiles and amphibians identified on Fort Campbell are relatively common and abundant in the region. The exception is the barking tree frog (*Hyla gratiosa*), which is deemed in need of management in Tennessee.

Fish

Previous fish surveys conducted in Fort Campbell streams and lakes indicate that approximately 60 fish species are present on the installation (Fort Campbell, 2012a). These species are recorded in Appendix D of the INRMP. The most common fishes identified include: stonerollers (*Campostoma oligolepis*), creek chubs (*Semotilus atromaculatus*), scarletfin shiners (*Lythrurus fasciolaris*), southern redbelly daces (*Phoxinus erythrogaster*), northern hogsuckers (*Hypentelium nigricans*), banded sculpins (*Cottus carolinae*), blackspotted topminnows (*Fundulus olivaceus*), bluegills (*Lepomus macrochirus*), longear sunfishes (*Lepomis megalotis*), fantail darters (*Etheostoma flabellare*), and Mamequit darters (*Etheostoma* sp).

Invertebrates

Previous invertebrate surveys on Fort Campbell have identified over 100 species of caddisflies, 27 taxa of mayflies (*Ephemeroptera*), 90 taxa of aquatic beetles (*Coleoptera*), 9 species of aquatic snails (*Gastropoda*); 10 species of crayfish, 26 stonefly (*Plecoptera*) taxa, 23 species of dragonflies and damselflies; and 42 species of butterflies (Fort Campbell, 2012a). These species are recorded in Appendix D of the INRMP.

Many of the streams on Fort Campbell do not provide suitable habitat for mussel fauna due to factors including intermittent flows, unstable substrate, and sediment deposition. The reach of the Little West Fork that occurs on Fort Campbell above the wastewater treatment facility provides the most stable habitat characteristics observed during previous mussel surveys; a large

number of mussels were observed in Little West Fork Creek between the water intake facility and a small unnamed tributary entering from the north, near McNair Road (Fort Campbell, 2012a). Lists of recorded mussels are found in Appendix D of the INRMP.

3.6.2.1.3 Protected Species

Federally listed threatened or endangered species receive protection under the ESA. All Army land uses, including military training and testing, timber harvesting, and recreation, are subject to ESA requirements for the protection of listed species and critical habitat. Management of federally-listed species on Fort Campbell is conducted in accordance with the ESA, Endangered Species Recovery Plans, and U.S. Army regulations and guidance. The USFWS is the primary Federal agency with which Fort Campbell cooperates on fish and wildlife management. The USFWS provides signatory agreement on the INRMP concerning conservation, protection, and management of the fish and wildlife resources.

Fauna

Previous surveys for rare, threatened, and endangered animal species have been conducted within the installation, which included investigations of mammals, birds, reptiles, amphibians, fish, crustaceans, and mollusks listed by the USFWS, or monitored by Tennessee and/or Kentucky, and potentially occurring on or near Fort Campbell and in the surrounding area. Table 3.6-1 contains threatened or endangered species and species of Special Concern observed at Fort Campbell and their conservation status (Fort Campbell, 2012a). Wildlife databases were also reviewed to describe the typical habitat where these species are likely to occur. Three federally protected species have been observed on the installation; the endangered Indiana bat and gray bat and the threatened northern long-eared bat. No critical habitat, however, for the gray bat or Indiana bat exists on Fort Campbell.

Endangered Species Management

Management of federally-listed species on Fort Campbell is conducted in accordance with the ESA, endangered species recovery plans, and U.S. Army regulations and guidance. The ESA requires all Federal agencies to conserve listed species. All Army land uses, including military training and testing, timber harvesting, and recreation, are subject to ESA requirements for the protection of gray bats, Indiana bats and northern long-eared bats.

The Endangered Species Management Component (ESMC) for Indiana bats and gray bats was prepared and authorized in 2001, reauthorized in 2008, and updated in July 2020. These are located within the Fort Campbell INRMP as appendices. AR 200-1 requires an ESMC for each installation where federally-listed species occur. The purpose of the ESMC is to ensure compliance with the ESA, while meeting the requirements of the military mission on the installation. The ESMC provides guidance for coordination with the Threatened and Endangered

Species Program Manager to ensure proposed projects do not affect endangered bats. The ESMC also describes conservation goals and objectives developed to maintain or enhance suitable habitat for endangered bats on Fort Campbell. The ESMC covers a period of five years and is reviewed annually and updated as necessary.

Table 3.6-1 Threatened, Endangered, and Special Species Observed on Fort Campbell

Scientific Name	Common Name	Federal Status[1]	Habitat[2]
Myotis sodalis	Indiana Bat	E	**Cave/Forest.** Indiana bats hibernate in caves during the winter. Adult females and their young roost in hollow trees and under loose bark (typically trees > 3-inch diameter during the summer while adult males roost primarily in caves, using trees as temporary roosts.
Myotis grisescens	Gray Bat	E	**Cave.** Species is the most restricted of all mammals to cave habitat. They use caves year-round.
Myotis septentrionalis	Northern Long-Eared Bat	T	**Cave/Forest.** Northern Long-Eared Bats hibernate in caves during the winter. Adult females and their young roost in hollow trees and under loose bark (typically trees > 3-inch diameter during the summer while adult males roost primarily in caves, using trees as temporary roosts.
Peucaea aestivalis	Bachman's Sparrow	S	**Open Areas**. Dry, upland sites with some scattered trees and shrubs with an open under-story and a high volume of grasses and forbs.
Ammodramus henslowii	Henslow's Sparrow	S	**Open Areas**. Large, flat, overgrown, moist fields, with scattered low shrubs or saplings. Typically found in native warm season grass fields, one year or more since burning, and unmowed hayfields.
Crotalus horridus	Timber Rattlesnake	S	**Forest.** Deciduous forests in rugged terrain

[1] E = Endangered; T = Threatened; S = Special Concern

[2] Species preferred habitat descriptions came from online sources including Eastern Kentucky University Department of Biological Sciences, Kentucky Fish and Wildlife, 2013; NatureServe Explorer, 2013; and Tennessee Wildlife Resources Agency, 2013.

Activities on Fort Campbell that potentially affect gray bats and/or Indiana bats adversely include:

- timber harvest activities,
- operation of tracked or wheeled vehicles on bare soil, vegetation, or other unimproved surfaces,
- operation of tracked or wheeled vehicles on unimproved stream crossings,
- excavation for engineering/force protection (e.g., foxholes, berms),
- construction without appropriate sediment control management,
- unimproved firebreaks lacking erosion control measures,
- improper use of pesticides,
- unstable streambanks, and
- untreated or poorly treated discharges into streams on the installation.

The protection of foraging and roosting habitat for Indiana and gray bats has led to the establishment of varying restrictions that apply to land use throughout the training areas. The installation has seasonal management restrictions to ensure installation actions do not directly or indirectly adversely affect either species. Because these bats typically (especially the gray bat) forage over water and in associated riparian areas, a substantial portion of their diet is insects with aquatic life stages. These bats also drink water from streams and lakes. Maintenance of good water quality is critical to management and conservation of the Indiana and gray bat on Fort Campbell. Chemical contaminants in water may be transferred to gray bats via drinking water or insects emerging from the water. Pollutants and silt may affect the survival of aquatic insects, which ultimately affects prey availability for gray bats. Fort Campbell regularly monitors the abundance and diversity of aquatic insect fauna in streams where bats forage. Annually, samples of aquatic insects are collected from 20 sites. Fort Campbell identifies insects in each sample and calculates the Index of Biological Integrity, the Ephemeroptera, Plecoptera, Trichoptera ratio, and the percentage of emerging species to evaluate water quality and availability of prey for gray bats (Fort Campbell, 2012a).

As previously stated, due to the ecological significance and benefits provided by riparian zones, including to the Indiana and gray bat, Fort Campbell maintains a 100-foot wide vegetated buffer along each side of perennial streams (first-order and larger), lakes, and ponds. A 50-foot wide vegetated buffer is maintained along each side of intermittent streams. Additionally, Fort Campbell restricts clearing of forested tracts to no larger than 20 acres, especially within the Casey Creek, Saline Creek, Fletcher's Fork, Jordan, and Piney Fork Creek sub-watersheds as these sub-watersheds lie between foraging areas and roost caves used by gray bats. Training actions are also restricted near caves and in and around foraging areas for the Indiana and gray bats (Fort Campbell, 2012a).

In addition, tree removal activities are seasonally restricted to ensure that no “take” of an endangered species occurs. Fort Campbell restricts removal of trees from 15 March until 15 November, to avoid harm to roosting Indiana bats. The Fort Campbell Endangered Species Program has also issued an Indiana bat tree evaluation procedure for single tree removal which includes the following steps to assess potential impacts (Fort Campbell, 2012a):

- Fort Campbell biologists conducts a habitat assessment to evaluate potential Indiana bat habitat and provide final report to the USFWS.
- If suitable roosting habitat is present within a proposed project area and tree removal cannot be avoided, Fort Campbell biologists will conduct acoustic monitoring and/or mist-netting surveys within that project area prior to project commencement.
- In areas with little or no suitable habitat present, individual roosting structures can be surveyed between 15 May and 15 August from sunset to complete darkness. If no bats are observed exiting the structure, the individual tree can be felled within 24 hours of survey.
- Indiana bat management and monitoring procedures will adhere to the guidelines set forth in the 2012 Draft Revised Indiana Bat Summer Survey Guidance.

Because the Indiana bat is found on Fort Campbell, management for forest bat species is completed at the more stringent levels supporting Indiana summer roosts. When screening each upcoming construction project, Fort Campbell would use the Army's programmatic informal consultation. The Army would conduct a Section 7 Consultation for any project that does not meet the criteria for "Not Likely to Adversely Affect". For environmental reviews in areas that preclude Indiana bats, Fort Campbell would follow the management guidelines found in the informal consultation.

Indiana Bat

The USFWS recognizes “suitable habitat"(summer and/or winter) that is appropriate for use by Indiana bats. Suitable winter habitat (hibernacula) is restricted to underground caves and cave-like structures (e.g., abandoned mines, railroad tunnels); none of which is known to be present within the Proposed Action project areas. Suitable summer habitat for Indiana bats consists of the variety of forested/wooded habitats where they roost, forage and travel; forested blocks, linear features such as wooded fencerows, riparian forests, and other wooded corridors are all suitable summer habitat. Suitable summer habitat varies from dense to loose aggregates of trees with variable amounts of canopy closure (USFWS, 2011).

A suitable roost tree refers to a tree (live or dead) with a diameter at breast height (DBH) of 3 inches or greater that exhibits any of the following characteristics: exfoliating bark, crevices, or cracks (Fort Campbell, 2012a). A suitable primary maternity roost tree refers to a dead or partially dead tree that is at least 9 inches DBH and has cracks, crevices, and/or loose or

exfoliating bark. Trees in excess of 16 inches DBH are considered optimal for maternity colony roosts (USFWS, 2007).

The Indiana bat has been documented in very low numbers on Fort Campbell during summer and autumn (approximately mid-April through September). No caves or mines providing suitable winter habitat for Indiana bats are known on the installation. Caves used by Indiana bats, however, are located within 5 miles. Results of several years of intensive, installation-wide mist net surveys suggest that small numbers of solitary male Indiana bats may occasionally inhabit Fort Campbell during summer and the spring/autumn migration periods. No female Indiana bats have been captured and no maternity colonies have been identified on the installation. No Critical Habitat for the Indiana bat has been designated by the USFWS on Fort Campbell (Fort Campbell, 2012a).

For approximately six months (mid-October through mid-April) each year, Indiana bats hibernate in caves or mines. A small percentage of available caves and mines offer the narrow range of climatic conditions (temperature, humidity, and air flow) required by the species. The period when bats leave the hibernaculum and migrate to summer habitat, called spring staging, occurs from approximately mid-April through early May. During the summer maternity season (approximately mid-May through mid-August), Indiana bats occupy summer habitat. They forage at night in upland and riparian forests, along wooded edges between forests and croplands, and over fields. Indiana bats roost during daytime in upland or bottomland habitats under exfoliating bark or in crevices/hollows of live or dead trees, or occasionally in tree cavities (USFWS, 2011).

At the end of summer, from approximately mid-August through September, Indiana bats return to hibernacula and enter a period of activity near the hibernaculum, called swarming. Swarming is significant because most mating occurs during that period, and foraging during swarming helps individuals accumulate fat reserves necessary to survive winter in hibernation (USFWS, 2011).

Forest habitat is essential to the survival of the Indiana bat. Indiana bats utilize forested areas as roosting and foraging habitat in the spring, summer, and fall. Forested corridors between summer roosts and foraging habitat are important; Indiana bats may avoid open fields to travel along forested corridors, even if it increases commuting distance. Large-scale clear-cutting or other forms of extensive tree removal eliminate Indiana bat maternity and foraging habitat, and remove corridors between caves and foraging habitat, leaving the bats vulnerable to predation. Removal of riparian forest may also result in degradation of water quality and elimination of prey species (USFWS, 2007).

Gray Bat

Gray bats forage on Fort Campbell from approximately April through September. Most perennial and some intermittent streams on Fort Campbell provide suitable foraging habitat for gray bats, and they have been identified in seven of the nine sub-watersheds on Fort Campbell (primarily Fletcher's Fork, Piney Fork, Jordan, and Saline creeks' watersheds). Gray bats have not been identified in the Dry Fork East Creek Sub-watershed, and no surveys for bats have been conducted in the Skinner Creek Sub-watershed. No Critical Habitat, however, has been designated by the USFWS for the gray bat on Fort Campbell (Fort Campbell, 2012a).

Gray bats inhabit caves year-round, but the species is limited to a few caves that provide a narrow range of climate conditions. Different caves are occupied by gray bats during the summer maternity season and winter hibernation. Gray bat hibernacula (winter caves) are generally deep, vertical caves that act as cold air traps. Gray bats hibernate in clusters of up to several thousand individuals. Gray bats migrate to summer caves that provide microclimate conditions different than those in hibernacula. Reproductive females form maternity colonies in caves with warm interiors that are typically within about 0.5 mile of a water body (lake, reservoir, stream) that provides foraging habitat (USFWS, 1982). No caves providing suitable summer or winter roost habitat for gray bats are known to exist on the installation. Past surveys of the two known caves on Fort Campbell have found no use by Indiana bats or gray bats. Caves near the installation, however, are occupied during summer and winter by gray bats, including Big Sulfur Spring Cave in Kentucky, and Tobaccoport and Bellamy caves in Tennessee (Fort Campbell, 2012a).

Gray bats typically forage over streams, reservoirs, and lakes, and through the adjacent riparian vegetation. Both large and small perennial streams provide suitable foraging habitat for gray bats. Forested riparian zones may improve the suitability of a river or reservoir for foraging gray bats. Forested corridors between caves and foraging areas are important to the survival of gray bats; forest is thought to provide cover from predators. The USFWS Gray Bat Recovery Plan recommends maintaining forested shorelines and riparian zones near gray bat maternity colonies (USFWS, 1982).

Gray bats primarily consume flying insects emerging from aquatic life stages. Terrestrial insects also are common prey. Studies comparing prey selection with prey availability have indicated gray bats are opportunistic feeders. Water pollution and siltation that adversely affect aquatic insect larvae may, therefore, also affect the survival of gray bat colonies (USFWS, 1982).

Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*) occurs in forested areas on Fort Campbell. The species was recently listed as "threatened" under the ESA (effective May, 2015). In response to the listing, the Army conducted a programmatic informal consultation for the northern long-eared bat with the USFWS under Section 7 of the ESA. The informal consultation identified

criteria under which construction projects would be considered "Not Likely to Adversely Affect" northern long-eared bat (Informal Conference & Management Guidelines on the Northern Long-eared Bat [*Myotis septentrionalis*] for Ongoing Operations on Installation Management Command Installations, USAEC, May 2015).

Currently, Fort Campbell is conducting maternity roost surveys for the northern long-eared bat to meet requirements under the 4(d) Rule and the programmatic consultation. All located roosts will be protected in accordance with the programmatic informal consultation. Following the survey, Fort Campbell would complete a programmatic ESA Section 7 documentation for the species. In addition, Fort Campbell is currently preparing an ESMC for this newly-listed species. The ESMC establishes a conservation program for the species in accordance with the ESA Section 7(a)(1) and supplements the Installation Natural Resources Management Plan, demonstrating a benefit to the species.

In January 2016, the USFWS issued a "Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions." Within the White- Nose Syndrome Zone, the final 4(d) rule prohibits incidental take of northern long-eared bats in their hibernacula, which may be caused by activities that disturb or disrupt hibernating individuals when they are present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present. Fort Campbell detected and confirmed presence of the disease in 2011 in one cave (Morgamie Cave) and in the Cold War era bunkers. All caves and cave-like structures are off-limits, and anyone entering those places must complete the USFWS/ White-Nose Syndrome decontamination protocols.

Other Protected Species

Fort Campbell has historically restricted 314 acres of training land seasonally because of training impacts to rare plant species and their habitats. The management and protection of species at risk (Bachman's sparrow and Henslow's sparrow) habitat, including mowing restrictions, was implemented by Fort Campbell to increase these species habitats and reduce impacts to these species during the nesting season. Seasonal restrictions, however, no longer exist for mowing due to loss of habitat from woody encroachment. Fields were becoming too woody to support nesting birds and military training.

Bachman's Sparrow

The Bachman's sparrow is a DoD Species at Risk bird that is seasonally present on the installation and is one of only a few birds that are completely endemic to America. This species has strict habitat requirements consisting of a high volume of grasses and forbs, and some scattered trees and shrubs with an open under-story on dry, upland sites. Installation populations occur within and adjacent to the Impact Areas. Several live-fire ranges have populations due to the frequent fires that simulate the habitat favored by the sparrow. The installation has seasonal

management restrictions to ensure installation actions do not directly or indirectly impact this species.

Henslow's Sparrow

The Henslow's sparrow is a DoD Species at Risk and a potential candidate species under the ESA. The bird is one of the fastest declining songbirds in North America due to the loss of suitable grassland nesting habitat. The sparrow is rarely encountered on grassland fragments less than 75 acres. Fort Campbell actively monitors and manages habitat utilized by this species on the installation. Imposed seasonal mowing restrictions, during the breeding season, protect nesting sites.

Timber Rattlesnake

The timber rattlesnake is a DoD species at risk reptile that occurs throughout the rear maneuver space. The species occupies a variety of forested habitats near dens or rookeries. Rattlesnake populations are in decline due to habitat degradation, disturbances around dens or rookeries, and indiscriminant killings. Fort Campbell actively surveys for this species to determine home ranges and population size. Management efforts to protect known occupied forest habitat are included within the INRMP.

Bald Eagle

Effective July 28, 2007, the USFWS removed the bald eagle *(Haliaeetus leucocephalus)* from the list of threatened and endangered species due to meeting or exceeding established recovery goals throughout the species range. Federal protection is afforded the species under the BGEPA and the MBTA. Bald eagles were considered occasional visitors on Fort Campbell with most sightings near Lake Kyle. Multiple records have been documented of transient birds foraging at Lake Kyle and the former Lake Taal since 2001. Between one and three bald eagles were observed on each occasion. The majority of observations occurred between December and February, but in 2006, bald eagles were observed near Lake Kyle between February and May, and again in November. This record is significant since it was the first observation of an adult pair and a single juvenile. However, none were documented nesting at either site until February 2018 at Lake Kyle. The nesting pair are utilizing a loblolly pine approximately 500m north of the lake on the western edge of a permanent bivouac site.

Management controls for compliance with the BGEPA were implemented to ensure compliance with the regulation. In southeastern states, the period between November and May is when many resident bald eagles nest.

Potential habitat for nesting bald eagles on Fort Campbell is forest within about 0.25 mile of Lake Kyle. However, potential nesting habitat on Fort Campbell is marginal quality compared to the abundant, high quality nesting habitat available less than 5 miles away along the Cumberland

River, and approximately 10 miles away at LBL. Two nest sites have been recorded on Fort Campbell, Lake Kyle and the Training Area 19 mitigated wetland site. Only the Lake Kyle site supports and active nesting pair. Foraging bald eagles can be observed anywhere on Fort Campbell.

State Listed Species

For species that occur on Fort Campbell without specific Federal legal protection, but considered rare by KDFWR or Tennessee Department of Environment and Conservation, Fort Campbell does not manage at the species level, but rather at the ecosystem level as discussed in the Natural Resources Management Program section. Management objectives are established to sustain a variety of natural habitat types likely to support a diverse group of species, including rare species.

Locations of regionally rare state-listed plant species are buffered with signs and are off-limits to military excavation or vehicular activity. These buffered locations vary in size, based on the size of the plant population and the presence of suitable habitat. With habitat improvement, plant numbers generally increase. These buffered locations have not created cumulative restrictions to land use. Endangered plants do however, on occasion, require some effort to ensure that training events resulting in earth disturbance do not impact listed species and candidates.

Threatened and Endangered Species near Fort Campbell

A number of endangered or threatened plants, mussels, and reptiles are found within habitat that is contiguous to Fort Campbell but not within the installation boundaries. Since they do not occur on Fort Campbell there are no management practices relating to them. Table 3.6-2 lists these species.

Table 3.6-2 Threatened and Endangered Species near Fort Campbell

Scientific Name	Common Name	Federal Status[1]	Category
Apios priceana	Price's Potato Bean	T	Plant
Dromus dramas	Dromedary Pearly Mussel	E	Clam
Epioblasma walkeri	Tan Riffleshell	E	**Clam**
Lampsilis abrupta	Pink Mucket Pearly Mussel	E	Clam
Nerodia erythrogaster neglecta	Copperbelly Water Snake	T	Reptile
Obovaria retusa	Ring Pink Mussel	E	Clam
Plethobasus cooperianus	Orange-foot Pimple Back Pearly Mussel	E	Clam
Pleurobema plenum	Rough Pigtoe	E	Clam
Quadrula fragosa	Winged Mapleleaf Mussel	E	Clam

[1] E = Endangered; T = Threatened

3.6.2.2 Environmental Consequences

No new ranges or facilities will be constructed to support IDDS-A and range usage would increase by 0.8%, a negligible amount. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species at Fort Campbell. Therefore, negligible, less than significant impacts are expected to all biological resources. Other impacts to biological resources are described in section 3.2.1.2 and are also expected to be less than significant.

3.6.2.3 Cumulative Effects

Fielding of all two planned systems listed in section 3.3 may only require expansion or renovation of existing facilities. Therefore, impacts from construction are expected to be negligible and less than significant. An expected increase of soldiers of approximately 1.5% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. Adding up to 210 soldiers, 111 spouses, and 189 children at Fort Campbell is about 0.18% of the ROI population, a negligible amount. Overall cumulative impacts to biological resources are described in section 3.3.1. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

The Army has plans and funding to construct an Automated Multi-Purpose Training Range (AMPTR), an Automated Multi-Purpose Machine Gun (AMPMG) range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.1.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements and use of SOPs and BMPs will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.6.3 Cultural Resources

3.6.3.1 Affected Environment

A detailed description of cultural resources at Fort Campbell is provided in the ICRMP (Fort Campbell, 2012b), and is incorporated into this PEA by reference. The ICRMP is Fort Campbell's primary guidance document for the management of cultural resources on the Fort

Campbell Military Reservation, Kentucky and Tennessee. The ICRMP articulates how all applicable legislation, DoD regulations, legal requirements, and existing PAs are implemented. It also addresses how Fort Campbell staff will coordinate with external regulatory bodies and other stakeholders. Finally, the ICRMP was prepared to address Department of the Army and DoD requirements for an ICRMP and to provide Fort Campbell command and staff with a tool for managing a range of cultural resources across the installation.

Cultural resources management requirements are defined in Army Regulation 200-1, *Environmental Protection and Enhancement*, Headquarters, Department of the Army and include:

- Historic Properties – Buildings, structures, and districts, and other features defined by AR 200-1 and protected through the NHPA;
- Archaeological Resources – Archaeological sites as defined and governed by the ARPA, AR 200-1, and the NHPA;
- Cultural Items – Traditional Cultural Properties (as defined in the NHPA and as described in National Register Bulletin 38), and sites and artifacts associated with Native American graves (as defined and governed by the NAGPRA;
- Native American Sacred Sites – as identified EO 13007 and the in the AIRFA; and
- Collections of artifacts and records pertaining to them as directed in 36 CFR 79

On July 16, 1941, the federal government announced the selection of the Clarksville-Hopkinsville area as one of 14 locations for the installation of new military training facilities in the United States. Within one year's time, over 106,000 acres of land was purchased for the future military installation. Development of the installation began in February 1942 with the removal of hundreds of families and the demolition of homesteads, farm houses, and even entire communities. Camp Campbell opened on July 1, 1942 (Fort Campbell, 2012b).

3.6.3.1.1 Cultural Resources Present

A total of 1,574 archaeological sites have been identified within the installation's boundaries. To date, 1,226 of these sites have formal determinations of eligibility with concurrence from appropriate SHPO. Of this total, 26 sites have been determined eligible for the NRHP (Fort Campbell, 2012b). As a requirement of the PA, sites lacking formal eligibility determinations require Section 106 Consultations with appropriate SHPOs prior to the initiation of proposed undertakings.

Inventory of cultural resources is a requirement under Section 110 of the National Historic Preservation Act. The Cultural Resources Management Program (CRMP) at Fort Campbell maintains an extensive Geographic Information System (GIS) database to keep track of archaeological sites, historic sites, historic buildings, and cemeteries across the installation. This

database organizes site information in a format that can be queried for various tasks, such as project review and assessment.

The cantonment area currently encompasses approximately 14,000 acres on the east portion of the Fort Campbell (Figure 3.6-3). The cantonment area serves as the "city" portion of Fort Campbell and is classified as light industrial, supporting the majority of the Post's activities including: schools, shopping, recreation, residential neighborhoods, barracks complexes, and community facilities. Major land/space utilization includes airfield operations (Sabre AAF and Campbell AAF), administration, community facilities, family housing, unaccompanied personnel, facilities maintenance, military support, medical, outdoor recreation, supply storage, and training. In consideration of the general land use within the cantonment area, typical activities associated with developed land are anticipated to continue in the future.

The PA regarding the operation, maintenance, and development of (Fort Campbell, 2019a) broadly covers undertakings across the installation. The PA outlines the stipulations for satisfying the Army's Section 106 responsibilities for all individual undertakings of the program. For each undertaking, the proponent of the undertaking works in consultation with the Fort Campbell Cultural Resources Manager (CRM) to determine the APEs as defined in 36 CFR 800.16d and assesses whether prior efforts for identification of historic properties are adequate in accordance with guidelines established by each SHPO. If identification efforts with the APEs are adequate and there are historic properties or properties considered eligible for listing in the NRHP, Fort Campbell will assess whether the undertaking is likely to cause adverse effects and whether mitigation measures are necessary. The determinations and documentation are submitted to the appropriate SHPO for review.

Fort Campbell is also required to provide the SHPO and the ACHP an annual report on or before January 1 of each year summarizing activities carried out under the terms of the PA. These reports include a list of projects and program activities reviewed for possible effects to historic properties, determinations of effect concluded under this PA, a summary of mitigation or treatment measures implemented or still pending to address the effects of undertakings, and a summary of consultation activities and views of the SHPO and interested parties where appropriate. The annual report is available for public inspection.

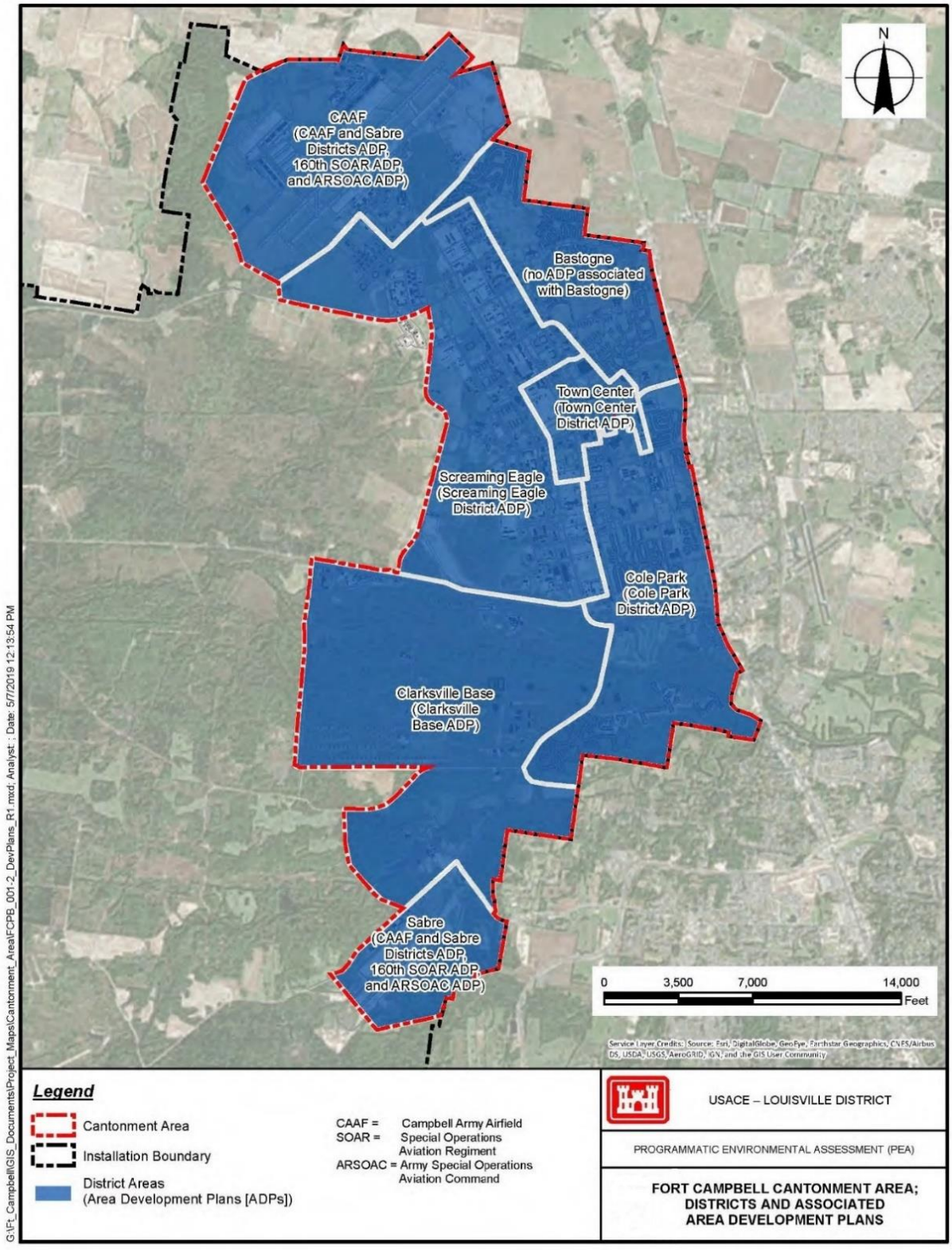

Figure 3.6-3 Fort Campbell Cantonment Area

Historic Properties

Historic Buildings are characterized by being at least 50 years old, or older, from the current year and include facilities classified as World War II temporary buildings, residences originally constructed as part of the Capehart and Wherry family housing program, and structures that were used as Cold War weapons and ammunition storage. All these buildings are more than 50 years old and are considered through nation-wide Program Comments that allows the demolition and alteration of these remaining building types at Fort Campbell. Architectural evaluations at Fort Campbell are on-going.

According to the Fort Campbell cultural resources database, most of the aboveground structures more than 50 years old have been evaluated with concurrence of the eligibility listing in the NRHP by the appropriate SHPO (Fort Campbell, 2012b). The following structures have been determined to be Eligible for listing in the NRHP with concurrence by the appropriate SHPO:

- Facility 1541 (Durrett House)
- Facility 5001 (Parish House/CG Quarters)
- Facility 6081 (Childers' House)
- Enoch Tanner (Wickham) Statue
- State Line Marker (15CH0291 and 40SW0836).
- Lincoln Elementary School

There is only one NRHP-Eligible historic district at Fort Campbell (the Clarksville Base Historic District). Clarksville Base was established during the Cold War as a naval weapons storage site that stored weapons and weapon components, including early generation nuclear weapons and components. Clarksville Base was one of the earliest naval weapons storage facilities established by the Armed Forces Special Weapons Project. Consultations between the Tennessee Historical Commission and Fort Campbell determined that Clarksville Base is eligible for the National Register of Historic Places as a historic district through associations with the Cold War under Criterion A, a significant and distinguishable entity whose components may lack individual distinction (Fort Campbell, 2012b).

Fort Campbell has a PA with the Tennessee SHPO to specifically address development, construction, and operations at the Clarksville Base Historic District (CBHD) (Fort Campbell, 2019b). The APE for the proposed developments within the CBHD is the entire area of the CBHD including both the development area and the preservation area within the district.

With respect to operations of the former Clarksville Base, The Master Planning Branch confers with the Cultural Resources Program staff no less than twice each calendar year to review the status of all construction or improvement projects planned or potentially considered for placement in the CBHD. For undertakings that pose potential effects to CBHD as a whole and to contributing elements of the district and located in a preservation area, the PA has stipulated

standard treatments. The CRMP and the Master Planning Branch documents each project affecting the CBHD or its contributing elements. The documentation is retained in the project planning files.

Regarding effects on historic properties within CBHD but not associated with operations of the former Clarksville Base, the proponent of each undertaking works in consultation with the Fort Campbell CRMP to determine the APE and assess whether prior efforts for identification of historic properties are adequate in accordance with guidelines established by the Tennessee Historical Commission. If identification efforts with the APEs are adequate and there are historic properties or properties considered eligible for listing in the NRHP, Fort Campbell will assess whether the undertaking is likely to cause adverse effects and propose mitigation measures if necessary. The determinations and documentation are submitted to the Tennessee SHPO for review.

In addition, each calendar year by the anniversary of the effective date of the PA, Fort Campbell provides a report including a list and description of the undertakings initiated within the CBHD. The report includes maps of areas affected by the undertakings and the corresponding documentation. The annual report also summarizes the efforts to complete the general mitigation measures if any of the measures are incomplete at the time Fort Campbell compiles the report.

Archaeological Sites

There are 26 archaeological sites at Fort Campbell currently eligible for listing in the NRHP. Some of these eligible sites, including sites that contain human remains, are within the expanded areas of the cantonment area and in the Clarksville Base.

Phase I surveys and Phase II site evaluations at Fort Campbell are on-going. It is noted that there are several locations on Fort Campbell that are excluded from further archaeological inventory because they have been heavily disturbed and/or unsafe for survey (Fort Campbell, 2016).

Cemeteries

During construction of the installation, many graves and cemeteries were relocated off-post. However, a large number remain today and are under Army protection. Approximately 170 historic-era cemeteries are thought to remain and numerous attempts to locate them on maps have occurred since 1941. Currently, the CRMP has identified 131 of these historic era cemeteries, which are fenced and marked in GIS. Fort Campbell has an ongoing program to identify historic cemeteries. Improvements to the inventory of cemeteries on the installation have continued since 2002.

3.6.3.1.2 Consultation and Coordination with Indian Tribal Governments

Native American Sacred Sites

EO 13175, *Consultation and Coordination with Indian Tribal Governments*, 65 FR 218 (November 9, 2000) directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with EO 13175, DoD Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, (September 24, 2018) federally recognized tribes that are historically affiliated with lands in the vicinity of a Proposed Action have been invited to consult on proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to interested tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Cultural Resources Program Manager is designated as Fort Campbell's Tribal Liaison Officer and serves as the government-to-government contact concerning tribal affairs.

EO 13007, *Indian Sacred Sites*, 61 FR 104 (May 24, 1996) directs "each executive branch agency with statutory or administrative responsibility for the management of federal lands shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites." Currently, there are no recorded sacred sites on Fort Campbell, although the installation has several sites that contain Native American burials. Since this class of cultural resource is defined by Indian Tribes, and no Tribes have come forward to designate a sacred site on Fort Campbell, the CRMP needs to take no action at this time.

In addition, there are no recorded TCPs on Fort Campbell. The TCPs are historic properties and, if present, are protected under the NHPA. Given the number of historic cemeteries, the potential for historic landscapes, and the range of prehistoric sites, it is possible that TCPs might be present. Since this class of cultural resource is generally defined by Indian Tribes or groups that descend from historic communities, and no such groups have come forward to designate a traditional cultural site on Fort Campbell, the CRMP needs to take no action at this time.

3.6.3.2 Environmental Consequences

Fort Campbell does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 0.8%, which is negligible. Impacts to cultural resources are adequately addressed in section 3.2.2.2 and are expected to be negligible and less than significant.

3.6.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the two planned systems listed in section 3.3 are described in section 3.3.1. They are expected to be minor or negligible and less than significant for the same reasons stated in section 3.6.2.3.

The Army has plans and funding to construct an AMPTR, an AMPMG range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.2.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements to account for historic properties and use of SOPs and BMPs will reduce anticipated impacts. Impacts from the construction and use of the new ranges are expected to be at worst minor and less than significant when combined with the Action Alternative.

3.6.4 Soils

3.6.4.1 Affected Environment

The soils at Fort Campbell provide surfaces for maneuvering and other exercises, mediums for constructing/digging force protection structures, and foundations for buildings and other structures. Most of the soils at Fort Campbell are silt loams that drain easily and are fairly deep; however, silt loams are also inherently unstable, and are very susceptible to both wind and water erosion.

Fort Campbell Soil Formation and Landscape Position

Soils at Fort Campbell generally formed in cherty limestone residuum or in loess mantles overlying limestone residuum (weathered bedrock). Several limestone formations underlie Fort Campbell, including the St. Genevieve and the St. Louis Limestone formations (Fort Campbell, 2012a). Due to the limestone formations, karst landscape is typical across the installation. Karst landscapes are formed by the dissolution of limestone from precipitation, and are characterized by sink holes, sinking streams, closed depressions, subterranean drainage, and caves (Kentucky Geological Survey, 2013). In particular, the north and northeastern sections of the installation, east of the Casey Creek Sub-watershed and north of the Little West Fork Sub-watershed, are located in a highly karstic area. Thin soil mantles, sinks, and fractured and solution-weathered limestone characterize this area (USACE, 1994).

Table 3.6-3 Most Prevalent Soil Series on Fort Campbell

Soil Series *Soil Subgroup*	Slope % *(Soil Unit Symbol)*	Acres	%[1]	%[1] of Total Area	Characteristics
Dickson silt loam/silty clay loam 0 to 12% slopes *Glossic Fragiudults*	0 to 2 *(DsB)*	1,631	1.6	29.8	Very deep, moderately well-drained soils that have a slowly permeable fragipan2 in the subsoil. Formed in a silty mantle 2 to 4 feet thick and the underlying residuum of limestone. They are on nearly level to sloping uplands. Moderately well- drained; medium to slow runoff; moderate permeability above the fragipan and slow to very slow permeability in the fragipan. Somewhat limited for the construction of roads and buildings without basements. *HEL*[2]
	2 to 6 *(DkB2/ DsC*)	28,941	28.0		
	6 to 12 *(DsC2)*	256	0.2		
Hammack silt loam *Glossic Paleudalfs*	2 to 5 (MoB)	3,445	3.3	16.9	Very deep, well-drained, moderately permeable soils formed in a loess mantle and the underlying cherty residuum from limestone. These soils are on ridgetops and sideslopes of rolling to hilly areas. Well-drained, runoff is medium or rapid. Permeability is moderate. Very limited for the construction of roads, and not (MoB) to somewhat limited for the construction of buildings without basements. *HEL*
	5 to 12 (BeB2, HxC)	8,223	7.9		
	2-12 (BeC2)	5,890	5.7		
Sengtown gravelly silt loam *Typic Paleudalfs*	5 to 12 (Ba)	4,553	4.4	10.0	Very deep, well-drained, moderately permeable soils on uplands. Formed in residuum weathered from cherty limestone. Well-drained. Medium to very high runoff. Moderately slow to slow permeability. Ba is somewhat limited, and Be and Rf are very limited for construction of roads and buildings without basements. *HEL*
	12 to 20 (Be)	3,830	3.7		
	20 to 60 (Rf)	2,000	1.9		

[1] % indicates percentage of total Fort Campbell land area.

[2] *HEL* = Highly Erodible Land

Most of the soils on the installation are relatively old and have formed over thousands of years. These soils are typically upland soils, and have undergone soil genesis long enough to develop argillic horizons (accumulated silicate clay) and belong to the Alfisol and Ultisol soil orders[51]. Some younger soils also can be found, typically in floodplains or in disturbed (urban) areas. These soils have no or little soil profile development, and are classified as Entisols and Inceptisols. Table 3.6-3 lists the soils and characteristics mapped at Fort Campbell by Soil Series and their classification to the subgroup level (e.g., Dickson silt loam, *Glossic Fragiudults*) which cover 10% or more of the installation.

The majority of the soils developed in silty mantles over limestone, or limestone residuum, and include the Dickson, Hammack, Crider, Lax, Pembroke, Brandon, Sengtown, Taft, and Guthrie soil series. They are all Ultisols or Alfisols. All of these soils, except Taft and Guthrie, are located on upland ridge tops and side slopes. Taft and Guthrie are both poorly to somewhat poorly drained soils that developed on upland flats, stream terraces, or depressions. Guthrie is a hydric soil, and Taft has hydric inclusions. Dickson covers the largest portion of Fort Campbell. Almost one-third of the installation, mostly in the center, has been mapped as Dickson silt loam or Dickson silty clay loam. Dickson is the Tennessee State soil. This soil is highly erodible land (HEL) which is discussed below in Erosion and Erosion Management. Since it is mostly gently sloping (2-6% slopes) it can be successfully managed. Hammack silt loam is another widespread soil series, common across the installation, except in the Saline Creek watershed. Hammack silt loams are also HEL, but are typically steeper sloped (5-20% slopes) and, therefore, are more likely to erode than the Dickson soil. The same holds true for Sengtown gravelly silt loam, which covers about one-tenth of the installation. The Sengtown soils are HEL and tend to be moderately to severely steeply sloped (5-60% slope), and exhibit severe erosion hazards depending on the location and type of activity proposed on the land.

Erosion and Erosion Management

Soil is formed over hundreds, often thousands, of years. When uncovered, it can become detached from the soil column by the impact of rain water or from the force of wind. When detached by rain, it can travel with the water in the form of overland flow to surface waters. Once soil particles become suspended in runoff, they change from being natural resources that support plant growth to pollutants in the form of sediment. Soil erosion is a vast problem on Fort Campbell from past clear-cut logging activities, establishment of historic firebreaks, agricultural practices, and maneuver training. Many of the Fort Campbell soils formed in silty loess mantles, parent material that was deposited thousands of years ago by wind. As these soils are disturbed or not protected by vegetative cover, they become unstable and easily eroded.

[51] A soil order is the highest order in the Soil Taxonomy system used by the U.S. Department of Agriculture, and is determined by the presence or absence of major diagnostic horizons. In Table 3.6-3, Alfisols are those soils ending in –alfs, and Ultisols are those ending in -ults. Entisols end in –ents, and Inceptisols end in –epts.

Many of the soils on Fort Campbell are classified as HEL (Figure 3.6-4). While the HEL concept was developed for agricultural cropland and for water erosion only, it is a valuable tool in soil management used to identify soils that are at risk being eroded if not managed correctly. There is a total of approximately 70,598 acres (67.9% of total area) of HEL on Fort Campbell.

Erosion takes many forms. Sheet erosion is difficult to detect as soil is removed more or less uniformly across the surface. Rill erosion forms small channels that are irregularly dispersed and is often seen on bare land. Rill erosion can be smoothed over with tillage, while gully erosion forms large channels that cannot be corrected by ordinary tillage practices. Gullies are formed by accelerated erosion, and are often started as rill erosion. On Fort Campbell, deep gullies can present difficulties for maneuvering activities. Fort Campbell recognizes the importance of keeping its soils in place to support plant growth, since a variety of vegetation communities are important for training exercises, and are mediums for the construction of ranges, maneuvering trails, buildings, etc. Fort Campbell recognizes that sedimentation is the number one pollutant of Fort Campbell waterways, which has caused several streams to not meet their state-designated uses. Sedimentation has also led to indirect impacts to endangered bats that utilize aquatic insects as forage. For these reasons, Fort Campbell has adopted an aggressive soil erosion management policy.

The effects of military training and vegetation management on soil erosion vary widely, depending on the type and intensity of the activity and the location of the activity with respect to HEL and slopes. The two most common types of training conducted at Fort Campbell are maneuvers and live-firing exercises. Maneuvering heavy wheeled or tracked vehicles can cause a high level of disturbance to soils and vegetation, which can cause accelerated soil erosion. In particular, repeated maneuvering in a small area greatly disturbs the area, and especially compacted soils may be difficult to rehabilitate. Prior to training, proposed training activities and training site locations are coordinated with the Fort Campbell Environmental Division to screen for and avoid sensitive areas, including highly erodible soils and steep slopes. Detailed recovery plans agreed upon by the units (e.g., ARNG) and Range Division are also required prior to training to ensure that the land will be recovered following the training exercise.

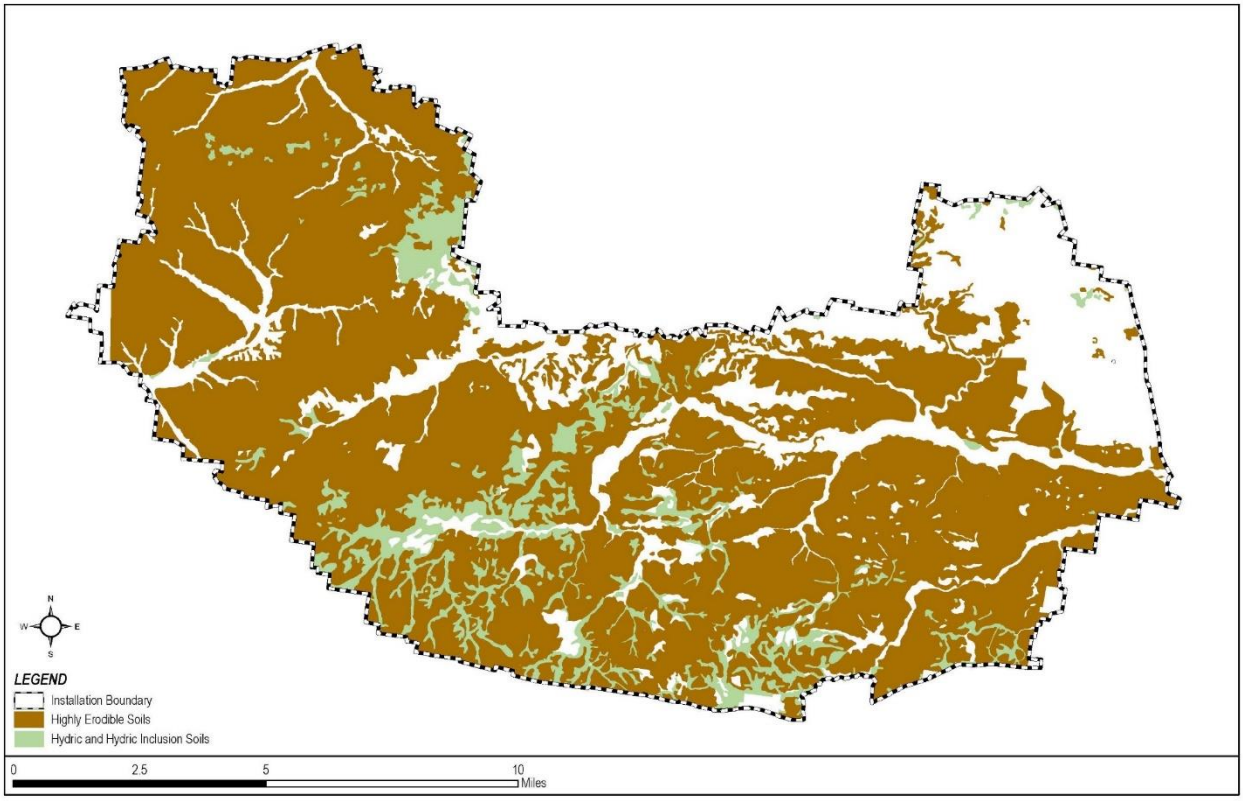

Figure 3.6-4 Highly Erodible Land on Fort Campbell

Vegetation management (clearing and prescribed burns) within the training areas also impacts soil stability. When the soils become void of vegetation after clearing or prescribed burning, they are very susceptible to erosion until vegetation is re-established. Disturbance from firing exercises also increases erosion. The firing of munitions into the soil causes soil disturbance and increases the potential for wind and water erosion around heavily targeted areas. Munitions firing also increases the potential for fire, and in turn, increases the potential for soil erosion due to lack of vegetative cover.

Fort Campbell Integrated Training Area Management Program

Five basic management techniques are used at Fort Campbell to minimize military training effects to the soil and vegetation, and therefore, reduce the potential for soil erosion: (1) limit total use; (2) redistribute use; (3) modify kinds of use; (4) alter the behavior of use; and (5) manipulate the natural resources for increased durability. This is done through the ITAM Program. The ITAM Program is responsible for inventorying and monitoring land conditions, rehabilitating lands unsuitable for training, and integrating training requirements with land capacity.

ITAM includes management of training lands (HEL), and integrates range/ITAM activities with environmental land management activities. The program performs biological evaluations on the land quality and land carrying capacity and then makes recommendations regarding repairs and reconfigurations of the training sites. When needed, ITAM provides training land remediation, reconfiguration, and maintenance to sustain the training areas for all-weather training activities. Training area stewardship guidelines are listed in Fort Campbell Regulation 385-5 – Sustainable Range Program. For example, the ITAM Program must recover all excavated areas to natural contour following the completion of field training. The ITAM Program monitors recovery efforts and enforces digging recovery requirements for training exercises occurring in training areas, particularly those adjacent to water bodies.

The ITAM Program at Fort Campbell is administered by the ITAM/Range Division of the G3/Directorate of Plans, Training, Mobilization (G3/DPTM), and consists of four components: 1) Range and Training Lands Assessment, 2) Land Rehabilitation and Management, 3) Training Requirements Integration , and 4) Sustainable Range Awareness. The G3/DPTM works closely with the Fort Campbell Environmental Division towards integrating land management activities and natural resource management programs.

Environmental Stewardship Guidelines

In an effort to comprehensively manage and protect soil resources on Fort Campbell, the INRMP contains soil management goals and objectives designed to protect soil resources and prevent soil destabilization and erosion. With the implementation of the existing soil resource environmental stewardship guidelines contained within the INRMP and the ITAM environmental stewardship guidelines, the impact of training exercises is reduced as much as possible. After training, land evaluations determine which remediation measure is needed, and if training must be rotated to another area while the land recovers.

Measures to control sediments to reduce and avoid impacts to surface water quality contained in the *Fort Campbell Storm Water Management Plans* and are discussed in the water quality section. This policy establishes the management of storm water, prevention of erosion, and control of sediment for construction or land clearing activities on the installation, and ensures that all activities are compliant with state permits. The regulatory levels for TMDL and parameters (sediment, pathogens, nutrients, etc.) vary from watershed-to-watershed, depending on the severity of the impairment and the intended uses of the stream.

3.6.4.2 Environmental Consequences

Since Fort Campbell does not plan on constructing ranges or facilities to support IDDS-A no impacts to soils from construction are expected. The increase in range usage is predicted to be 0.8%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.3.2.

3.6.4.3 Cumulative Effects

Fielding of the two planned systems listed in section 3.3, along with the Proposed Action, may only require expansion or renovation of existing facilities. Therefore, impacts from construction are expected to be negligible and less than significant. An expected increase of soldiers of approximately 1.5% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. The impacts are described in section 3.3.1. The additional actions in combination with those of the Action Alternative, are expected to result in negligible to minor, less than significant cumulative effects to soils.

The Army has plans and funding to construct an AMPTR, an AMPMG range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.3.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements, the use of SOPs and BMPs, and routine range assessments and maintenance will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.6.5 Land Use and Compatibility

3.6.5.1 Affected Environment

Fort Campbell covers approximately 105,000 acres. The installation consists of training and maneuver areas (approximately 68,000 acres), range and impact areas (approximately 27,000 acres), and built-up areas (Figure 3.6-5). A detailed description of land use on Fort Campbell is provided in Section 2.0 of the INRMP. The majority of natural resources management activities on Fort Campbell occur in the maneuver space, which includes the entire installation except the cantonment area.

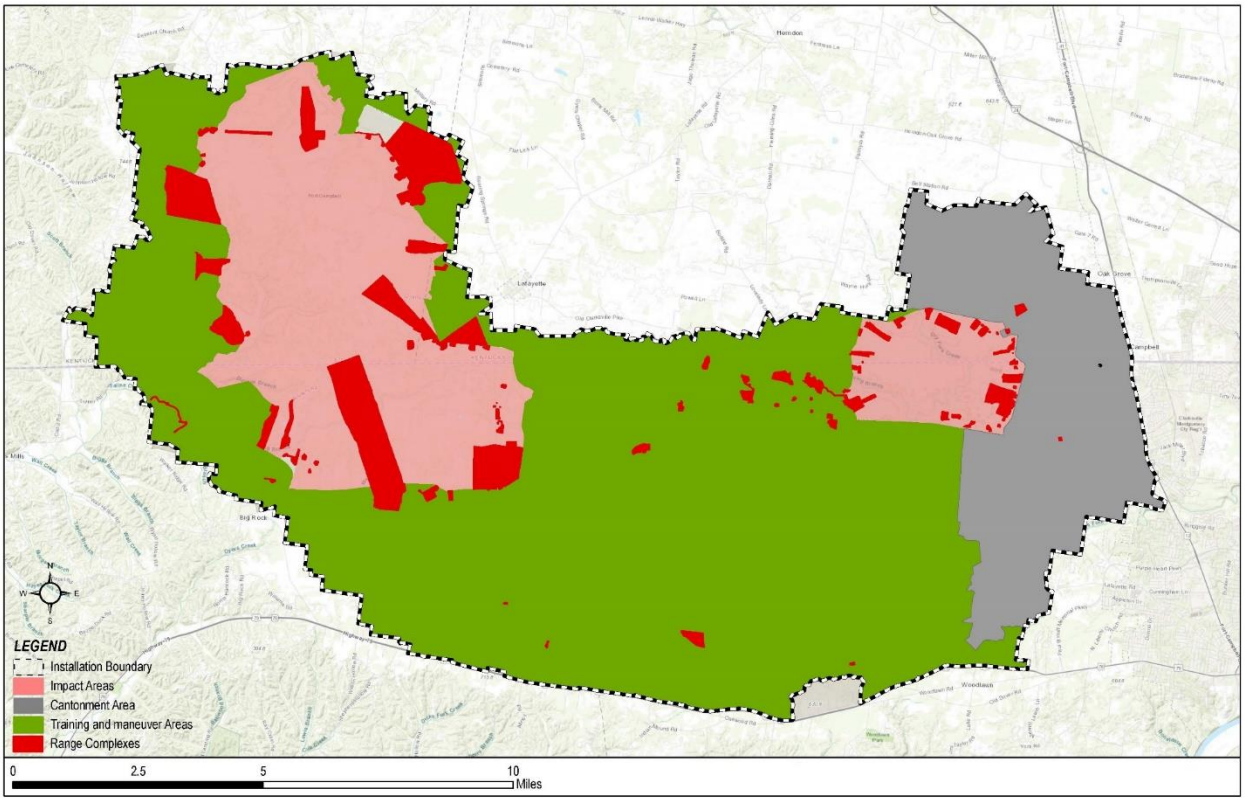

Figure 3.6-5 Land Use on Fort Campbell

3.6.5.1.1 Cantonment

The cantonment area at Fort Campbell (Figure 3.6-3) has been developed into a wide variety of land uses that comprise elements necessary for a complete urban-style community. As a result of historical Base Realignment and Closure transformation actions, a combination of redevelopment, development, and expansion has occurred within the cantonment area districts.

The Fort Campbell cantonment area occupies approximately 14,000 acres along the eastern portion of the installation with 40% of its land mass within Christian County, Kentucky and the remaining 60% occupying Montgomery County, Tennessee. Land use is classified as the following types within the cantonment area: residential, commercial, industrial, institutional, open space, vacant/agricultural, and airports.

There are various indoor and outdoor recreation opportunities across the installation. These facilities include a golf course, campgrounds, a bowling center, swimming pools, and gymnasiums. Hunting and fishing are also common activities on post.

To support the mission of Fort Campbell, land use compatibility assures future development will not interfere with future missions. Development planning carefully considers impacts of future facilities on training and deployment areas within the cantonment area.

3.6.5.1.2 Range Complex

The range space contains the Impact Area (22,144 acres) and Small Arms Impact Area (4,494 acres). While wildlife and natural habitat exist, and wildland fires occur, within the impact areas, they are off-limits to natural resources personnel due to hazards associated with unexploded ordnance. Management activities and objectives described in the INRMP do not involve the impact areas. Wildland fires that occur in the impact areas may be allowed to burn or may be suppressed by the Forestry wildland firefighters.

Land in the maneuver space is used for training activities conducted on Fort Campbell. It also provides habitat for fish and wildlife, space for agricultural and timber production, and opportunities for outdoor recreation. In accordance with the Sikes Act, the maneuver space is managed for multiple use to the extent practicable consistent with the military mission.

Coordinated planning among military trainers and natural resources personnel is essential to ensure appropriate space and conditions for training, maintaining regulatory compliance, implementing productive reimbursable programs (e.g., agricultural leases), and sustaining a healthy ecosystem. The ITAM Program and the Conservation Branch are responsible for developing and maintaining conditions in the maneuver space that support the military mission and other uses.

The Range Development Plan (RDP) (Nakata Planning Group LLC, 2004) and Range Complex Master Plan describe conditions of the maneuver space required to support necessary training, including the number and size of ranges, and the amount and characteristics of open area required for mounted and aerial training activities. Numerous other natural resources component plans guide management of the maneuver space, including the Forest and Open Area management plans. The role of component plans is described below in sections that address individual resources. The INRMP serves to integrate actions supporting the RDP and multiple component plans, with the result of providing clear comprehensive guidance for maneuver space land management.

3.6.5.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Campbell and range usage is expected to rise by only 0.8%, which is negligible. Therefore impacts to Land Use and Compatibility are expected to be negligible and less than significant and are addressed in section 3.2.4.2.

3.6.5.3 Cumulative Effects

Fielding of the two planned systems listed in section 3.3, along with the Action Alternative, may only require expansion or renovation of existing facilities since the systems would field to existing units or replace existing equipment one-for-one. Therefore impacts from construction are expected

to be negligible and less than significant. An expected soldier population increase of approximately 1.5% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. The effects of the additional actions are described in section 3.3.1. When combined with those of the Action Alternative, the effects are expected to result in negligible to minor, less than significant cumulative effects to Land Use and Compatibility.

The Army has plans and funding to construct an AMPTR, an AMPMG range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.4.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers at that location. The new ranges will be constructed within the existing range complex, maintaining current land uses and away from incompatible uses. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.6.6 Facilities

3.6.6.1 Affected Environment

Fort Campbell is encompasses 104,664 acres. The installation consists of training and maneuver areas (approximately 63,049 acres), range and impact areas (26,638 acres), and built-up areas. Covering approximately 15,000 acres, the built-up area consists of the cantonment area (Administrative Area (9,371 acres), (Sabre Heliport (2,280 acres), the former Clarksville Base (2,600 acres), Green space adjacent to Campbell AAF (726 acres) and various solid waste management units where cleanup of contamination occurs.

A variety of small land uses are located in the built-up areas including administration, operational training and maintenance, landing strips for fixed-wing aircraft and helicopters, motor pools, supply and storage, maintenance, commercial and medical services, industrial, community facilities, troop and family housing, recreation (e.g. golf course), open space, and two small lakes.

3.6.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at Fort Campbell was assessed based on the Army RPLANS records. Fort Campbell has a deficit of required facility space to support the IDDS-A battery HQ, TEMF, hazardous material storage, and barracks as shown in Table 3.6-4.

Table 3.6-4 Facilities that may require construction at Fort Campbell

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Campbell available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(1,028,371)	N	N
TEMF	1	28,304	0.6	11,083	N	N
Hazardous Mat'l Storage*	1	60	0.0	(14,170)	N	N
Barracks	1	8,420	0.2	(131,421)	N	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.						

Fort Campbell would plan to provide facilities for the IDDS-A battery on par with what other units stationed there typically receive. New construction is not needed to support this requirement. Most units on Fort Campbell are assigned less than the maintenance facility space required by doctrine. The IDDS-A would be provided the required HQ, vehicle maintenance, and hazardous material storage space from existing facilities and this may require an exception to standard since it may be less than Army doctrine requirements. The need for barracks would be accommodated through Army supported off-post housing if required. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Fort Campbell also has a deficit of two range types required to support IDDS-A training. The specific range types are not being listed as an operational security measure. The deficit in acreage for the range types is shown in Table 3.6-5.

Table 3.6-5 Range Acreage that may require construction at Fort Campbell

Standard Range shortage[1]		**Standard Range acreage shortage[2]**	
One battery	Two batteries	One battery	Two batteries
0.43	0.44	2140	2189
0.86	0.86	N/A[3]	N/A[3]
[1]The Standard Range shortage is computed by dividing the shortage of RD by the number of normal training days per Army doctrine.			
[2] The Standard Range acreage shortage is computed by multiplying the Standard Range shortage by the minimum Standard Range area.			
[3]No minimum range area specified per Army doctrine.			

Fort Campbell would not construct new ranges to support the IDDS-A. Training requirements would be met through the use of approved simulations or appropriate scheduling per the SRM or ReARMM. If funding becomes available the required ranges could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Since Fort Campbell does not plan on constructing ranges or facilities to support IDDS-A no impacts to facilities from construction are expected. The increase in range usage is predicted to be 0.8%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.5.2.

3.6.6.3 Cumulative Effects

Fielding of the two planned systems, when combined with the Action Alternative, is expected to have less than significant cumulative effects with minor or negligible increases of the impacts described in section 3.3.1. The systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities.

The Army has plans and funding to construct an AMPTR, an AMPMG range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.5.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity. Impacts are expected to be no greater than minor and less than significant when combined with the Action Alternative. The new ranges will distribute training across a greater number of ranges and reduce the use of any single range. Also, the Army performs routine monitoring of range conditions and implements maintenance and rehabilitation when required.

3.6.7 Water Resources

3.6.7.1 Affected Environment

3.6.7.1.1 Surface Water

Surface water systems of Fort Campbell consist of 422 stream miles and four small manmade lakes at scattered locations. Major streams are perennial with substrates ranging from unconsolidated sediments to cobble (Fort Campbell, 2013). The installation is divided into three primary watersheds: Little West Fork Creek, Saline Creek, and Casey Creek formed from nine sub-watersheds as shown in Figure 3.6-6. All watersheds drain to the Cumberland River/Lake Barkley, either to the south, west, and northwest, and then flow into the Ohio River.

The Casey Creek watershed, which includes the Skinner Creek sub-watershed drains the far northwest portion of the post. The Saline Creek watershed drains the far west portion of the post. These watersheds encompasses about 34% of Fort Campbell which is primarily training areas and ranges.

Little West Fork Creek watershed, formed from the remaining six sub-watersheds, is composed of 297 stream miles that drain approximately 66% of the surface runoff of the installation, including the cantonment area. Water flows in an easterly direction toward a confluence with the West Fork of the Red River. The main stem of Little West Fork Creek is located south of the cantonment area. Little West Fork Creek was channelized in the 1950s. Headwater streams in and near the cantonment area are small intermittent water bodies with stable channels (Fort Campbell, 2013).

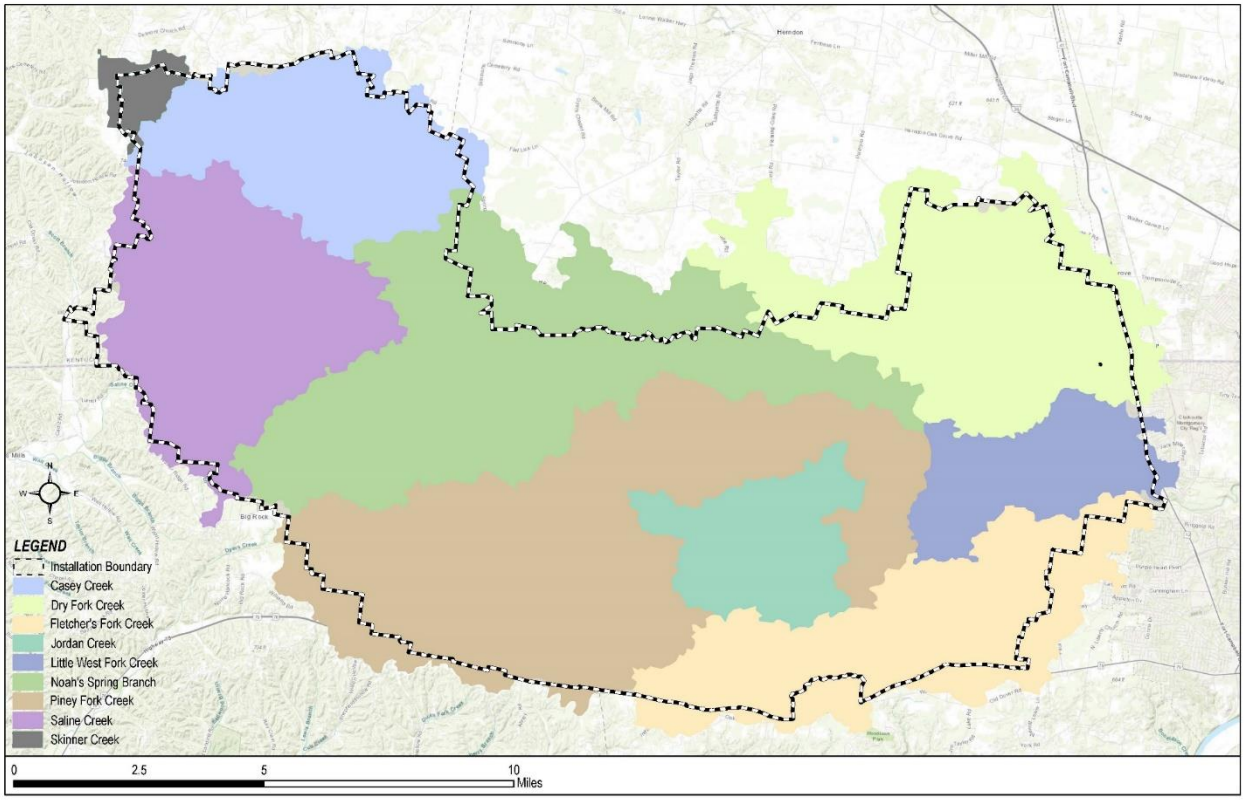

Figure 3.6-6 Sub-watersheds on Fort Campbell

Peak flows occur from December through April, and then gradually diminish to the low flow period between August and October. Stream flow during dry periods is maintained by springs (Fort Campbell, 2013). There is a strong connection between surface waters and groundwater on Fort Campbell. Because of the karst terrain, streams may exhibit losing characteristics (flow lost to groundwater) and gaining reaches (groundwater discharge increases stream flow). Where caves are present and connected to a stream by karst, surface streams can disappear underground

and often reappear in another location as a spring. Disappearing streams are more likely to occur during drought conditions in late summer and early fall when the water table drops (Fort Campbell, 2013).

Riparian Zones

Riparian zones (buffers) are ecologically important areas recognized by Fort Campbell for the protection of aquatic habitat (Fort Campbell, 2012a). Their position in the landscape adjacent to water bodies generally support biological communities distinct from the surrounding upland because the continually wet habitat allows development of riparian-dependent plant and animal communities. Plants in the riparian zone typically are tolerant of periodic flooding or saturated soils and plant debris into streams provide in-stream channel structure, increasing aquatic habitat diversity while decreasing streambank erosion. Species diversity and productivity is also often greater in riparian areas because these areas contain species from both aquatic and terrestrial communities. Vegetation in the riparian zone protects water quality by controlling runoff flow, stream temperature, and reducing input of sediment, nutrients, and contaminants into surface water from activities in the sub-watershed.

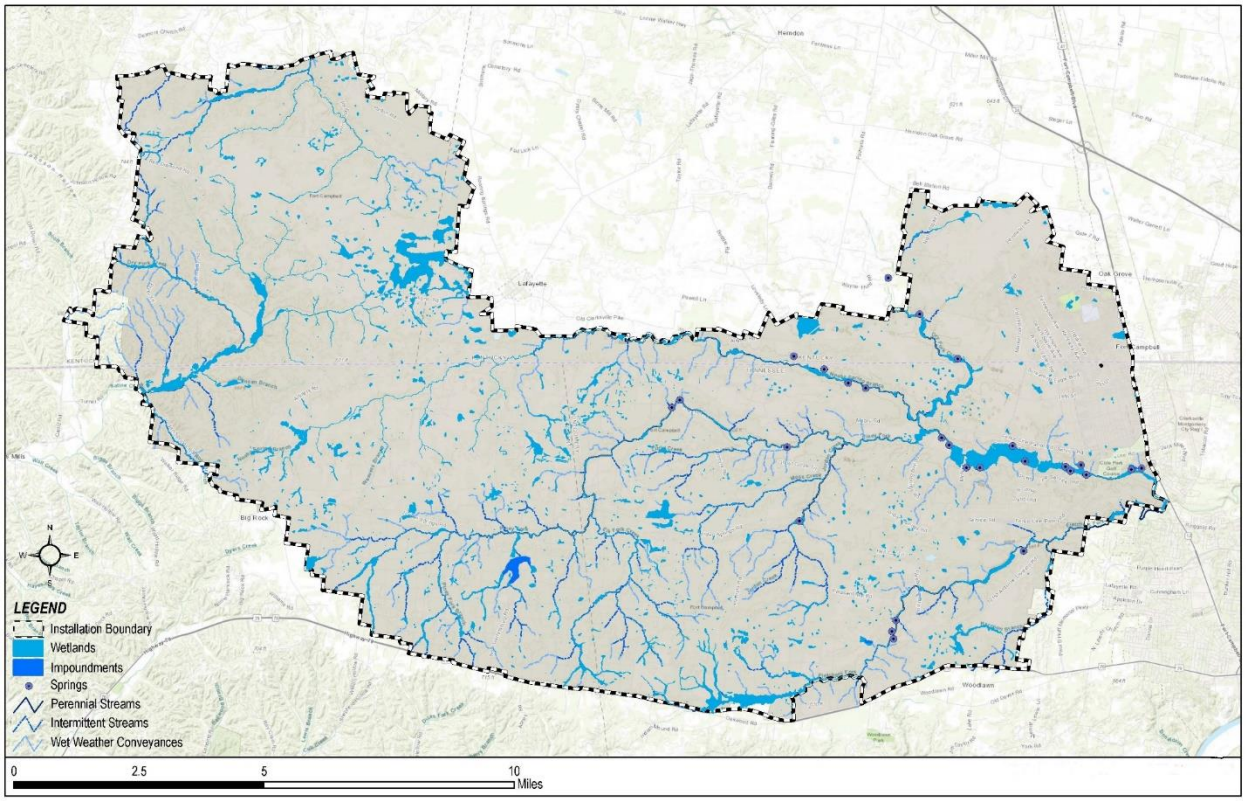

Figure 3.6-7 Surface Water Bodies on Fort Campbell

Riparian areas also form natural travel corridors for wildlife foraging, migration, and dispersal. When riparian areas are distinct from surrounding uplands, they can function as travel corridors and provide refuge for riparian-dependent species.

Due to the ecological significance and benefits provided by riparian zones, Fort Campbell maintains a 100-foot-wide vegetated buffer along each side of perennial streams (first-order and larger), lakes, and ponds. A 50-foot-wide vegetated buffer is maintained along each side of intermittent streams. Fort Campbell has 2,897 acres of riparian buffer management areas along surface water bodies of the installation (Figure 3.6-7). Within these areas, training and non-training activities that impact water quality and aquatic habitat are limited (e.g., timber harvest and creation of skid trails is prohibited).

3.6.7.1.2 Groundwater

Groundwater occurs at Fort Campbell in the subsoil and underlying limestone. Groundwater recharge occurs through precipitation, which averages 50.75 inches per year. The subsoil is generally low in permeability but can yield large amounts of water where it is sufficiently thick. Substantial quantities of groundwater are located in solution cavities in the underlying limestone. There are shallow and deep aquifers under Fort Campbell. The shallow aquifer is recharged by sinkholes. Thirty-five improved sinkholes/Class V Underground Injection Controls (UICs)[52] infiltrate some of the stormwater runoff in the cantonment area. Inventories of the Class V UICs are maintained in Kentucky and Tennessee. Groundwater discharges from the bedrock aquifer primarily to surface water at springs or as seepage along surface streams. Groundwater may cycle back underground and return to the aquifer. The deep aquifer is associated with Boiling Spring, Quarles Spring, and Blue Spring.

Potable water is supplied to Fort Campbell by Boiling Spring, an artesian water source located approximately 2.5 miles west of the southern portion of the cantonment area. The Boiling Spring aquifer has natural barriers to contamination from onsite and offsite sources and is, therefore, a source of consistently high-water quality. It is noted, however, that additional information from the Kentucky Department for Environmental Protection indicates there has been observed connectivity between karst surface features within the cantonment area and the Boiling Springs Basin. The nature of karst aquifers and demonstrated activity within the cantonment area could influence water quality.

3.6.7.1.3 Water Quality

Surface water quality is moderately impacted by installation activities. The amount of sedimentation in streams resulting from erosion ranges from moderate to severe, as determined

[52] Class V wells are used to inject non-hazardous fluids underground. Most Class V wells are used to dispose of wastes into or above underground sources of drinking water. https://www.epa.gov/uic/underground-injection-control-well-classes accessed 17Nov20.

by the loss of rocky substrates in streams through burial by sediments. Sedimentation is the most serious water quality threat at Fort Campbell. Steps being implemented to minimize water quality degradation include cessation of grading bare soil firebreaks twice yearly, allowing development of vegetative cover to hold the soil and aggressive enforcement of erosion controls requirements on construction projects in the cantonment area. Sediment accumulation data has been collected at several locations as part of the Land Condition Trend Analysis program. Results indicate sedimentation has been affecting biotic communities and compromising the aquatic systems at Fort Campbell (USAEC, 2017).

The Fort Campbell SWMP and the Comprehensive SWPPP Summary Documents provide descriptions of storm drainage areas and associated outfalls, potential storm water pollution sources, and material management approaches to reduce potential storm water contamination. The SWMP covers all areas and non-industrial activities within the limits of Fort Campbell. Storm water protection for industrial activities is covered in the Kentucky and Tennessee Comprehensive SWPPP Summary Documents, supported by site specific industrial activity SWPPPs.

The SWMP addresses the specific storm water management requirements of Fort Campbell's municipal NPDES General Permit, while the SWPPP addresses the requirements of the industrial NPDES Permits TN Multi-Sector General Permit and KYR00 Permit.

The SWPPP and SWMP provide specific requirements and BMPs to prevent surface water contamination from activities such as construction, storing and transferring of fuels, storage of coal, use of deicing fluids, storage and use of lubrication oils and maintenance fluids, solid and hazardous waste management, and use of deicing chemicals. Implementation of BMPs such as: silt fences, sediment basins, rock check dams, temporary seeding, storm drain inlet protection, and dust control reduce the likelihood of pollutants entering the Fort Campbell storm system from construction activities:.

The *Fort Campbell Storm Management Plan* (for projects over 1 acre) establishes management of storm water, prevention of erosion, and control of sediment for construction or land clearing activities on the installation, and ensures that all activities are compliant with state permits (Fort Campbell, 2005). The policy and its implementation provide a regulatory mechanism to ensure compliance to sustain water quality, each state's storm water construction general permit, Municipal Separate Storm Sewer System permit, and the future establishment of state TMDLs.

Fort Campbell operates in compliance with the CWA and Safe Drinking Water Act permits. The installation develops, implements, and enforces a stormwater management program designed to reduce the discharge of pollutants to the maximum extent practicable to protect water quality. The program implements control measures for illicit discharges (dumping), construction site

stormwater runoff control, and post-construction stormwater management in new development and redevelopment. Certain activities on the installation must also comply with the Tennessee and Kentucky NPDES General Permits for Industrial Activities. Installation staff, tenants, activities, contracting offices, and contractors must comply with all the requirements outlined in regulations and the Fort Campbell Stormwater Management Plan and Checklist. Fort Campbell Stormwater Program staff conducts inspections of site activities as needed to ensure compliance with CWA permits (Fort Campbell, 2018).

3.6.7.1.4 Wetlands and Floodplains

Wetlands

Along with forested areas and grasslands, wetlands comprise another vegetated habitat type found throughout Fort Campbell. Wetlands includes lakes, rivers, streams, swamps, marshes, or similar areas that develop between open water and dry land. These sites are a valuable natural resource improving water quality, reducing flood and storm damage, providing wildlife habitat, supporting hunting and fishing activities, and providing educational and aesthetic promise.

Based on USFWS NWI data, approximately 3,700 acres of potential wetlands are located on the installation with palustrine and lacustrine habitats being the most dominate types of wetlands present. Most wetland areas are located near perennial streams and creeks in low-lying areas (USAEC, 2017). Depressions formed in karst areas on Fort Campbell are also potential wetland sites. Minimal wetlands occur within the cantonment area and are located in the extreme north and south regions. These wetlands have been identified primarily northeast of Campbell AAF in the northern region of the cantonment area and south and west of Sabre in the southern region of the cantonment area. Limited field surveys for wetlands have been conducted since the late 1990's but have not been continued due to the high cost (Fort Campbell, 2013).

In 2000, Fort Campbell coordinated with the NRCS to conduct wetland delineations throughout the installation. The locations of potential wetlands were mapped using digital photographs (USACE, 1987). All potential wetlands thought to be "jurisdictional" were submitted for a jurisdictional determination by the USACE, Nashville District. A total of 398 wetlands, totaling approximately 682 acres, were identified on Fort Campbell. All identified wetlands were mapped using Global Positioning System technology; wetland locations and boundaries are maintained in a geographic information system mapping database. Most wetlands on Fort Campbell are palustrine (Fort Campbell, 2013) and are shown in Figure 3.6-8.

Vegetated buffers of 100 ft are maintained around all jurisdictional wetlands and perennial streams, lakes, and ponds while 50 foot buffers are maintained along intermittent streams. Where it is determined that a wetland has, or could have, significant habitat value, or where current activities adjacent to a wetland are causing noticeable adverse impacts on the habitat, buffers of

greater than 100 ft may be established. Activities within buffer zones are limited to those which would cause little or no impact on, or disturbance to, the wetland.

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the "the waters of the United States" under Section 404 of the CWA.

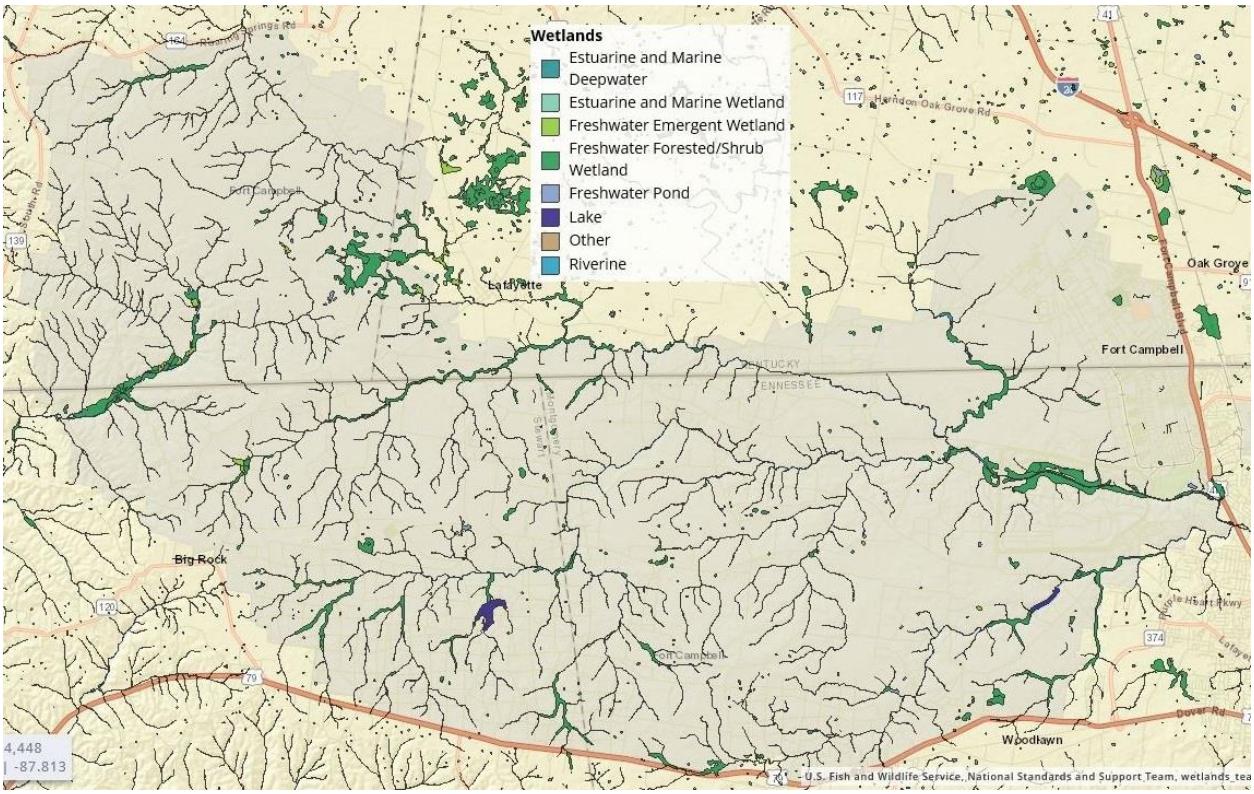

Figure 3.6-8 Wetlands on Fort Campbell

Floodplains

EO 11988, *Floodplain Management*, instructs Federal agencies to consider the location of floodplains in the siting and development of projects. Typically, projects involving the placement of structures (i.e., buildings, berms, inadequately sized bridges) that have the potential to affect floodwater elevations or flows are discouraged. There are a total of 3,342 acres of 100-year floodplains mapped at the installation. The extent and location of 100-year floodplains are shown on Figure 3.6-9.

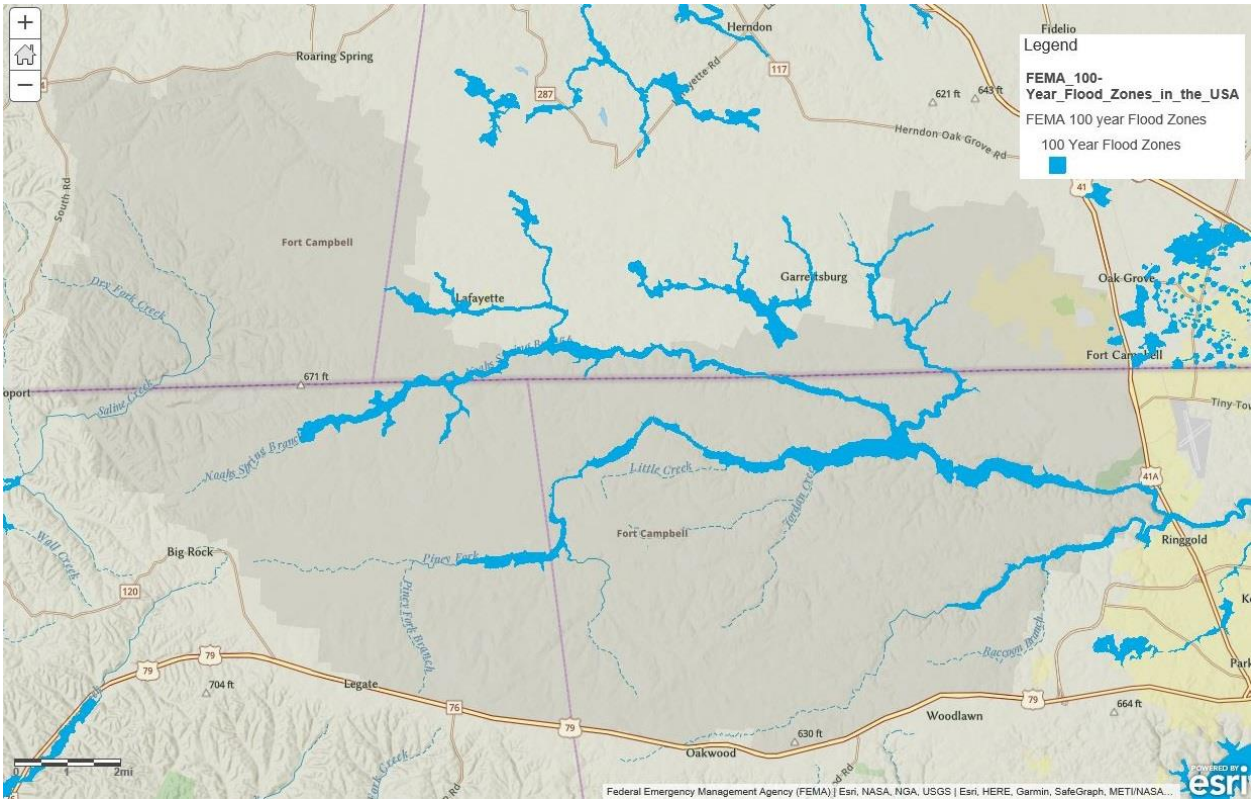

Figure 3.6-9 Floodplains on Fort Campbell

3.6.7.2 Environmental Consequences

Impacts to water resources at Fort Campbell are described in section 3.2.6.2 and are expected to be negligible and less than significant. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 0.8%, a negligible amount. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions.

3.6.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the two planned systems is expected to have minor, less than significant cumulative effects to all water resources. The impacts are described in section 3.3.1. The new systems would be fielded to existing units or replace equipment on a one-for-one basis with no additional facility requirements anticipated. The anticipated population increases of the two systems and IDDS-A is 1.5% for soldiers on Fort Campbell and including all family members is 0.18% within the ROI resulting in minor and negligible impacts, respectively, to waters, water use, and potential water quality degradation.

The Army has plans and funding to construct an AMPTR, an AMPMG range, and a Shadow UAS Training Facility at Fort Campbell in the future. Impacts from construction would be like those described in Section 3.2.6.2. The IDDS-A system may use the AMPTR and AMPMG ranges but not the Shadow facility. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Routine range assessments and maintenance will ensure undesirable chemicals and compounds are not migrating to water resources. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.7 FORT RILEY, KANSAS

3.7.1 Background

Fort Riley is a U.S. Army installation located in North Central Kansas, on the Kansas River, between Junction City and Manhattan (Figure 3.7-1). The installation covers 101,733 acres (41,170 ha) in Geary and Riley counties. Fort Riley's population includes 15,009 soldiers (Army), 164 Airmen (Air Force), and 18,028 family members (9,347 on post, 8681 off post). Fort Riley is home to the 1st Infantry Division (1st ID), which includes:

- 1st ABCT
- 2nd ABCT
- 1st CAB
- 1st Sustainment Brigade
- Division Headquarters and Headquarters Battalion
- Division Artillery

Other tenants on Fort Riley include: 407th Army Field Support Battalion, 10th Air Support Operations Squadron, 97th Military Police Battalion, U.S. Army Medical Activity (MEDDAC), Dental Activity, Warrior Transition Battalion, Civilian Human Resources Agency, Civilian Personnel Advisory Center, 902nd Military Intelligence Group, Logistics Readiness Center, Mission and Installation Contracting Command, Special Operations Recruiting Battalion, 3rd Weather Squadron 2nd Detachment, Army and Air Force Exchange Service, Defense Commissary Agency, Army Benefits Center, and the Network Enterprise Center.

The mission of the 1st ID and Fort Riley is to build and maintain combat ready forces; and on order, deploy these forces in an expeditionary manner to conduct Decisive Action to fight and win in complex environments as members of a Joint, Inter-organizational, and Multinational team. (http://www.riley.army.mil/Units/1st-Infantry-Division/).

Figure 3.7-1 Location of Fort Riley

Smoky Hill Range

Smoky Hill Range is an additional training range for Fort Riley, located approximately 60 miles southwest of the installation and 10 miles west of Salina, Kansas (Figure 3.7-2). Smoky Hill Range is located in Saline and McPherson Counties.

The Smoky Hill Air National Guard Range is the largest and busiest Air National Guard (ANG) bombing range in the nation, encompassing 51 square miles, and has more than 100 Tactical targets and an electronic warfare range. The complex provides approximately 36 thousand acres for air-to-ground weapons training, allowing Active and Reserve component military organizations to train jointly in a realistic environment that combines ground and air assets in operational training in a way that is possible at only a few sites throughout the United States. The Smoky Hill Range provides airspace within FAA-sanctioned Military Operations Area, which permits active and reserve units to operate both piloted and unmanned aircraft in training scenarios.[53] Smoky Hill Range also has a FAA-sanctioned restricted area described in the Airspace section.

[53] Source: http://www.kansastag.gov/gpjtc_default.asp Accessed on May 6, 2020.

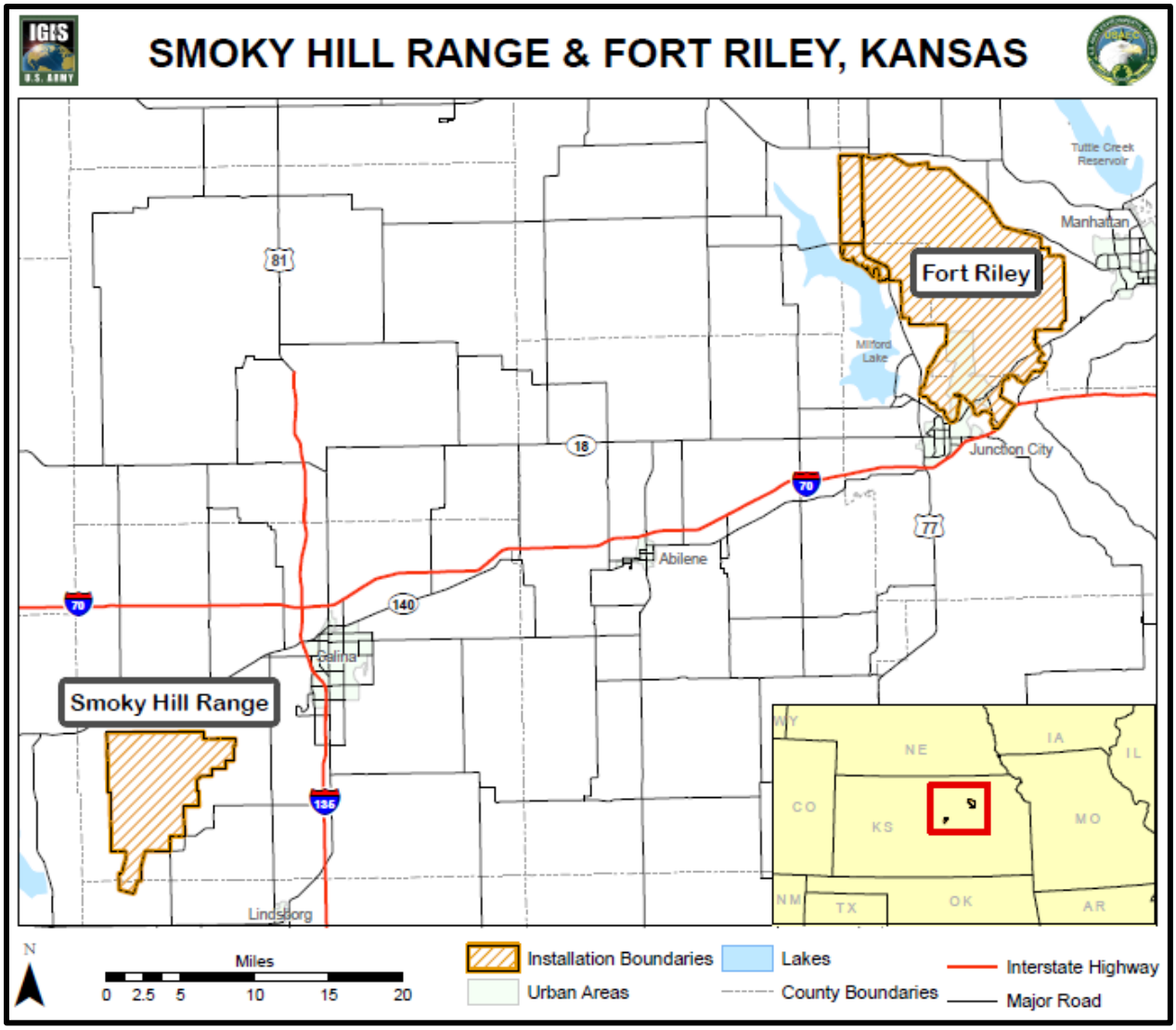

Figure 3.7-2 Location of Smoky Hill Range Relative to Fort Riley

The Kansas Training Center (KSTC) is an area at the northeast corner of Smoky Hill Range that could host Army and ARNG maneuver exercises. It is approximately 3,500 acres (Figure 3.7-3). The KSTC could host up to 10 battalion exercises annually with each training exercise lasting up to two weeks. Up to eight company/battery level exercises could be conducted annually. Each exercise would last five to seven days. Battalion and company/battery training exercises will not be conducted simultaneously. Division level and BCT level command centers could be established on the range up to six times annually each lasting up to 10 days.

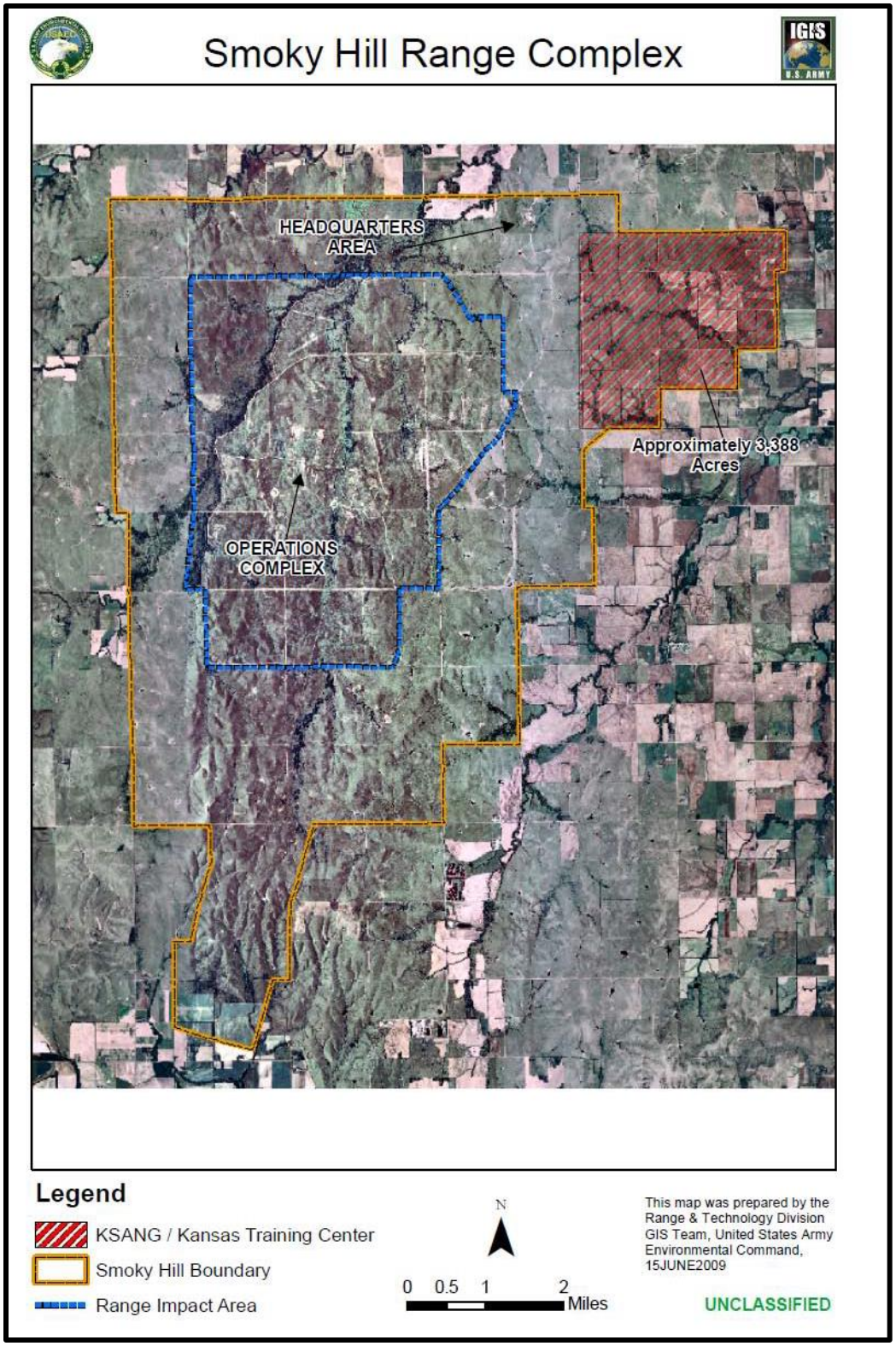

Figure 3.7-3 Map of Smoky Hill Range

3.7.2 Biological Resources

3.7.2.1 Affected Environment

3.7.2.1.1 Flora

At Fort Riley, grasslands comprise approximately 67% of the installation (Fort Riley, 2016). The native grasslands of Fort Riley consist primarily of tallgrass prairie (Figure 3.7-4). Some elements of the mixed-grass prairie exist because Fort Riley is located near the transition zone between the tallgrass prairie and the mixed-grass prairie to the west (Kuchler, 1974).

The native grasslands on Fort Riley generally do not exhibit classic tallgrass prairie, which would be composed of big bluestem, indiangrass, switchgrass, or the mixed-grass prairie, such as little bluestem and sideoats grama. Past land-use activities, minimal management, lack of large herbivore grazing, and military training exercises have produced native grasslands that exhibit a less than pristine species composition and that have been invaded by woody species. The grasslands with the least disturbance contain the highest percentages of native warm-season grasses and associated forbs (Fort Riley, 2016).

Prairie grasslands cover approximately 92% of the 33,873-acre Smoky Hill Range. They include native grasslands and disturbed or brome-dominated grasslands. The native grasslands are dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and switchgrass (*Panicum virgatum*) and also include various wildflowers such as aster (*Aster spp.*), goldenrod (*Solidago spp.*), and prairie coneflower (*Ratibida spp.*) (Kansas Biological Survey [KBS], 2006). Other native grasslands are dominated by big bluestem, Indiangrass (*Sorghastrum nutans*), little bluestem, side-oats grama (*Bouteloua curtipendula*), and blue grama (*Bouteloua gracilis*) (KBS, 2006). The grasslands that have been subjected to manmade disturbances, mainly agriculture, are dominated by smooth brome (*Bromopsis inermis*). Many of the disturbed grasslands are in varying stages of recolonization by native grassland species.

Forestlands comprise approximately 16% of Fort Riley. Most of this acreage is associated with the bottomland forests along the Republican and Kansas Rivers and the woodlands within the drainages of Threemile, Sevenmile, and Wildcat Creeks. However, upland forests occur along the mainstems of most streams on the installation.

Freeman and Delisle (2004) identified three forest communities (Eastern cottonwood-Willow Forest, Eastern cottonwood-Sycamore Forest, and Green ash-Elm-Hackberry Forest) and one woodland community (Chinquapin oak-Bur oak Ravine Woodland) on Fort Riley. Forest communities generally had 61–100% tree canopy cover, three distinct canopy layers (over-story trees, understory shrubs, herbaceous layer), and trees >5 m tall. Woodland communities usually had 26–60% canopy cover and trees <5 m tall (Fort Riley, 2016).

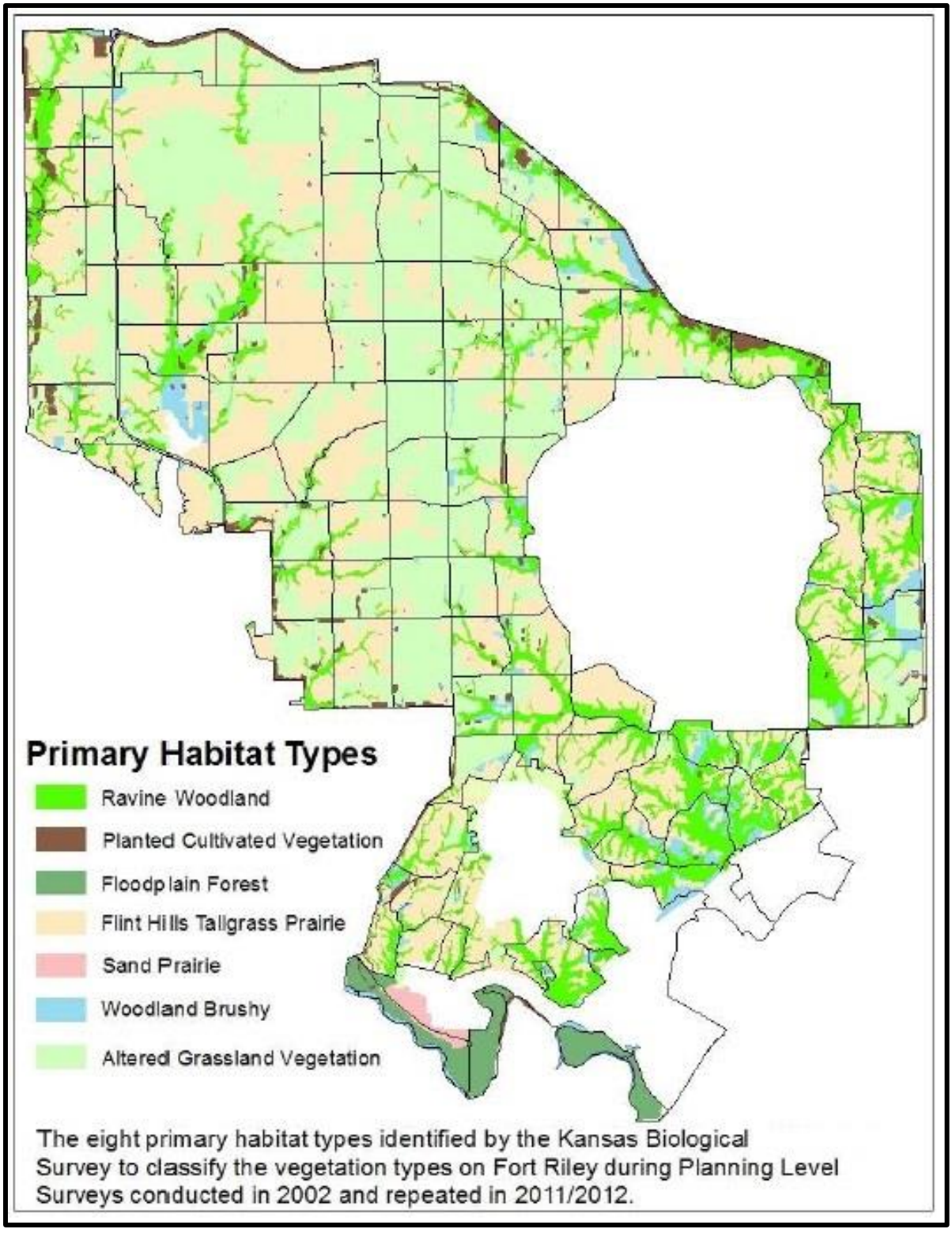

Figure 3.7-4 Primary Habitat Types on Fort Riley

Upland forests and woodlands encompass approximately 4.5% of the Smoky Hill Range including planted bur oak (*Quercus macrocarpa*)[54]. Other timber species found at Smoky Hill Range include black walnut *(Juglans nigra*), osage orange (*Maclura pomifera*), smooth sumac (*Rhus glabra*), mulberry (*Morus spp*.), cottonwood (*Populus deltoids*), and boxelder (*Acer negundo*) which provide valuable wildlife habitat and protection. Smooth sumac and osage orange are undesirable invasive species in the pasturelands (Kansas Air National Guard [KSANG], 2001).

3.7.2.1.2 Fauna

Fort Riley's habitat supports at least 40 species of mammals, 269 species of birds, 47 species of turtles, reptiles, and amphibians, and 60 species of fish (Fort Riley 2016). This includes a variety of upland game birds, big game species, and furbearer species (U.S. Army, 2018).

Wildlife habitat on Smoky Hill Range is associated with prairie grassland, woodland, and riparian vegetation types. The majority of wildlife on the range is associated with prairie grassland habitats. Riparian habitats along intermittent streams also provide habitat for wildlife species. Existing data on wildlife species and descriptions of wildlife habitats present on the range are documented in the INRMP (KSANG, 2007) and a Natural Features Inventory of the Smoky Hill Air National Guard Range (KBS, 2006).

Mammals

Approximately 42 species of mammals, including 25 species of small mammals, reside on Smoky Hill Range. Typical carnivores observed include red fox (*Vulpes vulpes*), bobcat (*Felis rufus*), coyote (*Canis latrans*), badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*). White-tailed deer (*Odocoileus virginianus*) inhabit the range, especially in riparian corridors and undeveloped portions of the property. Small mammals found on Smoky Hill Range, including the eastern mole (*Scalopus aquaticus*), Elliot's short-tailed shrew (*Blarina hylophaga*), and eastern woodrat (*Neotoma floridana*), are the major prey base for raptors, snakes, and carnivorous mammals (KSANG, 2001). The black-tailed prairie dog (*Cynomys ludovicianus*), is resident on the KSTC but not the remainder of Smoky Hill Range. Mammal species at Fort Riley are similar, with the exception of black-tailed prairie dogs.

Birds

The avifauna of Fort Riley is rich and diverse, with 269 bird species documented on the installation (Fort Riley, 2016). As is typical for Kansas, most of these species are migrant, non-game songbirds. The birds occupy a wide range of habitat types on the installation, from riverine sandbars to interior woodlands.

[54] Personal communication, Mr G Wiens, Smoky Hill Range Natural Resources Manager, 14 January 2021.

Numerous inventories of birds have been conducted on Fort Riley. Surveys have documented 134 bird species on Fort Riley during "breeding safe dates," i.e., periods when migrants of that species are expected to be absent from Kansas. Of these, 110 are confirmed or probable breeders. The most abundant breeding birds are brown-headed cowbird, dickcissel, grasshopper sparrow, eastern meadowlark, and mourning dove.

Other notable breeding birds include Henslow's sparrow, loggerhead shrike, and the interior woodland species ovenbird, wood thrush, and prothonotary warbler. Common woodland species include blue jay, black-capped chickadee, and northern cardinal. Common shrubby edge species include brown thrasher, common yellowthroat, and field sparrow.

Common raptors are the red-tailed hawk, northern harrier, great horned owl, barred owl, bald eagle, eastern screech-owl, and American kestrel. Common shorebirds are killdeer, greater yellowlegs *(Tringa melanoleuca)*, lesser yellowlegs *(Tringa flavipes)*, least sandpiper *(Calidris minutilla)*, and spotted sandpiper *(Actitis macularius)*. Common wading birds are great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and little blue heron *(Egretta caerulea)*. Common winter birds are Harris's sparrow *(Zonotrichia querula)*, American tree sparrow *(Spizelloides arborea)*, and dark-eyed junco *(Junco hyemalis)*.

Birds use a variety of habitats on Smoky Hill Range, including marshes, forests, shrublands, and grasslands. Smoky Hill Range supports habitat for approximately 142 species of birds, including 19 game species, 90 breeding birds, and 33 wintering bird species. Raptor species seen on the range include osprey (*Pandion haliaetus*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), and red-tailed hawk (*Buteo jamaicensis*). Common wading birds in the area include the black-crowned night heron (*Nycticorax nycticorax*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and the green heron (*Butorides virescens*). Shorebirds, including killdeer (*Charadrius vociferus*), semipalmated plover (*Charadrius semipalmatus*), ring-billed gull (*Larus delawarensis*), black tern (*Chlidonias niger*), and sandhill cranes (*Grus canadensis*), have the potential to occur on Smoky Hill Range (KSANG, 2001).

Reptiles and Amphibians

Fort Riley supports the variety of snakes, turtles, lizards, frogs, and toads commonly found in the tallgrass prairie region (Busby et al. 1994). Forty-seven species of reptiles and amphibians (21 species of snakes, 9 lizards, 7 turtles, and 10 amphibians) have been captured or observed on Fort Riley (Fort Riley, 2016). The most common species are ringneck snake and western chorus frog. No listed threatened or endangered species are known to occur. The venomous copperhead is common in woodlands on Fort Riley. In 2005, there was a report of a massasauga in Maneuver Area N. However, the snake was not captured, no picture was taken to confirm the identification, and the individual was not certain of the identification. Thus, the species is not included. A photo

of a timber rattlesnake reportedly taken from Fort Riley in 2010 has been received by the Conservation Branch (Fort Riley, 2016).

Approximately 30 species of reptiles and 16 species of amphibians are found on Smoky Hill Range. Typical herptile species include common snapping turtle (*Chelydra serpentina*), yellow mud turtle (*Kinosternon flavescens*), red-eared slider (*Chrysemys scripta*), ornate box turtle (*Terrepene ornate*), hognose snake (*Heterodon nasicus* and *H. platyrhinos*), massasauga (*Sistrurus catenatus*), bull snake (Pituophis catenifer), western ribbon snake (*Thamnophis proximus*), prairie rattlesnake (*Crotalus viridus*), diamondback water snake (*Nerodia rhombifera*), northern water snake (*Nerodia sipedon*), and Graham's crayfish snake (*Regina grahami*) (KSANG, 2001).

3.7.2.1.3 Protected Species

The three federally listed species that are documented on Fort Riley are the endangered Topeka shiner (*Notropis Topeka*), and the piping plover (*Charadrius melodus*), and black rail (*Laterallus jamaicensis)* which are threatened. The least tern was recently delisted by the USFWS. The bald eagle, delisted in 2007, is a year-round resident. The Topeka shiner has been found in Wildcat, Sevenmile, Wind, Honey, Silver and Little Arkansas Creeks (Figure 3.7-5). It is believed that Topeka shiners potentially may immigrate into Fourmile, Threemile, and Forsyth Creeks. The piping plover is uncommon, primarily a transient migrant, but also a potential breeder along the Republican and Kansas Rivers' sandbars. The piping plover has been observed along the Republican and Kansas Rivers sandbars. Potential habitat for these species is shown in Figure 3.7-6. The black rail is uncommon, but is a potential breeder in wetland areas. The black rail has been observed in upland habitats on Fort Riley during the migratory seasons. Fort Riley falls within the migratory path and historic range of three other rare species. The endangered whooping crane is a spring and fall migrant has been observed on the Milford lake wildlife area within two and a half miles of Fort Riley. The historic range of threatened northern long-eared bat includes much of Kansas, but has not been found in the Fort Riley area. The threatened red knot is a rare spring and fall transient shorebird that could be found throughout Kansas. It remains possible that these species may be encountered within the installation's boundaries or airspace. Buffers have been established around the habitat areas for these species to prevent disturbance.

There are three resident species of Fort Riley that were petitioned to list under the ESA and are currently under review. The monarch butterfly and the regal fritillary butterfly are common residents of the Fort Riley prairie landscapes. The tri-colored bat has been documented during acoustic bat surveys and observed in multiple roost sites and in one hibernacula.

No federally listed species are known to occur on Smoky Hill Range (U.S. Army, 2010).

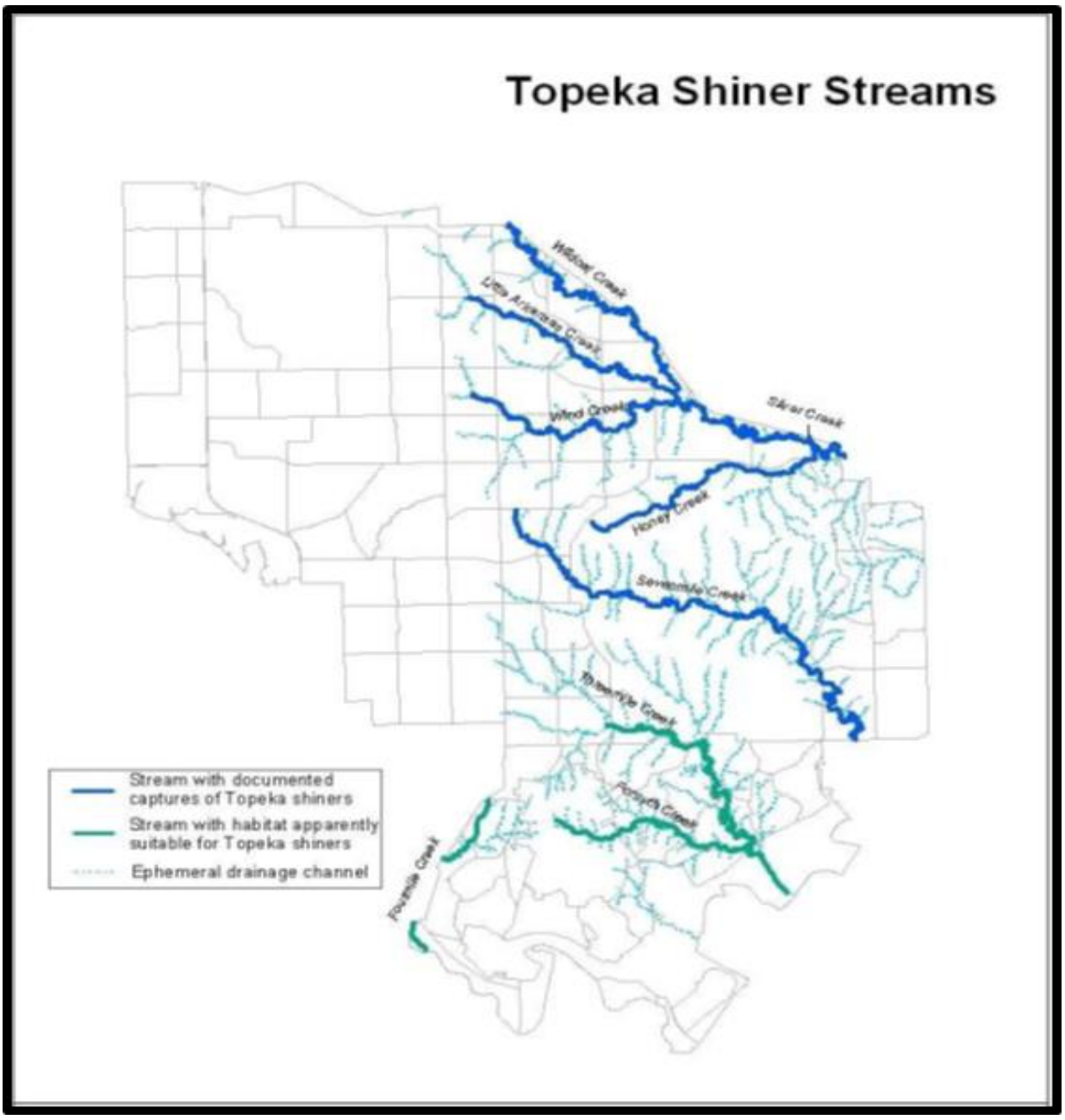

Figure 3.7-5 Streams with Topeka Shiner Captures or Apparently Suitable Habitat
Source: Fort Riley 2016

The Army created a SAR (Species at Risk) list to identify imperiled species that would have a significant impact on military missions if federally-listed as threatened or endangered. The objective of creating the SAR list is to proactively conserve these species and thereby preclude the need for a future listing. Army-designated SARs that occur on Fort Riley are the Henslow's sparrow, regal fritillary butterfly, rusty blackbird, and Texas horned lizard.

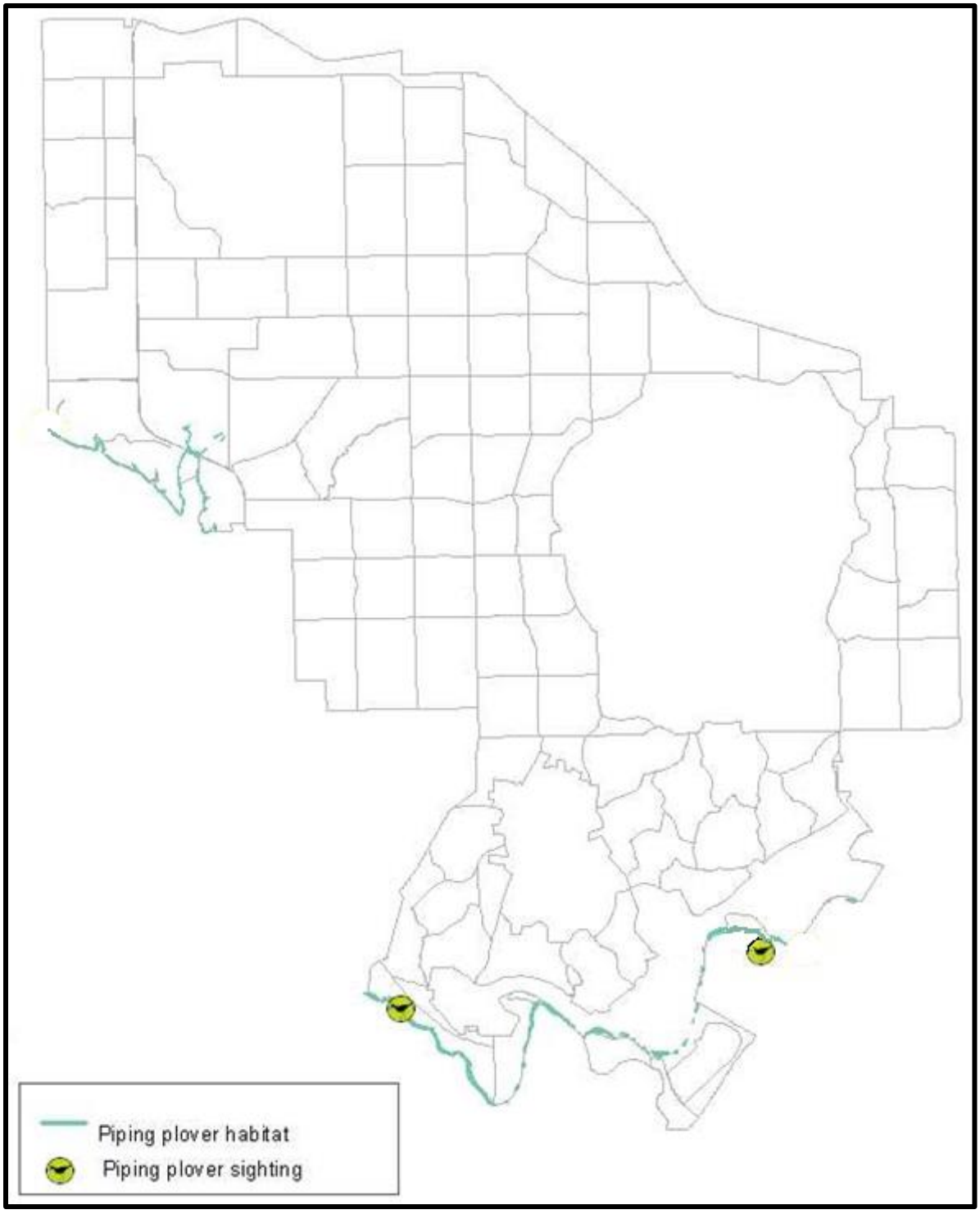

Figure 3.7-6 Sandbar/Beach Habitat Locations Attracting Piping Plovers
Source: Fort Riley 2016 as modified by USAEC 2021 to account for least tern delisting

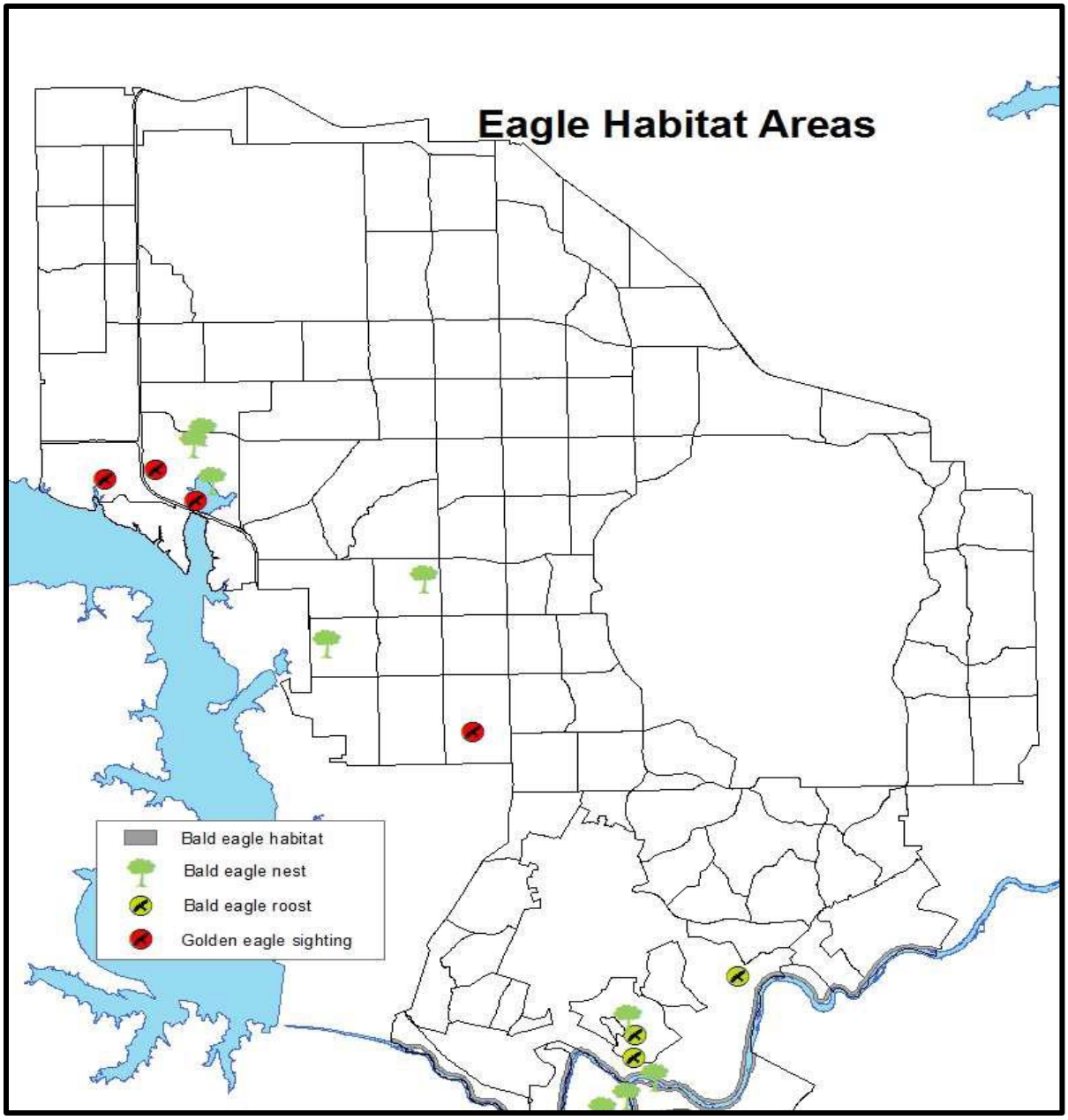

Figure 3.7-7 Eagle Habitat and Sighting Areas
Source: Fort Riley 2016

The bald eagle, while no longer federally-listed as threatened, still receives federal protection under the BGEPA (16 U.S.C. 668-668c), enacted in 1940. Five locations with eagle nests occur on and around Fort Riley. Three eagle nests occur near Madison Creek Cove, Milford Lake on Fort Riley. This area has had one pair of nesting eagles annually since 2004. The second area with an eagle nest is on USACE property along Farnum Creek, adjacent to Fort Riley. This nest was first used in 2005, was occupied annually for 11 years, but was unoccupied in 2016.

Meanwhile, a new, active bald eagle nest was located on Fort Riley (TA 54) in 2016, approximately 3.5 miles from the Farnum Creek nest. The fourth area is around the confluence of the Kansas River, where four nests exist. Two nests are along the Kansas River on Fort Riley, and two nests are along the Smoky Hill River just upstream from the installation. One pair of nesting eagles have been active in this locale annually since 2009. Additionally, a fifth eagle nesting location exists approximately one mile west of the installation along the old channel of the Republican River below Milford Dam. Bald eagles roost along the Kansas and Smoky Hill rivers, and are frequently observed perched along the Republican River, Kansas River, and Milford Lake shorelines, and flying over Fort Riley. Important bald eagle habitat areas and golden eagle sightings are shown in Figure 3.7-7. Additionally, Fort Riley has documented sightings of golden eagles in Maneuver Areas A, G, and H. Golden eagles also are protected by the BGEPA.

Bald and golden eagles are not known to inhabit or use the Smoky Hill Range (U.S. Army, 2010).

There is no federally listed critical habitat on Fort Riley. The Department of the Interior initiated a policy to exclude military facilities from critical habitat if there was an approved INRMP for that facility, which addressed the species in question. The rationale for this policy was that an INRMP is a planning document that allows the military to implement landscape-level management of its natural resources while coordinating with various stakeholders.

There are no critical habitat designations in McPherson or Saline Counties where Smoky Hill Range is located.[55]

3.7.2.2 Environmental Consequences

Fort Riley does not plan to construct new facilities or ranges to support the IDDS-A. Live-fire range usage is predicted to increase by 1.3%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species at Fort Riley. Impacts to biological resources are addressed in section 3.2.1.2 and are expected to be negligible and less than significant.

3.7.2.3 Cumulative Effects

Fielding of all 10 planned systems listed in section 3.3 may require construction of facilities to support the M-SHORAD. Other systems would be fielded to existing units and facilities that may require expansion or renovation. Fort Riley has identified a potential location for the M-SHORAD

[55] https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/List-of-all-Kansas-Counties accessed 1 June 2020.

but funding is not available to execute the construction yet. Fort Riley also has a plan to construct an AMPTR in the future. This project is not funded either. There are expected to be minor, less than significant impacts from the construction. The site for M-SHORAD is not habitat with significant floral, faunal, or protected species assets and is adjacent to existing battalion facilities that were constructed recently. The AMPTR site is a significant distance away minimizing the potential to compound the impacts. An expected increase of soldiers of approximately 4.8% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. Adding up to 760 soldiers, 402 spouses, and 684 children at Fort Riley is about 1.0% of the ROI population, a negligible amount. Overall cumulative impacts to biological resources are as described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

3.7.3 Cultural Resources

3.7.3.1 Affected Environment

3.7.3.1.1 Cultural Resources Present at Fort Riley

Fort Riley has identified and manages 985 archeological sites—472 historic civilian, 135 historic military, 30 multi-component, and 348 prehistoric archeological sites. To date, 56 archeological sites have been determined eligible for the NRHP (Fort Riley, 2020 pers. comm.[56]). The CRMP staff also manages three Historic Districts, including the Main Post Historic District, the Packers Camp, Marshall AAF. The Main Post Historic District is a one-mile square area (2.6 km^2) containing 259 historic facilities and has been listed on the NRHP since 1974. The three historic districts are shown in Figure 3.7-8. Protection and identification protocols such as buffers and no dig areas have been established to protect known resources and identify other significant resources. A more detailed list is below.

- Archaeological survey
    - 83,055 total acreage of installation
    - 65,277 acres surveyed (78.6%)
- 985 total archaeological sites
    - Site types
        - 472 Historic civilian
        - 135 Historic military
        - 348 prehistoric
        - 30 multicomponent
    - Designation status
        - 56 evaluated and determined eligible for the NRHP

[56] Theresa de la Garza. 2020. Email regarding updated cultural resources information on Nov 18, 2020.

        - 628 evaluated and determined not eligible
        - 14 sacred sites (no need for further evaluation)
        - 57 located in Impact Zone or Multi-purpose Range Complex (too hazardous for evaluation)
- 754 facilities age 50 or over on installation
    - 457 are historic
    - 147 determined not historic
    - 150 not evaluated (treat as historic), of which many are located on the ranges
- Three Districts
    - Main Post
        - Listed on National Register
        - 259 historic facilities (148 privatized)
    - Packers Camp
        - 2 historic facilities
    - Marshall Army Air Field
        - 20 historic facilities (12 privatized)
- WWII Temporary Bldgs – 4 facilities in Funston addressed by Programmatic Memorandum of Agreement
- WWII & Cold War Ammo – 9 facilities in ASP area addressed by Program Comment
- Capehart and Wherry Housing – 142 housing facilities in Custer Hill Family Housing Area addressed by Program Comment
- Cold War Unaccompanied Personnel Housing – 16 facilities on Custer Hill Troop Area addressed by Programmatic Memorandum of Agreement
- Inter-War Era Housing – 55 housing facilities (and other ancillary features) in the Main Post Historic District and Marshal AAF addressed by new Program Comment[57]

Known Cultural Resource Sites at Smoky Hill Range

Smoky Hill Range is overseen by the KSANG 184th Wing located at McConnell Air Force Base (AFB), Kansas, and is maintained and operated by the 184 WG/Det 1, located at Smoky Hill Range. Following Section 106 of the NHPA, cultural resource surveys have been completed throughout much of the Smoky Hill Range and the installation staff has consulted with the SHPO on these surveys. A total of 67 archaeology sites have been identified at Smoky Hill Range, including 22 prehistoric and 45 historic sites (ANGRC, 2005). Currently, no sites are listed on the NRHP. Evaluation (Kansas Phase III) to determine eligibility for listing on the NRHP has been recommended for four archaeological sites (three prehistoric sites and one historic site). Another historic site identified through a previous reconnaissance survey has been recommended

[57] Per 36 CFR § 800.14 (e) a Program Comment is an alternative that allows a federal agency to request the ACHP comment on a category of undertakings in lieu of commenting on a case-by-case basis.

for subsurface testing (Kansas Phase IIB). The remaining 62 sites have been determined to be ineligible for listing on the NRHP and require no further work (ANGRC, 2005).

Built resources typically must be 50 years of age to be eligible for listing on the NRHP unless the resources meet Criterion Consideration G for "exceptional significance." All buildings on the range were examined in 1998 for eligibility to the NRHP (ANGRC, 2005). Currently, none of the buildings has reached the 50-year age requirement, nor did they meet Criterion Consideration G; therefore, no buildings are currently eligible for listing on the NRHP. However, the ICRMP recommends architectural evaluation of Smoky Hill Range Buildings 6001 and 6011 in 2009 (ANGRC, 2005). Several branches of the DoD also are exploring whether or not Cold War-era facilities (1946 through 1989) meet Criterion Consideration G. If guidelines for evaluating Air National Guard (ANG) properties during that period become available, additional consideration may be given to evaluating the significance of these buildings.

Among the structures located at Smoky Hill Range are 18 bridges and culverts built during the 1930s under the Work Progress Administration (WPA) and other federal programs. Those structures that occur on the KSARNG portion of the range have been evaluated and none were found to be eligible for the NRHP. The bridges that occur on other portions of the range have not received a formal survey by a qualified architectural historian. However, their locations have been mapped and they have been photographed during an archaeological reconnaissance survey. A formal architectural evaluation of these bridges and culverts and any additional WPA projects not previously identified have been recommended, as has an architectural evaluation of four World War II-era bunkers on the range (ANGRC, 2005). Until a determination of NRHP eligibility is made for these resources, they must be treated as if they are historic resources.

Potential Cultural Resource Sites at Smokey Hill

There are 4,426 acres at Smoky Hill Range with a high probability of containing both prehistoric and historic cultural resources. Of these, 3,059 acres have not yet received an archaeological survey, including 1,403 acres within the impact area and 1,656 acres in the buffer zone and leased lands. An intensive survey (Kansas Phase IIB) should be conducted on any high probability areas before any activities that have the potential to disturb archaeological sites. Survey methods for various types of terrain are specified in the ICRMP (ANGRC, 2005). The remaining 26,166 acres are classified as a low probability for archaeological resources and are of no further management concern (ANGRC, 2005).

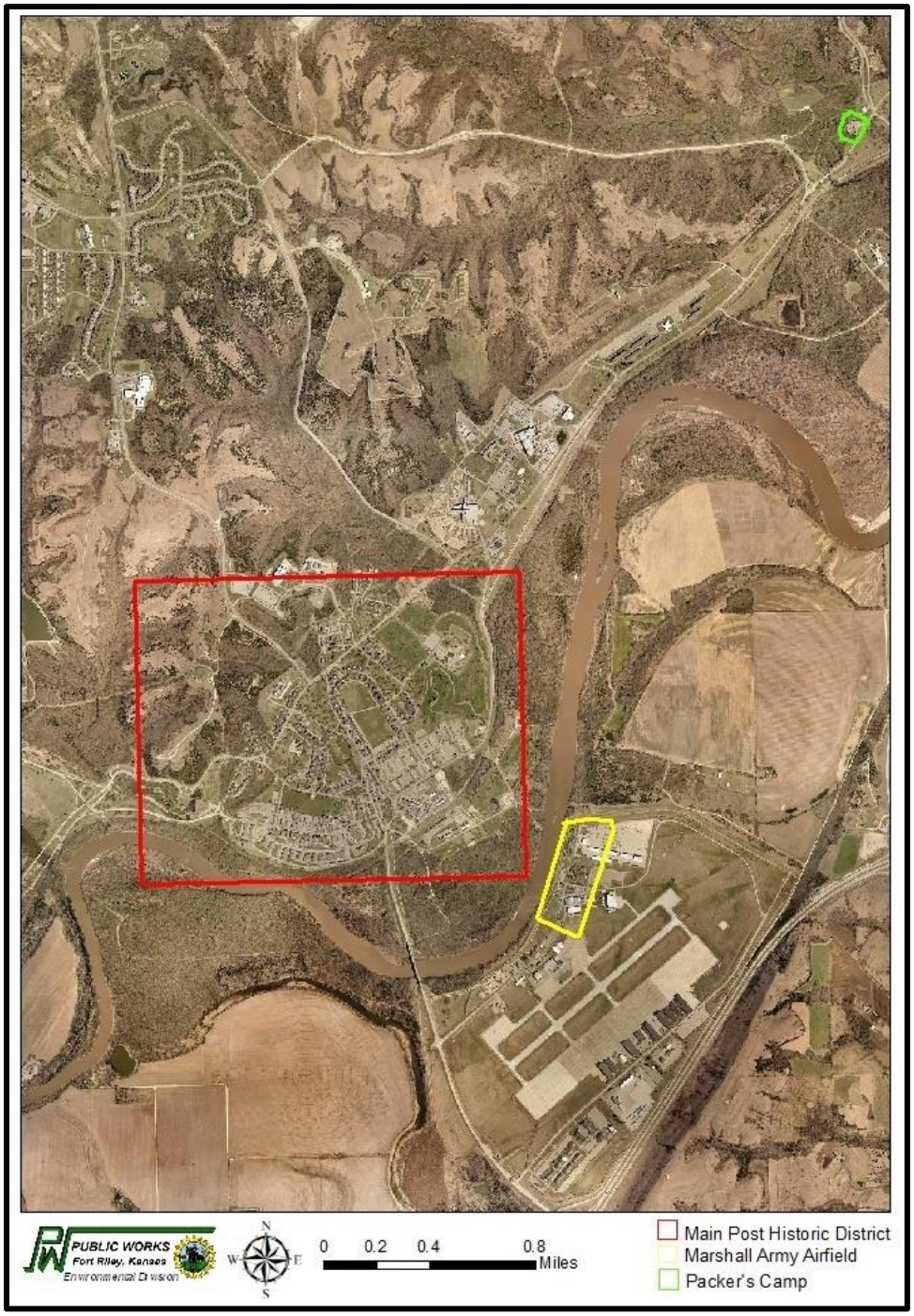

Figure 3.7-8 Historic Districts on Fort Riley

A historic probability model created by examining historical atlases of Saline County identified potential sites of 54 previously unknown 19th-century homesteads on Smoky Hill Range. Of these, 38 have been visited. The remaining 16 locations, as well as many homesteads that continued to be occupied into the twentieth century, have not received a reconnaissance survey

and have been designated high probability zones for historic resources. Five previously unsurveyed homesteads settled by African Americans also are considered to be high probability areas, possibly with high potential levels of significance. Finally, there are 63 wells and cisterns that may have the potential to indicate the presence of associated homesteads, and small high probability areas have been designated around each of these wells. An intensive survey (Kansas Phase IIB) also has been recommended for all high probability areas (ANGRC, 2005).

3.7.3.1.2 Consultation and Coordination with Indian Tribal Governments

Fort Riley operates under the 2016 *Programmatic Agreement Among the United States Army Garrison Fort Riley, The Kansas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Operation, Maintenance, and Development of Fort Riley Clay, Geary and Riley Counties, Kansas* (Fort Riley, 2016b). The PA ties together the more specific management practices and activities that the garrison had been accomplishing under several individual management plans and agreements. Stipulations within the PA include ground disturbance review protocols with the Cultural Resources Manager, protection measures, a monitoring strategy, and annual reporting to the SHPO. The PA also includes a list of activities exempted from further consultation as Fort Riley analyzes effects on historic properties and protected properties from military training, other activities, and natural processes.

As of 2015, 12 federally-recognized tribes indicated continued interest in prehistoric archeological resources at Fort Riley and expressed a desire to continue consultation under various preservation laws. The tribes with which Fort Riley consults and has informal NHPA Section 106 consultation agreements, include the Cheyenne River Sioux Tribe; Kaw Nation of Oklahoma; Kickapoo Tribe in Kansas; Kiowa Tribe of Oklahoma; Osage Nation; Otoe-Missouria Tribe of Indians; Pawnee Nation of Oklahoma; Ponca Tribes of Oklahoma and Nebraska; Prairie Band Potawatomi Nation; Sac and Fox Nation of Missouri in Kansas and Nebraska; and the Wichita and Affiliated Tribes. Fort Riley also maintains formal Comprehensive Agreements, related to compliance with NAGPRA, with both the Kaw Nation of Oklahoma and Pawnee Nation of Oklahoma.

3.7.3.2 Environmental Consequences

Since Fort Riley does not plan on constructing ranges or facilities to support IDDS-A no impacts to cultural resources from construction are expected. The increase in range usage is predicted to be 1.3%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.2.2.

3.7.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the 10 planned systems listed in section 3.3 would be similar to those described in section 3.2.2.2. They are expected to be minor or negligible and less than significant for the same reasons stated in section 3.7.2.3.

3.7.4 Soils

3.7.4.1 Affected Environment

The primary soil association encountered in Fort Riley is the Wymore-Irwin. It is a deep, nearly level group of silty, clay loams found in the upland. The Smolan-Geary and the Clime-Sogn are also prevalent (Jantz et al, 1975). Smolan soils are composed of deep, gently sloping to sloping materials and are typically formed in loess. These tend to be moderately well to well -drained soils with slow permeability. Geary soils consist of deep, gently sloping and sloping deposits that are well drained and have moderate permeability. Clime soils consist of moderately deep, sloping to moderately steep deposits that are calcareous as a result of being formed from the weathered residuum of calcareous clayey shales. These soils have moderately well to well – drained characteristics with moderately slow permeability. Sogn soils are shallow, sloping underlain by limestone and were formed in residual material weathered from shale and limestone. They have moderate permeability and can be excessively drained. The Eudora-Haynie-Sarpy Eudora association is found on floodplains & terraces. The soils tend to be deep, nearly level silt loams, very fine sandy loams, and loamy fine sands with well-drained characteristics and are moderately permeable (Figure 3.7-9).

3.7.4.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Riley and range usage is expected to rise by only 1.3%, which is negligible. Therefore impacts to soils are expected to be negligible and less than significant and are addressed in section 3.2.3.2

3.7.4.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Proposed Action, may require construction of facilities to support the M-SHORAD battalion. Other systems would be fielded to existing units and facilities that may require expansion or renovation. Fort Riley has identified a potential location for the M-SHORAD but funding is not available to execute the construction yet. Fort Riley also has a plan to construct an AMPTR in the future. This project is not funded either. There are expected to be minor, less than significant impacts from the construction because the site for M-SHORAD is adjacent to existing battalion facilities that were constructed recently, the AMPTR site is a significant distance away, and the Army would take all necessary steps to minimize impacts. An expected increase of soldiers of approximately 4.8% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. The impacts are described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to soils.

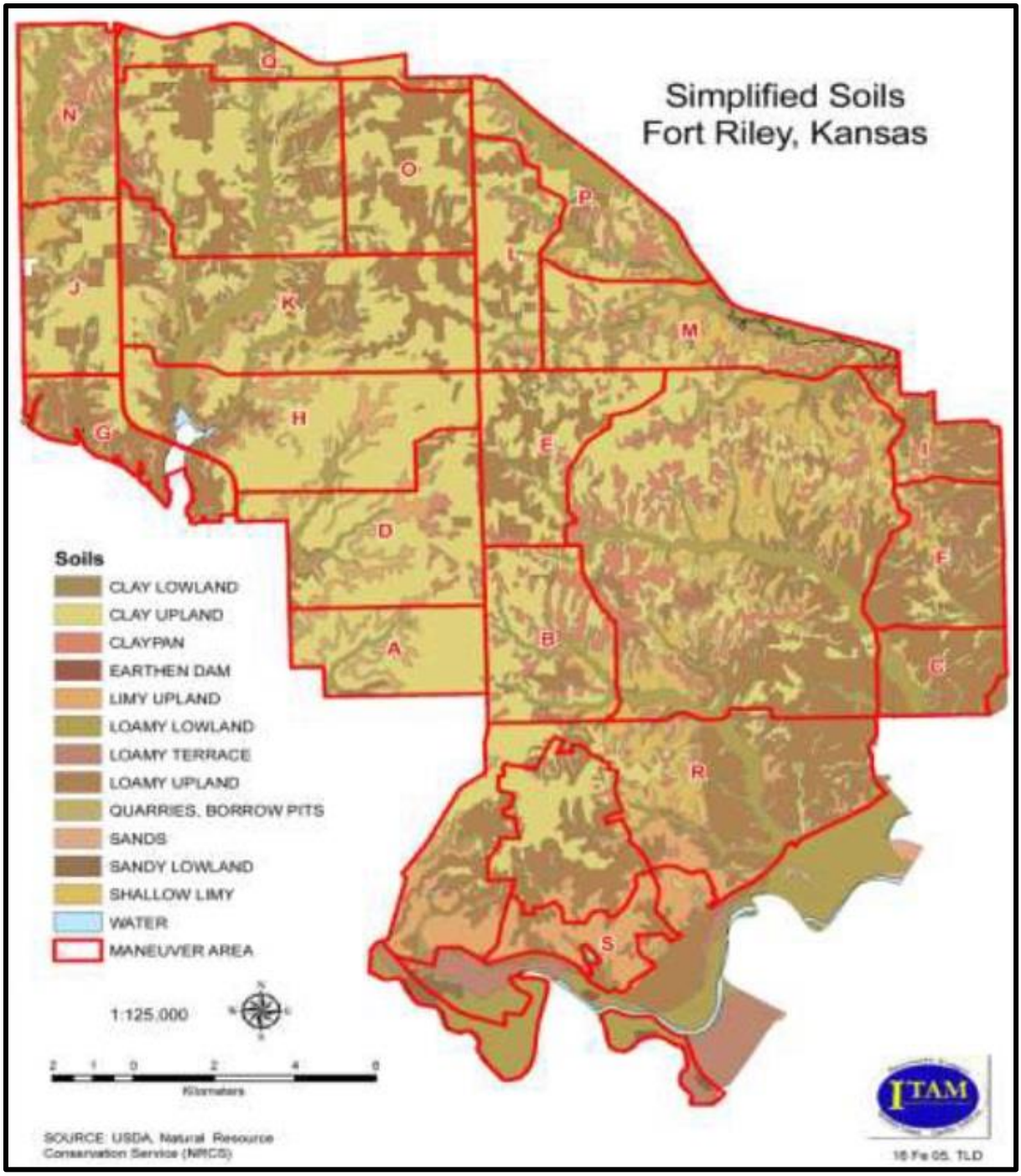

Figure 3.7-9 Soil Types on Fort Riley
Source: Fort Riley 2016

3.7.5 Land Use and Compatibility

3.7.5.1 Affected Environment

Fort Riley land use is divided between the cantonment and training ranges. Cantonment areas provide housing, community/recreation, and industrial and transportation operations and are mostly in the southern portion of the installation in six distinct areas (Figure 3.7-10). The training/range land-use category is the dominant one on Fort Riley.

3.7.5.1.1 Cantonment

Cantonment (or developed) areas total approximately 12,000 acres and are Main Post, Camp Forsyth, Camp Funston, Camp Whitside, Custer Hill, and Marshall AAF.

Improved grounds include improved and semi-improved areas. Improved grounds contain many native and non-native trees, shrubs, and groundcovers on approximately 5,613 acres. Improved areas are maintained as mowed turf and planted with ornamental and native trees and shrubs. Semi-improved areas are grassy fields and larger groves of trees that receive periodic mowing and maintenance.

Outdoor Recreational Facilities

Custer Hill Golf Course was a 170 acre 18-hole course that has been converted to the Adventure Park. Three additional parks/picnic areas totaling approximately 60 acres are maintained in a semi-natural condition; they are Moon Lake and McCormick and Wyman Parks.

3.7.5.1.2 Range Complex

One-hundred and three designated training areas, 76 of which are combined into 17 larger maneuver areas, comprising approximately 70,000 acres.

The main impact area and the surrounding training live-fire ranges in the eastern portion cover approximately 16,200 acres. These areas are off-limits to maneuver training, public use, and most management activities.

The Douthit Gunnery Complex in the northwestern portion includes approximately 2,000 acres. Training and maneuvers that usually occur within the Douthit Gunnery Complex Safety Fan cease when either the Digital Multi-purpose Range Complex (DMPRC) or Digital Multi-purpose Training Range (DMPTR) is active. The Douthit Gunnery Complex live-fire danger fan covers approximately 30,500 acres and includes training areas 40-46, 57-62, 66-74, 77, 78, 83, 84, 88, 89, and 93-96.

Fort Riley aviation units complete air-to-ground weapons training at the Smoky Hill Range. The KSTC supports non-dud producing live-fire maneuver training of Army infantry and tracked vehicle equipped units, combat aviation units, combat support, and combat service support units.

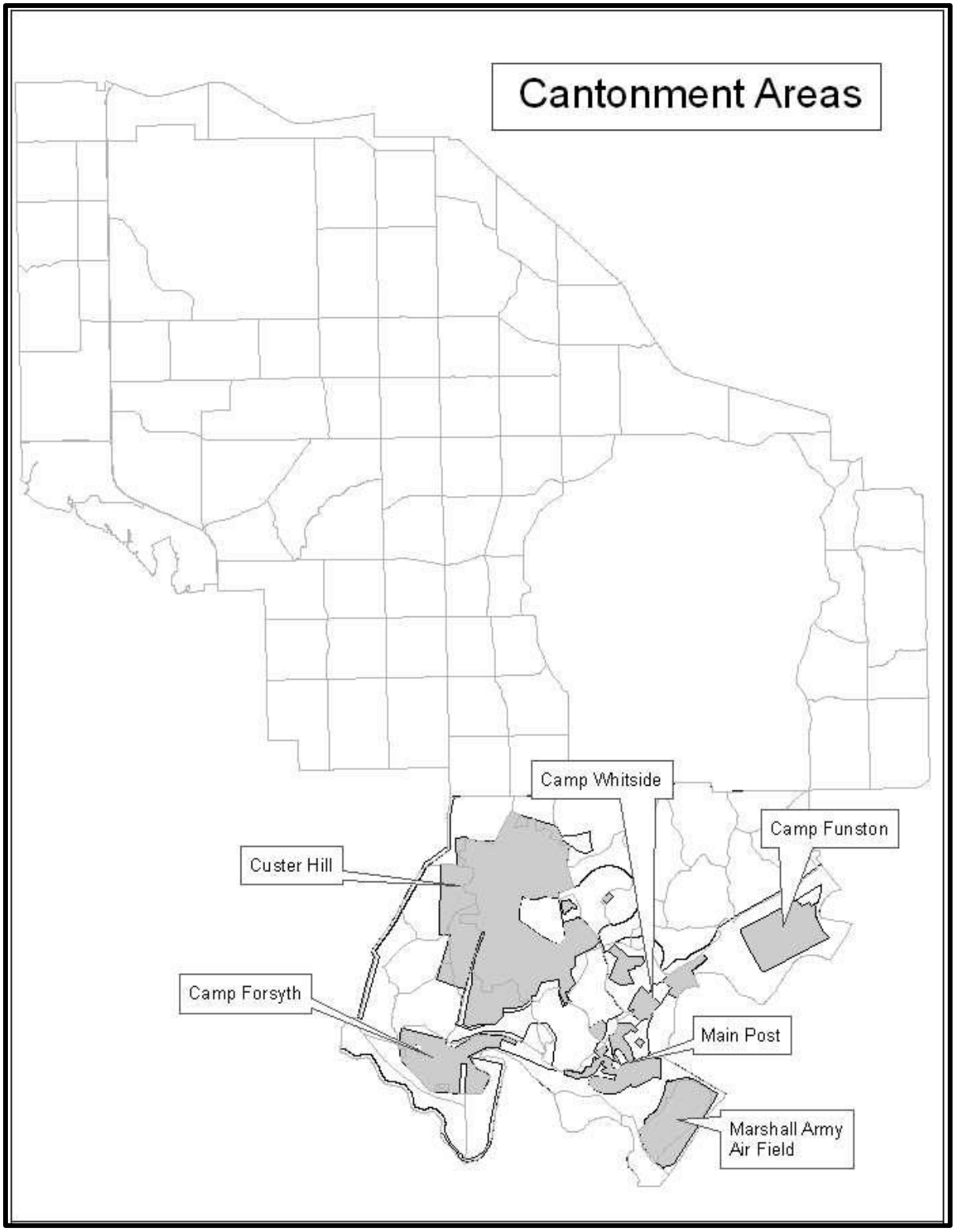

Figure 3.7-10 Six Distinct Cantonment Areas in the Southern Portion of Fort Riley

3.7.5.2 Environmental Consequences

Impacts to Land Use and Compatibility at Fort Riley are described in section 3.2.4.2 and are expected to be negligible and less than significant. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 1.3%, a negligible amount.

3.7.5.3 Cumulative Effects

Fielding of the 10 planned systems listed in section 3.3, in addition to the Action Alternative, may require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. An AMPTR is also planned to support training of all units. Neither project is funded yet. Fort Riley has identified a potential location for the M-SHORAD and AMPTR which do not change the land use, resulting in minor, less than significant impacts from the construction. Other systems would field to existing units or replace existing equipment one-for-one. An expected soldier population increase of approximately 4.8% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The effects of the additional actions are described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in minor, less than significant cumulative effects to Land Use and Compatibility.

3.7.6 Facilities

3.7.6.1 Affected Environment

The six cantonment areas, also addressed briefly in Land Use and Compatibility, contain the heaviest concentration of facilities and mission support activities on Fort Riley. Support services in the cantonment include administration, maintenance, service, storage and supply buildings, housing, medical facilities, community facilities, and Marshall AAF.

Army facilities are built to meet the standards of the Uniform Facilities Criteria using standard designs of MILCON requirements, standardization, and integration or similar documents. Exceptions to the standard are available and if granted for a facility, it would be considered adequate.

3.7.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at Fort Riley were assessed based on the Army RPLANS records. Fort Riley has a deficit of required facility space to support the IDDS-A battery HQ, TEMF, and hazardous material storage facilities as shown in Table 3.7-1.

Table 3.7-1 Facilities that may require construction at Fort Riley

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Riley available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(258,764)	N	N
TEMF	1	28,304	0.6	(119,265)	N	N
Hazardous Mat'l Storage*	1	60	0.0	(7,876)	N	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.						

Fort Riley would plan to provide facilities for the IDDS-A battery on par with what other units stationed at Fort Riley typically receive. New construction is not needed to support this request. Most units on Fort Riley are assigned less than the HQ, maintenance, and hazardous material storage facility space required by doctrine. The IDDS-A would be provided the required headquarters, vehicle maintenance, and storage from existing facilities. This may require an exception to standard since it may be less than the requirement by Army doctrine. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Recently updated information shows Fort Riley may have a deficit of barracks space for unaccompanied soldiers. The need for barracks space would be accommodated through Army supported off-post housing if required.

Fort Riley also has a deficit of one range type required to support IDDS-A training. The specific range type is not being listed as an operational security measure. The deficit in acreage for the range type is shown in Table 3.7-2.

Table 3.7-2 Range acreage that may require construction at Fort Riley

Standard Range shortage[1]		**Standard Range acreage shortage[2]**	
One battery	Two batteries	One battery	Two batteries
0.34	0.35	1683	1732
[1]The Standard Range shortage is computed by dividing the shortage of RD by the number of normal training days per Army doctrine.			
[2] **The** Standard Range acreage shortage is computed by multiplying the Standard Range shortage by the minimum Standard Range area.			

Fort Riley would not construct new ranges to support the IDDS-A. Training requirements would be met through the use of approved simulations or appropriate scheduling per the SRM or

ReARMM. The unit could also travel to another Army installation that has the capability to support the specific IDDS-A training needed. If funding becomes available the required ranges could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

No new construction planned to support IDDS-A and live-fire range usage only predicted to increase by 1.3%, which is negligible. Impacts to facilities resulting from the Action Alternative are described in section 3.2.5.2 and would be less negligible and less than significant.

3.7.6.3 Cumulative Effects

Fielding of the 10 planned systems, when combined with the Action Alternative, is expected to have minor, less than significant cumulative effects with minor or negligible increases of the impacts similar to those described in section 3.2.5.2. Additional facility requirements of the M-SHORAD have been accounted for in other analysis, the AMPTR would undergo a separate analysis also. The proposed site for M-SHORAD is adjacent to existing battalion facilities but with access that will not impair use of the existing facilities. The proposed site for the AMPTR is a significant distance away, minimizing the compounding of impacts from that effort. Other systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities. The anticipated population increases of all 10 systems and IDDS-A is 4.8% for soldiers on Fort Riley and including all family members is 1.0% within the ROI resulting in minor and negligible, less than significant impacts, respectively.

3.7.7 Water Resources

3.7.7.1 Affected Environment

3.7.7.1.1 Surface Water

Surface water resources analyzed in this PEA include lakes, rivers, and streams (Figure 3.7-11). On Fort Riley, the Kansas Department of Health and Environment (KDHE) has designated surface water use categories for the Republican, Smoky Hill, and Kansas Rivers; Fourmile, Rush, Timber, Little Arkansas, Sevenmile, Threemile, and Wildcat Creeks; and Milford Lake (Fort Riley, 2016). The KDHE has determined these surface water bodies are suitable for and should be protected for contact recreation, expected or special aquatic life, food procurement, domestic water supply, irrigation, livestock watering, industrial water supply, and groundwater recharge (Fort Riley, 2016).

The KDHE listed Wildcat Creek as an impaired stream, under Section 303d of the CWA, due to high fecal coliform bacteria count and low dissolved oxygen. Anecdotal information provided by Riley County indicated the quality of water in Wildcat Creek passing through Fort Riley was good. It is suspected that high fecal coliform counts occurring in the lower end of the stream,

below the confluence of Little Kitten Creek, are related to poorly functioning on-site waste systems in the vicinity of Manhattan (Fort Riley, 2016). Urban development occurring on the west side of Manhattan, downstream from Fort Riley, is altering hydrogeomorphology and thereby increasing sediment and contaminant loads in Wildcat Creek.

Surface water at Smoky Hill Range is limited to ponds and intermittent streams and their tributaries (Figure 3.7-12). Intermittent streams are those that have measurable flow only during certain times of the hydrologic year. The major intermittent streams at Smoky Hill Range are Ralston Creek, Castle Creek, Spring Creek, and M-60 Creek. These streams flow north to northeast, eventually draining into the Smoky Hill River. Also, there are approximately 140 ponds located on the Smoky Hill Range installation for water storage and livestock access. Some siltation occurs from livestock trampling and excrement and from runoff along the firebreaks, which results in a decrease in water quality. The potential for chemical contamination is managed by spraying pesticides under DoD instructions and Measures of Merit regarding pesticide use. Stormwater from Smoky Hill Range flows via overland flow to the northern portion of the base. There are no stormwater inlets or storm sewer pipes at the base. Stormwater from the headquarters area and the Operations Complex flows toward an unnamed tributary that discharges into Spring Creek. Spring Creek discharges to the Saline River approximately 13 miles northeast of the Headquarters Area. The Saline River then flows southeast for approximately 5 miles before it discharges to the Smoky Hill River.

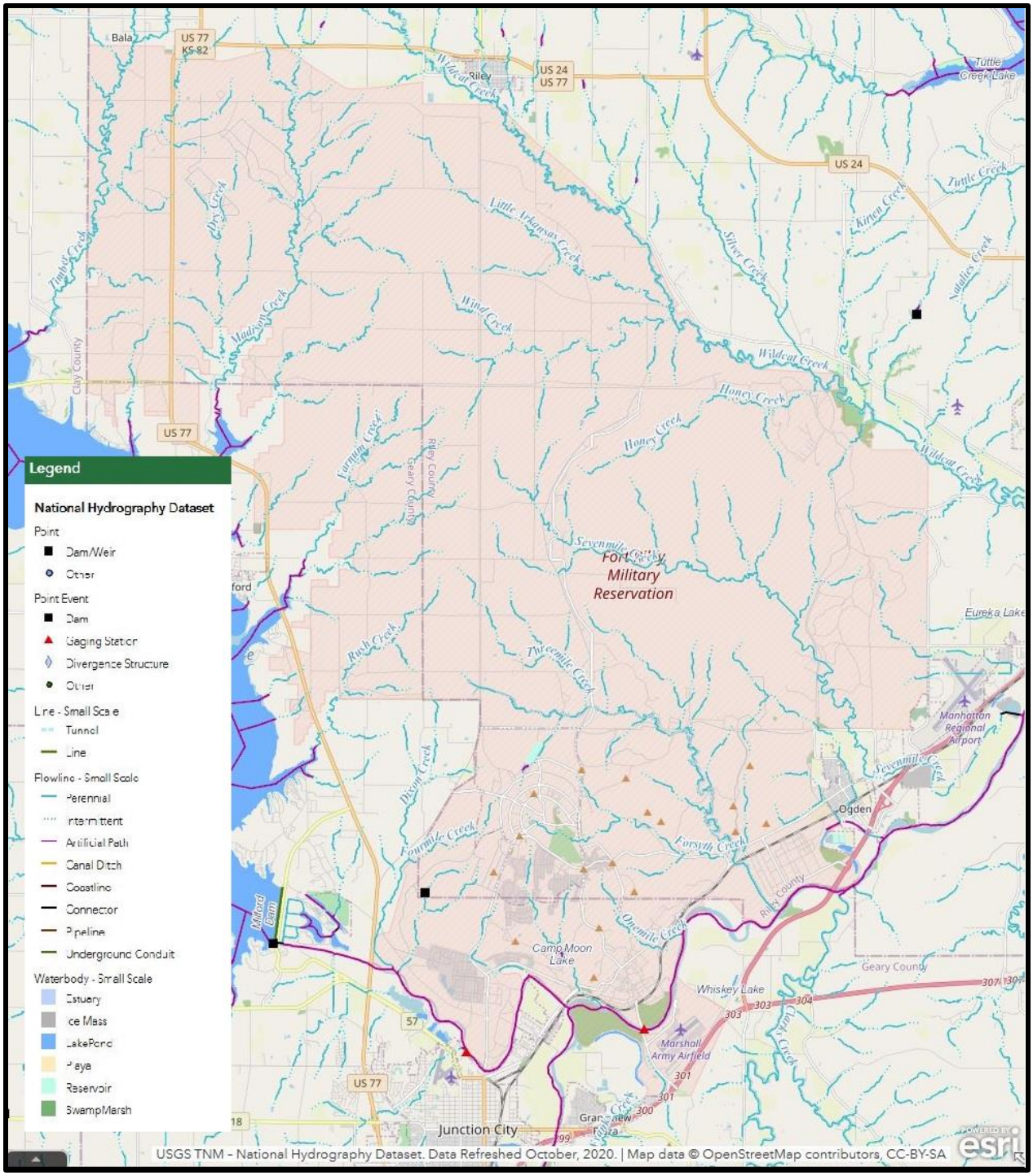

Figure 3.7-11 Fort Riley Surface Waters

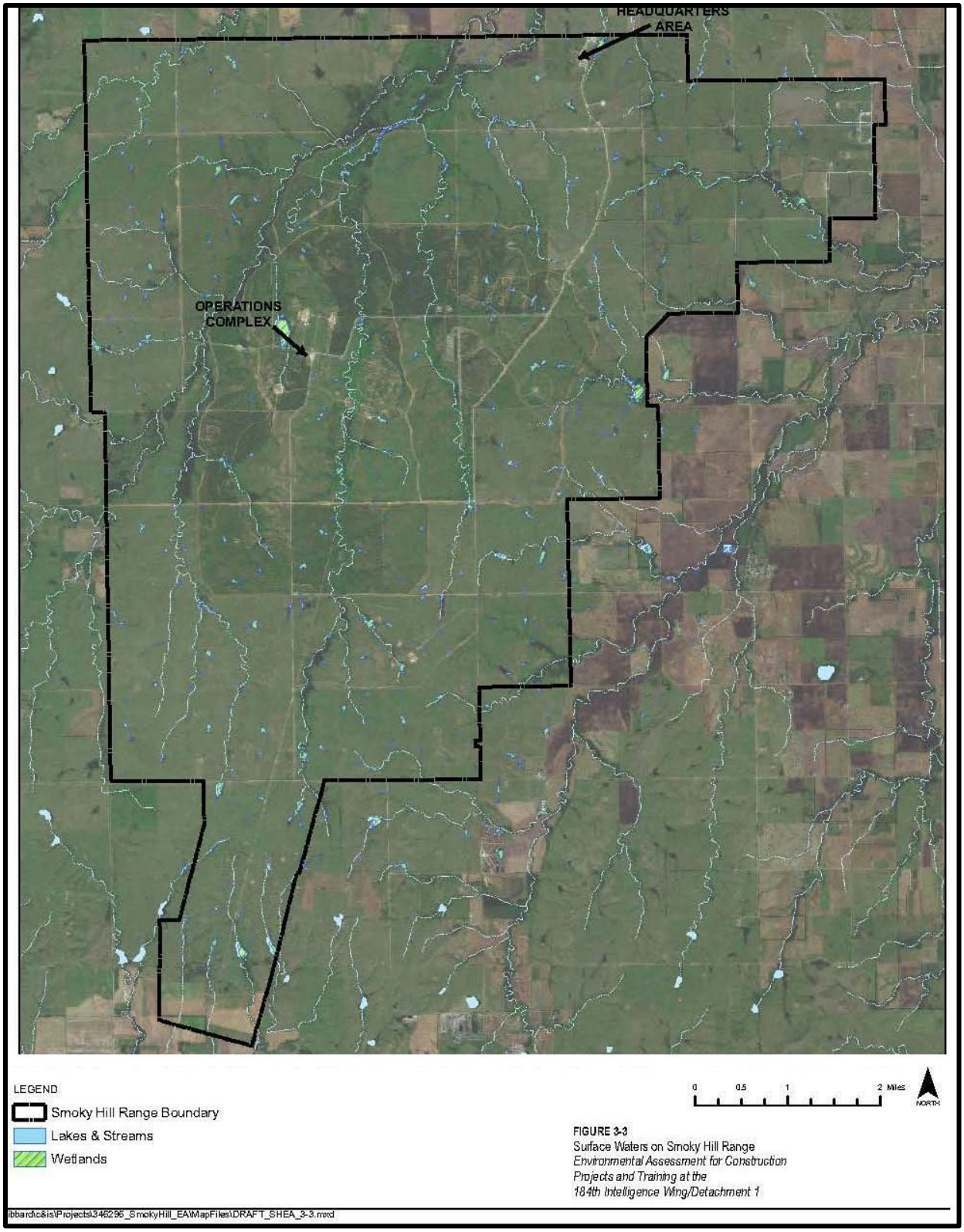

Figure 3.7-12 Smoky Hill Range Surface Waters

3.7.7.1.2 Groundwater

Groundwater in the area emanates from the large subterranean sand and gravel deposits that are found throughout Kansas. Smoky Hill Range overlies confined sandstone aquifers inter-bedded with siltstone or shale. According to the U.S. Geological Survey (USGS), the hydraulic conductivity of sandstone aquifers is low to moderate. Still, because they extend over the large areas, these aquifers provide large amounts of water.

The geology controls the rate of groundwater movement. In this area, the Dakota Formation of the uplands is composed of much finer-grained materials than the Pleistocene alluvial deposits in the valley and, therefore, has a lower permeability. Movement of water through the finer material is slower than through the coarser material, and steeper or higher slopes are required to move the same quantity of water through the finer upland deposits. Depth to groundwater ranges from a few feet to more than 40 feet, but in most cases, it is between 20 and 30 feet-below ground surface. Groundwater in this region is generally too salty for use as potable water, although the shallowest aquifers are sometimes used as sources of drinking water.

3.7.7.1.3 Water Quality[58],[59]

The KDHE administers the CWA in Kansas. The CWA provides the framework for management of water quality in the nation's surface waters. The goal of the CWA is to achieve water quality standards such that all waters are fishable and swimmable. The State Water Resource Planning Act provides the statutory authorization for addressing water quality management. The KDHE Bureau of Water ensures compliance with state and federal regulations applicable to groundwater. No umbrella federal legislation exists for groundwater. Surface waters are regulated under the Kansas Administrative Regulations, Article 16. This article states that, "For all surface waters of the State, if existing water quality is better than applicable water quality criteria established in these regulations, that existing water quality shall be fully maintained and protected."

Drinking water on Fort Riley is obtained from multiple ground water wells that are owned and operated by the Fort Riley Utility Services (FRUS) Inc. which is a subsidiary of American States Utility Services, Inc. Fort Riley has retained the water rights. The State of Kansas may not impose any restrictions on usage. FRUS operate three separate drinking water systems on the installation.

Fort Riley is located at the end of the Lower Republican River Hydrologic Unit Code (HUC) 10250017 and at the beginning of the Upper Kansas River HUC 10270101. The Lower

[58] Fort Riley. 2018. Environmental Assessment, Integrated Natural Resources Management Plan, Kansas Training Center, 19 December 2018.
[59] Fort Riley. 2010. Final Environmental Assessment of Army Mechanized Maneuver Training on Kansas Air National Guard's Smoky Hill Bombing Range & the Kansas Army National Guard's Kansas Training Center January 2010.

Republican is listed as being impaired by dissolved oxygen for aquatic life and eutrophication for aquatic life. The Upper Kansas is listed as being impaired by sulfate for water supply uses, E. coli for recreation, total suspended solids for aquatic life and total phosphorus for aquatic life.

Fort Riley is covered by two NPDES permits. The first covers the domestic sewage treatment and is owned by FRUS. The second is held by the Environmental Division of Fort Riley's DPW. This permit covers the Industrial Wastewater System, Industrial Stormwater discharges and Borrow Area Management. Fort Riley has created a SWPPP, Environmental Compliance Plan and a Borrow Area Management plan that implement a series of BMPs, training classes, inspection programs, prohibitions on practices, and other management practices that could prevent or reduce the amount of pollutants in storm water runoff.

A watershed study of the KSTC and Smoky Hill Range was completed in 2007 (Applied Ecological Services [AES], 2007) and stated the condition of the watershed is stable. The KSTC is part of Smoky Hill Range. The study noted, however, that if and as the military training mission of the KSTC changes, the potential for added erosion could increase, thereby impacting water quality. The watershed study included a vulnerability assessment that concluded there is increased stormwater runoff volumes with construction of new facilities, particularly on the east portion of the property.

The Lower Smoky Hill watershed within the KSTC is identified as HUC 10260008. According to the Kansas Department of Health and Environment 2018 303(d) List of All Impaired and Potentially Impaired Waters, Bureau of Water Watershed Planning, Monitoring, and Assessment Section (April 13, 2018), the Lower Smoky Hill watershed is listed as being impaired by nitrate for water supply uses, total phosphorus for aquatic life, biology for aquatic life, and total suspended solids for aquatic life.

Smoky Hill Range is covered by a NPDES General Permit for Storm Water Discharges Associated with Industrial Activities. This permit regulates storm water discharges at the base. The Range also adheres to a SWPPP that provides strategies to control storm water discharges and to minimize pollution of nearby surface waters (KSANG, 2000).

The Smoky Hill Range SWPPP (KSANG, 2000) is an engineering and management strategy prepared specifically for the Smoky Hill Range to improve the quality of the storm water runoff and thereby improve the quality of the receiving waters. The SWPPP consists of a series of steps and activities to identify potential sources, including significant materials, of storm water pollution or contamination and to implement BMPs. BMPs are processes, procedures, schedules of activities, prohibitions on practices, and other management practices that could prevent or reduce the amount of pollutants in storm water runoff.

Groundwater in this region is generally too salty for use as potable water, although the shallowest aquifers are sometimes used as sources of drinking water.

3.7.7.1.4 Wetlands and Floodplains

Wetlands

Wetland areas on Fort Riley include springs and seeps, streams, rivers, ponds and lakes, low areas behind terraces in abandoned crop-fields, and emergent marshes along the periphery of water bodies (Figure 3.7-13), such as those within the Madison Creek and Farnum Creek arms of Milford Lake. In 1991, the USFWS documented approximately 1,449 acres of wetlands. Approximately another 84 acres have been constructed since the inventory (total 1,533 acres in 2002). Of this total, 972 acres are considered permanently inundated. The riverine habitat comprises 145 miles and encompasses 748 acres (Fort Riley, 2008). Buffers are in place to protect these resources.

At Smoky Hill Range wetlands, including riparian forests, woodlands, and shrublands, encompass approximately 1% of the installation. Most wetlands at Smoky Hill Range are associated with intermittent stream drainages and ponds. The NWI has classified all wetlands on Smoky Hill Range as palustrine wetland systems. Palustrine wetlands of the Great Plains include wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens in situations traditionally called marshes, swamps, prairies, etc., as well as those occurring along the edges of streams, lakes, or ponds (Cowardin et al., 1979). Palustrine wetlands at the range include various types of marshes dominated by great bulrush (*Scirpus validus*), cattails (*Typha sp.*), bur-reed (*Sparganium sp.*), bulrush (*Scirpus pungens, Scirpus americanus*), and/or spike rush (*Eleocharis sp.*) (KBS, 2006).

Riparian areas refer to the banks of streams and ponds that support a variety of water-dependent vegetation not found in drier upland areas; thus, they are considered to be wetlands. Riparian vegetation of Smoky Hill Range is dominated by woody trees, shrubs, and shade-tolerant herbaceous species and supports a variety of habitats and associated plant and wildlife species. The dominant trees found in the riparian areas of Smoky Hill Range are osage orange and elm (*Ulmus spp.*).

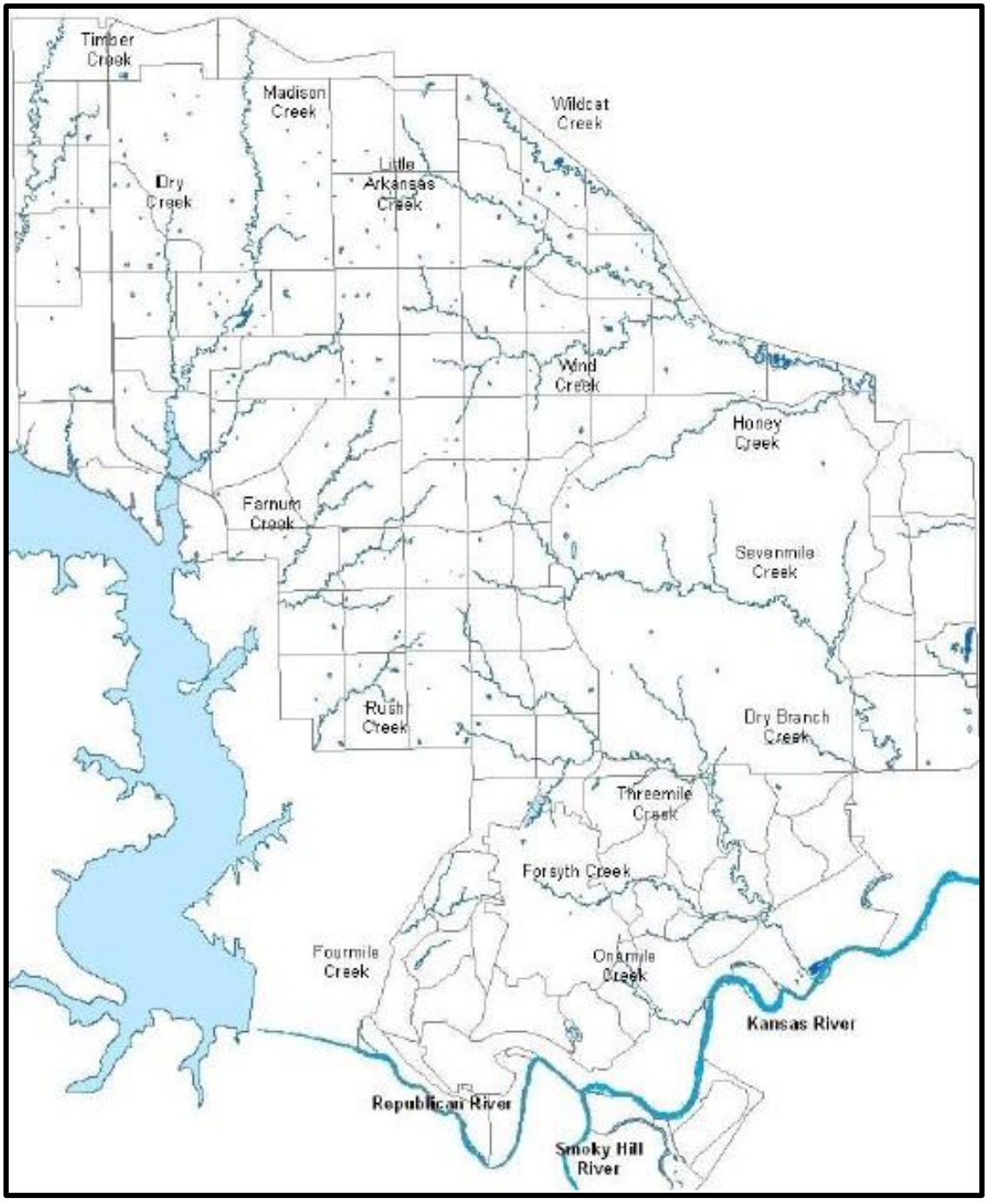

Figure 3.7-13 Springs, Seeps, Streams, Rivers, Ponds, and Lakes on Fort Riley

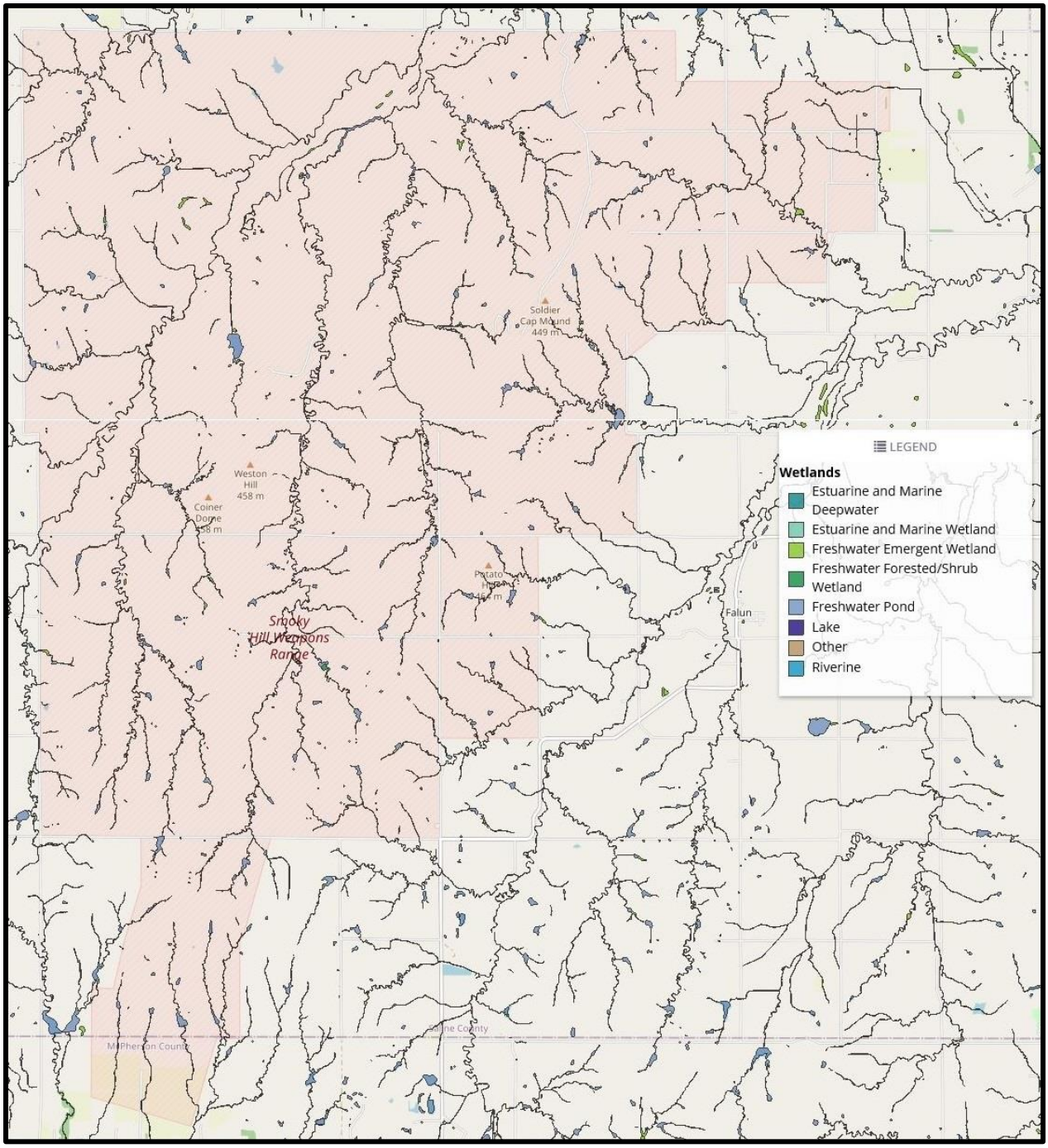

Figure 3.7-14 Wetland Areas at Smoky Hill Range

Wetland communities included scrub-shrub wetlands typically found along narrow, intermittent drainages or along pond edges in the central and western portions of KSTC including Smoky Hill Range. They consist of bush wild-indigo (*Amorpha fruticosa*), prairie cordgrass (*Spartina pectinata*), American germander (*Teucrium canadense*), American waterhorehound (*Lycopus americanus*), and Torrey's rush (*Juncus torreyi*) with pond edges composed of black willow

(*Salix nigra*) and eastern cottonwood (*Populus deltoides*). Wetlands also include Palustrine emergent wetlands that are associated with drainages, depressions, and ponds and consist of smartweed (*Persicaria* spp.*)*, cattails (*Typha* spp.), bald spikerush and pale spike-rush (*Eleocharis erythropoda* and *Eleocharis macrostachya*, respectively), American water horehound, yellowfruit sedge (*Carex annectans*), Torrey's rush, rough barnyard grass (*Echinochloa muricata*), common cocklebur (*Xanthium strumarium*), and broad-leaf arrowhead (*Sagittaria latifolia*) (AES, 2007). Wetlands at Smoky Hill Range are shown in Figure 3.7-14.

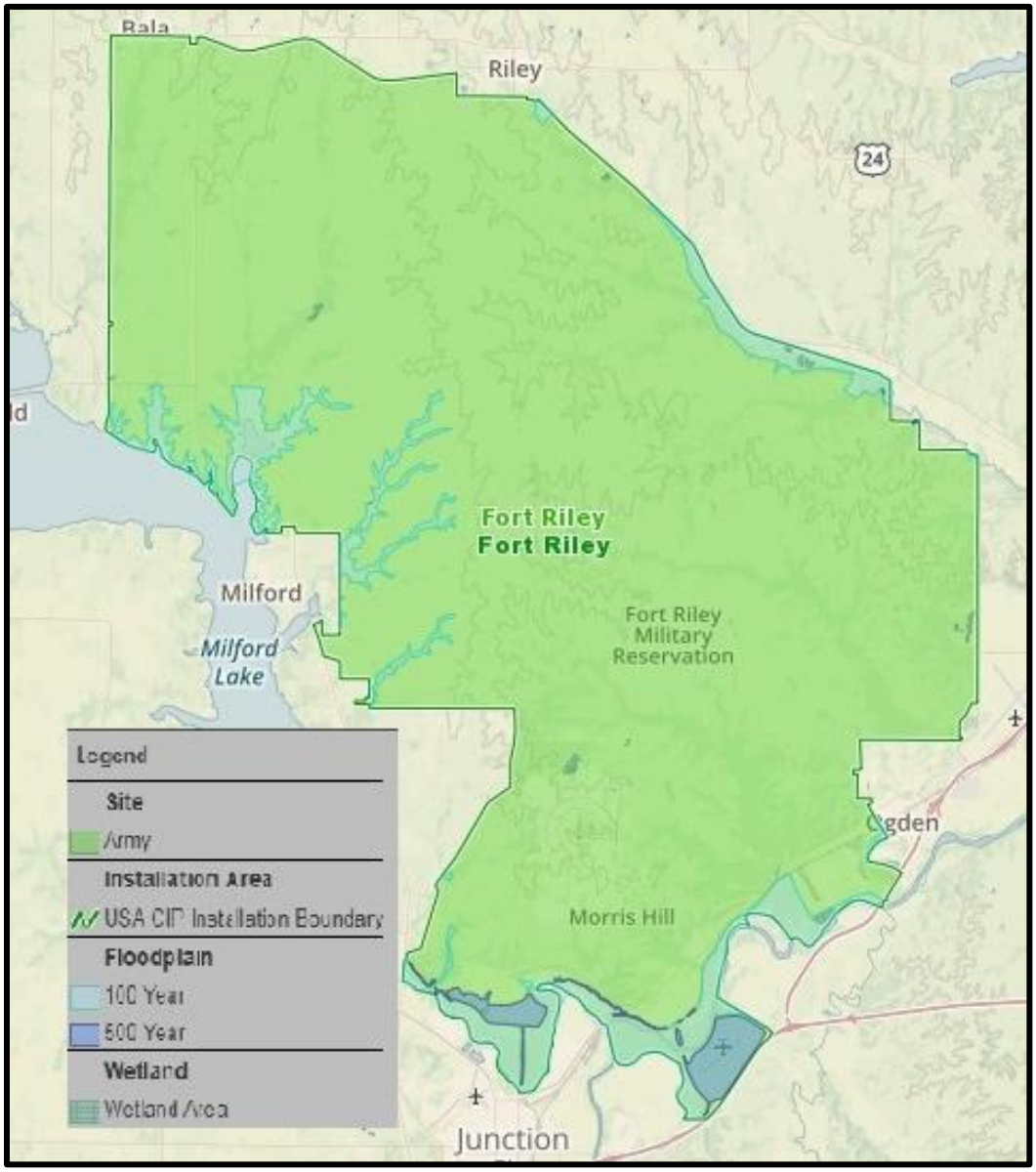

Figure 3.7-15 Wetlands and Floodplains on Fort Riley

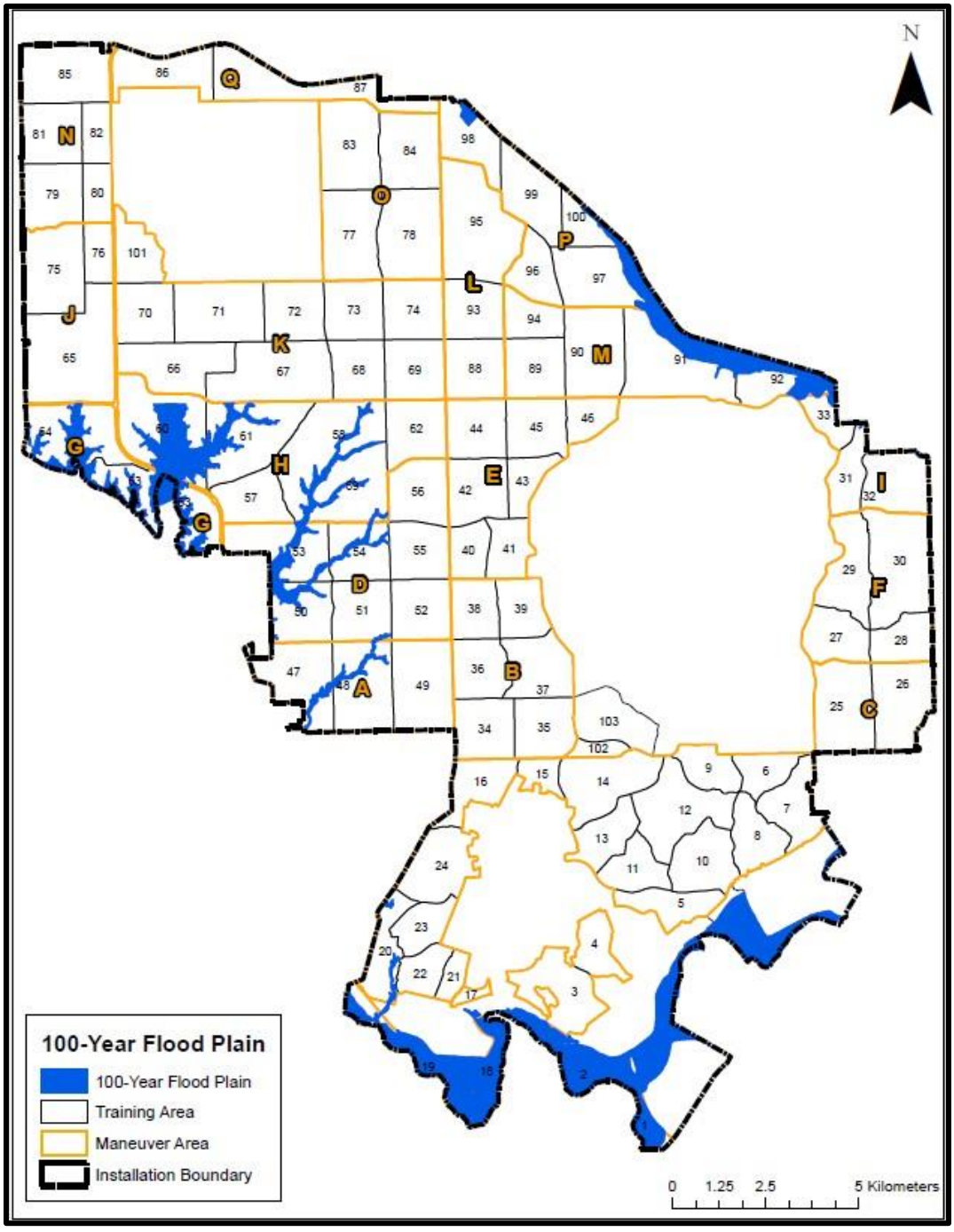

Figure 3.7-16 100 Year Floodplains on Fort Riley

Floodplains

Under Kansas state law, the floodplain is considered to be the land adjoining lakes and rivers that are covered by the 100-year or regional flood. The principal concern with flooding is the

potential for hazards to troops and loss of or damage to livestock and property. All three intermittent streams and their major tributaries are within the 100-year floodplain.

The 100 year floodplain of Fort Riley consists of 6,155 acres located near the Republican and Kansas Rivers, Wildcat , Rush , Farnum and Madison Creek. A system of levees has been constructed adjacent to the Kansas River, making the areas safe and acceptable for building sites. Figure 3.7-15 shows both wetlands and floodplains on Fort Riley while Figure 3.7-16 shows only the floodplains.

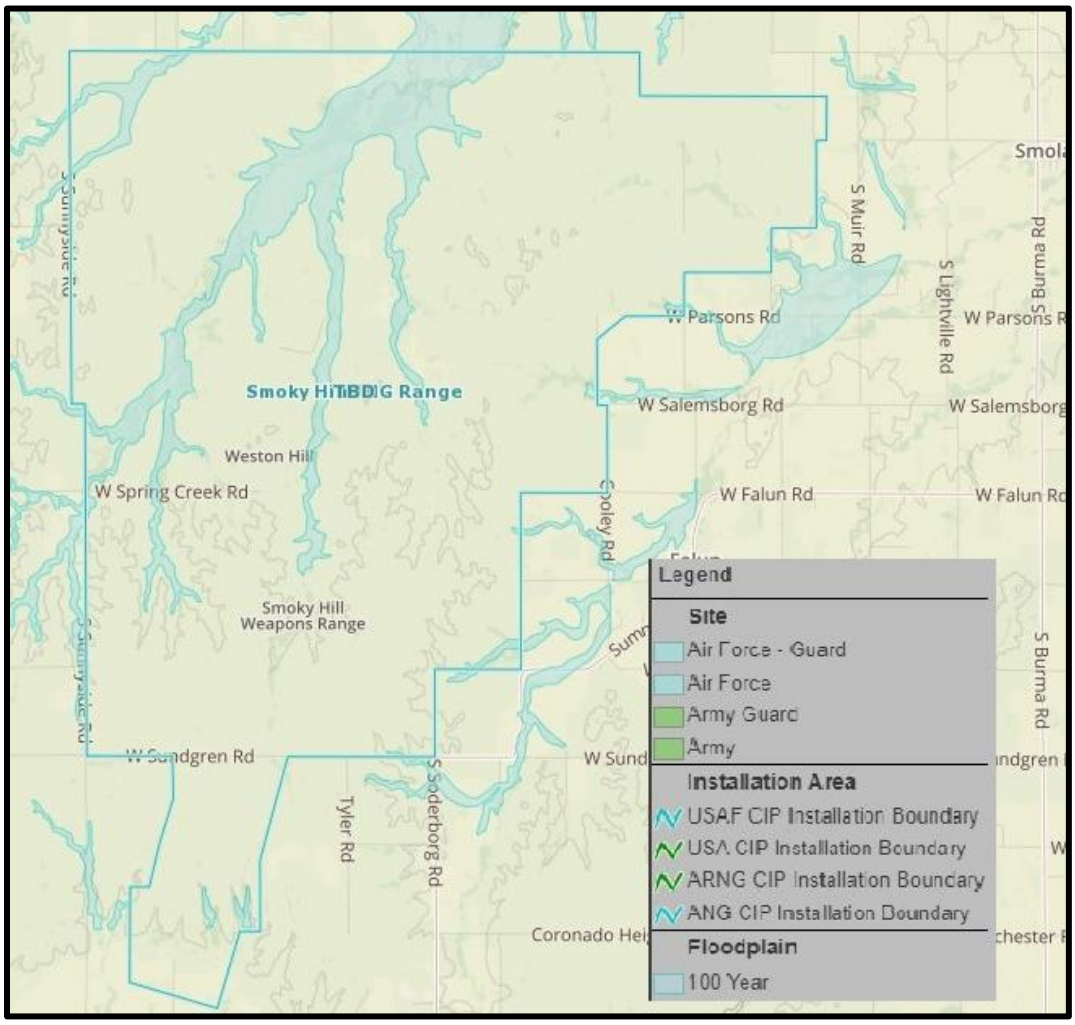

Figure 3.7-17 Floodplains at Smoky Hill Range

During the spring and summer months at Smoky Hill Range, dirt roads serving the range may occasionally become inundated, causing transportation difficulties or temporarily halting transportation to some areas. Flash floods also may occur along the smaller streams from brief, intense periods of rainfall during these months.

The frequency of short-duration stream flooding on Smoky Hill Range is not well documented because USGS does not maintain streamflow gauging stations on any of the range's streams. However, flood information is available for other nearby streams. Spring Creek, which runs through the range, is a tributary of Mulberry Creek, with which it has a confluence about 10 miles northeast of the range. Mulberry Creek exhibits overbank flooding every 10 to 25 years and last exceeded the flood stage in 1995 (Perry, 2005). Mulberry Creek has a flood stage of 24 feet; the 1995 flood produced a stage reading of 27.14 feet and 8,440 $feet^3$ per second (Perry, 2005). While USGS does not monitor flows along Spring Creek, flood conditions within the range are similar to those found along Mulberry Creek. Floodplains at Smoky Hill Range are shown in Figure 3.7-17.

3.7.7.2 Environmental Consequences

Fort Riley does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 1.3%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. Impacts to all water resources are adequately addressed in section 3.2.6.2 and are expected to be negligible and less than significant.

3.7.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the 10 planned systems is expected to have minor, less than significant cumulative effects to all water resources. The impacts are described in section 3.2.6.2. All the new systems except the M-SHORAD would be fielded to existing units with no additional facility requirements anticipated. The potential site for M-SHORAD facilities and the AMPTR site are separated by a significant distance and in separate watersheds minimizing the potential to compound the impacts. The anticipated population increases of all 10 systems and IDDS-A is 4.8% for soldiers on Fort Riley and including all family members is 1.0% within the ROI resulting in minor and negligible impacts, respectively, to waters, water use, and potential water quality degradation.

3.8 FORT SILL, OKLAHOMA

3.8.1 Background

Fort Sill encompasses approximately 93,679 acres and is located in Comanche County, Oklahoma. Fort Sill is approximately 90 miles southwest of Oklahoma City, Oklahoma, and approximately 50 miles north of Wichita Falls, Texas, on I-44 (Figure 3.8-1). Altus AFB is 50 miles west in Altus, Oklahoma. The town of Indiahoma and the cities of Cache and Lawton are located on the southern border of Fort Sill, and Elgin and Medicine Park are located on the northern border. The Wichita Mountains National Wildlife Refuge is located along the northwestern border of Fort Sill.

Fort Sill is home to the U.S. Army Fires Center of Excellence, with a primary mission to train soldiers and develop ADA, Field Artillery (FA), and Electronic Warfare leaders; design and develop fire support for the force; support unit training and readiness; mobilize and deploy operating forces; and maintain installation infrastructure and services. Fort Sill is also one of the five locations used for Army Basic Combat Training.

Fort Sill hosts the following organizations:

- U.S. Army Field Artillery Center and School
- U.S. Army Air Defense Artillery Center and School
- U.S. Army Electronic Warfare School
- U.S. Army Training Center brigade.

The principal operational units at Fort Sill include:

- 75th FA Bde
- 428th FA Bde
- 434th FA Bde
- 30th ADA Bde
- 31st ADA Bde

Fort Sill also hosts Field Artillery training for the U.S. Marine Corps and provides range support for aerial bombarment training for the U.S. Navy, Marine Corps, and Air Force aviation units.

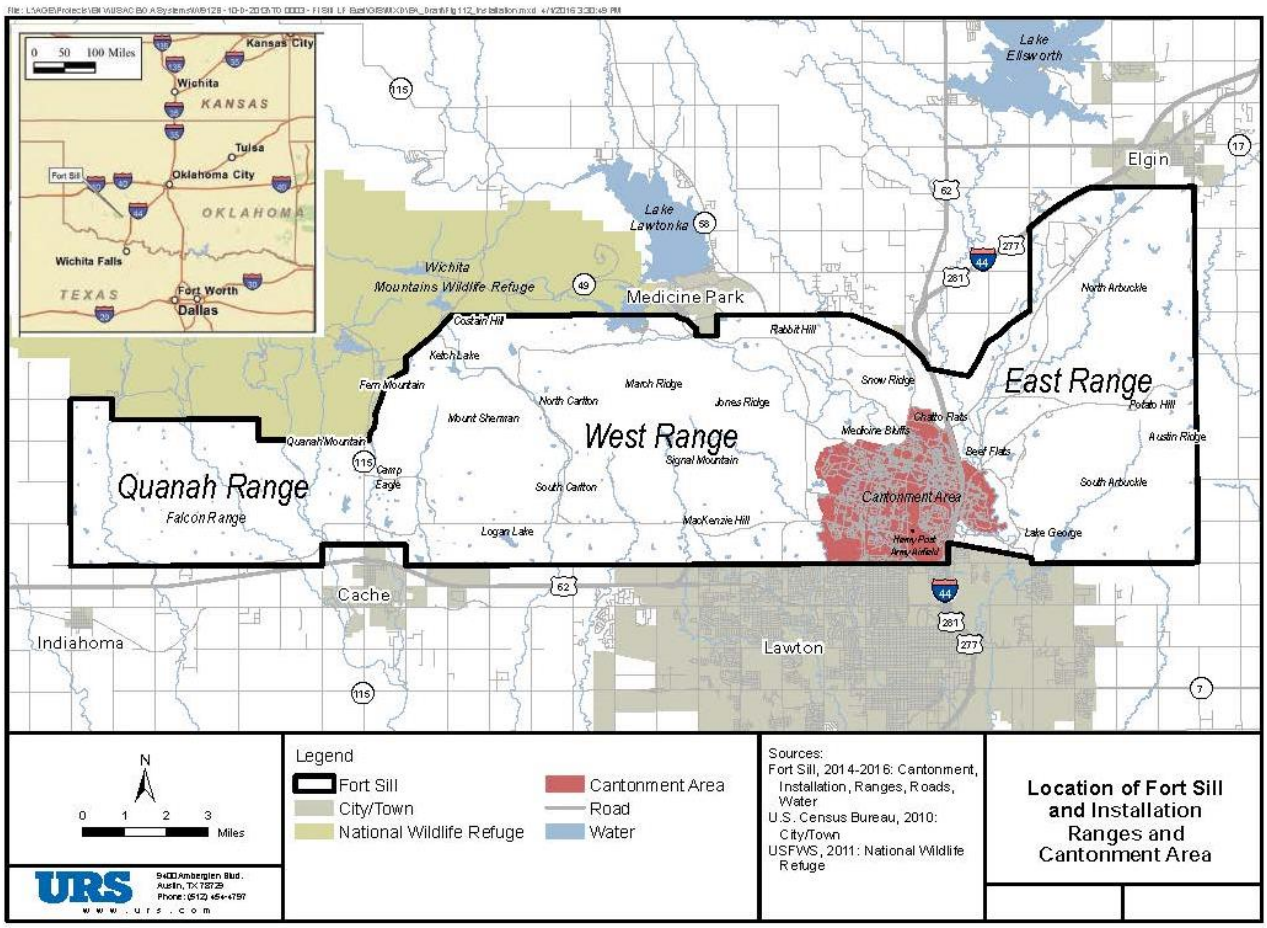

Figure 3.8-1 Location of Fort Sill, Oklahoma

3.8.2 Biological Resources

3.8.2.1 Affected Environment

3.8.2.1.1 Flora[60]

Fort Sill is located within an ecological transition area in which tall-grass prairie merges with short grass prairie and soil variation has created diverse plant communities. More than 70% of the installation is comprised of grassland communities, while a mix of dense woodland, riparian areas, oak savannah, and agricultural lease lands constitute the remaining areas (Figure 3.8.-2).

Dense woodlands are found along streams and on sandy, gravelly, and some stony upland areas. Principal trees along streams are elm, pecan, hackberry, and red (*Quercus shumardii*), blackjack (*Q. marilandica*), bur (*Q. macrocarpa*), post (*Q. stellata*), and white oak (*Q. alba*). The most common trees on upland sites are blackjack, post, and white oaks. An understory of grasses, forbs, and woody shrubs occurs in most wooded sites. Mesquite trees are found on many

[60] Source: Fort Sill INRMP 2014.

hardland and slickspot soil or disturbed areas growing in association with blue and sideoats grama. Red cedar occurs on all soil types.

Former cropland areas have a wide variety of vegetation. Old fields in creek bottoms have dense stands of johnsongrass, annual brome grasses (*Bromus spp.*), or smaller amounts of native grasses. Old fields on uplands usually have annual grasses, such as three awn (*Aristida spp.*), gumweed (*Grindelia spp.*), and other invasive species.

Many upland areas with tall grass are well suited to hay production. Other areas with tall or mid-grasses are too rough or rocky for haying operations. Areas with short and mid-grasses, such as gramas, are not productive enough for commercial haying. Much of the unimproved area is suitable for livestock grazing, but severe interference with military training activities would occur. The wide variety of vegetation and topography make Fort Sill a desirable area for wildlife and associated recreational uses.

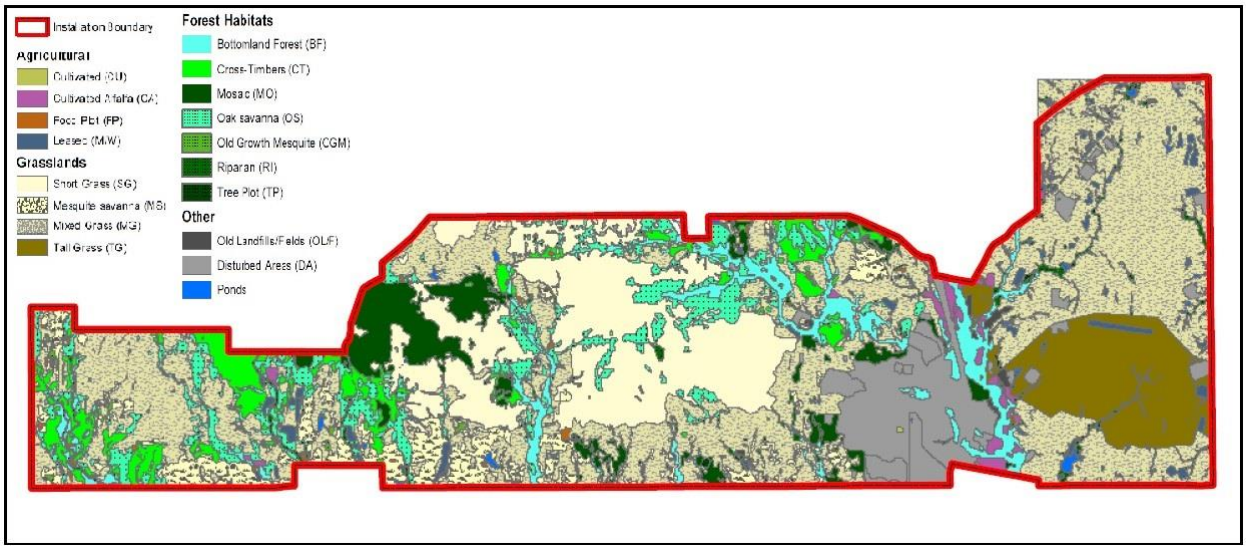

Figure 3.8-2 Vegetation Types on Fort Sill

3.8.2.1.2 Fauna

Information on wildlife occurring at Fort Sill is provided in the INRMP (Fort Sill, 2019a). Fort Sill has a diversity of habitats that support a variety of fauna, including mammals, birds, fish, reptiles, and amphibians. Prescribed burns are used to improve habitat quality.

Mammals

The diversity of natural environments at Fort Sill provides suitable habitat for a variety of mammal species. Common mammal species include coyote (*Canis latrans*), armadillo (*Dasypus novemcinctus*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), cottontail rabbit (*Sylvilagus floridanus*), fox squirrel

(*Sciurus niger*), beaver (*Castor canadensis*), deer mouse (*Peromyscus maniculatus*), and white-tailed deer (*Odocoileus virginianus*). Mountain lions (*Puma concolor*) have been observed on the installation. Bison inhabit the Wichita Mountains Wildlife Refuge and have, on occasion, been found on Fort Sill (Fort Sill, 2014). Game species include white-tailed deer, elk (*Cervus canadensis*), raccoons, feral pigs (*Sus scrofa*), and coyotes. Bat species potentially occurring on Fort Sill include the silver-haired bat (*Lasionycteris noctivagans*), Mexican free-tailed bat (*Tadarida brasiliensis*), eastern red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*) (Fort Sill, 2014).

Birds

The state of Oklahoma is within the Central Flyway migration corridor, which is utilized by more than 400 avian species. Fort Sill provides a suitable stopover or resident habitat for many of these species. Bird species commonly observed at Fort Sill include American crow (*Corvus brachyrhynchos*), black-capped vireo (*Vireo atricapillus)*, common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), turkey vulture (*Cathartes aura*), bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*), pheasants (*Phasianus colchicus*), and several species of swallows (*Hirundo spp.*). Avian game species on the installation include bobwhite quail, mourning dove, pheasants, and waterfowl species such as mallard, teal, and Canada and snow geese. Several natural areas providing habitat and refuge for birds, as well as many other wildlife species, have been established on the installation (Fort Sill, 2014). Cowbird trapping is used to improve the nesting success of migratory birds.

Fort Sill is within the Oaks and Prairies Bird Conservation Region (19), which includes 19 species: little blue heron, swallow-tailed kite, bald eagle, peregrine falcon, black rail, upland sandpiper, long-billed curlew, Hudsonian godwit, buff-breasted sandpiper, red-headed woodpecker, scissor-tailed flycatcher, Sprague's pipit, Smith's longspur, Bell’s vireo, loggerhead shrike, Swainson’s warbler, orchard oriole, and Harris’s sparrow (USFWS, 2008; Fort Sill, 2014).

Fish

Aquatic habitat within Fort Sill includes several creeks and associated tributaries and ponds. Common fish species that could inhabit these waters include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), green sunfish (*L. cyanellus*), channel catfish (*Ictalurus punctatus*), and others (Fort Sill, 2014).

Reptiles and Amphibians

A herpetological survey documenting species observations for the installation was performed at Fort Sill in 1991. Forty-five different species were either collected or verified by sightings (Fort Sill 2014). Reptile species with the potential to occur within Fort Sill could include a wide

variety of turtles, lizards, and snakes. Amphibians, including salamanders, frogs, and toads, could also be present.

3.8.2.1.3 Protected Species

Fort Sill is located within the central mixed-grass prairie region. One plant species is under review for listing on the ESA—Hall's bulrush (*Schoenoplectiella hallii*).

In 2012 Hall's bulrush was confirmed along the edge of the western end of Lake Elmer Thomas (Hideaway). The few scattered plants were in an area noticeably disturbed by feral hogs. These plants are also abundant along the northern end of Engineer Lake and near Pottawatomi Twins pond as noted in the current INRMP (Fort Sill 2019a). Currently the Hall's bulrush can be found along all edges of Lake Elmer Thomas and Engineer, Pottawatomi Twins, and Zani ponds. The Hall's bulrush seed floats and gets washed around with wind and disturbance, any bank on impoundment that has appropriate conditions can and will have plants grow. There may be other populations on post that have not been documented due to lack of intensive surveying. As of May 2021 the Hall's Bulrush was determined to not warrant listing as a threatened or endangered species.[61]

3.8.2.2 Environmental Consequences

Since Fort Sill does not plan on constructing ranges or facilities to support IDDS-A no impacts to biological resources from construction are expected. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species at Fort Sill. The predicted increase in range usage is 3.7%, a minor amount that is less than significant. More detailed impact information is in section 3.2.1.2.

3.8.2.3 Cumulative Effects

Fielding of all 12 planned systems listed in section 3.3 may require construction of facilities to support the M-SHORAD training mission, not a full M-SHORAD battalion. Locations have been identified for a General Instruction Building and barracks space within the main cantonment area that supports minimal floral, faunal, and protected species. Expansion or renovation of existing facilities may also be required to support other equipment. Minor, less than significant impacts from construction are expected because the potential sites support only minimal biological resources. An expected increase of soldiers of approximately 3.3% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that

[61] *Federal Register* / Vol. 86, No. 89 / Tuesday, May 11, 2021 at https://www.govinfo.gov/content/pkg/FR-2021-05-11/pdf/2021-09748.pdf#page=1 accessed 28Jul21.

are expected to be less than significant. Adding up to 595 soldiers, 107 spouses, and 302 children at Fort Sill is about 0.90% of the ROI population, a negligible amount. Overall cumulative impacts to biological resources are as described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

3.8.3 Cultural Resources

3.8.3.1 Affected Environment

3.8.3.1.1 Cultural Resources Present

As of October 2020, all standing properties and structures constructed before 1975, and nearly 200 archaeological sites, have been evaluated for NRHP eligibility. (Fort Sill, 2018 and pers. Comm. 2020[62]). Fort Sill screens training missions and reviews facility projects to preclude damage to cultural resources. Buffers are established around properties if required and SOPs provide guidance to avoid impacts.

Five individual buildings, structures, or objects on Fort Sill are currently listed in the NRHP, and more than 420 NRHP eligible properties, sites, and resources—69 archeological sites; 18 individual architectural/historic buildings, structures, and sites; and 10 historic districts containing approximately 340 standing resources—are located on the installation. In addition, 289 archeological sites have been determined not eligible for listing in the NRHP. No NRHP-eligible properties are known to occur in the APEs. Please note that the number of contributing members to the historic districts is subject to review and change due to the new Inter-War Era Historic Housing (1919-1940) Program Comment adopted by the ACHP on September 4, 2020.

Undiscovered resources would be handled using procedures described in the Fort Sill ICRMP and could include stopping training and mechanized excavation, notification of appropriate parties, and protection of materials.

3.8.3.1.2 Consultation and Coordination with Indian Tribal Governments

Fort Sill consults with the nine Fort Sill-affiliated Native American tribes to provide access to sacred sites (including cemeteries, plants, animals, and landscapes considered sacred) located on Fort Sill. EO 13007 identifies Native American sacred sites as special floral and faunal and mineral areas that contain resources used in religious ceremonies, among other natural and cultural resources. Confidentiality and access to these sites is mandated by this EO and the AIRFA. For these reasons, no maps or descriptions are publicly available.

[62] Pers. Comm. Nov 2020. Selena Bagnara-Milan and David Fritz. Ft. Sill Cultural Resources.

3.8.3.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Sill and range usage is expected to rise by only 3.7%, which is minor. Therefore impacts to cultural resources are expected to be minor and less than significant and are addressed in section 3.2.2.2

3.8.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the 12 planned systems listed in section 3.3 would be similar to those described in section 3.2.2.2. They are expected to be minor and less than significant for the same reasons stated in section 3.8.2.3.

3.8.4 Soils

3.8.4.1 Affected Environment

Surface soils and rocks on Fort Sill are varied, including igneous rocks (Cambrian); limestones, dolomites, shales, sandstones, and conglomerates (Ordovician and Permian); and unconsolidated alluvium (Quaternary).

Soils of Fort Sill are located along the major land resource area (MLRA) boundaries of the Wichita Mountains, Central Rolling Red Plains, and Central Rolling Red Prairies. Comanche County is drained mostly by tributaries of the Red River. Small areas are drained by the Washita River and its tributaries. The topography ranges from the nearly level floodplains along the rivers to steep uplands associated with the Wichita Mountains.

Although no farmlands in Comanche County are classified as “unique,” nine soil series in the county are classified as prime farmland soils. Four of the nine series occur on Fort Sill, but only two cover large areas of land on Fort Sill. Approximately 25,066 acres (38%) of Fort Sill are classified as prime farmland soils.

Soil disturbance that is not properly managed results in erosion. Fort Sill recognizes the importance of keeping its soils in place to support plant growth because a variety of vegetation communities are important for training exercises. The transport of sediment during erosion has been identified as the number one pollutant of waterways on Fort Sill. Sedimentation has also led to indirect impacts on other resources. For these reasons, Fort Sill has adopted an aggressive soil erosion management policy.

To comprehensively manage and protect soil resources on Fort Sill, the INRMP (Fort Sill, 2014) contains soil management goals and objectives designed to protect soil resources and prevent soil destabilization and erosion. Impacts on soil resources are reduced through the implementation of the existing soil resource environmental stewardship guidelines contained within the INRMP. Frequent land evaluations determine which remediation measure is needed and if installation activities must be rotated to other areas while designated land areas recover (Fort Sill, 2019b).

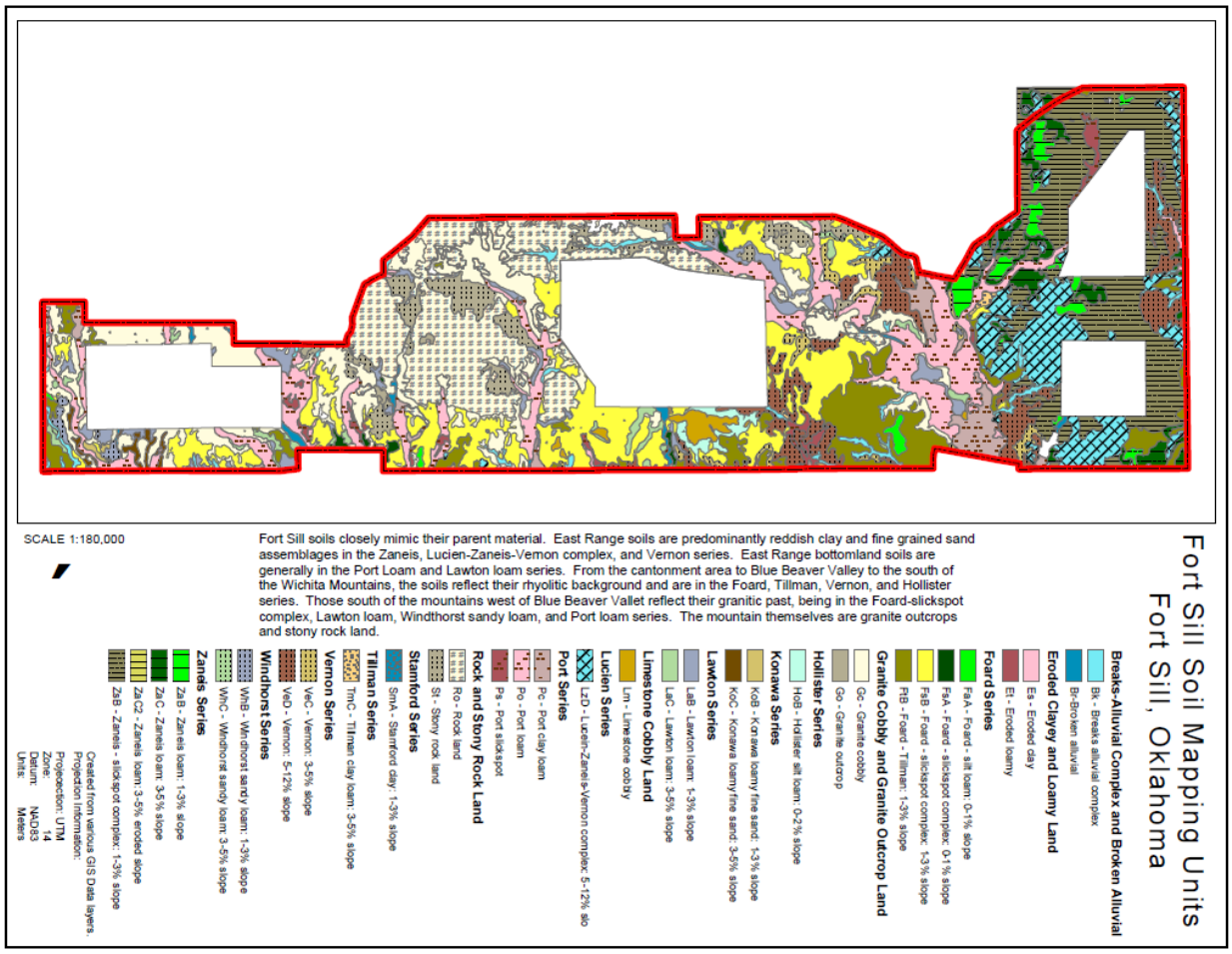

Figure 3.8-3 Fort Sill Soil Mapping Units

3.8.4.2 Environmental Consequences

Impacts to soils at Fort Sill are described in section 3.2.3.2 and are expected to be minor and less than significant. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 3.7%, a minor amount.

3.8.4.3 Cumulative Effects

Fielding of the 12 planned systems listed in section 3.3, along with the Proposed Action, may require construction of facilities to support the M-SHORAD training mission, not a full M-SHORAD battalion. Locations have been identified for a General Instruction Building and barracks space within the main cantonment area that are in previously developed areas with well-developed surface drainage systems that will help control erosion and soil damage. Expansion or renovation of existing facilities may also be required to support other equipment. There are expected to be minor, less than significant impacts from construction because the potential sites would not be subject to extensive erosive forces. An expected increase of soldiers of approximately

3.7% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The impacts are described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to soils.

3.8.5 Land Use and Compatibility

3.8.5.1 Affected Environment

Land use at Fort Sill is primarily designated for military training purposes. The installation is divided into the cantonment area, training areas, live-fire training ranges, artillery firing points, impact areas, and areas unsuitable for training.

3.8.5.1.1 Cantonment

The cantonment area contains the administrative areas, medical facilities, the Henry Post AAF, a cemetery, family housing, barracks, and other soldier housing. The cantonment area and areas unsuitable for training (landfill, recreation area, cultural sites, ammunition supply point, etc.) comprise 8,312 acres.

3.8.5.1.2 Range Complex

The training areas comprise 45,266 acres (38,735 acres of which are classified as heavy and 6,531 acres of which are classified as light) and provide land for dismounted maneuver training and mounted heavy and light vehicle maneuver training. The four live-fire training range impact areas (dudded and non-dudded) and other non-maneuver-areas comprise 39,991 acres.

Fort Sill is divided into three ranges: East, West, and Quanah. The ranges on Fort Sill are shown on Figure 3.8.-4. The East Range is used primarily for field artillery and small arms weapon training. The West Range is used for artillery, live aircraft bombing, and aerial gunnery training. The Falcon Range in the Quanah Range is used primarily by the Air Force for air-to-surface munitions training (inert and training bombs, rockets, strafe, and laser) and maneuvers (Fort Sill, 2005).

Due to the delisting of the black-capped vireo in 2018, the installation no longer imposes training restrictions for the species. However, in accordance with a letter from the Army to the USFWS (Department of the Army, 2017) the installation will continue to adaptively manage the species populations within its boundaries.

Recreational activities (e.g., hunting and fishing) are an allowed use at Fort Sill. The installation has been divided into hunter use compartments and areas. These divisions are based on habitat type and are available for hunting depending on the impact areas and training areas and the military training schedule. Those who want to hunt or fish on Fort Sill are required to take the Fort Sill Sportsman Safety Class (Fort Sill, 2014). The responsibilities, procedures, and rules for hunting and fishing are provided in Fort Sill Regulation 200-1, *Recreational Use, Management,*

Harvest, and Protection of Natural Resources (Fort Sill, 2015b). The surface danger zones (SDZs) associated with live-fire training cannot be utilized for recreational purposes while active.

Additional land use within Fort Sill and the West and East Range areas includes approximately 5,000 acres of leased agricultural land (Fort Sill, 2014). These leases include cultivated fields, wildlife food plots, and mowed and hayed fields. These lands are within the training areas and the non-dudded impact buffer zone and are considered safe for agricultural purposes. All agricultural areas have been cleared of unexploded ordnance (UXO), and the chance of a dud-related accident is remote (Fort Sill, 2014). Fort Sill agricultural lease crop fields are off-limits to vehicle training (Fort Sill, 2015c). The agricultural lease areas may pose training and operational constraints within the West and East Range areas as shown in Figure 3.8.-4.

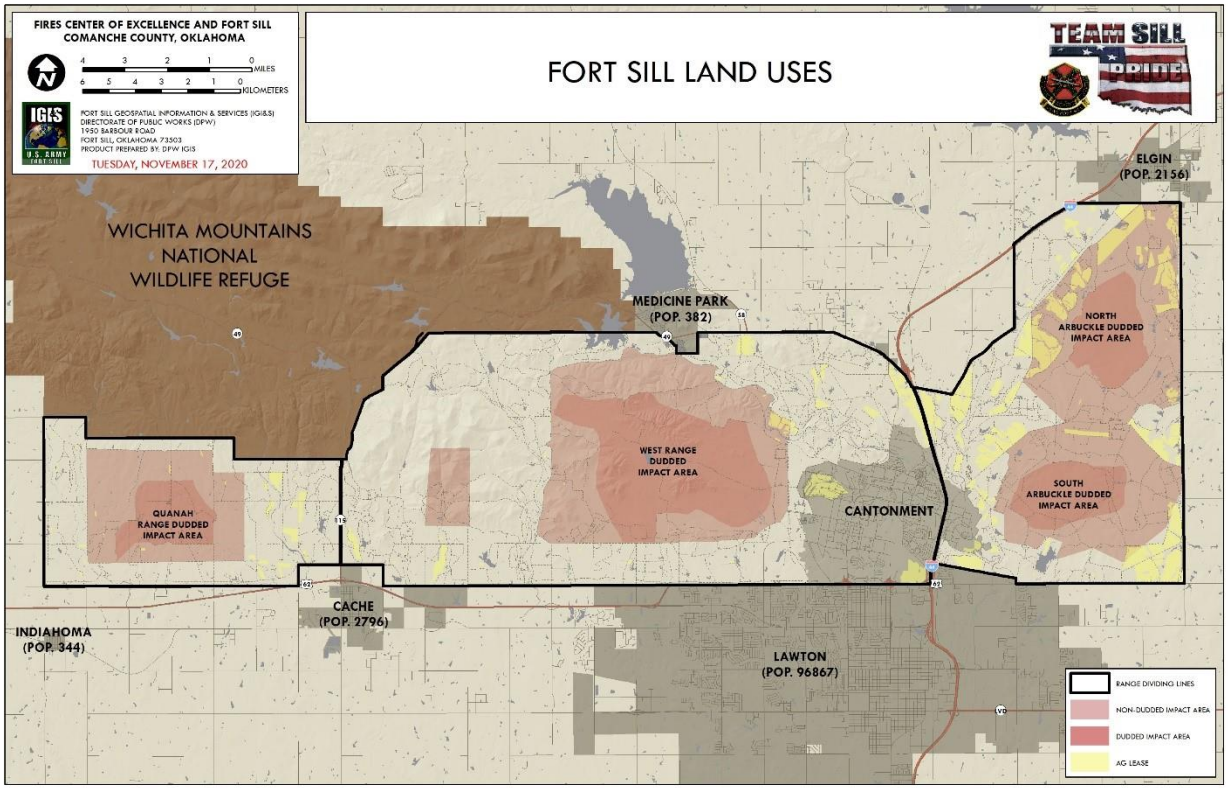

Figure 3.8-4 Fort Sill Land Uses

3.8.5.2 Environmental Consequences

Fort Sill does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 3.7%, which is minor. Impacts to Land Use and Compatibility are adequately addressed in section 3.2.4.2 and are expected to be minor and less than significant.

3.8.5.3 Cumulative Effects

Fielding of the 12 planned systems listed in section 3.3, along with the Action Alternative, may require construction of facilities to support the training of student soldiers that will be assigned to an M-SHORAD battalion. Locations have been identified for a General Instruction Building and barracks space within the main cantonment area that does not change the land use, resulting in less than significant impacts from the construction. Other systems would field to existing units or replace existing equipment one-for-one. An expected soldier population increase of approximately 3.3% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The effects of the additional actions are similar to those described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in minor, less than significant cumulative effects to Land Use and Compatibility.

3.8.6 Facilities

3.8.6.1 Affected Environment

The garrison area or cantonment, also addressed briefly in Land Use and Compatibility Section, contains the heaviest concentration of facilities and mission support activities on Fort Sill. Support services in the cantonment include administration, maintenance, service, storage and supply buildings, housing, medical, and community facilities.

Army facilities are built to meet the standards of the uniform facilities criteria using standard designs of MILCON requirements, standardization, and integration or similar documents. Exceptions to the standard are available and if granted for a facility, it would be considered adequate.

3.8.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at Fort Sill was assessed based on the Army RPLANS records. Fort Sill has a deficit of required facility space to support the IDDS-A battery HQ and hazardous material storage as shown in Table 3.8-1.

Table 3.8-1 Facilities that may require construction at Fort Sill

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Sill available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(7,950)	N	N
Hazardous Mat'l Storage*	1	60	0.0	(2,179)	N	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.						

Fort Sill would plan to provide facilities for the IDDS-A battery on par with what other units stationed at Fort Sill typically receive. New construction is not needed to support this request. Some units on Fort Sill are assigned less administrative and maintenance space than they require according to Army standards. The IDDS-A would be provided the headquarters and hazardous material storage from existing facilities and this may require an exception to standard since it may be less than the requirement by Army doctrine. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Fort Sill also has a deficit of three range types required to support IDDS-A training. The specific range types are not being listed as an operational security measure. The deficit in acreage for the range types is shown in Table 3.8-2.

Table 3.8-2 Range acreage that may require construction at Fort Sill

Standard Range shortage[1]		**Standard Range acreage shortage[2]**	
One battery	Two batteries	One battery	Two batteries
0.20	0.21	1009	1058
0.30	0.31	138	144
0.38	0.39	3.3	3.3
[1]The Standard Range shortage is computed by dividing the shortage of RD by the number of normal training days per Army doctrine.			
[2] **The** Standard Range acreage shortage is computed by multiplying the Standard Range shortage by the minimum Standard Range area.			

Training requirements would be met through the use of approved simulations or appropriate scheduling per the SRM or ReARMM. The unit could also travel to another Army installation that has the capability to support the specific IDDS-A training needed. If funding becomes available the required ranges could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Since Fort Sill does not plan on constructing ranges or facilities to support IDDS-A no impacts to facilities from construction are expected. The increase in range usage is predicted to be 3.7%, a minor amount that is less than significant. More detailed impact information is in section 3.2.5.2.

3.8.6.3 Cumulative Effects

Fielding of the 12 planned systems, when combined with the Action Alternative, is expected to have minor, less than significant cumulative effects with minor or negligible increases of the impacts described in section 3.2.5.2. Additional facility requirements of the M-SHORAD have

been accounted for in other analysis and are expected to be less than significant. Other systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities resulting in minor, less than significant impacts.

3.8.7 Water Resources

3.8.7.1 Affected Environment

3.8.7.1.1 Surface Water

Fort Sill is in the surface drainage basin of the Red River and its tributaries. The Cache Creek system, the primary tributary in the Lawton-Fort Sill area, drains from the north to south ending in the Red River. Cache Creek has two main forks, East Cache and West Cache, which merge just before reaching the Red River. East Cache Creek is the main fork. On East Cache Creek and its primary tributary, Medicine Creek, two lakes (Lawtonka and Ellsworth) supply Fort Sill and Lawton with potable water. East Cache Creek is gauged near Walters, Oklahoma, at which point the drainage basin has an area of 675 square miles with an average annual flow of 133,200 acre-feet.

Just east of Lawton and Fort Sill is the drainage basin of Beaver Creek, which supplies the Waurika Reservoir. This reservoir supplements the two aforementioned lakes to provide Lawton-Fort Sill and other communities with water. Portions of the East Range drain into Beaver Creek. Figure 3.8.-5 shows the drainage pattern for Fort Sill and Comanche County.

Beef Creek is another significant tributary to the East Cache Creek on Fort Sill. Blue Beaver, Rock, and Post Oak Creeks are significant Fort Sill tributaries to West Cache Creek. About 52% of Fort Sill is within the East Cache Creek watershed; 40% lies within the West Cache Creek watershed; 8% is in the Beaver Creek watershed.

Many small impoundments have been constructed on Fort Sill. There are 219 ponds and lakes ranging in size from less than one acre to the 333-acre Lake Elmer Thomas. Lake Elmer Thomas was drained in 1988 due to structural problems with the dam. A new dam was completed in 1993, and the lake was filled by 1996. Important lakes and ponds include Lake George, Ketch Lake, West Lake, Menard, Engineer, Logan, and Pottawatomi Twins. There are 142 ponds and lakes totaling 673 acres normally managed as fisheries (673 acres only includes the Army-owned portion of Lake Elmer Thomas). Other ponds are designated for wildlife use. All ponds are used for firefighting purposes.

3.8.7.1.2 Groundwater

Groundwater in the area around Fort Sill occurs in three aquifers: the Arbuckle Group (Cambrian and Ordovician), Post Oak Conglomerate (Permian and Cimarronian), and Alluvial (Quaternary). All are partially recharged from Fort Sill surface waters.

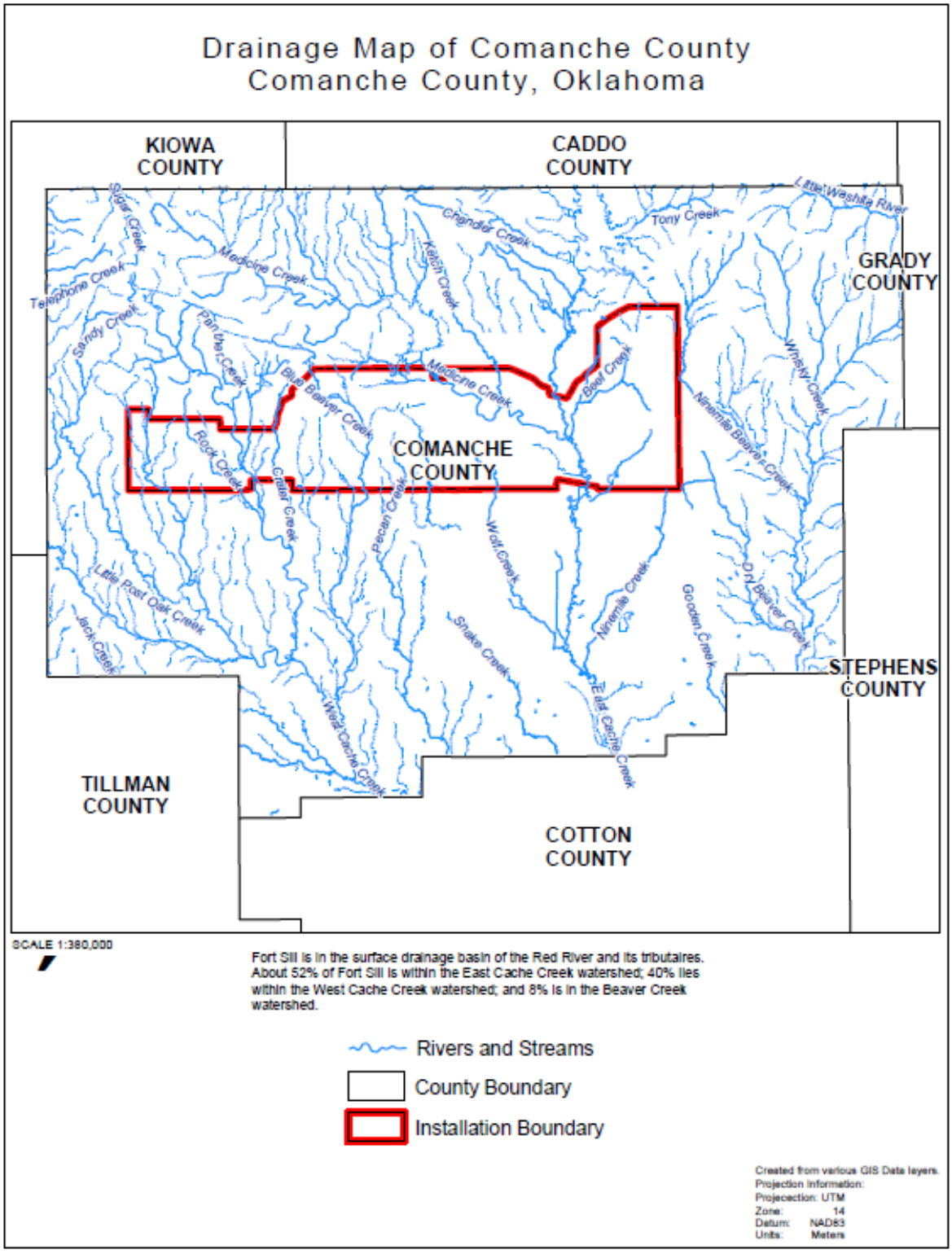

Figure 3.8-5 Comanche County Drainage

The Arbuckle Group aquifer is the largest source of groundwater in the immediate area of Lawton-Fort Sill, but it is generally poor quality. Several small communities in the area use this water source. This aquifer is characterized by limestone, dolomite, sandy dolomite, mudstone, and conglomerate, about 6,000-feet thick. It yields 90–600 gallons per minute to wells. Recharge is principally along the southern flank of the Wichita Mountains and through the overlying Post Oak conglomerate. Oklahoma has designated beneficial uses for the Arbuckle Group as irrigation, municipal and domestic water supply, industrial, and non-irrigation agricultural.

The Post Oak conglomerate consists of limestone conglomerate, about 40-feet thick near limestone outcrops. It generally yields only about 10 gallons per minute to wells. It is considered a minor aquifer.

The Alluvial aquifer is made up of sand, clay, and gravel along flood plains, and it is as much as 32-feet thick. Water yields vary from 5–500 gallons per minute. Recharge is by precipitation on flood plains and streambed infiltration. Most water produced is for domestic and stock use. It may occasionally exceed State drinking water primary or secondary standards.

3.8.7.1.3 Water Quality

The water quality of lakes and streams on Fort Sill is generally good. Total dissolved solids and hardness are generally lower in Comanche County than in surrounding counties. These waters are generally of sufficient quality to support their designated uses. Oklahoma Water Quality Standards establish the following uses for West Cache, Blue Beaver, Post Oak, Crater, East Cache, Medicine, and Wolf Creeks:

- public and private water supply;
- fish and wildlife propagation, primary warm water fishery;
- agriculture;
- industrial and municipal process and cooling water;
- primary body contact recreation; and
- aesthetics.

Post Oak Creek is designated as one of Oklahoma's "High-Quality Waters." The Lake Elmer Thomas watershed is designated as a "Sensitive Public and Private Water Supply." Other surface waters on Fort Sill are designated for the following uses:

- agriculture,
- industrial and municipal process and cooling water,
- aesthetics,
- habitat limited fishery, and
- secondary body contact recreation.

The recent explosion of non-native feral hogs on Fort Sill has led to concerns regarding their impact on water quality. These hogs have been shown to contribute bacteria to water bodies and are known to carry *E. coli* strains that could infect humans and livestock. They also increase stream turbidity and decrease the health of watersheds and riparian communities (Peterson et al., 2012).

3.8.7.1.4 Wetlands and Floodplains

Wetlands on Fort Sill were inventoried through the evaluation of aerial photography from February 1983 and March 1984. In 1995, the USFWS verified this evaluation from 1995 aerial photography of the installation. This verification resulted in the identification of 1,174 acres of potential wetlands on Fort Sill (Fort Sill, 2014). The 100-year floodplains have been mapped on Fort Sill for the following creeks and their tributaries: Medicine Creek, East and West Cache Creeks, Sitting Bear Creek, Post Oak Creek, and Blue Beaver Creek. A 200m buffer surrounds ponds and lakes.

3.8.7.2 Environmental Consequences

Since Fort Sill does not plan on constructing ranges or facilities to support IDDS-A no impacts to all water resources from construction are expected. The increase in range usage is predicted to be 3.7%, a minor amount that is less than significant. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. More detailed information of the less than significant impacts is in section 3.2.6.2.

3.8.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the 12 planned systems is expected to have minor, less than significant cumulative effects to all water resources. The impacts are as described in section 3.2.6.2. All the new systems except the M-SHORAD would be fielded to existing units with no additional facility requirements anticipated. The M-SHORAD impacts are also expected to be less than significant with potential construction sites located in the main cantonment area away from significant water sources and with well-developed surface drainage. The anticipated population increases of all 12 systems and IDDS-A is 3.3% for soldiers on Fort Sill and including all family members is 0.90% within the ROI resulting in minor and negligible, less than significant impacts, respectively, to waters, water use, and potential water quality degradation.

3.9 FORT STEWART, GEORGIA

3.9.1 Background

Fort Stewart is a U.S. Army post in Georgia, primarily in Liberty and Bryan Counties, but also extending into smaller portions of Evans, Long, and Tattnall Counties (Figure 3.9-1). The installation is located approximately 41 miles (66 km) southwest of the city of Savannah and is the largest Army installation east of the Mississippi River. The Fort Stewart Military Reservation covers approximately 280,000 acres (113,312 ha) of land. Wright AAF and Evans AAF lie within the boundaries of Fort Stewart proper.

Hunter AAF is a separate facility approximately 35 miles northeast of Fort Stewart. Although they fall under the same commander, the Proposed Action would have negligible impacts at Hunter AAF, and with a few exceptions, is not discussed further.

Fort Stewart and Hunter AAF (FS-HAAF) are the Army's training and military armored power projection combination on the eastern seaboard of the United States. Tank, field artillery, helicopter gunnery, and small arms ranges operate simultaneously throughout the year.

Primary units stationed at FS-HAAF include:

- 3rd ID
- 1st ABCT (1/3 ABCT)
- 2nd ABCT (2/3 ABCT)
- 3rd ID Sustainment Bde
- 3rd Combat Aviation Bde
- 3rd ID Artillery

FS-HAAF’s mission is to provide a safe, secure, and responsive community that enhances the FS-HAAF power projection platform in support of national security objectives.

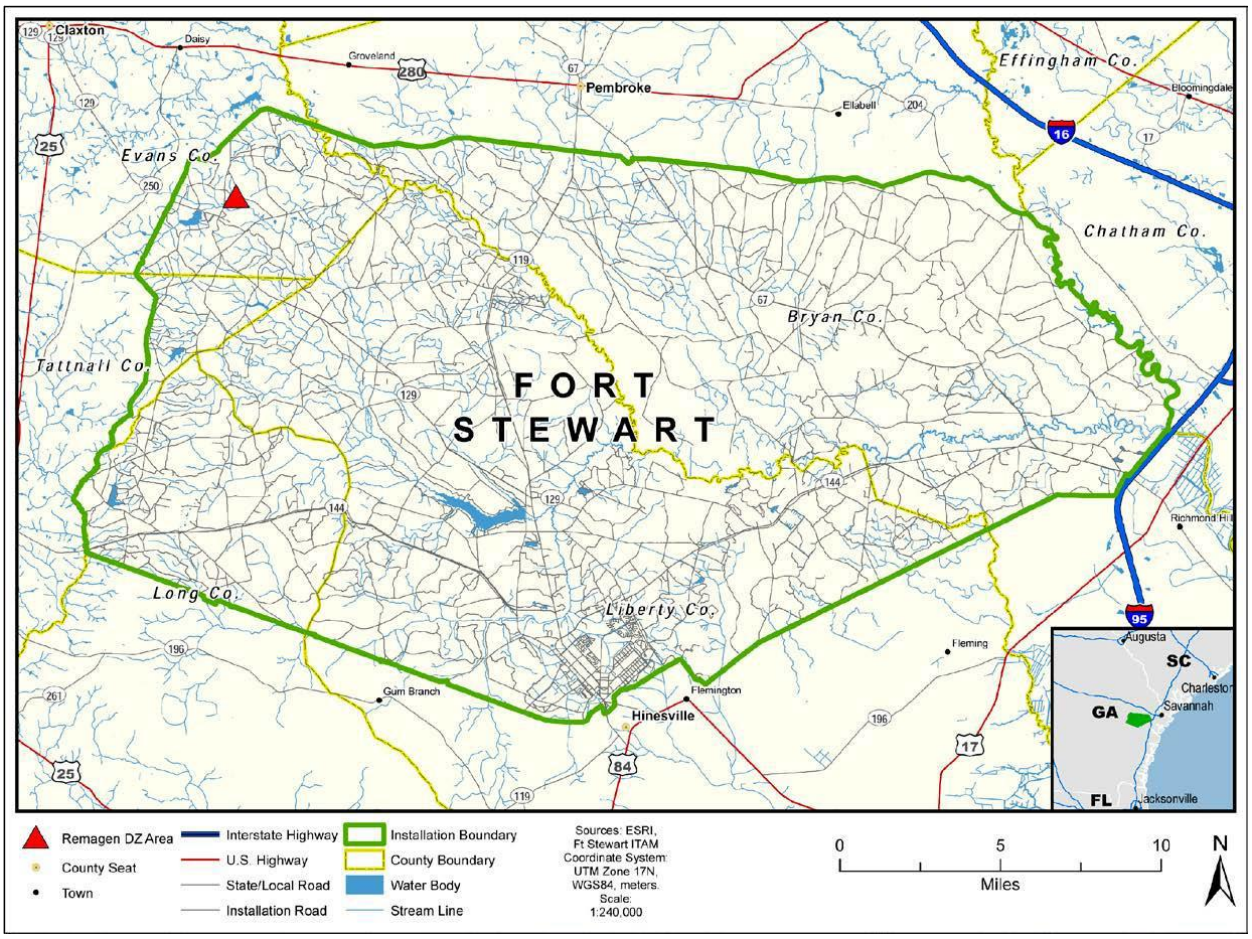

Figure 3.9-1 Location of Fort Stewart

3.9.2 Biological Resources

3.9.2.1 Affected Environment

The longleaf pine community dominates Fort Stewart's natural resources. There are numerous habitat types on the installation, including: longleaf pine forests, mesic lowland pine forests, evergreen scrub forests, lowland broadleaf evergreen forest hammocks, dwarf oak forests, upland broadleaf deciduous-needleleaf forests, bay swamp, herb bogs, shrub bogs, gum and cypress ponds, blackwater streams, and the blackwater river and swamp system.

3.9.2.1.1 Flora

A total of 1,066 taxa from 724 sites were found on FS-HAAF (The Nature Conservancy [TNC], 1995). Species found represent 465 genera and 139 families.

3.9.2.1.2 Fauna

Natural animal communities on Fort Stewart include especially large mammals and have been affected by urbanization in the Southeast. Two prominent examples are panthers (*Felis concolor*) and black bears (*Ursus americanus*), which were extirpated from the area before Army occupation of the lands at Fort Stewart. White-tailed deer (*Odocoileus virginianus*) and feral hogs (*Sus scrofa*) are common, as are many smaller mammals, which are relatively undisturbed by urbanization (Thomas et al., 1996).

3.9.2.1.3 Protected Species

Fort Stewart is occupied by 10 protected species, including eight federally listed species (Table 3.9-1). Federally listed threatened and endangered species are discussed below.

Table 3.9-1 Federal Protected Species on Fort Stewart

Common Name	Scientific Name	Listing Status
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Wood stork	*Mycteria Americana*	Threatened
Eastern black rail	*Laterallus jamaicensis ssp. jamaicensis*	Threatened
Bald eagle	*Haliaeetus leucocephalus*	BGEPA[63] protected
Eastern indigo snake	*Drymarchon corais*	Threatened
Gopher tortoise	*Gopherus polyphemus*	Candidate
Frosted flatwoods salamander	*Ambystoma cingulatum*	Threatened
Smooth coneflower	*Echinacea laevigata*	Endangered

Short Nose and Atlantic Sturgeon

This species historically has been collected in the lower Ogeechee River. An estimated 300 short nose sturgeons inhabit the Ogeechee River as of 2001, but none are known to inhabit the Canoochee River. Fort Stewart borders the Ogeechee River and its tributary, the Canoochee River, flows across the installation. The species is vulnerable to several threats, including decreased water quality, loss of adequate habitat by sedimentation, and lack of summer thermal refuges (Fort Stewart, 2001).

The Atlantic sturgeon is a long-lived species that has been documented in the Ogeechee and Canoochee Rivers. The most significant threats to Atlantic sturgeon are accidental catch in some

[63] BGEPA = Bald and Golden Eagle Protection Act

commercial fisheries, dams that block access to spawning areas, poor water quality, dredging of spawning areas, water withdrawals from rivers, and vessel strikes.

Red-Cockaded Woodpecker (RCW)

As of 2020, Fort Stewart had approximately 607 active clusters and 582 potential breeding groups (personal communication Kendrick, M. Fort Stewart, Sep 21, 2020). Due to achieving recovery goals, Fort Stewart received concurrence from the USFWS in September 22, 2015 for the deportation of all RCW clusters. Figure 3.9-2 provides locations on RCW trees as well as habitat management units (HMUs).

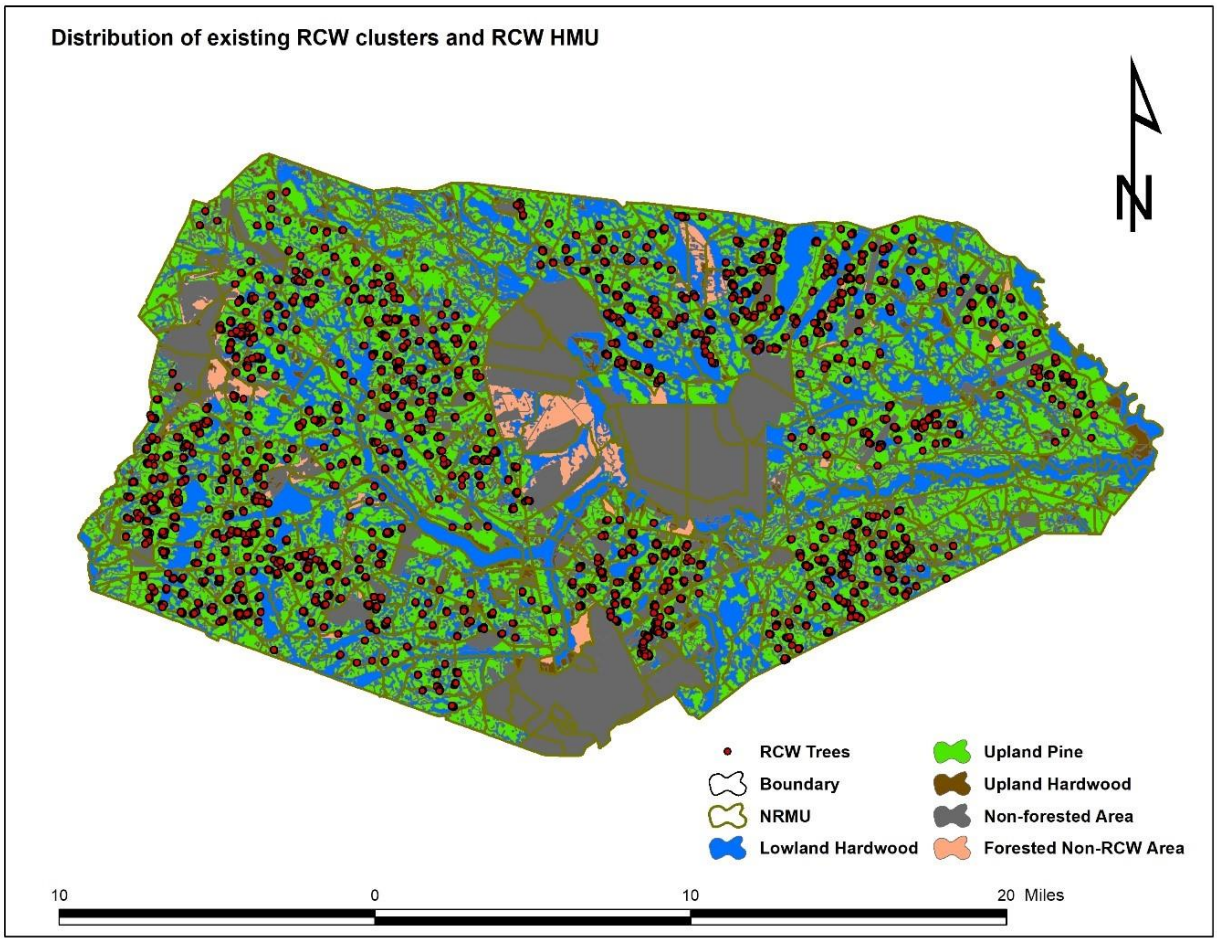

Figure 3.9-2 Distribution of Existing RCW Clusters and HMUs, as of 2020

Wood Stork

The wood stork occasionally forages on Fort Stewart but is not known to nest here (Fort Stewart, 2001). Habitat management guidelines for the wood stork recommend prohibiting aircraft operation within 500 feet of a nesting colony (Fort Stewart, 2010).

Eastern black rail

In southeastern Atlantic coast states, the eastern black rail habitat includes impounded and impounded salt and brackish marshes. The black rail is a potential breeder in wetland areas. The black rail has been observed during the migratory seasons. The species is known or believed to occur in Georgia.

Bald Eagle

As of 2020, there were two HMUs for the bald eagle on Fort Stewart. One was located in TA E13 and one in TA C17. The nest in TA C17 receives minimal disturbance, is monitored by the Georgia Department of Natural Resources (GA DNR) and therefore requires no restrictions. Habitat management guidelines for the bald eagle nest in TA E13 require aircraft avoidance within 1,000 horizontal and vertical feet of the nest during the bald eagle nesting season from October to May and no live fire training, only blank rounds within the TA year-round (personal communication Kendrick, M. Fort Stewart, Apr 1, 2021). Figure 3.9-3 provides locations of bald eagle nests.

Figure 3.9-3 Bald Eagle Nest Sites as of 2020

Eastern Indigo Snake

Because these animals are seldom seen, reliable population estimates are not available (Fort Stewart 2001). Figure 3.9-4 shows the locations of indigo snake populations and their HMUs.

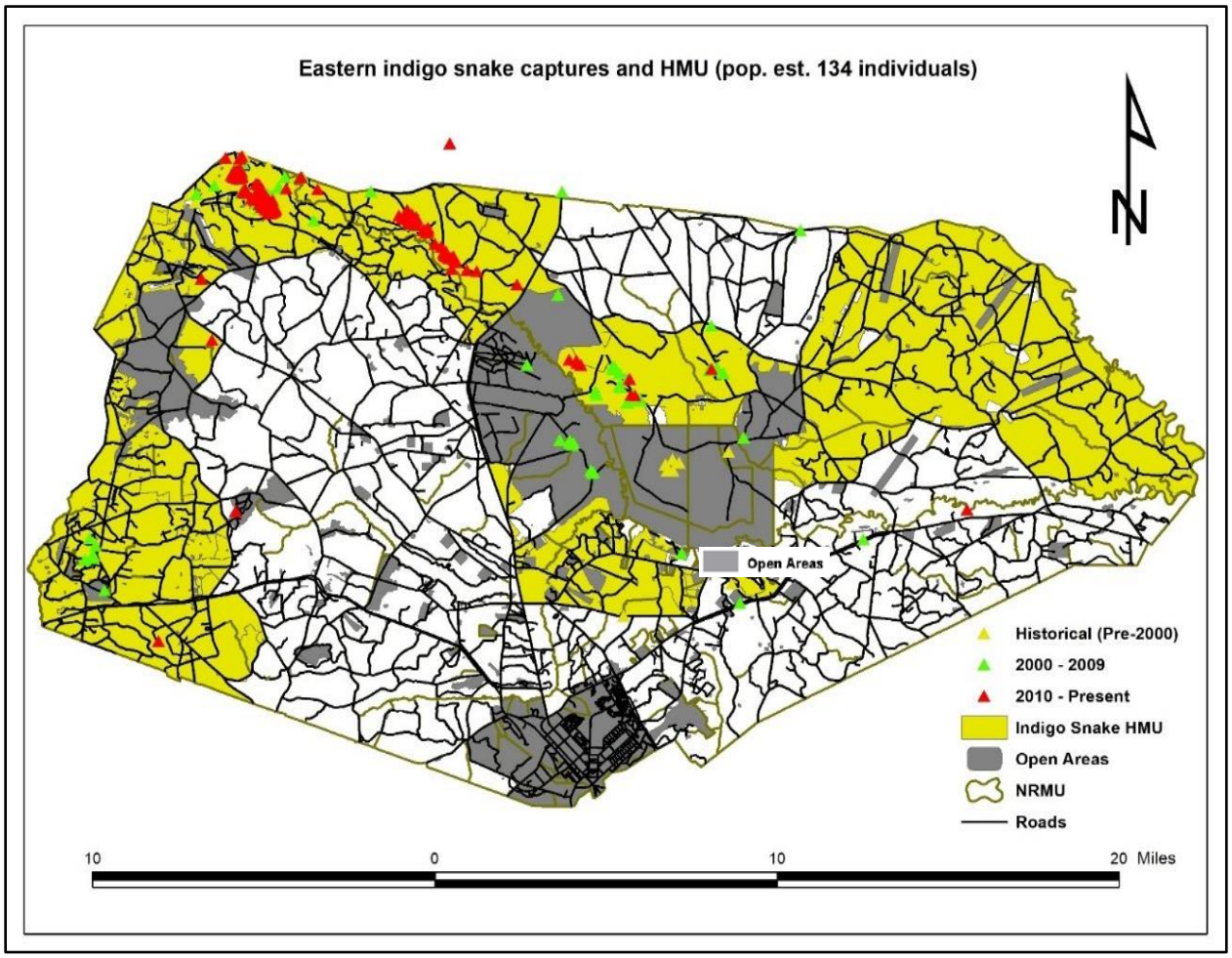

Figure 3.9-4 Eastern Indigo Snake Locations and HMUs as of 2020

Gopher Tortoise

Gopher tortoises are widespread and common throughout most of the sandhill areas inhabited by this eastern indigo snake population. Population sizes are unknown. Figure 3.9-5 provides general locations of gopher tortoise populations and monitoring sites as of 2015.

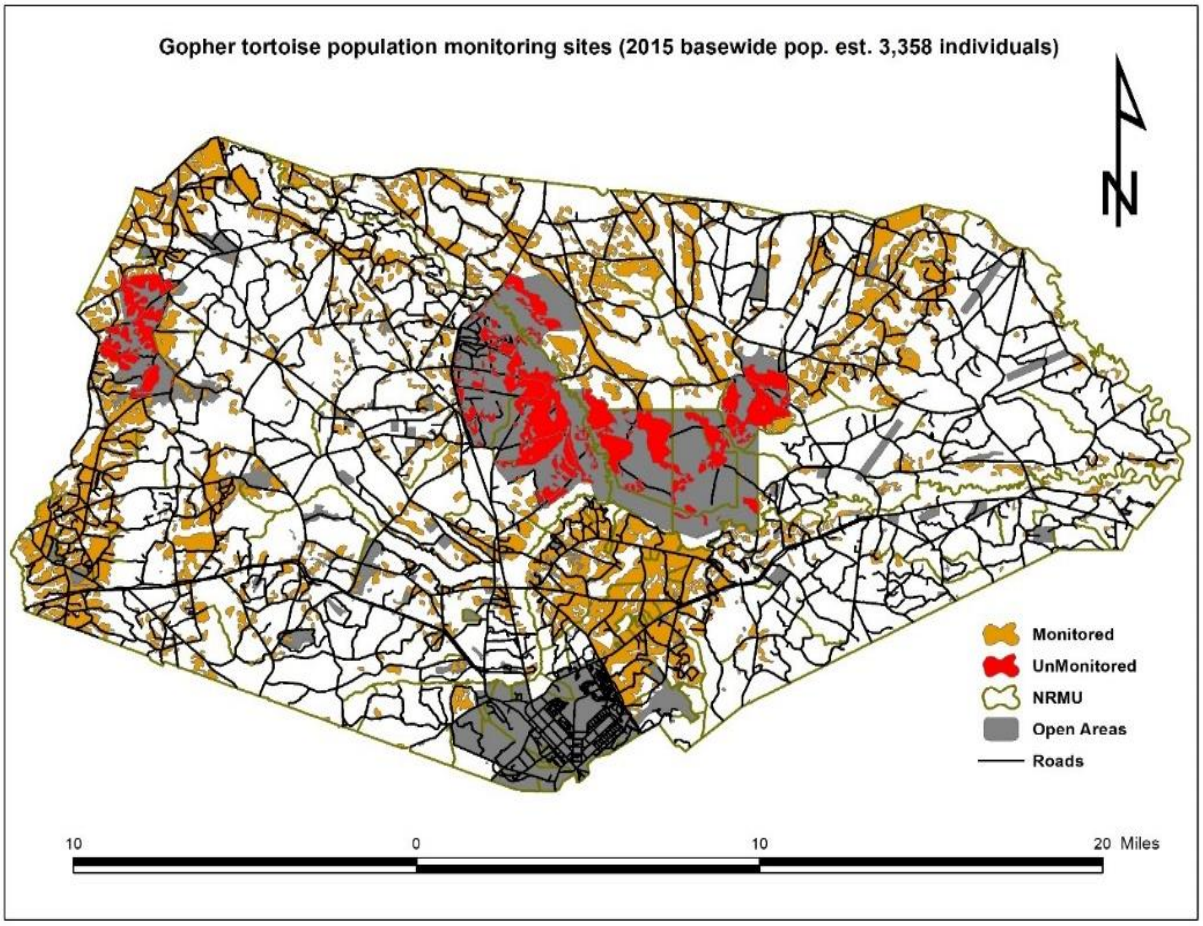

Figure 3.9-5 Gopher Tortoise Monitoring Sites, as of 2015

Frosted Flatwoods Salamander

Suitable habitat for this species is extensive and widespread on the installation and has been promoted through past and current management practices especially prescribed burning (Fort Stewart, 2001). A 100 foot buffer surrounds all breeding sites. Figure 3.9-6 provides locations of frosted flatwoods salamander sightings and HMUs as of 2020.

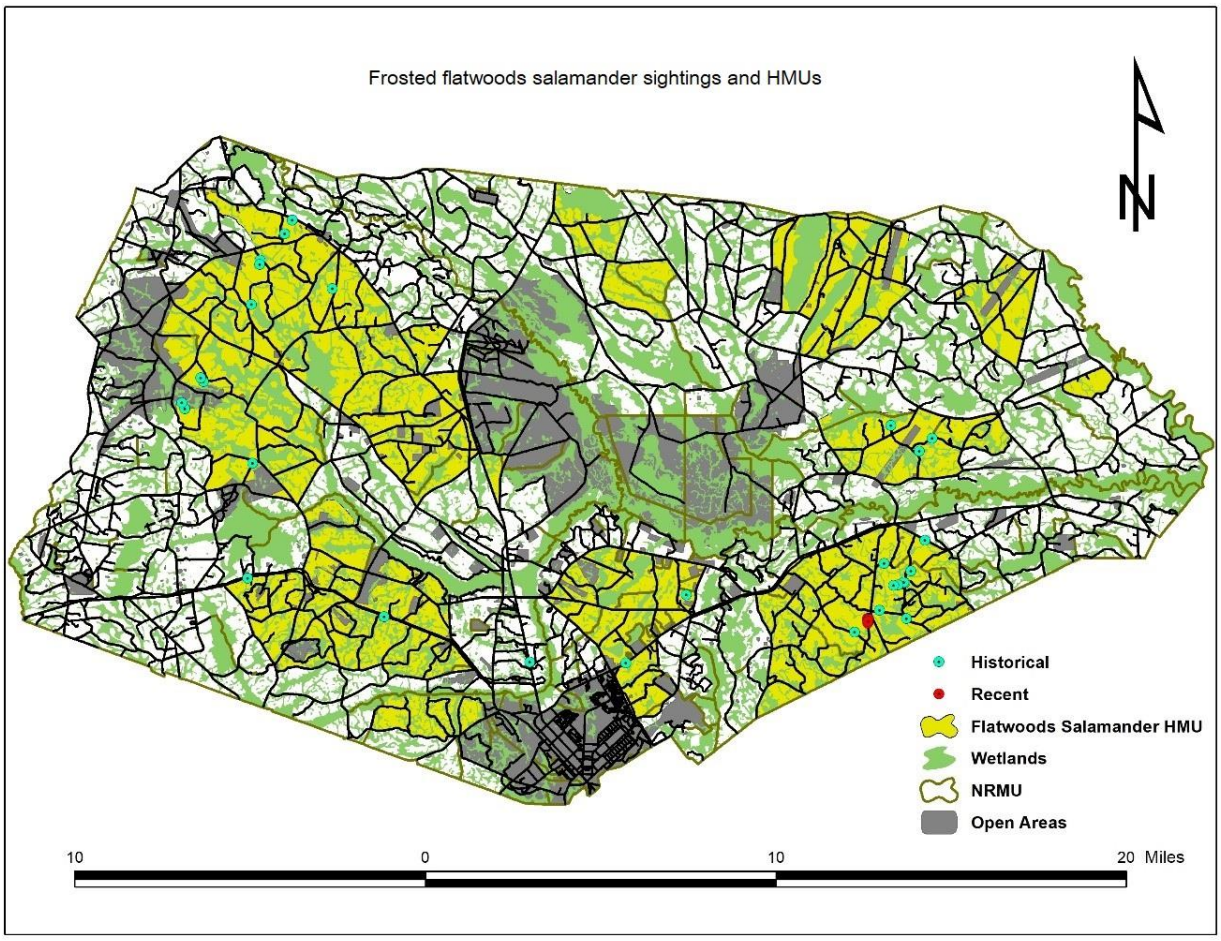

Figure 3.9-6 Frosted Flatwoods Salamander Sightings and HMUs as of 2020

Smooth coneflower

The smooth coneflower is a perennial herb measuring approximately 3.3 ft. tall with light purple petals. It is known to occur in the northwestern corner of the installation.

3.9.2.2 Environmental Consequences

The IDDS-A would not routinely use Hunter AAF; therefore, the Proposed Action would have negligible effects at Hunter AAF.

No construction of new facilities or ranges is expected at Fort Stewart and range usage is expected to rise by only 1.0%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species at

Fort Stewart. Therefore, impacts to biological resources are expected to be negligible and less than significant and are addressed in section 3.2.1.2

3.9.2.3 Cumulative Effects

Fielding of all eight planned systems listed in section 3.3 may require construction of facilities to support the M-SHORAD and may also require expansion or renovation of existing facilities. Fort Stewart has identified a potential location for the M-SHORAD facilities but funding is not available to execute the construction yet. There are expected to be less than significant impacts from the construction because the site is within the main cantonment area that does not host substantial flora, fauna, or protected species. An expected increase of soldiers of approximately 4.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. Adding up to 760 soldiers, 402 spouses, and 684 children at Fort Stewart is about 3.0% of the ROI population, a minor amount. Overall cumulative impacts to biological resources are similar to those described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

Fort Stewart is planning to construct a Convoy Live Fire Range/Entry Control Point (CLF/ECP) and Scout Recce Gunnery Complex (SRGC) in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.1.2. The IDDS-A system may use the SRGC. Use of the range could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements and use of SOPs and BMPs will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.9.3 Cultural Resources

3.9.3.1 Affected Environment

The ROI for Fort Stewart extends to the installation boundary.

3.9.3.1.1 Cultural Resources Present

<u>Archeological Resources</u>

Of the 279,270 acres on Fort Stewart, 220, 525 acres of training lands has been surveyed and 951 acres remain (Fort Stewart pers.com, 2020[64]). From this work, the Army developed a refined site prediction model that identified 59,219 acres, or 21% of the installation, as having a high

[64] Pers. Comm. Oct 2020.B. Greer, Archeologist, Ft. Stewart, GA

probability for the occurrence of archaeological resources. Approximately 225,548 acres, or 79% of the installation, have been identified as having low probabilities for the occurrence of archaeological resources (Fort Stewart, 2014).

Although archaeological sites that are ineligible for the NRHP do not require protection from an unauthorized excavation under the NHPA, *all* archaeological sites that are at least 100 years old and are of scientific value are prohibited from unauthorized disturbance under the ARPA. As such, Fort Stewart routinely monitors archaeological sites susceptible to vandalism and looting. Furthermore, Fort Stewart prohibits metal detection to recover artifacts without an ARPA permit. The ICRMP contains SOPs directing avoidance of marked historic sites. Also, cultural resources personnel review of construction, renovation, and repair plans that affect facilities and training exercises planned in areas with digging restrictions.

National Register of Historic Places eligibility of archaeological resources identified on Fort Stewart are summarized in Table 3.9-2. In order to protect them, in accordance with NHPA and ARPA, the location of these archaeological resources are not graphically depicted within this public document, although general information regarding their location and eligibility to the NRHP is provided. Cultural resource management personnel schedule surveys as needed. As a result of these surveys, Fort Stewart has identified 4,139 archaeological sites, as of 2020.[65]

Table 3.9-2 Archaeological Resource Eligibility on Fort Stewart

Eligibility Status	Number of Sites
Listed on NRHP	1
Eligible for NRHP Inclusion	74
Potentially Eligible for NRHP Inclusion	66
Indeterminate Eligibility for the NRHP inclusion (includes sites not fully delineated or pending final Phase I analysis)	89
Not Eligible for NHRP	3,909

Source: Fort Stewart 2010.

There are 103 range and impact areas totaling 25,856 acres on Fort Stewart, including pistol, rifle, machine gun, tank, anti-tank, aerial gunnery, and demolition ranges (Pirnie, 2006a). In addition to these official range footprints, 110,472 additional maneuver area acres have been identified as having an elevated potential for UXO. With this added acreage, there is an estimated total of 136,328 acres on Fort Stewart that are potentially UXO-contaminated.

In some cases, previously identified cultural resources have been recommended potentially eligible and were subsequently identified as containing UXO. Although these resources have

[65] Pers. Comm. Oct 2020.B. Greer, Archeologist, Ft. Stewart, GA

remained potentially eligible, it is anticipated that these sites will be re-evaluated for the NRHP on a case-by-case basis.

All lands that are neither cantonment nor range/impact areas are considered maneuver areas, which total approximately 250,000 acres on Fort Stewart (this count includes the 110,472 UXO-contaminated maneuver areas) and 2,600 acres on Hunter AAF (Pirnie, 2006b). Training activities in maneuver areas include artillery firing, demolition training, and tactical training exercises. The term "maneuver areas," for this document, also includes special-use areas, such as firing points and bivouac areas.

Cemeteries

When the military acquired FS-HAAF, it also took responsibility for cemeteries that had been previously established on the properties. The Army, subject to available resources, is dedicated to the preservation of the cemeteries on the military reservation. The ICRMP contains SOPs directing avoidance of cemeteries.

Sacred Sites

Native American resources are limited on Fort Stewart (relative to its size) and are associated with one confirmed burial site (the Lewis Mound) and two potential burial mounds. All three sites are eligible for the NRHP. Fort Stewart consults with the federally recognized Native American Tribes regarding effects to historic properties and ensures Tribal concerns are taken into account following the appropriate cultural resource laws (Fort Stewart, 2010). Furthermore, Fort Stewart recognizes the importance of access to sacred sites and has established procedures that integrate not only the military mission, but also the safety and well-being of the requestor, and the rights and privacies of the requesting tribes.

3.9.3.1.2 Consultation and Coordination with Governments

Fort Stewart Programmatic Agreement (PA)

Fort Stewart and the Georgia SHPO developed a PA in May 2011, and it expires in May 2021, but a follow-on agreement is expected. It provides Fort Stewart with a flexible tool to manage its cultural resources, allowing Fort Stewart to meet the requirements of the Cultural Resource Management review of undertakings with no effect or no adverse effect without waiting for the 30-day response from the SHPO. In short, the PA is the CRMP's regulatory backbone, guiding and streamlining the program's compliance with federal laws and regulations while providing a timely, effective method of managing Fort Stewart's cultural resources.

3.9.3.2 Environmental Consequences

The IDDS-A would not routinely use Hunter AAF; therefore, the Proposed Action would have negligible effects at Hunter AAF.

Impacts to cultural resources at Fort Stewart are described in section 3.2.2.2 and are expected to be negligible and less than significant. No new ranges or facilities would be constructed to support IDDS-A and range usage would increase by 1.0%, a negligible amount.

3.9.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the eight planned systems listed in section 3.3 would be similar to those described in section 3.2.2.2. They are expected to be minor and less than significant for the same reasons stated in section 3.9.2.3.

Fort Stewart is planning to construct a CLF/ECP and SRGC in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.2.2. The IDDS-A system may use the SRGC. Use of the range could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements to account for historic properties and use of SOPs and BMPs will reduce anticipated impacts. Impacts from the construction and use of the new ranges are expected to be at worst minor and less than significant when combined with the Action Alternative.

3.9.4 Soils

3.9.4.1 Affected Environment

In coastal Georgia, drainage from three physiographic provinces, the Blue Ridge Mountains, Piedmont Plateau, and Coastal Plain, affect the composition of alluvial deposits. Near FS-HAAF, the parent material for all soils is water-lain sediments deposited during and before the Pleistocene (Fort Stewart, 2001).

As a result of the mild climate, freezing and thawing cycles have little effect on soil weathering. Much of the rainfall percolates through the soil and moves dissolved and suspended materials downward. As a result, most soils on uplands are highly weathered, leached, strongly acid, and low in natural fertility and organic matter (Fort Stewart, 2001). Figure 3.9-7 provides a soil map for Fort Stewart.

Soil surveys have been completed for Fort Stewart by the USDA NRCS (then the Soil Conservation Service). Site-specific soil testing may be required for grounds maintenance or turf management, but a further classification of soil series is unnecessary (Fort Stewart, 2001).

Most soils on the installation are classified as sandy and infertile. At Fort Stewart, Ellabelle loamy sand, Ogeechee, Pelham, Stilson, Rutlege, Leefield, and Mascotte are common soil series. Many of these series are well suited to the production of forest trees and are unsuitable to cross-country movements of heavy equipment during wet periods (Fort Stewart, 2001).

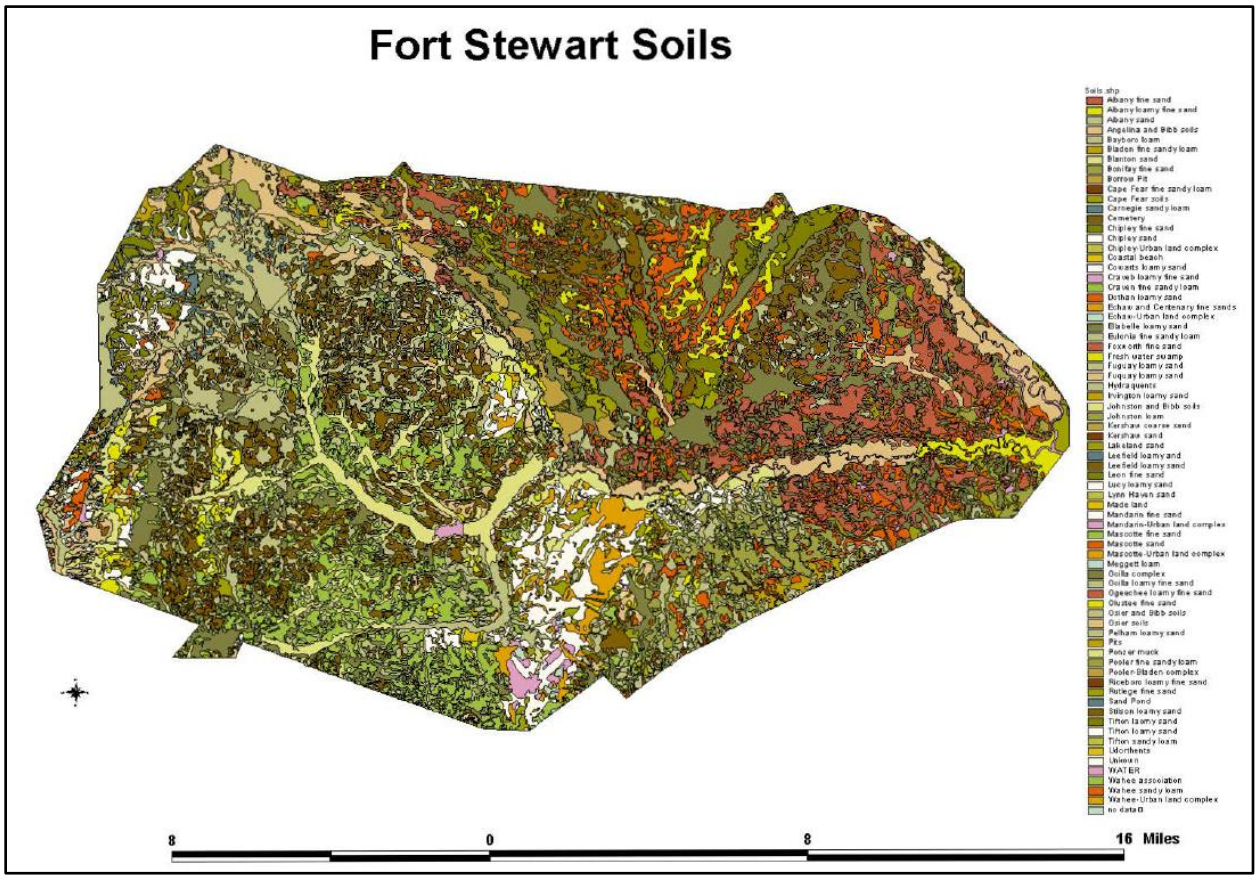

Figure 3.9-7 Fort Stewart Soil Map

3.9.4.2 Environmental Consequences

The IDDS-A would not routinely use Hunter AAF; therefore, the Proposed Action would have negligible effects at Hunter AAF.

Fort Stewart does not plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 1.0%, which is negligible. Impacts to soils are adequately addressed in section 3.2.3.2 and are expected to be negligible and less than significant.

3.9.4.3 Cumulative Effects

Fielding of the eight planned systems listed in section 3.3, along with the Proposed Action, may require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. Fort Stewart has identified a potential location for the M-SHORAD facilities but funding is not available to execute the construction yet. Impacts from construction are expected to be less than significant because appropriate measures would be taken to protect soil resources. An expected increase of soldiers of approximately 4.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be minor and less than significant. The impacts are similar to those described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative effects to soils.

Fort Stewart is planning to construct a CLF/ECP and SRGC in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.3.2. The IDDS-A system may use the SRGC. Use of the range could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements, the use of SOPs and BMPs, and routine range assessment and maintenance will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.9.5 Land Use and Compatibility

3.9.5.1 Affected Environment

3.9.5.1.1 Cantonment

The Fort Stewart cantonment area is a single complex in the south-central portion of Fort Stewart next to the city of Hinesville and consists of the administrative, operational, and residential portions of Fort Stewart. The cantonment area encompasses about 8,465 acres and comprises the majority of development on Fort Stewart, including buildings, roads, parking, and adjacent open spaces for administrative functions, community activities, housing, barracks, installation support services, and Wright AAF (Figure 3.9-8) (Fort Stewart, 2010).

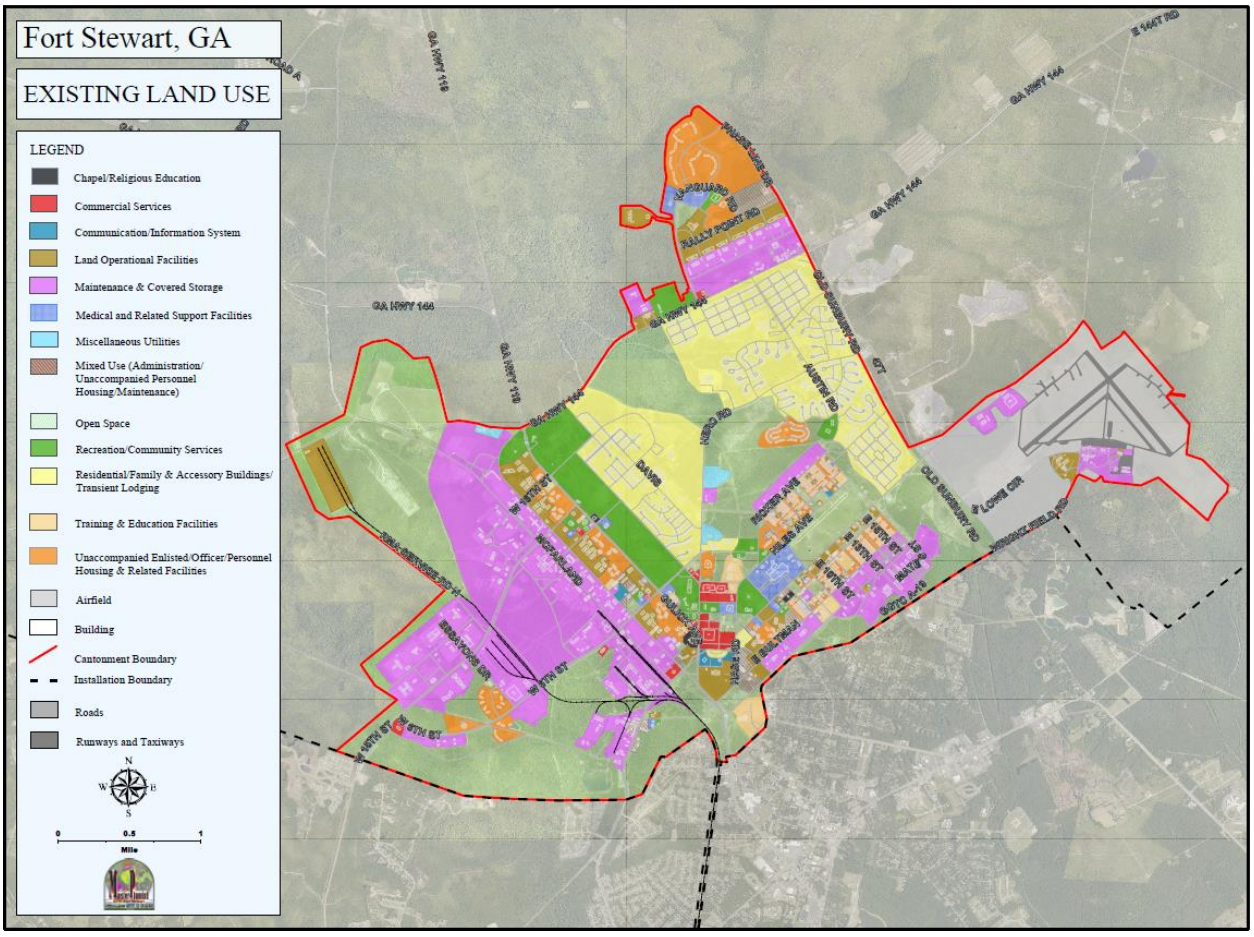

Figure 3.9-8 Fort Stewart Cantonment Area

Recreation

Recreational resources include areas for swimming, boating, hiking, hunting, and fishing. Fort Stewart has allowed the public access to installation lands for hunting and fishing since 1959. In general, any hunting or fishing area not closed for military use is open to the public with appropriate permits and restrictions. Access is denied to specific areas when safety or security concerns exist, prescribed burning is underway, or natural resources do not support such usage. As of 2010, about 1,500 to 2,000 people had permits to hunt at Fort Stewart, and they make 40,000 to 50,000 hunting trips annually (Fort Stewart, 2010). About 3,000 to 4,000 people held a fishing permit, and they make 60,000 to 80,000 fishing trips annually. Existing fishing facilities include piers, docks, and boat ramps on installation ponds and waterways. A limited number of landing sites provide access to the Canoochee and Ogeechee Rivers.

White-tailed deer, feral hogs, and wild turkeys are prominent game species on Fort Stewart, and largemouth bass and redbreast sunfish are popular species for anglers. Additional outdoor recreation activities include wildlife observation, camping, shooting sports (including archery

and skeet), volleyball, horseshoes, and playgrounds, which are in the Holbrook Pond Recreational Area.

3.9.5.1.2 Range Complex

Fort Stewart's range and training land infrastructure supports Abrams Tank, Bradley Fighting Vehicle, Aerial Gunnery, Artillery, and other live-fire training, maneuver training, and individual team and collective tasks (Figure 3.9-9). Range Support Operations estimates about 200,000 soldiers annually use the range facilities at Fort Stewart for mounted and dismounted individual weapons and crew qualifications. This number includes Company/Team through Brigade Combat Team maneuver exercises.

Heavy training activities occur in maneuver lands in the western portion of Fort Stewart, and light infantry training occurs in the eastern portion. The *heavy* designation refers to armor and mechanized infantry forces or to areas where maneuvers are unrestricted consisting of all types of vehicles and equipment, including tracked vehicles. *Light* refers to light infantry forces or to areas where maneuvers may be restricted to only small units or units having only wheeled vehicles.

Small-arms ranges are concentrated in the southwestern Delta training area of Fort Stewart. Dismounted infantry training occurs south of Highway 144, primarily in the southeastern Alpha training areas. Training on established maneuver areas simulates battlefield conditions. Large-scale maneuver training events build on all the individual skills that soldiers possess and test each rank of the BCT command. Both active-duty and reserve soldiers train at Fort Stewart. Currently, live-fire and maneuver training can occur simultaneously in separate areas of Fort Stewart. Existing Fort Stewart ranges, maneuver areas, and facilities will support mission-essential training requirements and not tax existing training resources. However, the frequency and type of training may need to be changed as the Army works to meet current and future national security needs. Although mission-essential training requirements are identified in Army doctrines, some training is based on a commander's intent, discretionary need, and the availability of training resources.

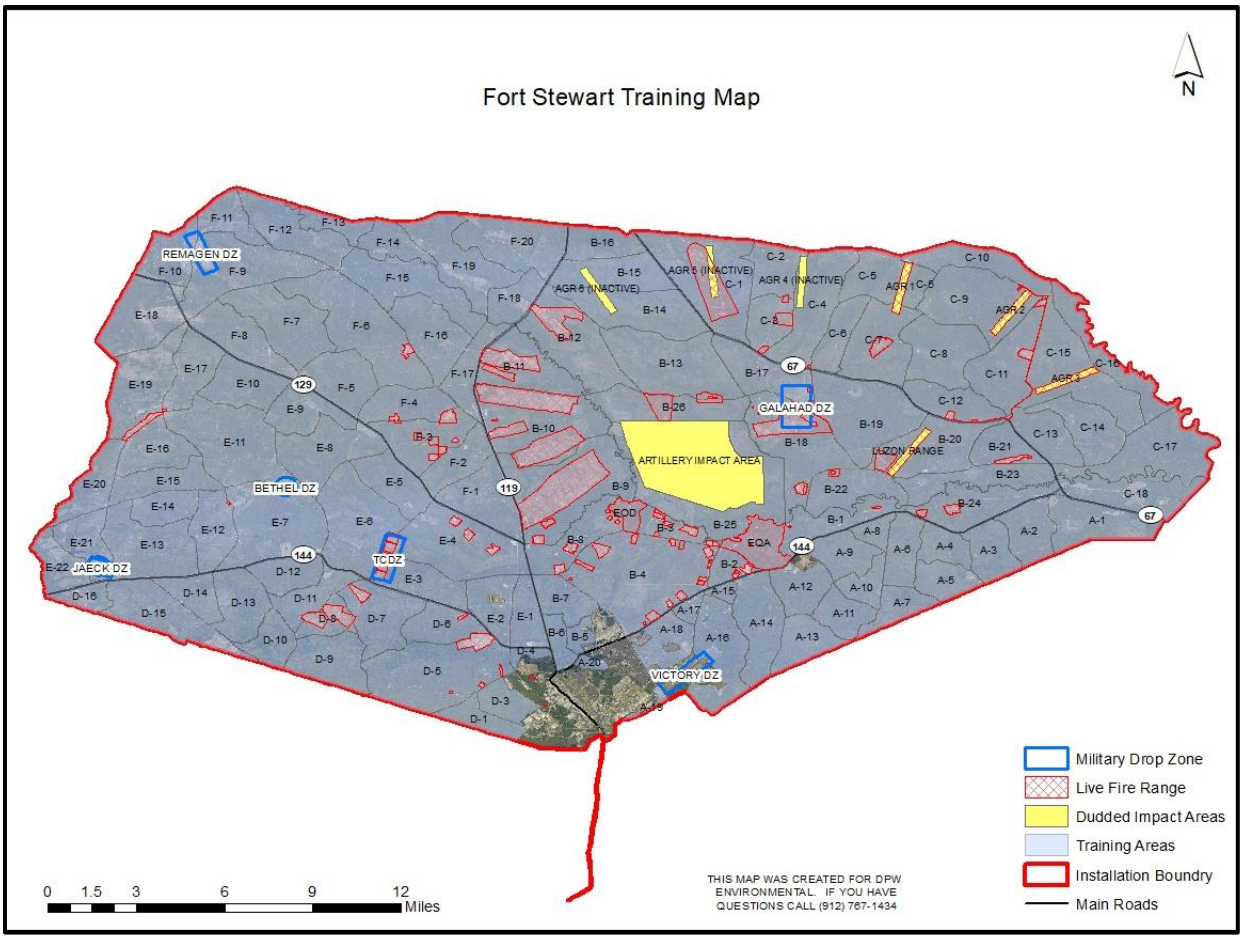

Figure 3.9-9 Range and Training Lands on Fort Stewart

3.9.5.2 Environmental Consequences

The IDDS-A would not routinely use Hunter AAF; therefore, the Proposed Action would have negligible effects at Hunter AAF.

Since Fort Stewart does not plan on constructing ranges or facilities to support IDDS-A no impacts to Land Use and Compatibility from construction are expected. The increase in range usage is predicted to be 1.0%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.4.2.

3.9.5.3 Cumulative Effects

Fielding of the eight planned systems listed in section 3.3, along with the Action Alternative, may require construction of facilities to support the M-SHORAD battalion and may also require expansion or renovation of existing facilities. Fort Stewart has identified a potential location for the M-SHORAD which does not change the land use, resulting in less than significant impacts from the construction. Other systems would field to existing units or replace existing equipment one-for-

one. An expected soldier population increase of approximately 4.6% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The effects of the additional actions are as described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in minor, less than significant cumulative effects to Land Use and Compatibility.

Fort Stewart is planning to construct a CLF/ECP and SRGC in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.4.2. The IDDS-A system may use the SRGC. Use of the range could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers at that location. The new ranges will be constructed within the existing range complex, maintaining current land uses and away from incompatible uses. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.9.6 Facilities

3.9.6.1 Affected Environment

The garrison area or cantonment, also addressed briefly in Land Use and Compatibility, contains the heaviest concentration of facilities and mission support activities on Fort Stewart. Support services in the cantonment include administration, maintenance, service, storage and supply buildings, housing, medical, and community facilities.

Army facilities are built to meet the standards of the uniform facilities criteria using standard designs of MILCON requirements, standardization, and integration or similar documents. Exceptions to the standard are available, and if granted for a facility, it would be considered adequate.

3.9.6.2 Environmental Consequences

The IDDS-A would not routinely use Hunter AAF; therefore, the Proposed Action would have negligible effects at Hunter AAF.

The excess or deficit of facilities available to support the IDDS-A at Fort Stewart were assessed based on the Army RPLANS records. Fort Stewart has a deficit of required facility space to support the IDDS-A battery HQ, TEMF, and hazardous material storage as shown in Table 3.9-3.

Table 3.9-3 Facilities that may require construction at Fort Stewart

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**Ft Stewart available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(257,631)	N	N
TEMF	1	28,304	0.6	(36,623)	N	N
Hazardous Mat'l Storage*	1	60	0.0	(6,414)	N	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.						

Fort Stewart would use existing facilities initially to house and train the IDDS-A. Fort Stewart has a future stationing capacity build-out plan should new construction funding become available for any of these garrison support facilities. This plan includes many potential build-out areas that could be used to construct any IDDS-A garrison facilities. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Fort Stewart shows a deficit of one range type in the ARRM. There exists a non-standard range that can support IDDS-A training. The specific range type is not listed as an operational security measure. Since Fort Stewart does not plan on constructing ranges or facilities to support IDDS-A impacts to facilities from construction are not expected. The increase in range usage is predicted to be 1.0%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.5.2.

3.9.6.3 Cumulative Effects

Fielding of the eight planned systems, when combined with the Action Alternative, is expected to have minor, less than significant cumulative effects with minor or negligible increases of the impacts similar to those described in section 3.2.5.2. Additional facility requirements of the M-SHORAD have been accounted for in other analysis and are expected to be less than significant. Other systems would field to existing units or replace equipment one-for-one and are not expected to require additional facilities, but may require refurbishment or expansion of existing facilities resulting in minor, less than significant impacts.

Fort Stewart is planning to construct a CLF/ECP and SRGC in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.5.2. The IDDS-A system may use the SRGC. Use of the range could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the

vicinity. Impacts are expected to be no greater than minor and less than significant when combined with the Action Alternative. The new ranges will distribute training across a greater number of ranges and reduce the use of any single range. Also, the Army performs routine monitoring of range conditions and implements maintenance and rehabilitation when required.

3.9.7 Water Resources

3.9.7.1 Affected Environment

Aquatic resources at Fort Stewart include natural cypress bogs, evergreen bays, streams and rivers, and their associated bottomland hardwood swamps. Some manmade facilities were present before military occupation, including millponds and rice fields. Existing aquatic resources are discussed as surface water bodies, groundwater, surface water quality, and wetlands and floodplains.

Four watersheds occur within Fort Stewart's boundaries: the Altamaha, Canoochee, Lower Ogeechee, and Ogeechee Coastal watersheds. Most of Fort Stewart is in the Canoochee River watershed, which is also the site of most of the ranges. The Canoochee River traverses from the northwest corner to the eastern side (Figure 3.9-10) with about 30 miles inside Fort Stewart. The Canoochee River originates in Emanuel County, Georgia, about 60 miles northwest of Fort Stewart (Fort Stewart, 2001).

3.9.7.1.1 Surface Water

Within the greater Fort Stewart watershed, surface water resources are diverse and include over 265 miles of freshwater rivers, streams, and creeks, numerous ponds and lakes, and over 12 miles of brackish streams (Fort Stewart, 2010). Although Fort Stewart occupies parts of four separate watersheds, the majority of the installation lies within the Canoochee and Ogeechee coastal watersheds (Figure 3.9-10). The Canoochee River crosses the installation from its northwest corner to its eastern side. The Ogeechee River forms the eastern boundary of the installation and discharges into the ocean. In addition, the southeast boundary of Fort Stewart drains into Goshen Swamp, which ultimately discharges into Peacock Creek, a 303(d) impaired water body designated by the GA DNR as impaired due to high levels of fecal coliform and low levels of dissolved oxygen. As there are navigable waters and streams present, additional specific requirements would apply to timber harvest and construction if locations in the area are selected.

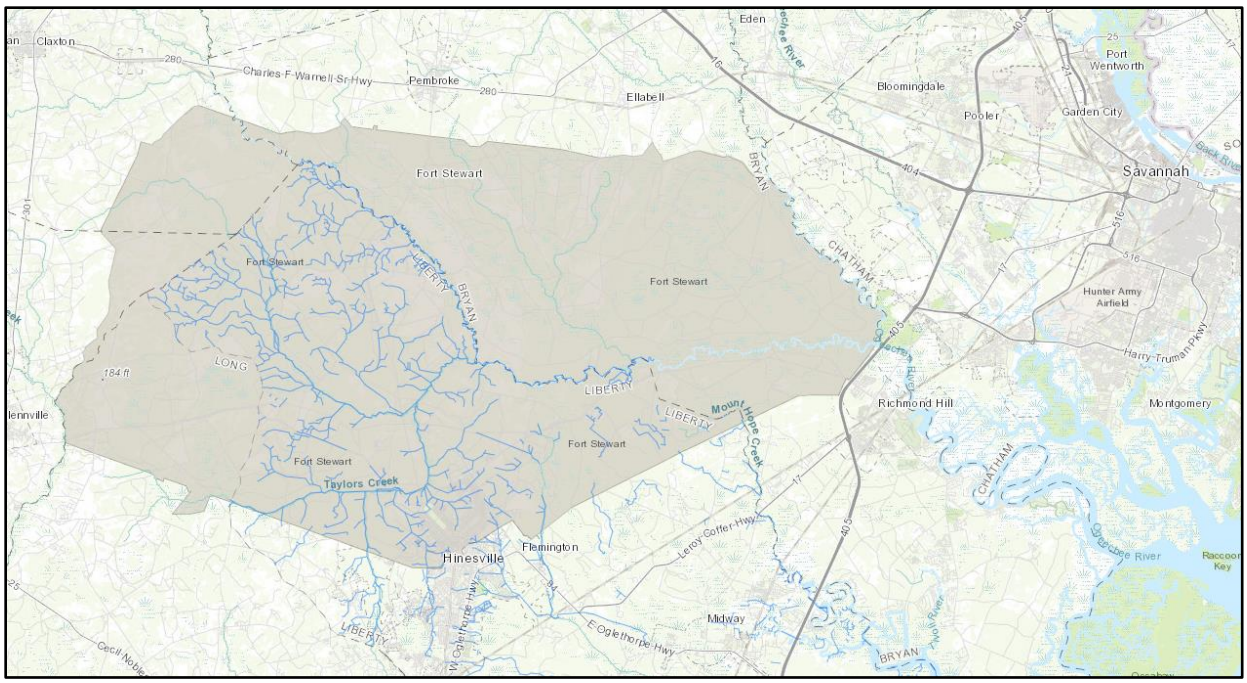

Figure 3.9-10 Surface Water Bodies on Fort Stewart

The Ogeechee River also originates in the Coastal Plain, about 130 miles north-northwest of Fort Stewart in Hancock County, Georgia. The Ogeechee drains the extreme northeastern portion of Fort Stewart. The Ogeechee joins the Canoochee at the eastern boundary of Fort Stewart. From its confluence with the Canoochee, the Ogeechee flows into the Atlantic Ocean, about 30 river miles away. Two additional watersheds drain to the Ogeechee River: the Lower Ogeechee River and Coastal Ogeechee watersheds. The Coastal Ogeechee watershed has two sub-watersheds: the Midway River and North Newport River.

While the Ogeechee generally carries a high silt load, the Canoochee River does not carry a heavy silt load, and has not developed large natural levees. The floodplain is generally narrow with little migration of the stream channel. Organic matter content is generally high in the Canoochee River (Fort Stewart, 2010). Both the Ogeechee River and the Canoochee River are blackwater streams, which are acidic with low nutrient concentrations and low buffer capacity; the high quantity of dissolved organic carbon results in a dark color.

A small portion of Fort Stewart, along the extreme western boundary, is within the Altamaha River watershed. Beards Creek and Slades Branch are part of this drainage. A portion of the southeastern border of Fort Stewart drains southward to the Jerico River and the North Newport River. Streams in this drainage include Raccoon Branch, Mouat Hope Creek, and numerous unnamed tributaries (TNC, 1995). A small section of the Little Creek and Black Creek watershed occurs in the northeast section of Fort Stewart. Little Creek flows into Black Creek, which flows

into the Ogeechee River north of Fort Stewart. Mill Creek drains the western portion of the cantonment area, flowing toward Taylors Creek. Mill Creek originates in a blackwater swamp known as Terrils Mill pond and receives stormwater runoff from the city of Hinesville before flowing onto the western portion of the cantonment area. The eastern portion of the cantonment area, including Wright AAF, drains to Goshen Swamp, which drains to Peacock Creek. A small portion in the southeastern cantonment area, containing the soldiers residential family housing and Georgia National Guard Training Center, drains to Melvin Swamp, which joins Goshen Swamp to form Peacock Creek near the unincorporated town of McIntosh.

The central cantonment area and the Liberty Woods development (along the northeastern edge of the cantonment area) drain toward Taylors Creek. Taylors Creek flows to Canoochee Creek and then to Canoochee River, generally flowing in an easterly direction through the center of Fort Stewart. The Canoochee River joins the Ogeechee River at the city of Richmond Hill. The Ogeechee River flows southward and forms the eastern boundary of Fort Stewart.

3.9.7.1.2 Groundwater

The Fort Stewart region has three distinct aquifer systems: the Floridan, Brunswick, and surficial (near surface) (Figure 3.9-11). The Floridan aquifer system is a deep sequence of limestone and is located 40- to 900-feet-below the surface. It comprises two distinct layers: the Upper Floridan and the Lower Floridan (Fort Stewart, 2010).

The principal artesian aquifer (Floridan) is a deep sequence of limestones of Eocene to Oligocene age, the primary source of large ground water withdrawals in the coastal area. This aquifer is generally 300 to 500-feet-below the surface and is comprised of two distinct layers. The upper layer is derived from the Oligocene Series of sandy, phosphatic limestone and is not generally used as a water source. It is underlain by the Ocala Limestone of Eocene age (Thomas and et al., 1996; Fort Stewart, 2001).

The principal artesian aquifer is overlaid by two shallow aquifer systems. A 120 to 150m-thick series of Miocene clays, sandy clays, and gravel lies directly above the principal artesian aquifer. Several industries in the coastal area have wells with yields greater than 200 gallons per minute from this aquifer. It is recharged largely by percolation from the surface aquifer, as well as some discharge from the principal artesian aquifer (Fort Stewart, 2001).

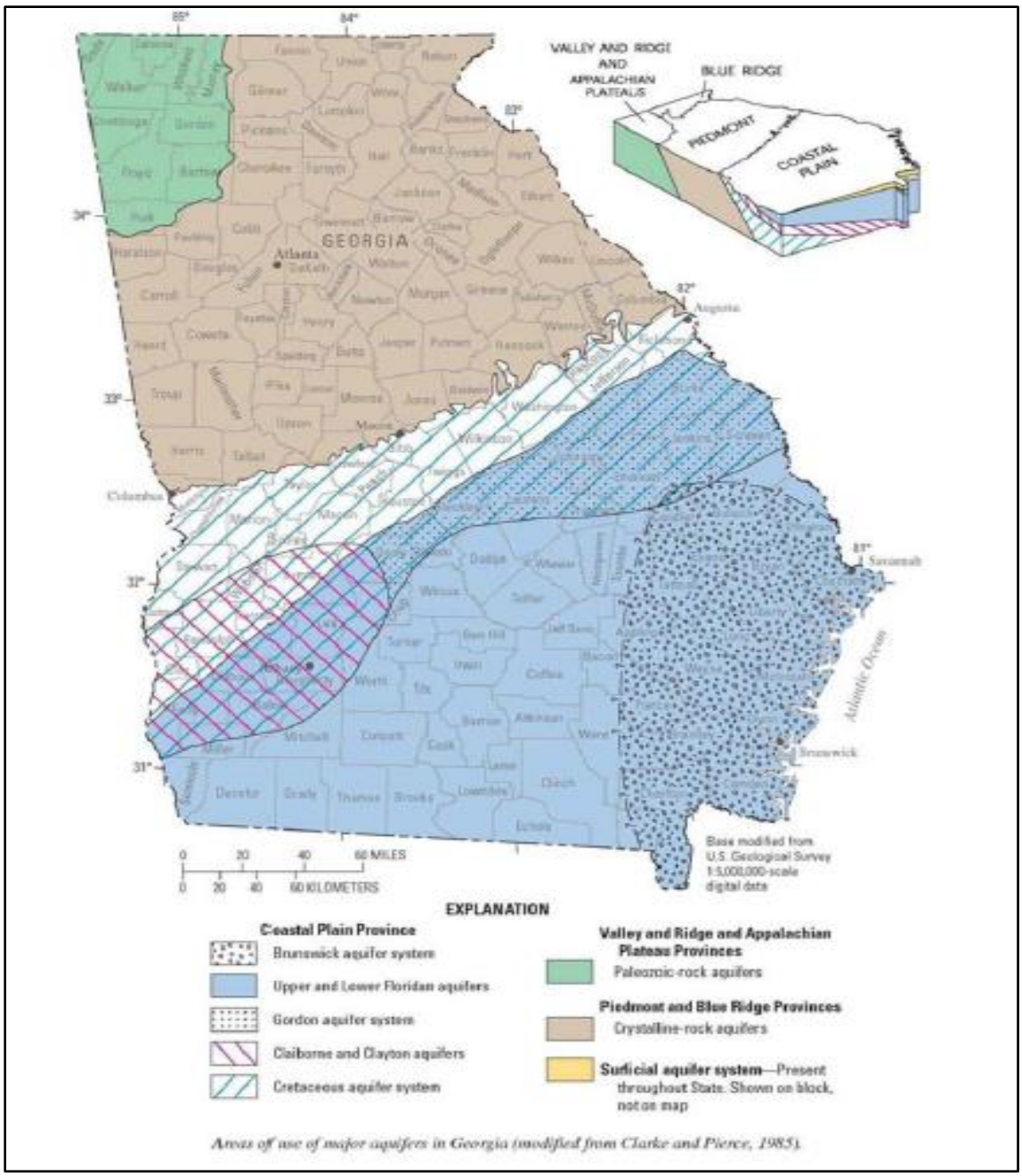

Figure 3.9-11 Georgia Aquifer Systems

The surface aquifer is composed of a relatively thin layer of sands, gravels, and clays, extending to a depth of approximately 25ms near the coast. The surface aquifer is recharged directly from rainfall percolating through sediments. During dry months the base flow of streams and rivers of the coastal area is maintained by discharge from the surface aquifer. Water quality varies from very low total dissolved solids to slightly alkaline, moderately hard water. The two shallow aquifer

systems are used almost exclusively for domestic water, but primarily as a secondary water supply rather than for drinking water (Fort Stewart, 2001).

3.9.7.1.3 Water Quality

Existing impairments to surface water quality include both point sources and nonpoint sources. The most common point sources are municipal or industrial activities and wastewater treatment plants. The NPDES permit, required under the Georgia Water Quality Assessment program and Georgia Erosion and Sediment Control Act, regulates the discharge of point source pollutants from industrial activities and construction projects within both the cantonment and training areas.

Nonpoint sources in the region include stormwater runoff from urban areas, agricultural, construction, and range training activities, golf course irrigation, and forest timber harvesting. The Georgia NPDES MS4 Permit regulates the nonpoint source discharges.

Off-post agricultural activity in the Ogeechee River watershed affects water quality by increasing the input of nutrients and pesticides, increasing soil erosion, and increasing channelization of off-Post tributaries to drain wetlands.

The GA DNR-Environmental Protection Division (EPD) has listed oxygen depletion as a problem in water bodies of the Ogeechee River watershed. Historically, the largest threat to maintaining adequate oxygen levels to support aquatic life has come from the discharge of oxygen-demanding wastes from wastewater treatment plants. According to state standards, a stream is considered impaired when the dissolved oxygen level falls below 4 milligrams per liter (mg/L).

Water quality in the main stem of the Canoochee River is affected by urban runoff and nonpoint source pollution. A fish consumption advisory exists in the two segments of the Canoochee River and in the Ogeechee River, where mercury concentrations in the fish tissue exceed the public health standards of 0.3 mg/kg. The EPD lists a segment of Taylors Creek and Canoochee Creek as impaired for low dissolved oxygen, attributed to the discharge from the Hinesville/Fort Stewart Waste Water Treatment Plant (WWTP), a municipal facility. In addition, a tributary to Taylors Creek is also impaired for high levels of fecal coliform. Nonpoint sources of erosion and sediment from Fort Stewart activities in training areas, roadside ditches, construction activities, steam pit sump pumps, and nutrient loads from the golf course and residential landscapes are possible causes of the low dissolved oxygen impairment of Canoochee Creek and Canoochee River. Minimization measures for these potential effects include proper stream bank stabilization for prevention of erosion and/or scouring of banks, and implementation of appropriate low impact development BMPs in the USACE Public Works Technical Bulletin (200-1-62 October 2008).

Peacock Creek and its tributaries are identified as impaired because they exceed fecal coliform standards and have low dissolved oxygen concentrations. Off-site activities that could contribute

to exceeding the limits include septic systems, sanitary sewer overflows, rural nonpoint sources, and animal wastes. Contributing on-site activities include urban nonpoint sources, such as construction, roadside ditches, nutrient loads from residential landscapes, Georgia ARNG Training Center-Central Vehicle Wash Facility, and animal wastes.

Three of the Ogeechee River's permitted discharges are on Fort Stewart. Within Fort Stewart boundaries, a municipal discharge plant on Taylors Creek (run by the city of Hinesville) serves both the city and Fort Stewart. Several off-site facilities, such as farming and commercial food stock industries, are upstream of Fort Stewart and may influence water quality at Fort Stewart. The low dissolved oxygen level of blackwater streams makes them particularly vulnerable to these discharges (Fort Stewart, 2010).

Most of the cantonment area on Fort Stewart—including administrative buildings, impervious parking lots, railroad, regulated industrial activities (such as washracks, central vehicle wash facility, motorpools, industrial WWTP, and the Central Energy Plant)—–drain to Mill Creek, which then drains to Taylors Creek, and ultimately discharges into a tributary of Canoochee Creek. The majority of runoff from the city of Hinesville enters Fort Stewart and drains to Mill Creek. An increase in sediment loads, higher stream velocities, overbank flooding, and turbidity occurs in Mill Creek, especially during heavy storm events. Fort Stewart also actively works to minimize impacts to impaired streams from the construction, operation, and maintenance of its ranges. For example, the installation recently installed a rock check dam system for Tank Trail 144, upstream of Taylors Creek, one of our listed impaired streams. The Fort Stewart Stormwater Maintenance SOP of 2005 and the EPA's own "Guidelines for Dirt Road Installation and Turnouts" are also utilized in range areas, in addition to dirt roads and forestry trails.

The Hinesville/Fort Stewart WWTP, existing small arms ranges, training roads, industrial activities north of Georgia Highway 144 East, residential areas, soldiers barracks, administrative buildings, parking lots, and the Taylors Creek Golf Course drain north to Taylors Creek, which then drains to a tributary of Canoochee Creek. The Georgia ARNG Training Center, Evans AAF, WWTP and land application system (LAS), and Wright AAF and LAS drain south to Goshen Swamp and Melvin Swamp, which drains to Peacock Creek in Liberty County, ultimately to the Ogeechee River (Fort Stewart, 2010).

Stormwater runoff can be a major source of pollutants to receiving water bodies. The Canoochee or the Ogeechee River captures most surface water runoff at Fort Stewart; however, along the southeastern border of Fort Stewart, surface water runoff flows southward along a number of tributaries into the Jerico River and the North Newport River.

The amount of impervious surfaces in an area—such as rooftops, driveways, sidewalks, paved roads, and parking lots—impacts stormwater runoff because impervious surfaces collect pollutants that can rapidly wash into streams when it rains. The installation's stormwater

collection system is mainly open water ditches or channels. Developed portions of the cantonment area drain by engineered stormwater collection systems consisting of storm sewer pipes, catch basins and inlets, and concrete culverts that eventually discharge to maintained grass drainage ditches/swales and trapezoid-shaped drainage channels. These structural features are primarily found in areas with impervious surfaces and development. In the less-developed areas of Fort Stewart, stormwater drainage is primarily overland flow following the topography of the land (Versar 2003). The extensive stormwater drainage system at the Fort Stewart cantonment allows for infiltration and some treatment in retention and/or detention basins to meet regulatory requirements for post-construction runoff.

Fort Stewart only utilizes sedimentation ponds and basins during the construction phase of a project. The existing retention ponds and detention basins on the installation are post construction measures (structural BMPs), meant to ensure NPDES permitting for runoff reduction, water quality, and total suspended solids removal of 80% are being met, as required.

Fort Stewart adheres to the requirements of the MS4 NPDES Permit requirements, the Georgia Stormwater Management Manual/Coastal Stormwater Supplement, the EISA-Section 438, and all applicable EOs for all projects within the cantonment or range areas.

Because Fort Stewart is flat and the surficial (near the surface) water table is high, some portions of the collection system have groundwater infiltration; in other areas, standing water collects in the ditches and the water temperature is very high on warm days. Because dissolved oxygen is low in waters with high temperature, much of the water that discharges from the slow-moving ditches to receiving water bodies is low in dissolved oxygen and may be a source of low dissolved oxygen for nearby water bodies such as Taylors and Canoochee Creeks (Fort Stewart, 2010).

3.9.7.1.4 Wetlands and Floodplains

Fort Stewart contains approximately 85,796 acres of wetlands (Fort Stewart geographic information system database). Palustrine wetlands comprise 77.3% of the total, while forested wetlands comprise 68.8% of the Palustrine system (DEH, 1993; Fort Stewart, 2001).

Given the prevalence of wetlands on the installation, Fort Stewart has made avoidance and minimization of wetlands impacts a top priority and wetlands are one of the primary factors to be considered when siting a new project. In this manner, much of the avoidance and minimization of wetlands impacts takes place before actual site selection actually occurs. Streamside management zone buffers have been established and the distance increases with increasing ground slope.

Floodplains adjacent to the Ogeechee River, Canoochee River, and the lower reaches of Canoochee Creek, Taylors Creek, and Savage Creek may be inundated for eight months or more annually (Figure 3.9-12).

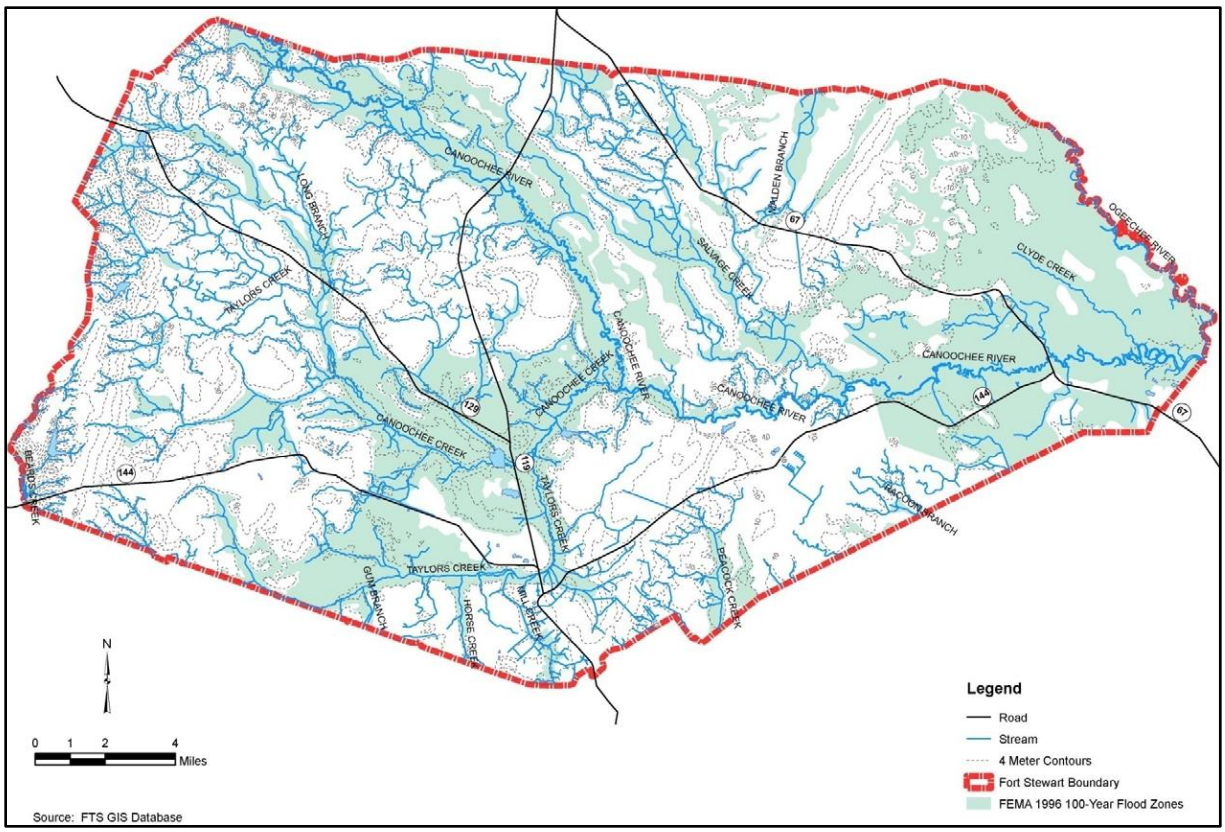

Figure 3.9-12 Fort Stewart Flood Zone Map[66]

The FEMA maps flood-prone areas and lands, to include those lying within the 100-year floodplain in Fort Stewart. There are approximately 120,000 acres of 100-year floodplain on Fort Stewart and approximately 90,000 acres of wetlands, based on the NWI, a map-based planning tool first initiated by the USFWS in 1974.

3.9.7.2 Environmental Consequences

No construction of new facilities or ranges is expected at Fort Stewart and range usage is expected to rise by only 1.0%, which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. Therefore impacts to all water resources are expected to be negligible and less than significant and are addressed in section 3.2.6.2

[66] Source: http://hinesville-gis.maps.arcgis.com/apps/webappviewer/index.html?id=7488f097dbd2462f8e707c1bd86fd13b. Accessed on March 26, 2020.

3.9.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the eight planned systems is expected to have minor, less than significant cumulative effects to all water resources. The impacts are as described in section 3.2.6.2. All the new systems except the M-SHORAD would be fielded to existing units with no additional facility requirements anticipated. The M-SHORAD impacts are also expected to be less than significant with a potential construction site having less than significant effects identified. The anticipated population increases of all eight systems and IDDS-A are minor, 4.6% for soldiers on Fort Stewart and including all family members is 3.0% within the ROI resulting in minor impacts to waters, water use, and potential water quality degradation.

Fort Stewart is planning to construct a CLF/ECP and SRGC in the future. These projects are not yet funded. Impacts from construction would be like those described in Section 3.2.6.2. The IDDS-A system may use the SRGC. Use of the range could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Routine range assessment and maintenance will ensure undesirable chemicals and compounds are not migrating to water resources. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.10 JOINT BASE LEWIS-MCCHORD, WASHINGTON[67]

3.10.1 Background

Joint Base Lewis-McChord (JBLM) consists of the former Fort Lewis and McChord AFB located near Tacoma, and Yakima Training Center (YTC) which is approximately 170 miles east. The installation was formed in 2010, when Fort Lewis, Yakima Training Center, and McChord Air Force Base were placed under joint basing. The three combined installations of JBLM encompass approximately 418,902 acres (169,526-hectare [ha]) of land. The geographic relationship between the Fort Lewis/McChord AFB portion of JBLM and YTC is shown in Figure 3.10-1. Although the names of Fort Lewis, McChord AFB, and Yakima Training Center have officially changed to JBLM – Lewis, JBLM – McChord and JBLM – YTC respectively, references to Fort Lewis, McChord AFB, and Yakima Training Center or YTC may be seen in this document.

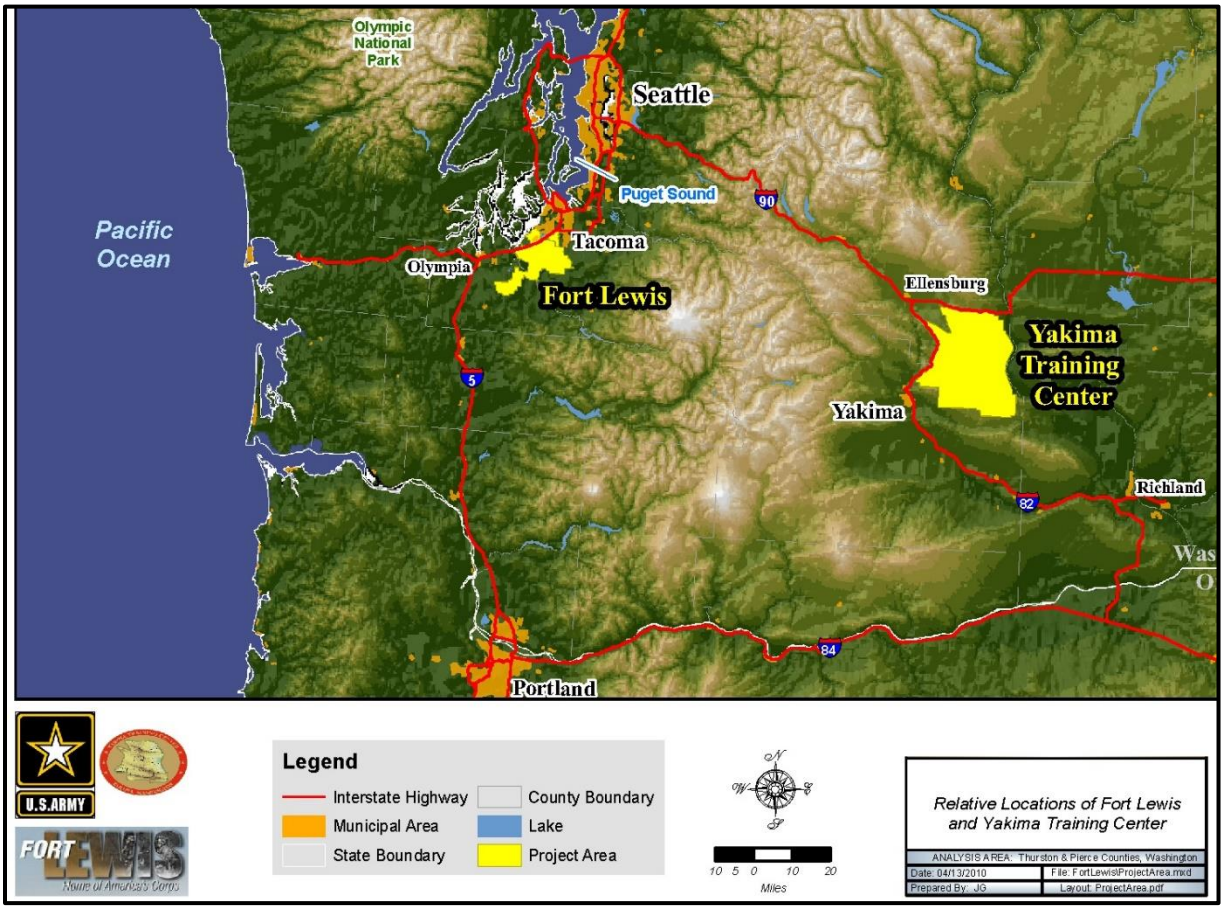

Figure 3.10-1 JBLM Installations Geographic Relationship

[67] Unless otherwise noted the source of information for the affected environment at JBLM is the *Final Environmental Impact Statement for the Fort Lewis Army Growth and Force Structure Realignment*, July 2010.

JBLM – Lewis (Figure 3.10-2) is the former Fort Lewis portion and is an 86,176-acre (34,874-ha) military reservation located in western Washington, in Pierce and Thurston Counties, approximately 35 miles (56 km) south of Seattle and 7 miles (10 km) northeast of Olympia. Interstate 5, which is the main transportation corridor in the Puget Sound region, runs through the installation. JBLM – Lewis is bordered on the north by JBLM – McChord, municipalities, and urban unincorporated areas in Pierce County; on the east and south by urban unincorporated and rural unincorporated areas in Pierce County, and several small communities, such as Roy; and on the west by Puget Sound, the Nisqually National Wildlife Refuge, the Nisqually Indian Reservation, and the Lacey and Yelm Urban Growth Areas.

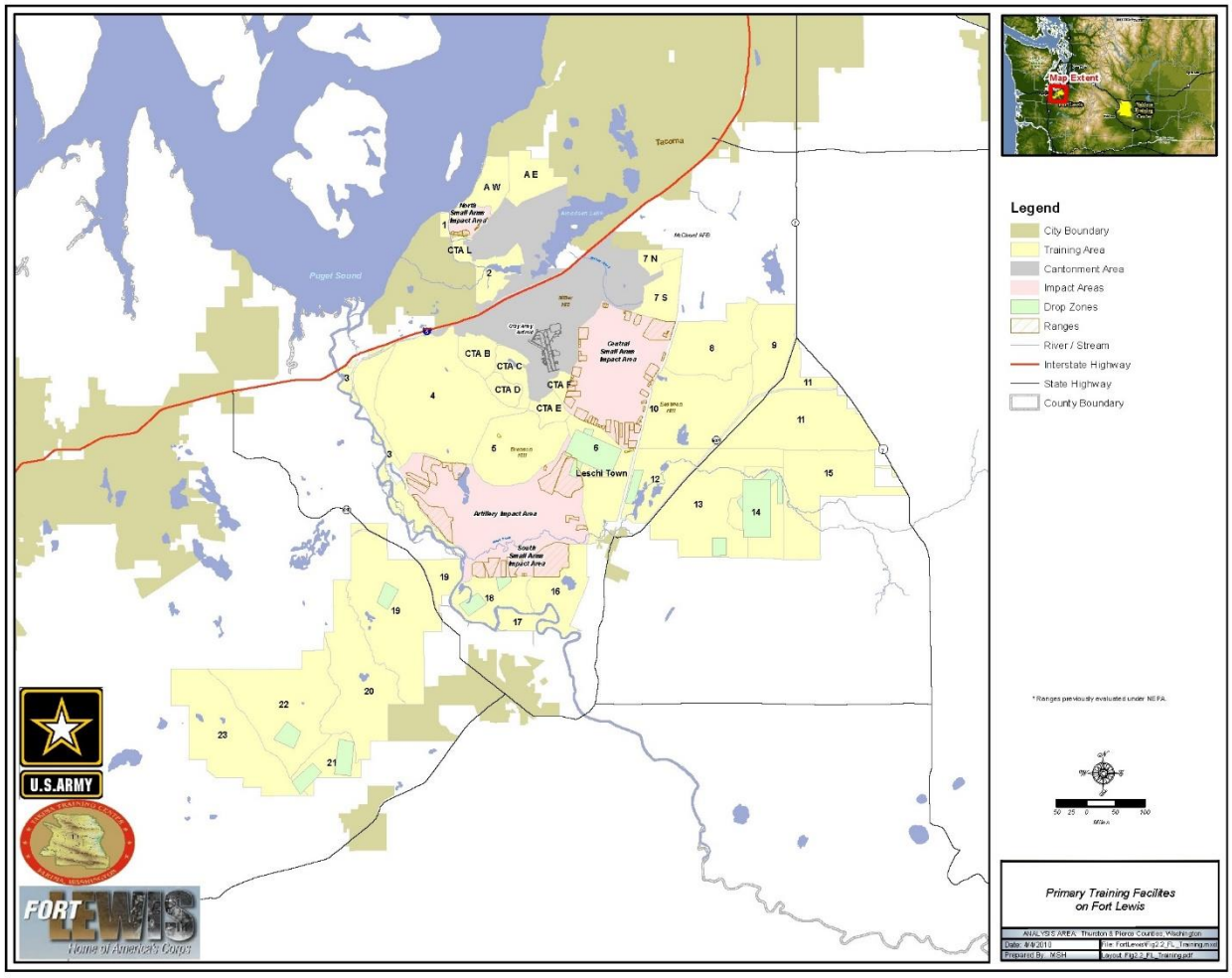

Figure 3.10-2 JBLM - Lewis (formerly Fort Lewis)

JBLM is a major facility for both weapons qualification and field training. It hosts over 30,000 soldiers and is home to the I Corps Headquarters and other major Army and Air Force units as listed below. Army Reserve units and the Washington Army National Guard also use JBLM's

facilities. Out-of-state Army units and units from allied nations periodically train at JBLM as well.

- I Corps
- 62nd Airlift Wing
- 627th Air Base Group
- Madigan Army Medical Center
- 7th Infantry Division
- 593rd Expeditionary Sustainment Command
- Regional Health Command Pacific
- 1st Special Forces Group
- 2nd Battalion, 75th Ranger Regiment
- 4th Battalion, 160th SOAR
- 5th Security Force Assistance Brigade
- 6th Military Police Group
- 8th Brigade, U.S. Army Cadet Command (ROTC)
- 66th Theater Aviation Command
- 189th Infantry Brigade
- 404th Army Field Support Brigade
- 446th Airlift Wing
- U.S. Army Medical Research Directorate – West
- Western Air Defense Sector of the Washington Air National Guard

JBLM also accommodates a variety of nonmilitary activities. These activities include recreation, commercial timber harvest, and Native American traditional cultural practices. Primary recreational activities are hunting, fishing, horseback riding, and other outdoor activities.

JBLM – YTC is a sub-installation to support training located in central Washington northeast of the City of Yakima and west of the Columbia River (Figure 3.10-3). The military mission of JBLM – YTC is to support tough, realistic, combined arms, joint, and coalition forces training for U.S. and allied military units in order to enhance unit readiness by sustaining training lands, range complexes, and support facilities capable of meeting all present and future training requirements.

As a training center, JBLM – YTC would generally not host permanently stationed military personnel and equipment other than those needed to maintain the facility. There are Army civilian employees at JBLM – YTC. At present, JBLM – YTC hosts two military units, the 53rd Ordnance Company and a U.S. Army Air Ambulance Detachment. JBLM – YTC encompasses approximately 327,242 acres (132,433 ha) in Yakima and Kittitas Counties. Although the active Army units assigned to JBLM and the 81st SBCT of the Washington Army National Guard are

the principal users of JBLM – YTC, other units and forces also use JBLM – YTC. They include the Special Operations Command, Marine Corps, Air Force, Navy, Coast Guard, local and federal law enforcement, and forces from Canada, Japan, and other allied nations.

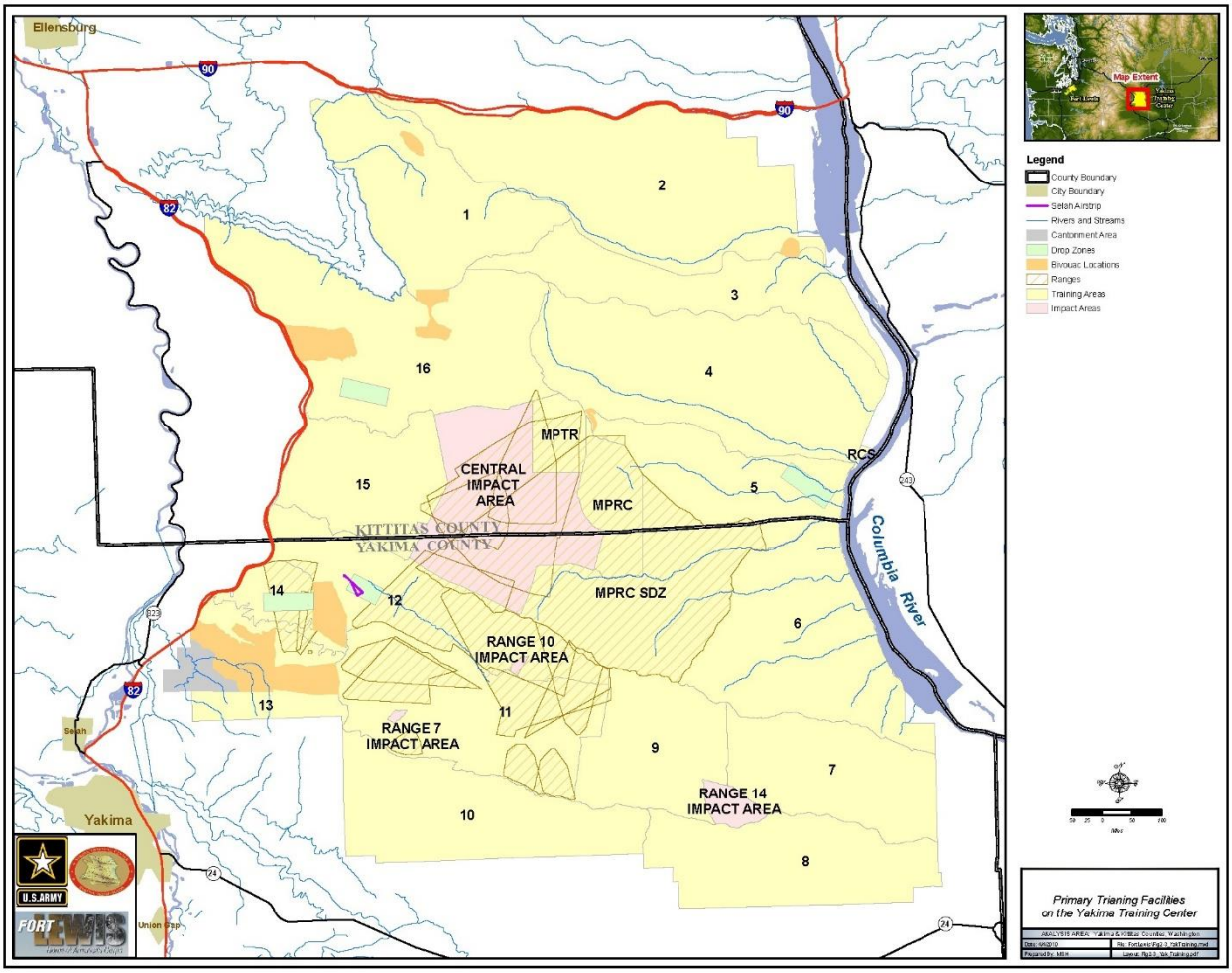

Figure 3.10-3 JBLM – YTC (formerly Yakima Training Center)

Please note that in sub-sections 3.10.2 through 3.10.7:

- JBLM will refer to the combination of Fort Lewis and McChord AFB
- JBLM – Lewis will refer to the Fort Lewis portion only
- JBLM – YTC will refer to Yakima Training Center portion only.

3.10.2 Biological Resources

3.10.2.1 Affected Environment

3.10.2.1.1 Flora

JBLM – Lewis

Plant Communities

The plant communities on JBLM – Lewis can be divided into four broad habitat types: coniferous forests, grasslands (commonly known as prairies), oak/oak-mixed woodlands, and wetlands/riparian zones (Figure 3.10-4). Specific management strategies for each plant community at JBLM – Lewis are detailed in the 2019 *Joint Base Lewis-McChord Integrated Natural Resources Management Plan* (2019 INRMP). In this PEA the wetlands/riparian zones are covered in the water resources section.

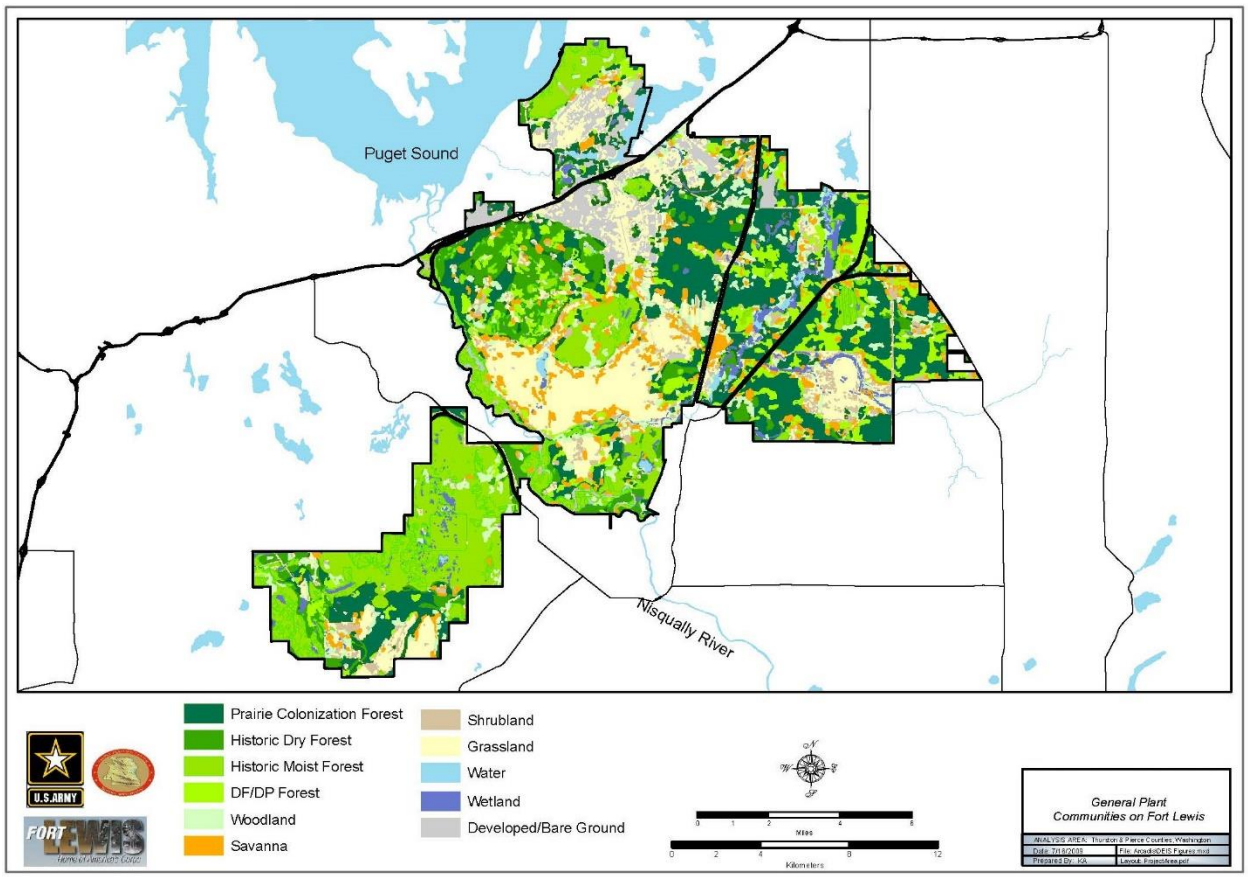

Figure 3.10-4 JBLM – Lewis General Plant Communities

Coniferous/Mixed Forests

Nearly two-thirds of JBLM – Lewis (approximately 54,800 acres [22,200 ha]) is dominated by closed forest, primarily conifer-dominated. Three coniferous forest types are present on JBLM – Lewis. The most prevalent type is prairie colonization forest, dominated by Douglas-fir (approximately 30,300 acres [12,200 ha]). The second type of coniferous forest is historical dry forest (7,300 acres [3,000 ha]), which is similar to prairie colonization forest, but occurs in areas where similar forests were in existence prior to European settlement. The third coniferous forest type is moist coniferous forest, which is dominated by Douglas-fir and western hemlock, with western red cedar present in both the understory and overstory (approximately 17,200 acres or 6,900 ha). Following logging or fire, some areas in a moist coniferous forest are temporarily dominated by red alder and big leaf maple. Hardwood stands cover approximately 6,400 acres (2,600 ha) of JBLM – Lewis.

Plant communities with a significant component of ponderosa pine occur in both prairie colonization forest and oak woodlands. JBLM – Lewis has the largest occurrence of native ponderosa pine west of the Cascade Mountains, including a few acres of native pine savanna with native grassland understory, which is a unique plant community found nowhere else.

Prairies/Grasslands

There are approximately 16,500 acres (6,677 ha) of grassland habitat on JBLM – Lewis. These grasslands vary in quality, with quality typically defined in terms of the amount of native vegetation relative to the amount of non-native vegetation on a given site. Intact, high-quality prairie is an open grassland habitat dominated by the native bunchgrass Roemer's fescue (up to 70% cover), with lesser amounts of long stolon sedge, California oatgrass, and prairie junegrass. The spaces between clumps are occupied by numerous forbs, primarily perennials, which often grow up through a biological soil crust. Grasslands also include significant areas that are dominated by Scotch broom and can therefore be classified as shrubland, at least temporarily. The acreage and location of shrubland varies from year to year, based on the level of Scotch broom control and/or regrowth.

The Washington Natural Heritage Program ranks South Puget Sound prairies in their plant community ranking system with a Global and State rank of G1S1 (the most threatened ranking possible), which means that they are imperiled on both global and state levels. Given that less than 10% of the original prairie grasslands in the south Puget Sound region remain (Crawford and Hall 1997), and that JBLM – Lewis contains some of the largest tracts of remaining prairie habitat in the region, JBLM – Lewis prairies are very important from a regional landscape perspective. Additionally, prairies on JBLM – Lewis provide habitat for numerous special-status plant and animal species.

Oak/Oak-mixed Woodlands

Oak and oak-mixed woodlands, which cover approximately 4,700 acres (1,900 ha) on JBLM – Lewis, range from pure Oregon white oak to a mix of oak, coniferous, and deciduous trees. Oak woodlands are typically ecotonal habitat between the grasslands and the surrounding forests and occur in association with Oregon ash in riparian zones within the grasslands. Historically, these communities supported open canopies that allowed grasses to persist in the understory and ranged from open savannas with a low density of trees to woodlands with more closed canopies and abundant shrub cover in the understory. Today, most of the remaining prairie-forest ecotones are woodlands; a large percentage of savannas have been altered by fire suppression and the subsequent invasion of trees and Scotch broom. Oregon white oak habitat in Washington is declining, and the remaining stands are often small, fragmented, or isolated, and degraded (Kertis 1986 as cited in Larsen and Morgan 1998). The remaining stands are at risk for encroachment from Douglas-fir and loss through urban development. It is estimated that JBLM – Lewis contains 35% of the remaining oak habitat in western Washington State (GBA Forestry Inc. 2002). For these reasons, they are important from a regional landscape perspective. Because Oregon white oak woodlands provide habitat for many rare animals, including the western gray squirrel and several bird species, the Washington Department of Fish and Wildlife (WDFW) lists them as a Washington State Priority Habitat.

Noxious Weeds

There are 114 noxious weeds targeted for control in Pierce County (Pierce County Noxious Weed Control Board 2008) and 36 noxious weeds targeted for control in Thurston County (Thurston County Noxious Weed Control Agency 2008). Noxious weeds are found in all habitat types on JBLM – Lewis, but occur primarily along fence lines, buildings, and roads, and in training and open areas. Management of invasive species is guided by the Integrated Pest Management Plan (IPMP). Weed control management on JBLM – Lewis focuses on Scotch broom and listed noxious weeds, including tansy ragwort, knapweeds, leafy spurge, mouse-eared hawkweed, and sulphur cinquefoil. Wetlands on JBLM – Lewis contain scattered populations of reed canarygrass, purple loosestrife, yellow-flag iris, and Eurasian watermilfoil. Control efforts on the installation include mechanical control, hand and machine removal, tree girdling, establishment of desirable cover, and use of herbicides. Control of invasive species is done by numerous programs, including Forestry, Fish and Wildlife, ITAM, and Pest Management.

JBLM – YTC

Plant Communities

Like much of the lower Columbia River Basin, JBLM – YTC is characterized by shrub-steppe vegetation. The shrub-dominated overstories typically support species of sagebrush and other

shrubs, and the understories support perennial bunchgrasses, such as bluebunch wheatgrass and Sandberg's bluegrass (Daubemire 1970).

In 1999, a comprehensive survey of upland vegetation was completed on JBLM – YTC, and plant communities were delineated as shown in Figure 3.10-5 (TNC, 1999). JBLM – YTC Environmental Division (ED) divides vegetation into 18 classes based on similarities in cover of dominant species, perennial forbs, exotic weeds, and perennial bunchgrasses. In general, upland plant communities include shrublands, grasslands, and dwarf shrublands, with a small component of communities that do not fit into one of these classes (Jones and Bagley 1998). The six predominant plant communities are shown in Table 3.10-1 and the remaining 12 plant communities account for less than 5% each of JBLM – YTC. Shrublands are typically dominated by big sagebrush, with bunchgrasses and annual and perennial forbs in the understory. Grasslands are similar to shrublands, except that the shrub component is greatly reduced or absent, has been eliminated by some type of disturbance (e.g., fire, military training), or is represented by rabbitbrush, which may sprout vigorously after a fire. Dwarf shrublands, typically found in areas with shallow, stony soils, are dominated by Sandberg's bluegrass and a layer of dwarf shrub species including buckwheat and stiff sagebrush.

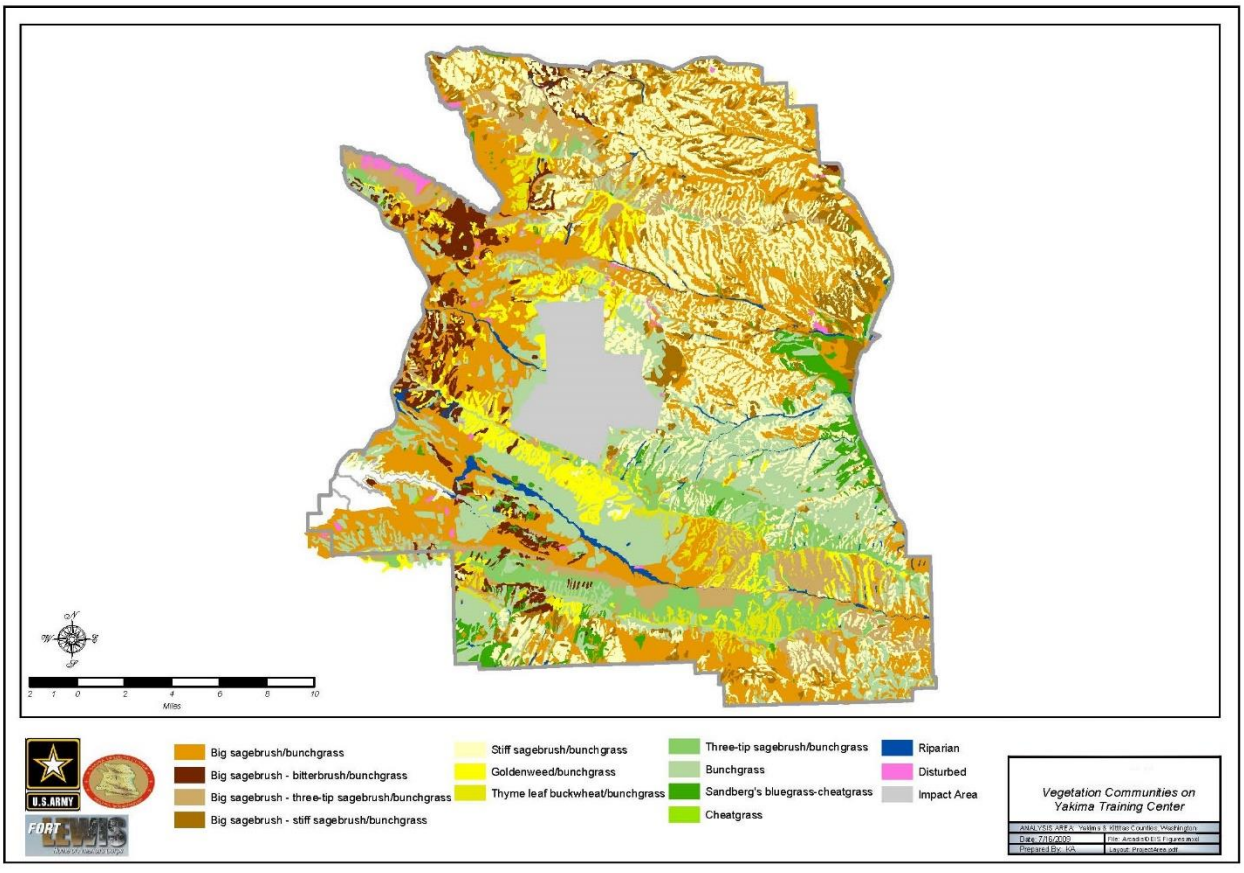

Figure 3.10-5 JBLM – YTC General Plant Communities

Table 3.10-1 Predominant Upland Plant Communities Occurring on JBLM – YTC

Plant Community	Description	Acres	Percent
Big sagebrush / bunchgrass	Big sagebrush with perennial bunchgrass understory; gentle upland slopes with deep silty loams or loamy soils.	78,799	24.2
Sparse big sagebrush / bunchgrass	Sagebrush cover patchy or < 5%; lower cover of perennial bunchgrasses; cheatgrass (downy brome) present; typically has experienced some level of past disturbance.	18,734	5.8
Big sagebrush – stiff sagebrush / bunchgrass	Big sagebrush and stiff sagebrush co-dominate shrub layer; bunchgrass understory; occurs where soils not uniformly deep.	35,233	10.8
Stiff sagebrush / bunchgrass	Stiff sagebrush co-occurs with purple sage, thyme buckwheat, and bitterbrush; Sandberg's bluegrass is dominant bunchgrass; occurs on shallow, rocky soils.	42,573	13.1
Three tip sagebrush / high bunchgrass	Main understory bunchgrass is Roemer's fescue; higher bunchgrass and forb cover than above; occurs at upper elevations.	17,987	5.2
Bunchgrass	Dominated by bluebunch wheatgrass or Roemer's fescue with occasional shrubs; occurs on deep, well-drained soils that may ultimately support big sagebrush.	30,742	9.4

Noxious Weeds

Noxious weed species can pose a threat to the ecological integrity of training lands, increasing soil loss and decreasing upland vegetative cover, surface water quality, and wildlife habitat. In addition, noxious weeds may potentially pose economic threats by spreading off the installation to surrounding agricultural fields and waterways. Noxious weed control at JBLM – YTC is accomplished through an Integrated Pest Management (IPM) approach, as documented in the JBLM – YTC Installation Pest Management Plan (IPMP) of March 2021 (Department of the Army 2021). The IPM strategy focuses on long-term prevention or suppression of noxious weed problems using techniques that have a limited impact on the environment including natural biological control, low-toxicity pesticides, and mechanical control. As part of its pest management program, JBLM – YTC controls noxious weeds in training areas, with a primary focus on knapweed and kochia control, and a lesser focus on musk thistle, Scotch thistle, Russian thistle, and purple loosestrife. With the exception of purple loosestrife, these species typically invade upland sites or establish themselves along intermittent drainages following a disturbance. Purple loosestrife, which is found in wetland and riparian areas, is particularly difficult to control because the Columbia River provides a continual seed source for this species.

3.10.2.1.2 Fauna

JBLM – Lewis

Wildlife Species and Their Habitats

JBLM – Lewis has a mosaic of plant community distributions and productive wildlife habitats utilized by approximately 20 species of reptiles and amphibians, 200 species of birds, 50 species of butterflies, and 50 species of mammals (Department of the Army 1994). Throughout the installation, there are large expanses of undeveloped, low-elevation wetland and upland habitats influenced by the Puget Sound maritime climate, glacial plains, and the Nisqually River watershed. These habitats are also present in the areas surrounding the installation, although they generally exist as small, fragmented pieces given the extensive development in the region.

Coniferous/Mixed Forest Wildlife

Forests are the largest ecosystem type on JBLM – Lewis and in the region, predominantly consisting of coniferous forests dominated by Douglas-fir. As the largest contiguous block of natural landscape in the South Puget Sound area, JBLM – Lewis is a critical component in regional attempts to preserve and enhance biological diversity. Forestlands adjacent to JBLM – Lewis are mostly fragmented and less valuable to forest-dependent species than forests on the installation.

Wildlife species typically associated with forested environments inhabit a wide array of habitat conditions. Important factors influencing the distribution and abundance of wildlife species within forests include the seral stage of forest stands, understory densities, canopy connectivity, and the quantity and distribution of coarse woody debris and snags. Common forest-dwelling amphibians and reptiles include northwestern salamander, long-toed salamander, western toad, common garter snake, and rubber boa. Larger trees and snags are utilized as foraging, nesting, and perching sites for bald eagles, great blue herons, osprey, band-tail pigeons, and a variety of woodpeckers and owls (Kavanagh 1991). The coniferous forests are also home to black-capped chickadees, red-breasted nuthatches, brown creepers, whereas ruffed grouse, kinglets, and warblers are attracted to deciduous and mixed coniferous-deciduous forests. Raptors known to nest in coniferous forests include redtailed hawk, Cooper's hawk, and the sharp-shinned hawk. Upland game birds, bluebirds, thrushes, flycatchers, and warblers use the forest edge. Although many of these bird species are resident year round on JBLM – Lewis, kinglets, flycatchers, warblers, and other birds found on JBLM – Lewis are migratory birds that spend only a portion of their year on JBLM – Lewis. Migratory birds may winter or breed on JBLM – Lewis, or may just use the installation for short periods while migrating between their breeding grounds to the north and wintering grounds to the south. Migratory birds are protected under the Migratory Bird Treaty Act of 1918, as amended, that provides protections to reduce the risk of harm to migratory birds or their habitats from Army or other federal actions. Forests provide cover and forage for a

variety of mammal species, including Columbia black-tailed deer, raccoon, coyote, black bear, various bat species, Townsend chipmunk, and northern flying squirrel. Several wildlife species of concern, including the bald eagle, the pileated woodpecker, and several neotropical birds, rely upon the installation's large blocks of forest for all or part of their life history needs.

Prairies/Grasslands Wildlife

The grassland landscape in South Puget Sound once extended from just south of Tacoma to beyond Oakville along the Chehalis River (Department of the Army 1998). In 1995, less than 3% of that area remained as grassland dominated by native vegetation (Crawford and Hall 1997). However, a significant portion of JBLM still contains native grasslands. The grasslands represent some of the last remaining grasslands in western Washington.

Native grasslands provide habitat for several rare plant and animal species, such as white-top aster, pocket gopher, and several species of butterflies. Hawks, common nighthawks, lazuli buntings, swallows, and sparrows forage and/or nest in the prairies. JBLM – Lewis contains bird species specifically adapted to prairie environments, including the western bluebird, streaked horned lark, western meadowlark, Oregon vesper sparrow, and savannah sparrow. Most of these species are migratory birds that spend only a portion of the year on JBLM – Lewis. Prairies provide food and limited cover for small- and medium-sized mammals, such as pocket gopher, deer mouse, vagrant shrew, Pacific jumping mouse, moles, and Eastern cottontail.

Oak Woodlands Wildlife

Since Euro-American settlement, more than one-half of all oak habitats in the South Puget Sound region have been eliminated. Historically, oak savanna and open woodlands were common and consisted of large, continuous stands containing large, mature, widely spaced oaks with single trunks and broad, spreading crowns. The understory was one herbaceous layer of native bunchgrasses and forbs. Frequent and regular fires helped to maintain these communities.

Reduction in the use of fire, land conversion and development, livestock grazing, military training, and other factors have resulted in the loss of oak woodlands. Oak stands are now much smaller and mostly isolated from other oak stands. Fire suppression has led to the invasion of woody pest species, primarily Scotch broom and Douglas-fir, which compete with oaks for scarce nutrients, and in the case of Douglas-fir, overtop and kill younger oaks.

Oak woodlands occur predominantly on grassland margins and provide important transitional wildlife habitat between grassland and forest ecosystems. On JBLM – Lewis, oak woodlands primarily occur within grassland/conifer forest ecotones, and to a lesser extent in grassland/riparian ecotones and as individual stands, which may or may not be adjacent to conifer forest. Oregon white oak woodlands are used by an abundance of mammals, birds, reptiles, and amphibians. Many invertebrates, including various moths, butterflies, gall wasps,

and spiders, live exclusively in association with this oak species. Oak/conifer associations provide contiguous aerial pathways for animals such as the state threatened western gray squirrel, and they provide important roosting, nesting, and feeding habitat for numerous birds and mammals. Dead oaks, and dead portions of live oaks, harbor insect populations and provide nesting cavities. Acorns, oak leaves, fungi, and insects provide food. Some birds, such as the Nashville warbler, exhibit unusually high breeding densities in oak. Oaks on JBLM – Lewis may play a critical role in the conservation of neotropical migrant birds that migrate through, or nest in, Oregon white oak woodlands (Larsen and Morgan 1998). Oak woodlands provide important forage and nesting habitat for Columbia black-tailed deer, Douglas squirrel, western gray squirrel, and northern flying squirrel.

Wetlands Wildlife

Approximately 4,100 acres (1,700 ha) of wetlands occur on JBLM – Lewis. Wetlands are widely distributed throughout the installation, and range in type from open water to forested swamps. They support numerous species of plants and animals. Ten amphibian and four reptile species were reported on JBLM – Lewis during a 1996 to 1997 herpetofauna inventory, including the northwestern salamander, long-toed salamander, Pacific giant salamander, rough-skinned newt, western redbacked salamander, ensatina, western toad, Pacific treefrog, red-legged frog, bullfrog, northern alligator lizard, western terrestrial garter snake, northwestern garter snake, and common garter snake (Hallock and Leonard 1997).

The western pond turtle may also occur on or near JBLM – Lewis, but has not been found on the installation (Forrester and Storre 1992). Western fence lizard, racer, sharp-tailed snake, and gopher snake, all species historically reported to occur in the vicinity of JBLM – Lewis, also were not detected.

The shrubs, trees, and water found in wetlands and riparian corridors provide foraging, nesting, and rearing sites for rufous-sided towhees, swallow, American robins, ruffed grouse, red-winged blackbirds, cedar waxwings, and belted kingfishers. Wetlands and riparian corridors also provide habitat for waterfowl and a variety of other water-dependent birds found year-round at JBLM – Lewis. Robins, blackbirds, waxwings, and several species of waterfowl are migratory birds that may breed or winter on JBLM – Lewis, or only use the installation for a short period each year while migrating between breeding and wintering grounds.

Wetlands and riparian corridors are a source of food and cover for both upland- and wetland-associated mammals. Species typically found in wetland and riparian environments in the JBLM – Lewis region include river otter, mink, muskrat, and beaver. Columbia black-tailed deer, black bear, raccoons, striped skunks, and spotted skunks are also frequent users of wetland and riparian corridors.

Estuarine and Marine Habitats Wildlife

JBLM – Lewis borders Puget Sound. Fish and other marine organisms found along the coast and near JBLM – Lewis are discussed in more detail in Section 3.10.2.1.3 or 3.2.10.1.4.

Bird species attracted to the protected marine habitats of Puget Sound include seabirds (such as alcids, gulls, and shearwaters) and shorebirds (such as phalaropes, sandpipers, herons, and plovers). Pigeon guillemot and glaucous-winged gull, the primary seabirds commonly found nesting south of Whidbey Island, are the only breeding seabirds with nests found in highly industrial areas in Puget Sound (e.g., Commencement Bay near Tacoma). Pigeon guillemots are particularly common near Solo Point, and the steep slopes adjacent to Solo Point provide suitable nesting habitat. They breed along the Pacific Coast from northwest Alaska to southern California, nesting in crevices and cavities on rocky shores and coastal cliffs.

Several marine mammal species may be found in the waters of South Puget Sound, including harbor seal, Steller sea lion, California sea lion, river otter, Dall's porpoise, harbor porpoise, killer whale, minke whale, humpback whale, and gray whale. Marine mammals in Puget Sound are heavily dependent on good water quality, sufficient food, and undisturbed habitat for their health and survival. Five of these species are resident to Puget Sound: harbor seal, Dall's porpoise, harbor porpoise, killer whale, and minke whale. The other species are migratory (Puget Sound Water Quality Authority [PSWQA] and WDNR 1992).

JBLM – YTC

Wildlife Habitat

The wildlife at JBLM – YTC uses three predominant habitat types in accordance with their specific life history requirements: shrub-steppe uplands, cliffs and talus slopes, and riparian and permanently wet areas. Shrub-steppe uplands account for more than 95% of land coverage at JBLM – YTC and provide life requisites for the majority of wildlife species that permanently or seasonally inhabit the installation (Department of the Army 2002). The open, shrubby habitats support numerous shrub-nesting and ground-nesting birds and mammals. In addition, reptiles and raptors feed on the diversity of small mammals and invertebrates that are found in the sage complexes of JBLM – YTC. Cliffs and talus slope habitats provide shade, cover, and rearing sites. Habitats associated with watercourses, springs, and riparian communities support a wide variety of wildlife by providing drinking water, cover, and in some cases, important food and nesting opportunities.

Wildlife Species and Populations

A total of 246 wildlife species occur or are likely to occur on JBLM – YTC: 8 amphibians, 14 reptiles, 174 birds, and 50 mammals (Johnson and O'Neil 2001, Department of the Army 2002).

Amphibians and Reptiles

Of the 22 species of amphibians and reptiles that are thought to occur at JBLM – YTC, four typically inhabit sagebrush and cliff and talus slope habitats: side-blotched lizard, sagebrush lizard, western fence lizard, and striped whipsnake. The most common species found in riparian habitats include Pacific treefrogs and long-toed salamanders. Other species, such as short-horned lizards, gopher snakes, and western rattlesnakes, are more evenly distributed throughout the landscape at JBLM – YTC.

Birds

The most common avian species found on JBLM – YTC are the western meadowlark, Brewer's sparrow, vesper sparrow, horned lark, and sage thrasher. Birds commonly associated with sagebrush habitat year-round include the greater sage-grouse, golden eagle, prairie falcon, common raven, rock wren, and horned lark. Summer residents of JBLM – YTC include Swainson's and red-tailed hawks, American kestrel, burrowing and short-eared owls, mourning dove, common nighthawk, sage thrasher, and sage sparrow. Winter residents include the rough-legged hawk, rosy finch, northern shrike, and bald eagle. Upland game birds include chukar, California quail, ring-necked pheasant, and Hungarian partridge. Riparian habitats provide some permanent water supplies for waterfowl (such as mallard, gadwall, cinnamon teal, blue-winged teal, wood duck, and shoveler) and a variety of songbirds. Additionally, bald eagles and osprey can be observed along river corridors. Cliff swallows are most commonly associated with cliffs, talus slopes, and riparian habitats, and may occur at the periphery of sage habitat.

Although many of these bird species are resident year-round on JBLM – YTC, several species of birds, including raptors, waterfowl, sparrows, doves and nighthawks, are migratory birds that spend only a portion of the year on JBLM – YTC. Migratory birds may winter or breed on JBLM – YTC, or may just use the installation for short periods while migrating between their breeding grounds to the north and wintering grounds to the south. Migratory birds are protected under the Migratory Bird Treaty Act of 1918, as amended, that provides protections to reduce the risk of harm to migratory birds or their habitats from Army or other federal actions.

Mammals

Five small mammals represent 98% of all species identified during 1990 monitoring surveys: deer mouse, sagebrush vole, Great Basin pocket mouse, least chipmunk, and northern pocket gopher. Additional small and mid-sized mammal species typically found on JBLM – YTC include black-tailed jackrabbit, Townsend's ground squirrel, Merriam's shrew, badger, porcupine, harvest mouse, and long-tailed vole. Large mammals found at JBLM – YTC include cougar, coyote, mule deer, and elk. Mule deer and elk are the predominant large mammals found at JBLM – YTC, while coyote primarily use shrub habitats for hunting small mammals.

Bats, including the western small-footed bat, little brown bat, and big brown bat, may roost in the cliffs and talus slopes and feed along the riparian drainages by night (ENSR 1995a). Other bat species that are known or likely to use habitats on JBLM – YTC include the pallid bat, spotted bat, and canyon bat.

Six species of mammal are typically found in riparian areas: raccoon, porcupine, mink, muskrat, beaver, and montane vole. Bushy-tailed woodrats and bighorn sheep occasionally use the cliffs and talus slopes.

3.10.2.1.3 Fish

JBLM – Lewis

Fish Species and Populations

At least 25 fish species live in lakes, ponds, marshes, rivers, and streams on JBLM – Lewis. Populations include resident, anadromous, and warm water fish species that live in aquatic habitats on JBLM – Lewis (Department of the Army 2007). Common resident and anadromous fish species that may occur on JBLM – Lewis include steelhead/rainbow trout, Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon/kokanee, cutthroat trout, bull trout, and mountain whitefish. For anadromous fish species, incubation of eggs and rearing of juveniles occurs in freshwater before the fish migrate to seawater for adult development, later returning to freshwater to spawn. Common warm water fish species found on JBLM – Lewis include rock bass, largemouth bass, brown bullhead, bluegill sunfish, pumpkinseed sunfish, black crappie, and yellow perch.

Fish species present in South Puget Sound and near the installation include Pacific herring, surf smelt, hake, cod, pollock, rockfish, surfperch, flounder, sole, spiny dogfish, Chinook salmon, chum salmon, coho salmon, pink (or humpback) salmon, sockeye salmon, and sea-run cutthroat trout. Surf smelt do not spawn in near-shore areas of Solo Point (Department of the Army 1998). Pacific herring were harvested for bait, roe, and food until this fishery was closed in 1983 because herring are a major food fish for declining salmon populations. Herring spawn on kelp and eelgrass found in near-shore regions, but this habitat is not found in abundance near Solo Point or nearby islands. However, a large concentration is found west of Anderson Island (Palsson 1998). Groundfish and salmonids are harvested off Solo Point (PSWQA and WDNR 1992).

Puget Sound is home to many shellfish and crustaceans: Dungeness crab, red rock crab, spot prawn, geoduck, Japanese oyster, Olympia oyster, European flat oyster, horse clam, butter clam, manila clam, native littleneck clam, soft-shell clam, spiny scallop, pink scallop, rock scallop, pinto abalone, sea urchin, and sea cucumber. Shellfish and crustaceans are abundant within Puget Sound in nearshore, shallow areas to depths greater than 300 feet (91 m), although they are not found in major abundance near Solo Point (PSWQA and WDNR 1992).

Fish Habitat

Fish habitats on JBLM – Lewis include lakes, ponds, streams, marshes, and more than 2 miles (3 km) of shoreline along Puget Sound. Most of the 29 bodies of water on JBLM – Lewis are relatively small (less than 30 acres [12 ha] of surface water) and shallow (less than 10 feet [3 m] in depth).

The various rivers and streams within JBLM – Lewis connect some of these bodies of water with Puget Sound, thereby providing habitat and migration corridors for anadromous fish. Streams and rivers on the installation generally can be characterized as low- to moderate-gradient waters having alternating pool and riffle habitats, with substrates dominated by cobble and gravel. Seasonal springs such as Nixon, Halverson, and Exeter springs are extremely important to anadromous fish for spawning grounds. Gravel has been added to each of the springs to enhance spawning habitat. These waterways are highly important to fish, as they provide spawning and rearing habitat for anadromous species, particularly chum, steelhead, and coastal cutthroat trout.

Infestations of reed canarygrass in some of the streams at JBLM – Lewis have reduced water flow, limiting the ability of salmon and trout to successfully navigate and spawn within them. Projects involving reed canarygrass removal, and other enhancement projects aimed at improving spawning habitat, have been in effect since the mid-1970s. Since the implementation of these projects, significant numbers of salmon and trout have returned to spawn within the restored streams.

Because of historical land use practices prior to government acquisition, many wetlands on JBLM – Lewis were ditched and drained for agricultural purposes, which severely degraded many aquatic habitats on the installation. Extensive restoration of lakes and marshes on JBLM – Lewis occurred during the 1970s and 1980s. Restoration projects have included installing dikes for water level manipulation, clearing vegetation and silt from stream channels, installing culverts, and constructing headgates and spillways. These projects should restore historical spawning areas and increase salmon production on JBLM – Lewis.

The north end of JBLM – Lewis is adjacent to approximately 2.5 miles (4 km) of shoreline. This area provides habitat for out-migrating juvenile anadromous salmonids and in-migrating adult salmonids using Nisqually River to the south and Chambers Creek to the north. Chinook salmon may run along the coast on their way to spawning habitat in Nisqually River and Chambers Creek, but it is unlikely that they spawn in Sequalitchew Creek (Baranski 1998, Carlson 1998, Fraser 1998, Mills 1998, Norman 1998, Walter 1998). Chinook salmon may congregate at the mouth of Sequalitchew Creek before moving on to the Nisqually River and Chambers Creek. Steep gradients and marsh habitat in the upper reaches of Sequalitchew Creek make for poor spawning habitat. However, adult coho and chum salmon are known to spawn intermittently in

the lower 650 feet (200m) of the creek near Puget Sound, and sea-run cutthroat trout are thought to utilize the creek when flows are adequate.

JBLM – YTC

Fish Species and Populations

Portions of the Columbia and Yakima River watersheds are on JBLM – YTC. The Columbia and Yakima River systems support anadromous and resident salmonids, with numerous other cold water and warm water fish species (Department of the Army 2002).

The five sub-drainage systems on JBLM – YTC that are tributaries to the Columbia River (Alkali Canyon, Corral Canyon, Hanson Creek, Johnson Creek, and Middle Creek) are intermittent within their headwaters. However, their lower reaches may be perennial some years. Chinook salmon fry have been observed using the lower reaches of Hanson, Alkali Canyon, and Corral Canyon Creeks for early rearing (Rogers et al. 1989). However, these creeks are too small for Chinook salmon to spawn in them. Johnson Creek, downstream of JBLM – YTC, contains both resident and anadromous (steelhead) forms of rainbow trout. Several adult steelhead have also been observed in this lower reach of Johnson Creek.

Numerous other cold water and warm water species, such as walleye, various sunfish, minnows, and suckers, inhabit this reach of the Columbia River. Other fish species found in streams on the installation include the threespine stickleback, largescale sucker, mountain sucker, longnose dace, chiselmouth, prickly sculpin, redside shiner, and the non-native eastern brook trout.

The Yakima River supports approximately 33 fish species (Patten et al. 1970). The reach of the Yakima River adjacent to JBLM – YTC supports a substantial recreational fishery for resident rainbow trout. Although a small population of spring Chinook salmon occurs below the Roza Dam, the reach adjacent to JBLM – YTC is the primary rearing habitat for spring Chinook salmon juveniles originating from upper Yakima River spawning areas (Northwest Power Planning Council 1990). Lmumma Creek within the Yakima River watershed supports populations of rainbow trout, mountain sucker, and longnose dace. Fish stocks exist in both perennial and non-perennial streams within these watersheds. Badger, Burbank, Cold, and Selah Creeks, found within the Yakima River watershed on JBLM – YTC, do not support fish populations. Populations may be supported immediately downstream of YTC within these creeks (Department of the Army 2002).

Fish Habitat

Fire and military training and livestock grazing activities have affected fish and their habitat at JBLM – YTC. Land use activities have accelerated erosion and stream sedimentation, influenced stream flow and temperature, and limited large woody debris and other vegetative structure. Degradation of most streams at JBLM – YTC may be partially attributed to higher peak flows

and lower base flows, in part from noxious weeds invading riparian areas and forming monocultures with taproots that are less able to hold soil than fibrous root systems of native plants (Department of the Army 2002). Activities that promote channel incision and bank erosion (such as noxious weed invasions) may affect shifts in volume and timing of surface and sub-surface water flows.

Land management and restoration efforts have improved fish habitat in several streams on JBLM – YTC (Department of the Army 2002). A riparian assessment conducted from 1996 to 1999 indicated that riparian areas benefited from Seibert staking and elimination of livestock grazing. A riparian assessment conducted during 2001 to 2003 found a decrease in invasive plant species, an improved vascular plant community, and an increase in vegetative litter along streams compared to earlier studies. These improvements occurred despite drought conditions during 1998 through 2002 (Bonsen et al. 2006). Furthermore, fish habitat on the installation has been protected through riparian plantings, road improvements near riparian areas, hardening of stream crossings, and fish passage improvements at crossings.

The reach of the Yakima River adjacent to JBLM – YTC is a deep, narrow canyon. The river flow is fast with very few gravel bars to support anadromous fish spawning. The nearest salmon spawning area to JBLM – YTC in this basin is below Roza Dam. The mainstem below Roza Dam becomes progressively degraded due to agricultural and municipal impacts. Fine sediment loading and high summer water temperatures from irrigation returns are the primary factors limiting salmonid production in the mainstem below Yakima. The stream reaches between JBLM – YTC and the Yakima River have been degraded because of grazing practices, further reducing the likelihood of salmonids from the Yakima River occurring on JBLM – YTC. Tributaries to the Yakima River at JBLM – YTC include Lmumma, Burbank, Selah, and Cold Creeks. Of these, Lmumma Creek is known to contain rainbow trout. The other three are barren of salmonids, with Cold Creek heavily degraded because of cattle grazing (Department of the Army 2001a).

3.10.2.1.4 Protected Species

JBLM[68]

Table 3.10-2 lists 17 plant, animal, and fish species that occur on or are potentially impacted by JBLM operations and are given a special status at the federal level based on their risk of extirpation and decline. Included in this table are some species that once occurred on JBLM, but are not thought to occur there currently or have been delisted recently.[69]

[68] Unless otherwise noted the source of information for protected species at JBLM is the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019.
[69] Species data from the USFWS Environmental Conservation Online System Ad-Hoc Species Report, https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report-input, accessed 23Jun21

Currently there are Endangered Species Management Components (ESMCs) for Taylor's checkerspot, Oregon spotted frog, northern spotted owl, streaked-horned lark, mazama pocket gopher, bull trout, Chinook salmon, steelhead trout, Boccacio rockfish, canary rockfish, and yelloweye rockfish. The ESMCs provide adequate assurances that actions taken by JBLM will protect and benefit listed species. As a result, the base was exempted from critical habitat designation.

Other listed species do not have ESMCs which is the case when no critical habitat was proposed for the species on JBLM, or species that are rare or sensitive. As listed in Table 3.10-2, these species have management objectives, survey strategies, or consultation plans with the USFWS or NOAA Fisheries when activities are proposed that potentially impact the species.

Table 3.10-2 JBLM – Lewis Species with Federal Protected Status

Common Name	Scientific Name	Primary Habitat	Federal Status	Management Practice
Water howellia[1]	*Howellia aquatilis*	Wetland	D	N/A
Taylor's checkerspot	*Euphydryas editha taylori*	Prairie	E	ESMC
Oregon spotted frog	*Rana pretiosa*	Wetland	T	ESMC
Marbled murrelet[2]	*Brachyramphus marmoratus*	Forest, Marine	T	Coordinate with USFWS
Northern spotted owl[3]	*Strix occidentalis caurina*	Forest	T	ESMC
Streaked horned lark	*Eremophila alpestris strigata*	Prairie	T	ESMC
Yellow-billed cuckoo[3]	*Coccyzus americanus*	Riparian	T	Coordinate with USFWS
Mazama pocket gopher (Roy Prairie & Yelm)	*Thomomys mazama glacialis & T. m. yelmensis*	Prairie	T	ESMC
Bull trout	*Salvelinus confluentus*	Aquatic	T	ESMC
Chinook salmon	*Oncorhynchus tshawytscha*	Aquatic	T	ESMC
Steelhead trout	*Oncorhyncus mykiss*	Aquatic	T	ESMC
Boccacio rockfish	*Sebastes paucispinis*	Marine	E	ESMC
Canary rockfish	*Sebastes pinniger*	Marine	T	ESMC
Yelloweye rockfish	*Sebastes rubberimus*	Marine	T	ESMC
Southern resident killer whale	*(Orcinus orca)*	Marine	E	Coordinate with NOAA Fisheries
Humpback whale	*(Megaptera novaeangliae)*	Marine	E	Coordinate with NOAA Fisheries
Steller sea lion[4]	*(Eumetopias jubatus)*	Marine	D	N/A

T = threatened, E = endangered, D = delisted, N/A = not applicable, ESMC = endangered species management component, USFWS = United States Fish and Wildlife Service, NOAA = National Oceanic and Atmospheric Administration

1 – This species was delisted in June 2021.

2 – This species is not known to nest on JBLM, but may forage in marine waters near the installation.
3 – This species is not known to occur on JBLM.
4 – The eastern distinct population segment (DPS) of this species, most likely to be found at JBLM, was delisted in 2013. The western DPS is listed as endangered.
Sources: National Oceanic and Atmospheric Administration Fisheries, https://www.fisheries.noaa.gov/species-directory/threatened-endangered, accessed 23Jun21 and U.S. Fish and Wildlife Service, https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report-input, accessed 23Jun21.

At JBLM there are 33 species that are listed as Washington State Species of Greatest Conservation Need (which includes species classified as State endangered, threatened, candidate, or sensitive) as listed in the 2015 update to the Washington State Wildlife Action Plan (SWAP) (WDFW 2015). Species without a specific Federal status are not managed but benefit from actions taken under the appropriate habitat management plan(s) with some actions to protect known populations. Management for special status species not covered specifically within management plans focuses on maintaining or enhancing populations and habitats. Management actions in supporting these species will not require or result in any modifications of military training activity.

Conservation of migratory birds in compliance with the MBTA is a key component to managing for biological diversity and ecosystem management. It is accomplished through conserving, protecting, and managing species habitats at JBLM. In addition, surveys for these species are conducted as resources allow. The following strategies have been implemented specifically for waterfowl management:

- Restrict vehicular traffic to established roads within 50-meter buffers along all bodies of water;
- Maintain existing snags, retention of damaged trees for future snags, and creation of snags to provide habitat for cavity nesting species;
- Implement a nest box program to supplement existing natural cavities for cavity nesting species;
- Control efforts for invasive non-native wetland plants;
- Manage Spanaway, Hardhack, Johnson, and Halverson Marshes for 50% open water.

In order to comply with the BGEPA military activities are regulated primarily to ensure that eagle disturbance does not result in a taking of the species. Bald eagles are year-round residents. JBLM requires protection zones for nest sites, communal night roost sites and foraging habitat. Surveys of primary wintering areas on the installation are conducted every three years, and nest surveys are conducted at each active nest site two times each year during the nesting period.

Nest and roost sites have a primary (400m radius) and secondary (800m radius) protection zones. All aircraft will fly no lower than 365m (1,200 feet) above mean sea level (MSL) over an area extending 400m (1,312 feet) in radius from nest sites with some exceptions for sites that were

established with current training levels. Projects within 660 feet of a nesting site may require permitting from the USFWS.

Critical winter foraging habitat along Muck Creek and the Nisqually River has a 1,000m protection zone (500m on both sides of the creek or river). Within these zones, protective measures are in place to avoid adverse impacts to eagles. Activities likely to disturb or harm eagles (e.g., construction, timber harvest, military training (artillery impact area use is exempt), blasting, and recreational activities) are prohibited or minimized within these zones during times of the year when eagles are likely to be present. All aircraft will fly no lower than 1,300 feet (MSL) along Muck Creek between designated points within the restricted dates.

JBLM – YTC

Table 3.10-3 lists two bird, four fish, and two plant species that are not known to occur on but are potentially impacted by JBLM – YTC operations and are given a special status at the federal level. There are no critical habitat designations for any of the eight species on JBLM – YTC. No specific management activities are required for these species.

Table 3.10-3 JBLM – YTC Species with Federal Protected Status

Common Name	Scientific Name	Federal Status
Northern spotted owl	*Strix occidentalis caurina*	T
Yellow-billed cuckoo	Coccyzus americanus	T
Bull trout	*Salvelinus confluentus*	T
Chinook salmon (upper Columbia spring run)	*Oncorhynchus tshawytscha*	E
Steelhead trout (mid-Columbia)	*Oncorhynchus mykiss*	T
Steelhead trout (upper Columbia)	*Oncorhynchus mykiss*	T
Umtanum desert buckwheat	*Eriogonum codium*	T
Ute ladies'-tresses	*Spiranthes diluvalis*	T

Source: USFWS, https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report-input, accessed 23Jun21.

There are 32 mammal, bird, amphibian, reptile, and fish species whose potential range includes JBLM – YTC listed as Washington State Species of Greatest Conservation Need but not federally listed.[70] There are 19 plant species with JBLM – YTC listed as a managed area in the *2019 Washington Vascular Plant Species of Special Concern*.[71]

Protection for migratory species covered by the MBTA is provided for by the JBLM – YTC policy for the protection of wildlife. Commanders will ensure wildlife and their habitat are not unnecessarily disturbed. Wildlife shall not be harassed, touched, captured, or killed under any circumstances (Department of the Army 2018).

[70] https://wdfw.wa.gov/species-habitats/at-risk/swap, accessed 23Jun21
[71] https://www.dnr.wa.gov/publications/amp_nh_vascular_ets.pdf, accessed 23Jun21.

Specific protection measures are in place for the sage-grouse. Training activities in sage-grouse protection areas are closely managed and must be coordinated in advance with Range Operations and the DPW ED. Sage-grouse protection measures are broken into three components; lekking (breeding), nesting and brood rearing, and year-round habitat protection (Department of the Army 2018).

Sage-grouse use their breeding grounds (leks) between 1 February and 15 May. During this period, units may use specific ranges between the hours of 0900 and 2359. Units may not occupy or use these ranges between the hours of 0000 and 0900. Stationing of ammunition guards between 0000 and 0900 is permitted on established ranges when the range will be operational for more than 24 hours. Travel through these areas is not authorized between 1 February and 15 June except on authorized main supply routes or other designated roads to these ranges. Aircraft are not permitted to fly below 300 feet AGL on the flight routes over the designated Protected Areas between 0000 and 0900 (Department of the Army 2018).

Sage-grouse nesting and brood rearing areas, between 1 February and 15 June, are off-limits to all military training activities except for gunnery training on designated ranges. Travel through sage-grouse protection areas is limited to authorized major supply routes or designated roads to these ranges (Department of the Army 2018).

Sage-grouse rely on specific habitat areas year-round to provide food, cover, and protection from predators and the elements. The following measures are in place to protect sage-grouse habitat. Digging in sage-grouse protection areas is not permitted. Bivouacking is not permitted within sage-grouse protection areas at any time. Military training in the sage-grouse protection areas is restricted to those training exercises approved by the I Corps G3. Units approved to train in these areas are typically battalion Task Force size or greater. Training will not be scheduled during the sage-grouse protection period (Department of the Army 2018).

Eagles have specific protection requirements under the BGEPA. These requirements are implemented at JBLM – YTC annually between 8 December and 24 March. Vehicle traffic on Hanson Creek road is prohibited between 1500 and 0900 between specific points. Coordination and prior approval by DPTMS and the DPW ED is required for use during this period. Aircraft are not permitted to fly below 300 feet AGL on the flight routes over the designated Protected Areas between 0000 and 0900. Report down range injured wildlife to Range Operations or cantonment area injured wildlife to the JBLM-YTC Police (Department of the Army 2018).

3.10.2.2 Environmental Consequences

No construction of new facilities or ranges is expected at JBLM – Lewis or JBLM – YTC and range usage is expected to rise by only 0.7% which is negligible. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live

ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. The training activities will not take place in the habitat areas of listed threatened and endangered species. Therefore impacts to biological resources are expected to be negligible and less than significant and are addressed in section 3.2.1.2

3.10.2.3 Cumulative Effects

Fielding of IDDS-A and all seven planned capabilities listed in section 3.3 may require construction of facilities to support the MDTF and may also require expansion or renovation of existing facilities. JBLM has identified a facility growth and improvement plan but funding is not available to execute the construction yet. There are expected to be less than significant impacts from the construction because the site is in a heavily built up area. The total soldier population of the MDTF is expected to be about 2,100. An increase of only about 600 would be expected because forming the MDTF would be accomplished in part by the conversion of existing units. Also, other units could be inactivated or re-stationed to free up facilities. The expected increase of 600 soldiers is approximately 2.0% of the installation total military population[72]. The additional soldiers would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. Adding up to 600 soldiers, 317 spouses[73], and 540 children[74] at JBLM is about 0.12% of the ROI population of Pierce and Thurston counties[75], a negligible amount. Overall cumulative adverse impacts to biological resources are described in section 3.2.1.2. They are expected to be less than significant because increases in facilities, intensity of training, and population are minor or negligible.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.1.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements and use of SOPs and BMPs will

[72] The total military population is from the Army Stationing and Installation Plan Common Operating Picture Report FY21 Q1 Locked Data 31Jan21, accessed 9Jul21.
[73] The number of spouses is estimated based on the June 2020 Army Active Duty Family Marital Status Report produced by the Defense Manpower Data Center (DMDC) at https://dmdcrs-pki.dmdc.osd.mil/dmdcrs/vp.html#!/reports/16?filter=A,N,M,F&filter=202006, accessed 29Jul20.
[74] The number of children is estimated based on the June 2020 Army Active Duty Family Number of Children Report produced by the DMDC at https://dmdcrs-pki.dmdc.osd.mil/dmdcrs/vp.html#!/reports/16?filter=A,N,M,F&filter=202006, accessed 29Jul20.
[75] The ROI population is derived from the U.S. Census Bureau Quick Facts at https://www.census.gov/quickfacts/fact/table/thurstoncountywashington,piercecountywashington,WA/PST045219, accessed 9Jul21.

reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.10.3 Cultural Resources[76]

3.10.3.1 Affected Environment

3.10.3.1.1 Cultural Resources Present

JBLM

At present, the CRMP manages over 350 historic buildings and historic landscapes in three historic districts: Fort Lewis Garrison Historic District, Old Madigan Historic District and the McChord Field Historic District (listed on the National Register of Historic Places), as well as individual National Register eligible buildings and structures such as Liberty Gate, the Red Shield Inn, the Mount Rainier Ordnance Depot Gate and Headquarters Building, and Carey Theater.

The CRMP also manages approximately 400 known archaeological sites including, Native American sites, Hudson's Bay Company sites, American pioneer homestead sites and military sites. In addition, the CRMP conducts archaeological surveys prior to development or construction.

A summary of JBLM National Register of Historic Places Historic Buildings, Structures, and Objects and Districts is provided in the following paragraph and lists.

These historic buildings, structures, objects, and districts were determined eligible prior to the creation of JBLM and as such are presented below with their original historic district title. Each of these historic districts is now part of JBLM. The buildings in American Lake Historic District are not managed by JBLM but are located on land owned by JBLM and leased to the Department of Veterans Affairs (VA). JBLM has no management responsibility for buildings located on VA leased land.

Fort Lewis Garrison Area Historic District

- Determined eligible, not formally listed on National Register, 470.1 acres
- Listed on the Washington Heritage Register, 24 June 2004
- 299 contributing buildings, structures and objects
- 293 contributing buildings
  - 71 buildings in the Garrison Area Historic District
  - 123 RCI-Privatized residences in Broadmoor Housing area

[76] Information regarding Cultural Resources was taken from the *Integrated Cultural Resources Management Plan for Department of the Army Joint Base Lewis-McChord*, March 2012 unless noted otherwise.

  - 99 RCI-Privatized residences in Greenwood Housing area
  - 1 contributing object (91st Division Monument)
  - contributing structures (Camp Lewis road alignment, Camp Lewis railroad alignment, 3 tennis courts)

Old Madigan Hospital Historic District

- Determined eligible, not formally listed on National Register, 32.4 acres
- 99 buildings evaluated in 1999 (see National Register Nomination)
- 42 recorded to HABS standards (HABS-WA-202) and demolished in 1994
- 27 contributing buildings recorded to HABS standards in 2003 (WA-202 Addendum)
- 1 contributing road structure
- 24 non-contributing buildings
- 5 non-contributing structures

McChord Field Historic District

- Listed on the NRHP, 2008, 18 acres
- 34 contributing buildings and structures
- 31 contributing buildings
- 3 contributing structures
- hangars 1-4 and Building 1104 are documented by an Historic American Building Survey

Individual National Register Listed Properties on JBLM

- Salvation Army Red Shield Inn (Lewis Army Museum).
  - Listed in the National Register, 14 February 1979.

Individually Eligible for National Register of Historic Places

- Liberty Gate (Main Gate) WWI, Kirtland Cutter design
- Warehouse, 1917 (Building 4079) WWI Period
- Hobby House, Post Craft Shop, Wagon Shed, 1917 (Building 5038) WWI Period
- Mount Rainier Ordnance Depot Gate (Logistics Center Gate, Building 9099) WWII period
- Logistics Center Headquarters (Building 9503) International Style
- Carey Memorial Theater, 1950 (Building 2163) Art Deco
- Automotive Crafts Shop, 1934 (Building 4043) Industrial
- Alert Hanger, 1951-1953 (Building 300) Cold War
- Radio Transmitter Building, 1939 (Building 830) PWA Moderne
- Electrical Vault, 1939 (Building 832) PWA Moderne

- B Street Bridge, 1914 (Building 84010)
- Goodman Hill Fire Lookout Tower, 1941-1942, timber construction, CCC/U.S. Army

Other Commemorative Properties (Not eligible for the National Register)

- Captain Wilkes July 4, 1841 Celebration Site: Listed on the Washington Heritage Register, 13 February 1970.
- Hudson's Bay Company Trail Monument (Building No. 4185): This commemorative object near the DuPont gate bears a JBLM building number. It is not eligible for the National Register and is not listed on the Washington Heritage Register.

A complete listing of all buildings, structures, and landscapes that are listed or eligible for listing in the NRHP is included in Appendix G. Buildings, structures and objects not included in this document have not been evaluated for National Register.

Building #3063 at Gray AAF is the oldest structure still in use, an aircraft hangar built in 1942. At present, this WWII period hangar has not been evaluated for National Register eligibility because of security concerns. Plans are being developed to evaluate Hangar 3603 in consultation with SHPO using techniques that will not pose security risks. Several other airfield structures will become 45 years old in the near future and will require National Register evaluations. Archaeological surveys have been conducted on Gray AAF. No archaeological sites have been recorded on Gray AAF.

JBLM Family Housing Operations were privatized on 1 April 2002 with the formation of a partnership between the Army and Equity/Lincoln, LLC. There are 223 historic family housing units in the Greenwood and Broadmoor neighborhoods included in the project. Because the privatization had the potential to adversely affect the Fort Lewis Garrison Area Historic District, the Army entered into the *First Amended Memorandum of Agreement among the United States Army, the Washington State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Privatization of Family Housing, Fort Lewis, Washington,* effective December 18, 2000. Under the agreement, the Army is responsible to ensure that construction, demolition, renovation, rehabilitation, operation, and maintenance of historic family housing is conducted in compliance with the National Historic Preservation Act.

On JBLM, the Nisqually, Puyallup, Squaxin Island, and Steilacoom tribes have an interest in TCP of religious or other cultural importance, as well as in lands on which to hunt, fish, and gather. Native Americans conducted hunting, fishing, and gathering activities near their settlements, but also traveled into the prairies and forest uplands to gather plant, animal, and stone resources, which they processed at special-purpose sites such as lithic reduction stations. The use of these areas for fishing, hunting, and gathering was reserved under the Treaty of Medicine Creek, signed in 1854. Continued access and healthy, sustainable resources are especially important for Nisqually tribal members who regularly conduct hunting and fishing

activities on JBLM. JBLM has established a clear access policy that recognizes Native American treaty-reserved rights to usual and accustomed places.[77]

Cultural resources at JBLM are protected by the following requirements:[78]

- Vehicle travel would continue to be almost entirely on existing roads and trails.
- The dig permit process requires a cultural resources review of an area before digging.
- Incidents of vandalism by soldiers are minimized through soldier awareness training.
- Restrictions to TCP access would be temporary, lasting only as long as the training.
- Continued coordination with the tribes and advanced scheduling would help to limit the degree of conflict.

JBLM – YTC

Cultural resources under the stewardship of JBLM – YTC encompass a broad range of resources associated with the knowledge, beliefs, art, morals, laws, and customs particular to a people or society. On JBLM – YTC historic properties have been identified in the following categories:

- districts (Wa pai xie Archaeological District, Tributary Headwaters Archaeological District), and
- sites (2,069 archeological sites)

To date, no JBLM – YTC historic properties have been listed on the National Register of Historic Places.

Native American burials are known to occur on JBLM – YTC. Burials sites at which remains have been reinterred or otherwise stabilized following consultation with Native American Tribes are protected from ongoing military mission impacts. One cemetery managed as a cultural resource, the *Wanapum Strasta*, or Wanapum Cemetery, occurs on the eastern portion of JBLM – YTC.

Sacred sites and TCP are additional classes of historic property which may be eligible for inclusion in the National Register, require avoidance of adverse impacts, or require allowance for access, because of traditional, religious, and/or cultural importance to Native American tribes or other cultural groups.

To date, 2,069 archeological sites have been identified on JBLM – YTC. Most of these, 1,137 sites, are prehistoric. There are 138 historic sites and 83 sites are multi-component, i.e. having both prehistoric and historic components. The remaining 711 sites are classified as unknown. A

[77] *Final Environmental Assessment RRPR Test Launch Noise Assessment at JBLM*, May 2016, pg 3-43.
[78] *Final Environmental Assessment RRPR Test Launch Noise Assessment at JBLM*, May 2016, pg 3-43 and 44.

total of 140 sites have been determined eligible for inclusion in the National Register. Another 433 sites require further investigation to determine National Register eligibility.

The Main Cantonment of JBLM – YTC contains Cold War-era buildings and structures that date to the 1950s, including single-story barracks, administrative and maintenance facilities, recreational facilities, ammunition storage structures, a water tank, and an airstrip. All of these historic resources, intended as temporary buildings/structures, are managed under a Section 106 programmatic agreement between the Army, the Advisory Council on Historic Preservation, and the Washington State Historic Preservation Office concerning the identification and treatment of 1) Cold War Era (1946-1974) Unaccompanied Personnel Housing and 2) World War II and Cold War Era (1939-1974) Ammunition Storage Facilities. This agreement acknowledges that these types of historic military structures are not eligible for listing in the NRHP and provides a programmatic approach to their management.[79]

Native American traditional cultural resources on JBLM – YTC are places and resources that are important in the ongoing traditional or spiritual practices of the Colville, Wanapum Band, Umatilla, Nez Perce, and Yakima tribes. Such resources include specific plant and animal habitats, natural features of the landscape, and places where important rituals were carried out in the past that continue to be used for such purposes in the present. They may not have specific geographic boundaries that can be drawn on a map and may be known only to tribal members who wish to keep their locations and natures confidential.[80]

Cultural resources at JBLM – YTC are protected by the following requirements:

- Dig permits are required on JBLM – YTC prior to any excavation in the range or cantonment area.
- Digging is prohibited within 50m of improved roads and utility lines.
- Digging is prohibited within 100m of wet or dry drainages
- Digging is prohibited in sage-grouse protection areas.
- All excavations must be filled and leveled and will be inspected.
- A utility dig permit is required prior to conducting any digging activities or installation (e.g., insertion or pounding in) of stakes or grounding rods in the cantonment area.
- Vehicle travel or digging in Seibert stake areas is prohibited but foot traffic is allowed in most of these areas.

Units that inadvertently encounter a cultural resource site must use the following procedures:

[79] *Programmatic Environmental Assessment Joint Base Lewis-McChord Real Property Master Plan,* June 2017, pg 3-33.
[80] *Programmatic Environmental Assessment Joint Base Lewis-McChord Real Property Master Plan,* June 2017, pg 3-33 and 34.

- Stop all training and digging activities at the site immediately and report the discovery to Range Operations.
- Protect the site from further disturbance and ensure no artifacts are removed until a representative from JBLM – YTC assumes responsibility of the site.

3.10.3.1.2 Consultation and Coordination with Governments

JBLM

A major goal of the ICRMP is to document the management processes that maintain the cultural resources program, provide for its continuity, and allow achievement of its mission SOPs. SOPs are organized according to the various legislative drivers that shape the management of cultural resources at JBLM. In addition to the laws, regulations, acts, and executive orders in Section 3.2.2.1 the Treaty of Medicine Creek and a MOA between Fort Lewis and the Nisqually Indian Tribe govern relations among the parties.

These SOPs are described in full in the PA Between the United States Army Garrison Fort Lewis and the Washington State Historic Preservation Officer Concerning the Management of Historic Properties on Fort Lewis and the Yakima Training Center Under Section 106 of the National Preservation Act of 1966 (as amended), signed in 2010.

Due to the history and location of JBLM, it falls under the domain and auspices of several nonmilitary agencies as listed below. Most of these agencies are strictly in an advisory role for JBLM and have no regulatory authority.

The SHPO reflects the interests of the State and its citizens in the preservation of their cultural heritage. Section 106 of the NHPA, requires JBLM to consider the effects of its undertakings on historic properties in consultation with the SHPO.

The ACHP is an independent Federal agency created by the NHPA, and is the major policy advisor to the Government in the field of historic preservation. The ACHP is composed of nineteen members. JBLM must afford the ACHP a reasonable opportunity to comment on any undertaking that might affect historic properties.

A number of Indian Tribes considered portions of present-day JBLM to be included in their aboriginal territories. This association with JBLM lands is documented in treaties with the U.S. government, historic and ethnographic literature, and tribal testimony. Tribes affiliated with JBLM lands include the Nisqually Indian Tribe, Puyallup Indian Tribe, Squaxin Island Tribe, and Yakama Nation. JBLM continues to consult with these tribal governments about the management of natural and cultural resources on JBLM lands.

The CRMP conducts important and necessary tribal coordination and consultation with the Nisqually Indian Tribe, the Puyallup Tribe of Indians, the Squaxin Island Tribe, the Yakima Nation, the Wanapum Band, and the Colville Tribes.

JBLM – YTC

Consultation is the key to compliance with federal and state cultural resources legislation. Major partners in consultation are the Washington SHPO, the Advisory Council, and Native American tribal governments.

JBLM – YTC consultation with the Washington SHPO is initiated by the CRM, and requests for concurrence or other action must be submitted with appropriate supporting documentation. Once an issue is submitted to the Washington SHPO, the SHPO has 30 days within which to reply. Otherwise, JBLM – YTC may assume concurrence. Consultation per Section 106 of the NHPA regarding potential effects to historic properties may result in agreement documents, which are compliance agreements setting forth measures for mitigation of adverse effects. It should be noted that agreement documents do not provide the Washington SHPO with approval authority over U.S. Army undertakings.

The Advisory Council is a key partner for NHPA compliance, particularly in the Section 106 process. The ultimate goal of the Section 106 process is to afford the Advisory Council opportunity to comment on proposed undertakings. While the Advisory Council is notified upon the initiation of consultation following a determination of adverse effect, it will exercise greater deference to the federal agency (i.e., JBLM – YTC) and the SHPO in the consultation process. Specifically, the Advisory Council will no longer be required to review determinations of no adverse effect or routine agreement documents between consulting parties. The Advisory Council will focus its attention on those situations where its expertise and national perspective can enhance the consideration of historic preservation issues and will conduct oversight on a programmatic, rather than case-by-case, basis. Nevertheless, the Advisory Council will continue to provide mediation in the Section 106 process if JBLM – YTC and the Washington SHPO or other consulting parties cannot reach a consensus.

Consultation with Native American tribal governments is integral to compliance with numerous aspects of cultural resources legislation, including the NHPA, NAGPRA, and AIRFA. These laws and their associated regulations are described in Section 3.2.2.1.

The federal government has established an important parameter for Native American consultation by recognizing that federal agencies exist in a government-to-government relationship with federally-recognized Indian tribes. A number of cultural resources types, such as NHPA traditional cultural properties and AIRFA sacred sites, can only be identified through Native American consultation. Culturally Affiliated Indian Tribes at JBLM – YTC are the

Yakima Nation, Wanapum Band, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe of Idaho.

3.10.3.2 Environmental Consequences

Impacts to cultural resources at JBLM – Lewis and JBLM – YTC are described in section 3.2.2.2 and are expected to be less than significant. No new ranges or facilities will be constructed to support IDDS-A and range usage would increase by 0.7%, a negligible amount. IDDS-A training events will frequently be accomplished using simulations with no firing of live ordnance. In the event live ordnance is fired it is designed for air intercept and will not have extensive ground explosions. The tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities.

3.10.3.3 Cumulative Effects

The cumulative effects to cultural resources of adding the seven planned capabilities listed in section 3.3 along with IDDS-A would be similar to those described in section 3.2.2.2. They are expected to be minor and less than significant because any future construction areas would be surveyed for cultural resource conflicts and the population increases and impacts are negligible for the same reasons stated in section 3.10.2.3.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.2.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements to account for historic properties and use of SOPs and BMPs will reduce anticipated impacts. Impacts from the construction and use of the new ranges are expected to be at worst minor and less than significant when combined with the Action Alternative.

3.10.4 Soils

3.10.4.1 Affected Environment

JBLM[81]

Soil of the Puget Sound lowlands, including JBLM, developed predominately from glacial deposits, such as outwash and till, deposited approximately 13,500 years ago at the end of the

[81] Information regarding JBLM soils was taken from the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019

last (Fraser) glaciation (Anderson et al. 1955, Zulauf 1979, Pringle 1990). Soil on the installation formed on these deposits through the processes of physical and chemical weathering and biological action. Soil fertility is low to moderate, with relatively shallow soil that is well-drained to excessively well-drained. Over 90% of JBLM soils are characterized as being somewhat excessively drained, gravelly, sandy loams up to 2 feet thick. The most common soil types are excessively well-drained, sandy-gravelly prairie soils over glacial outwash. These soil types are represented by the Spanaway and Nisqually soil series and are widely distributed across the entire installation. Other major soil types include moderately well-drained, sandy-gravelly forest soils over glacial till, which are common in the southern portion of JBLM located in Thurston County. These soil types are represented by the Alderwood and Everett soil series and typically support forest vegetation. The major soil types found on the installation are discussed in more detail below. Other soil types found in small amounts scattered across JBLM include finer-textured (sandy-silty) forest soils, alluvial soils along the Nisqually River, and isolated patches of poorly-drained wetland and organic (peat) soils, particularly in areas associated with localized drainages and wetlands.

Spanaway Series

Spanaway soils, which cover nearly half of the installation, are gravelly to stony sandy loams developed on level to slightly sloping glacial outwash. They are porous, droughty, and of low fertility. On JBLM, these soils were originally vegetated with native grasses. However, many of these areas are now dominated by non-native grasses and Scot's broom, a non-native shrub. In addition, more than 10,000 acres are now occupied by dry conifer forests up to 150 years of age.

Everett Series

Everett soils, which occur on glaciated uplands, have developed from loose, poorly sorted glacial drift, granite, or quartzite materials. These soils were originally occupied by Douglas-fir or red alder forests. These areas were logged and are now generally occupied by moderately dry conifer forest.

Pilchuck Series

Pilchuck soils occupy the floodplain along the Nisqually River. They developed on recently deposited sandy alluvium and are comprised of sand or loamy sand. The floodplain areas are dominated by deciduous forest, but in some places coniferous species provide an important vegetative component.

Nisqually Series

Nisqually soils developed on undulating glacial outwash in association with the Spanaway series soils; however, the Nisqually series is comprised of finer particle sizes and lacks the gravel component. These soils are loamy sand in texture and somewhat excessively drained.

They are more fertile and less droughty than the Spanaway soils, and were used for agriculture prior to Army acquisition of these lands. A large portion of the land on which these soils occur is now covered by dry conifer forest.

Alderwood Series

Alderwood soils formed in glacial till on the broad uplands. They are one of the most extensive soils in Pierce County. These soils are moderately well drained and consist of a 1- to 2-inch gravelly sandy loam surface layer, and subsoil to a depth of 40 inches that is gravelly sandy loam. The lower part of the substratum, to a depth of more than 60 inches, is composed of a weakly cemented compact glacial till. Although these soils are used for agriculture, the compact glacial till limits the suitability of these soils for deep-rooted crops. These soils are generally covered by moist conifer and hardwood forests.

Muck and Peat Series

Muck and peat soils are organic soils in different stages of decomposition. They developed in shallow depressions from organic materials, and are poorly drained and saturated for much of the year.

Soil conservation is accomplished by the DPW Forestry staff managing forest soils to maintain or enhance the health, resilience, and productivity of the forest. To maintain soil organic matter and nutrients, inputs of litter and woody debris are sustained and a component of soil-building trees and shrubs is maintained in the forest. To prevent or limit soil compaction during forest operations, special equipment and designated skid trails or yarding corridors may be used. In addition, areas of concentrated equipment operation are located on old roads and landings where soils have already been compacted. Where possible, areas heavily impacted during forest operations, including skid trails and temporary logging roads, are rehabilitated.

DPW Forestry staff use the following objective and strategies to enhance soil conservation throughout JBLM:

Objective 1: Maintain or enhance the health, resilience, and productivity of forest soils.

Strategies:

- To maintain soil organic matter and soil nutrients, sustain inputs of litter and woody debris and maintain a component of soil-building trees and shrubs (i.e., alder, maple, and cedar).
- Carefully design and schedule forest operations to prevent excessive soil compaction. Use special equipment and designate skid trail locations or yarding corridors.
- Locate concentrated equipment operation in areas that have already been compacted, such as old roads and landings.
- Rehabilitate areas where soil is heavily impacted.

- Minimize soil disturbance during silvicultural treatments, particularly at woodland-forest ecotones.

Forestry Program staff will monitor treatment sites for compaction and other soil disturbances and to assess the effectiveness of preventative measures. Areas that have been heavily impacted during forest operations will be rehabilitated, if practicable.

In prairies, the most important aspects of soil conservation are preventing damage to soil, particularly in areas not previously disturbed, and repairing damage to soil where it does occur.

Objective 2: Maintain soil conditions and processes that are suitable to sustain or enhance prairie habitat.

Strategies:

- Avoid soil compaction and mixing of soil layers to maintain the integrity of soil conditions.
- Actively repair damaged areas to maintain their capability for training and to minimize expansion of training impacts into other areas.
- Review dig permits for any digging/soil disturbance activities in prairies.
- Continue to use Range and Training Land Assessment and other appropriate land condition maps when planning locations for soil disturbing activities to avoid soil impacts in high quality prairies.
- Continue the dig permit process that requires review of projects and training exercises involving digging.
- Maintain and improve roads traversing prairie habitat to encourage military use of existing roads and help prevent widening of roads and deeply rutted sites.
- Determine which roads to decommission through the Land Use Deconfliction process.

JBLM – YTC[82]

Soils at JBLM – YTC are highly varied with respect to particle size, depth, slope, thickness, permeability, and other factors. Because a large portion of the soils are shallow, light, silt loams characteristic of arid to semiarid climates, many soils at the installation are fragile and easily eroded. JBLM – YTC lies within the Columbia Plateau physiographic province. Topography is dominated by east-west trending anticlinal and synclinal ridges and north-south trending drainages that dissect the ridges. Numerous drainages parallel the ridges and contribute water and sediment to the Columbia River on the east and the Yakima River on the west.

[82] Information regarding soils at JBLM – YTC was taken from the *Programmatic Environmental Assessment Joint Base Lewis-McChord Real Property Master Plan,* June 2017.

Shallow lithosol soils are common at JBLM – YTC (approximately 40% of the installation's acreage) and are generally found on south-facing slopes and windswept ridges. These soils commonly contain high percentages of cobbles and boulders. Because of their shallow nature and rock content, they have limited water-holding capacity and may be extremely saturated for about 6 to 8 weeks every year.

Deep soils at JBLM – YTC are dominated by mollisols followed by less extensive aridisols, entisols, and alfisols. Deep soils are often loamy or cobbly, generally are more productive, and have higher water-holding capacities than lithosol soils. Although deep soils typically become saturated because of snowmelt, they also dry quickly as water percolates through the soil profile. Silt loams and very cobbly loams make up about 70% of the installation's soils.

Most soils at JBLM – YTC are characteristic of arid climates and mesic temperature regimes. Soil surveys at the installation have identified more than 200 soil units, each of which has been rated in terms of suitability for various military operations and vehicular operations. Not all soils are equally suitable for the various operations that the Army conducts.

Most soils at JBLM – YTC are highly susceptible to erosion because of physical properties, steep slopes, and limited vegetation cover. Most erosion and runoff at the installation result from short-duration, high-intensity rain-on-snow events, commonly in areas of frozen or partially frozen soil. Frozen soils may be extremely resistant to erosion, but the erodibility of thawing soils is often greater. Summer thunderstorms are also a significant source of runoff.

JBLM – YTC has implemented numerous monitoring and mitigation strategies that aim to maintain soils in a manner that supports other natural resources, such as vegetation, water quality, wildlife, and cultural resources. Key methods include:

- stabilizing banks along the Columbia River;
- minimizing soils disturbance;
- revegetating disturbed areas;
- upgrading heavily used unimproved roads and bivouac areas;
- performing road maintenance following large maneuver events;
- installing weirs and check dams to promote sediment deposition;
- rotating training areas;
- monitoring water quality;
- closing roads that are steep, adjacent to streams, or not maintained to reduce soil loss;
- revegetation and erosion control measures following landscape scale wildland fires;
- monitoring wet soils and limiting maneuver training when soils are saturated

3.10.4.2 Environmental Consequences

IDDS-A training will not involve extensive maneuver, ground clearing activities, or ground level ordnance explosions. Many training events can be accomplished through simulations with no

live fire. Construction of new facilities or ranges to support the IDDS-A is not planned at JBLM – Lewis or JBLM - YTC. Also, live-fire range usage is predicted to increase by 0.7% which is negligible. Impacts to soils are adequately addressed in section 3.2.3.2 and are expected to be less than significant.

3.10.4.3 Cumulative Effects

Fielding of the seven planned capabilities listed in section 3.3 and the Action Alternative may require construction of facilities to support the MDTF and may also require expansion or renovation of existing facilities. As described in section 3.10.2.3 JBLM has identified a facility growth and improvement plan. Impacts from construction are expected to be less than significant because appropriate measures would be taken to protect soil resources. An expected increase of soldiers of approximately 2.0% would be using the live-fire ranges resulting in minor increases in the intensity and frequency of use of the training areas that are expected to be less than significant. The impacts are described in section 3.2.3.2. The additional actions in combination with those of the Action Alternative, are expected to result in minor, less than significant cumulative adverse effects to soils.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.3.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Planning requirements, the use of SOPs and BMPs, and routine range assessments and maintenance will reduce anticipated impacts. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.10.5 Land Use and Compatibility

3.10.5.1 Affected Environment

3.10.5.1.1 Cantonment

JBLM[83]

The cantonment area (approximately 14,260 acres [5771 ha]) is the developed portion of the installation (Figure 3.10-6). It serves as the center for most activities on JBLM apart from field training. Land uses in the cantonment area include family and troop housing, administrative uses,

[83] Information regarding JBLM land use was taken from the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019

commercial uses (e.g., shops and medical services), industrial uses (maintenance, logistics, and transportation), and open space maintained for training, recreation, and future development.

JBLM – YTC

The cantonment area (approximately 1,700 acres [690 ha]) serves as the administrative center for most training activities at JBLM – YTC, except for range management, which is located at Range Operations. There are no permanent party living facilities at JBLM – YTC, only transient housing to support units participating in training exercises. Administrative areas house buildings for offices, headquarters, classrooms, and other administrative functions. Commercial uses are limited to the Post Exchange and restaurant/club uses. Light industrial uses include warehousing, motor pool, and maintenance shops. Recreational uses include the recreation club and gymnasium, Kiddie Pond, and open space.

3.10.5.1.2 Range Complex

JBLM[84]

Training areas on JBLM, which are collectively referred to as the Range Complex, include maneuver, impact, range, and other training areas (Figure 3.10-6). They include forestland, wetland, prairie, brush, and marine environments. Training activities that characterize land use at JBLM include on/off-road vehicle movement, placement of temporary targets, gunnery practice, digging activities (vehicle positions, tactical operation centers, and foxholes), unit assembly, and unit deployment exercises.

JBLM training areas also accommodates a variety of nonmilitary activities, such as outdoor recreation, commercial timber harvest, nature walks, fish hatchery operations, and tribal members' traditional way-of-life.

Controlled Use Areas

Certain portions of JBLM have been designated as Controlled Use Areas (CUAs), where specific land use activities are restricted either seasonally or year-round. These areas contain unique attributes that require preservation, conservation, or restoration, or pose a safety or human health hazard. In some cases, land use restrictions in CUAs are associated with regulatory compliance (e.g., bald eagle nest and roost site buffers), and in other cases restrictions have been put in place to prevent additional restrictions on training in the future (e.g., priority habitat - areas occupied by listed species and/or contain high quality prairie that provides habitat for listed species). Areas designated as CUAs include wetlands and streams and their associated buffers, buffers for

[84] Information regarding JBLM land use was taken from the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019

listed species (priority habitat), and other natural resource areas; cultural sites; and environmental hazards such as landfills.

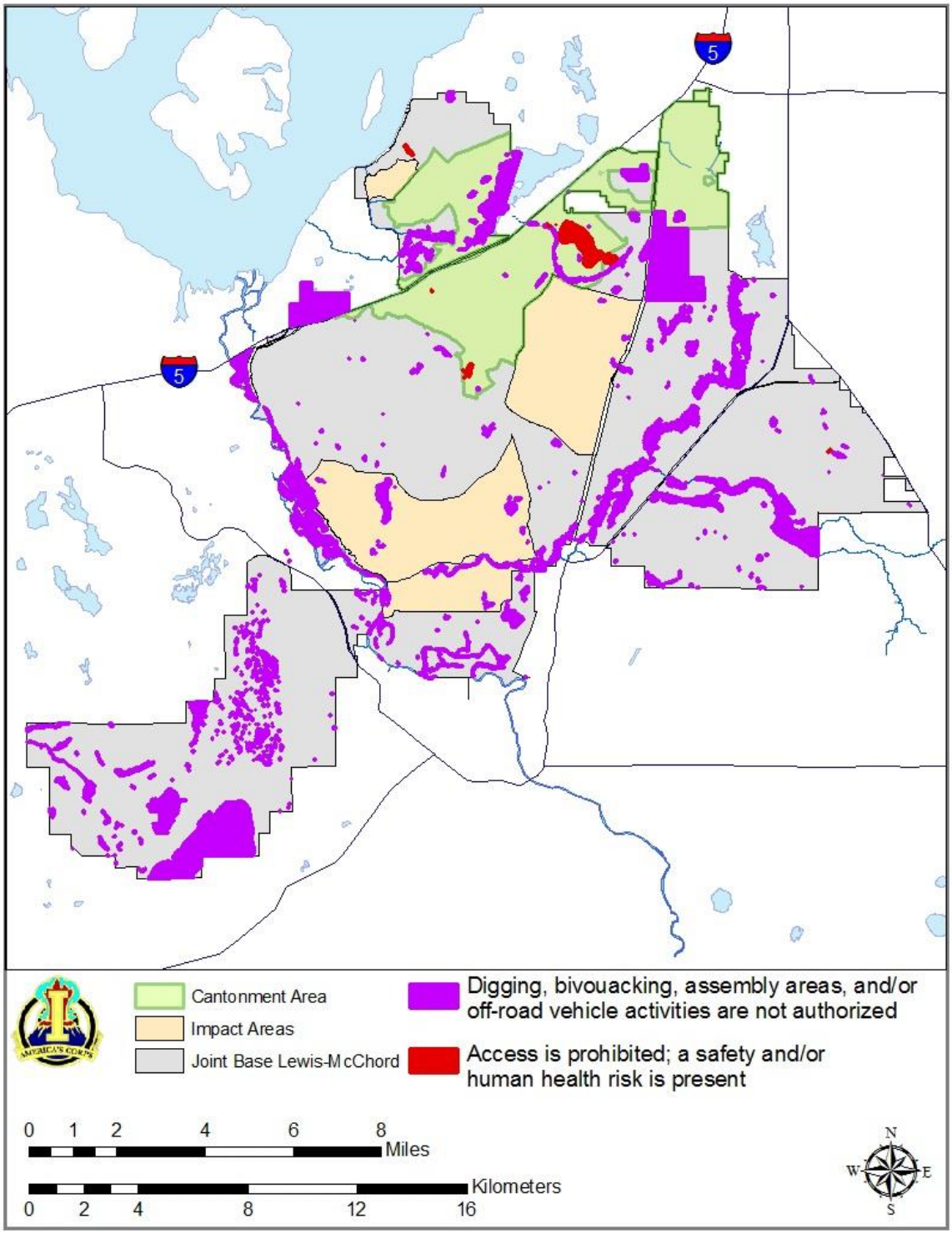

Figure 3.10-6 JBLM – Lewis Land Uses

JBLM – YTC

Training areas at JBLM – YTC include hilly desert and riparian environments. They are delineated into maneuver, impact, range, and special use areas. Special use areas include airborne training sites (drop zones), ammunition storage, and equipment storage. Training activities on maneuver areas that characterize land use at JBLM – YTC include maneuver events, off-road tracked vehicle movement, wheeled vehicle movement, aerial maneuver and gunnery activities, gunnery practice, digging activities (tank ditches, vehicle positions, and foxholes), unit assembly areas, and river crossing exercises.

The designated training areas are established to facilitate range management. Their use is managed by Range Operations. Training activities are coordinated to preclude damage to sensitive habitats and species. In conjunction with Range Operations, this coordination occurs with the ED at JBLM – YTC.

Non-military land uses at JBLM – YTC include recreational activities such as hunting, hiking, and horseback riding. These activities may take place anywhere throughout non-restricted areas of JBLM – YTC, depending on scheduled training exercises and when approved by the JBLM – YTC Commander. Between 1981 and 1984, the State of Washington Parks Department acquired the railroad right-of-way now known as the Palouse to Cascades State Park Trail. Twenty-two miles of this trail are located within, and owned and managed by JBLM – YTC. The trail is used for non-motorized types of recreation including hiking, trail rides, bicycling, and horseback riding.

JBLM – YTC is within the area ceded by bands and tribes of the Yakama Nation pursuant to the Treaty of 1855. Yakama tribal members continue to hunt and gather plant resources at JBLM – YTC. The Wanapum People live adjacent to JBLM – YTC's eastern boundary near Priest Rapids Dam and use the installation for traditional, religious, and ceremonial purposes. Restricted areas of JBLM – YTC (e.g., impact and dud areas) are not open to the public or for tribal access. Numerous areas of JBLM – YTC support root crop plants important to Native Americans.

To aid in resource management, JBLM – YTC is divided into five land use zones (Figure 3.10-7). These planning designations identify allowable military training activities and acceptable levels of impact to resources, thereby maximizing military training opportunities while simultaneously safeguarding resources. Land use and management activities are undertaken within the context of the zone designation. The descriptions of the five existing land use zone designations at JBLM – YTC are listed after figure 3.10-7.

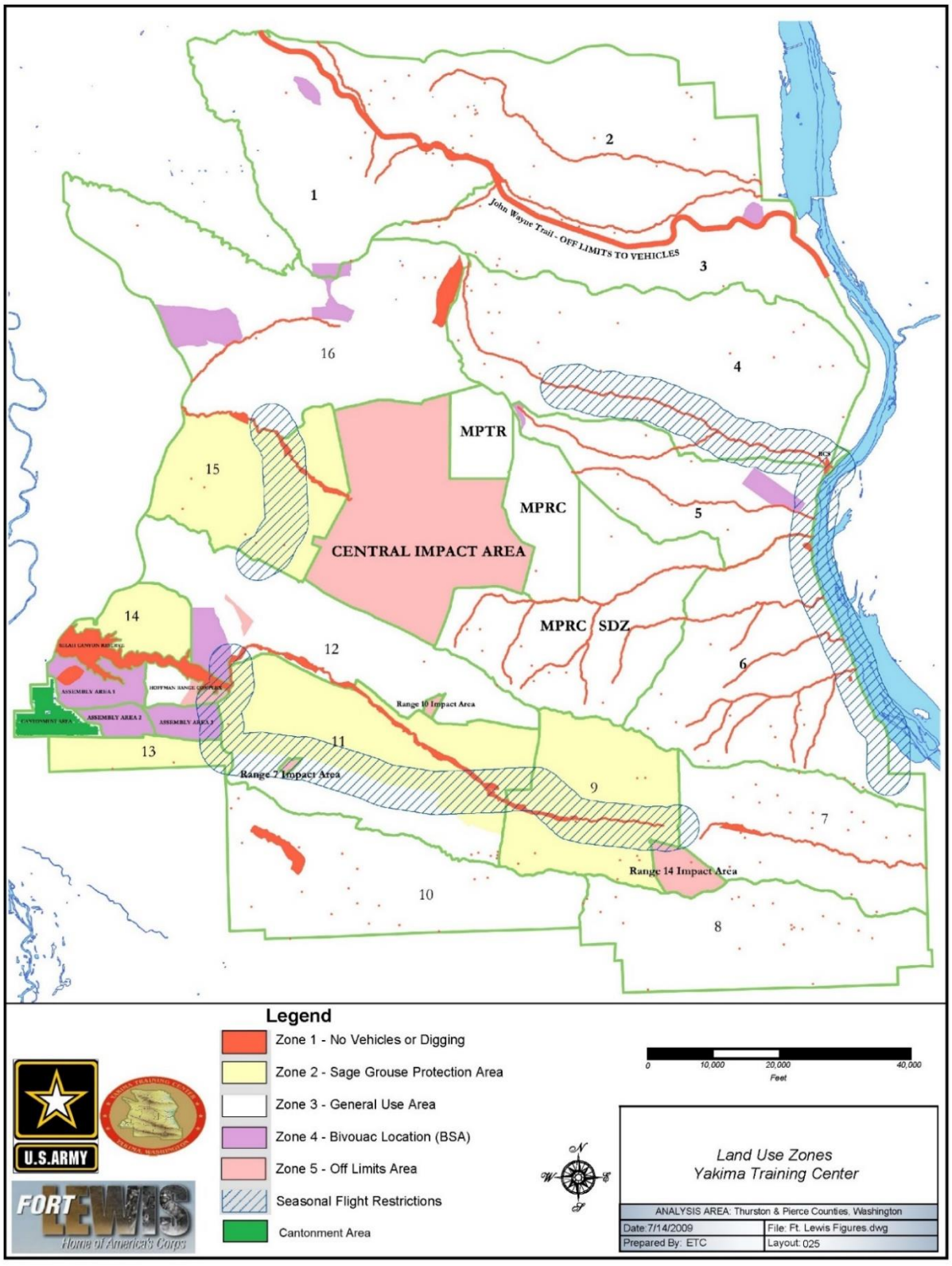

Figure 3.10-7 JBLM – YTC Land Uses

- Zone 1 (Land Bank). This zone covers approximately 14,030 acres (5,678 ha or 4.3%) of JBLM – YTC. It is managed for significant and sensitive natural and/or cultural resources (e.g. wetlands, riparian areas, archaeological, or sacred sites). Most forms of training, including all tracked and wheeled vehicle use, digging, and bivouacking, are prohibited in this zone. Protection and restoration of these sites is a primary management objective.
- Zone 2 (Conservation). This zone is the Sage-grouse Protection Area and covers approximately 75,901 acres (30,716 ha or 23.2%) of JBLM – YTC. Most forms of training are permitted within these areas, but are highly controlled. The Sage-grouse Management Plan provides a detailed description of protection and management measures that apply to these areas. Digging and bivouacking activities are not permitted within this zone. Army rest/rotation training regimes and restoration or rehabilitation activities are designed to maintain or enhance these areas.
- Zone 3 (General Use). This zone covers approximately 210,360 acres (85,130 ha or 64.3%) of JBLM – YTC and includes the MPRC, Multi-purpose Training Range (MPTR), cantonment area, and all the primary training and vehicle maneuver areas. With the exception of the cantonment area and portions of the MPRC and MPTR, all forms of training are permitted, including bivouac and digging activity, as long as surface water quality, soil stabilization, and potential long-term habitat reservoirs are maintained.
- Zone 4 (High Use). This zone covers approximately 8,330 acres (3,371 ha or 2.5%) of JBLM – YTC. It accommodates heavy use and high-impact activities, such as Brigade Support Areas (BSAs) and gravel pits. Reclamation or remediation activities are used to ensure protection of soil and water resources.
- Zone 5 (Impact Areas). This zone covers approximately 18,610 acres (7,531 ha or 5.7%) of JBLM – YTC and includes impact and dud areas and the Selah Airstrip. Due to unexploded ordnance in impact and dud areas, these sites are off limits; on-the-ground management of these sites is not feasible other than the protection of soil and water resources. These sites are, however, included in remotely sensed data collection efforts, including as subjects to satellite imagery and aerial photographs.

3.10.5.2 Environmental Consequences

Since JBLM – Lewis and JBLM – YTC do not plan on constructing ranges or facilities to support IDDS-A impacts to land use and compatibility from construction are expected to be less than significant. The increase in range usage is predicted to be 0.7%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.4.2.

3.10.5.3 Cumulative Effects

Fielding of IDDS-A and the seven planned capabilities listed in section 3.3 may require construction of facilities to support the MDTF and may also require expansion or renovation of existing facilities. As described in section 3.10.2.3 JBLM has identified a facility growth and

improvement plan. No change of land use is expected so impacts from construction are expected to be less than significant. An expected soldier population increase of approximately 2.0% would continue using the live-fire ranges in the same manner as previous, resulting in no impact. The effects of the additional actions are described in section 3.2.4.2. When combined with those of the Action Alternative, the effects are expected to result in less than significant cumulative adverse effects to Land Use and Compatibility.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.4.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers at that location. The new ranges will be constructed within the existing range complex, maintaining current land uses and away from incompatible uses. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

3.10.6 Facilities

3.10.6.1 Affected Environment

JBLM – Lewis

The cantonment area, also addressed briefly in Land Use and Compatibility, serves as the support center for activities at JBLM, other than field training. The cantonment area supports residential, administrative, commercial, and industrial activities, as well as Gray AAF and the Madigan Army Medical Center. The cantonment area contains the Post Exchange (PX), Commissary, services, a mini-mall, fast food restaurants, a welcome center, the library, and other facilities. The Gray AAF presently supports the Washington Army National Guard, Army Reserve, medical units, and private aircraft activities. The aircraft at Gray AAF include both fixed- and rotary-winged aircraft.

JBLM has approximately 5,000 Family housing units in 22 neighborhoods on the installation. Since 2002, Lewis-McChord Communities LLC has renovated more than 3,000 homes and constructed more than 1,000 new homes on the installation (USAEC 2014). JBLM has approximately 12,000 barracks and dormitory spaces for unaccompanied personnel.[85]

[85] *Programmatic Environmental Assessment Joint Base Lewis-McChord Real Property Master Plan,* June 2017, pg 3-68.

JBLM – YTC

Facilities within the 1,700-acre (690-ha) cantonment area, also addressed briefly in Land Use and Compatibility, are located in the southwest corner of the installation (Department of the Army 2005). A small developed area contains the parade field, headquarters, and other support facilities for the permanent party members of the installation. Approximately 2,500 barracks spaces are available to house Soldiers during training exercises. There are no family housing facilities or schools on JBLM – YTC. Administrative areas house buildings for offices, headquarters, classrooms, and other administrative functions. Personnel assigned to JBLM – YTC and their dependents live off the installation, within the regional area. Commercial uses are limited to the PX and restaurant/club uses. Light industrial uses include warehousing, motor pool, and maintenance shops. Vagabond Army Heliport, located in the cantonment area, is used for rotary-wing aircraft.

Army facilities are built to meet the standards of the uniform facilities criteria using standard designs of MILCON requirements, standardization, and integration or similar documents. Exceptions to standard are available and if granted for a facility, it would be considered adequate.

3.10.6.2 Environmental Consequences

The excess or deficit of facilities available to support the IDDS-A at JBLM – Lewis was assessed based on the Army RPLANS records. JBLM – Lewis has a deficit of required facility space to support the IDDS-A battery HQ, TEMF, hazardous material storage, and barracks as shown in Table 3.10-4. Since JBLM – YTC is a training center IDDS-A batteries will deploy there temporarily and permanent accommodations are not required.

Table 3.10-4 Facilities that may require construction at JBLM – Lewis

Facility space meeting the standard available – Y or N						
Facility	**Required per battery**	**Sq ft per battery**	**Acres per battery**	**JBLM – Lewis available sq ft**	**One battery**	**Two batteries**
Battery HQ	1	25,776	0.6	(529,005)	N	N
TEMF	1	28,304	0.6	(423,982)	N	N
Hazardous Mat'l Storage*	1	60	0.0	(6,551)	N	N
Barracks	1	8,420	0.2	(279,750)	N	N
* The Hazardous Material Storage Facility is constructed on the Tactical Vehicle Parking area.						

JBLM – Lewis would plan to provide facilities for the IDDS-A battery on par with what other units stationed there typically receive. New construction is not needed to support this requirement. Most units on JBLM – Lewis are assigned less than the facility space required by doctrine. The IDDS-A would be provided the required HQ, vehicle maintenance, and hazardous material storage space from existing facilities and this may require an exception to standard since it may be less than Army doctrine requirements. The need for barracks would be accommodated through Army supported off-post housing if required. If funding becomes available the required facilities could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

JBLM – Lewis also has a deficit of two range types required to support IDDS-A training. The specific range types are not being listed as an operational security measure. The deficit in acreage for the range types is shown in Table 3.10-5.

Table 3.10-5 Range Acreage that may require construction, JBLM – Lewis / JBLM – YTC

Standard Range shortage[1]		**Standard Range acreage shortage[2]**	
One battery	Two batteries	One battery	Two batteries
0.87	0.88	4307	4356
0.33	0.33	N/A[3]	N/A[3]
[1]The Standard Range shortage is computed by dividing the shortage of RD by the number of normal training days per Army doctrine.			
[2] The Standard Range acreage shortage is computed by multiplying the Standard Range shortage by the minimum Standard Range area.			
[3]No minimum range area specified per Army doctrine.			

Construction of new ranges to support the IDDS-A is not planned at JBLM – Lewis or JBLM – YTC. Training requirements would be met through the use of approved simulations or appropriate scheduling per the SRM or ReARMM. If funding becomes available the required ranges could be constructed and any required environmental analysis would be tiered or supplemental to this document or a separate effort.

Since JBLM – Lewis and JBLM – YTC do not plan on constructing ranges or facilities to support IDDS-A no impacts to facilities from construction are expected. The increase in range usage is predicted to be 0.7%, a negligible amount that is less than significant. More detailed impact information is in section 3.2.5.2.

3.10.6.3 Cumulative Effects

Fielding of the seven planned capabilities, when combined with the Action Alternative, is expected to have less than significant adverse cumulative effects with minor or negligible increases of the impacts described in section 3.2.5.2. Additional facility requirements of the MDTF are planned but not funded. The facilities would be constructed in the cantonment area and would be assessed under that effort if executed. Other capabilities, if fielded without MDTF, would require even less facility modification, smaller personnel growth, and lesser impacts.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.5.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase noise, ground disturbance, deposition of undesirable chemicals and compounds in the soil, and the number of soldiers in the vicinity. Impacts are expected to be no greater than minor and less than significant when combined with the Action Alternative. The new ranges will distribute training across a greater number of ranges and reduce the use of any single range. Also, the Army performs routine monitoring of range conditions and implements maintenance and rehabilitation when required.

3.10.7 Water Resources

3.10.7.1 Affected Environment

3.10.7.1.1 Surface Water

JBLM[86]

The surface water resources at JBLM include rivers, streams, lakes, wetlands, and marine areas (Figure 3.10-8). Four major source water drainage basins occur on JBLM: the Nisqually River basin, the Sequalitchew Creek basin (including American Lake), the Deschutes River basin, and the Chambers/Clover Creek basin (Clover Creek runs through McChord Field). Because of the gentle topography and generally permeable soils, surface water runoff is very low, with few perennial streams, and poorly defined surface water subbasins. Subsurface drainage is determined by the topography of impermeable strata that occurs at varying depths below the ground.

Streams on JBLM include Clover Creek, Morey Creek, Lacamas Creek, Muck Creek, Murray Creek, and Sequalitchew Creek. There are 29 lakes on the installation, with the largest being American, Lewis, Nisqually, and Sequalitchew lakes. Over 50% of JBLM (48,000 acres) falls

[86] The source of information for surface water at JBLM is the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019.

within the Nisqually River basin. The Nisqually River crosses the installation in a southeast to northwest direction and discharges into Puget Sound at the Nisqually Reach.

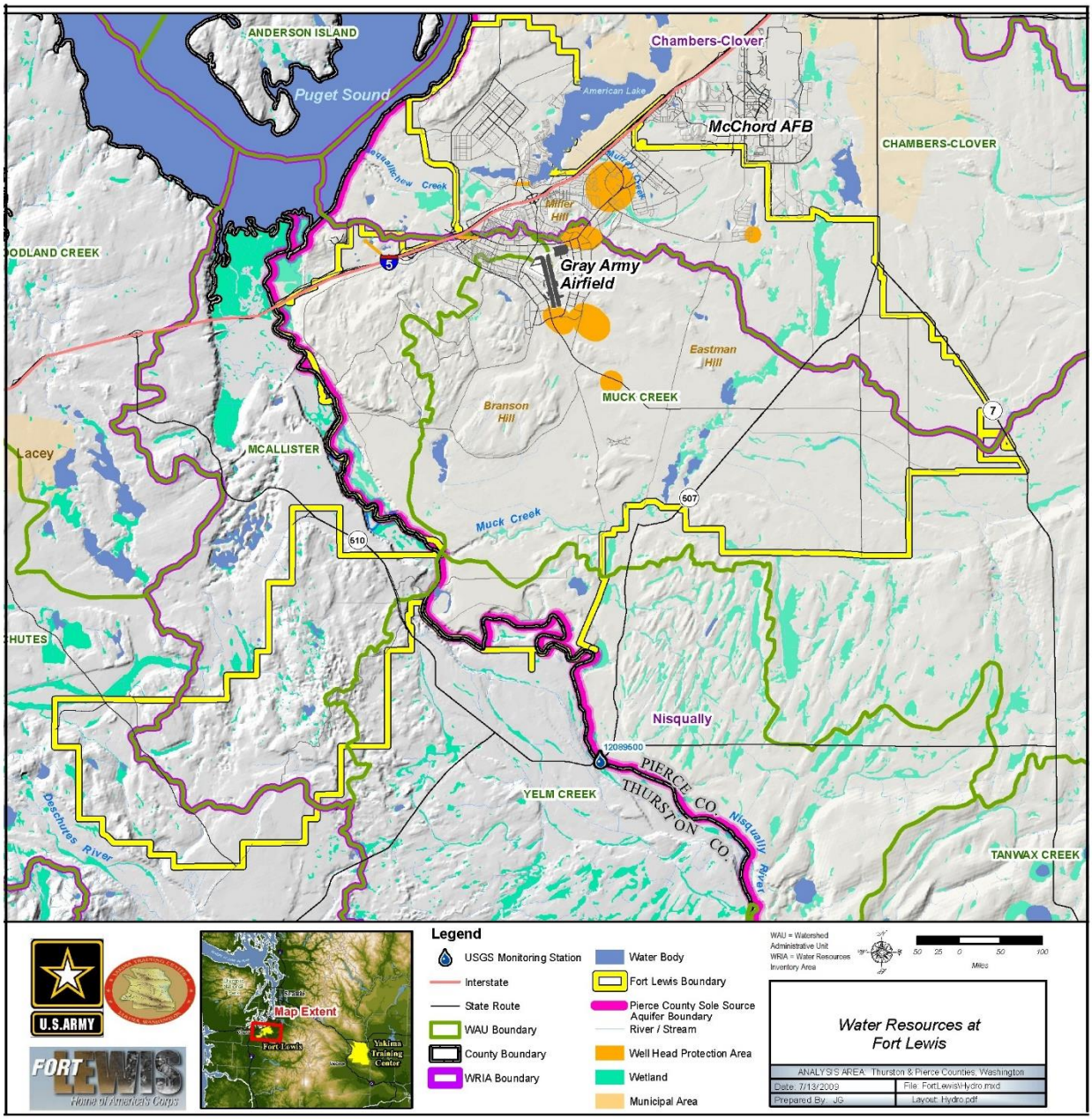

Figure 3.10-8 Water Resources at JBLM - Lewis

Stormwater from developed areas on the installation discharges to groundwater via onsite infiltration or through surface water drainage systems to Puget Sound or other surface waters on JBLM, such as Clover Creek, Murray Creek, American Lake or marshes in the vicinity of Sequalitchew Creeks. Stormwater runoff from one drainage basin on North Fort passes through

an oil/water separator before continuing down a constructed storm drainage channel (JBLM Canal) that discharges to Puget Sound near the wastewater treatment plant at the northwest corner of the installation.

Under the JBLM Municipal Separate Storm Sewer System (MS4) Permit (WAS-026638) new construction projects are required to provide onsite management and treatment of stormwater which reduces stormwater discharges to surface waters and increases onsite infiltration and aquifer recharge. Stormwater from commercial and industrial sectors of the cantonment area are routed through stormwater treatment facilities, which may include oil/water separators, prior to discharge to the JBLM MS4. Industrial and commercial process wastewater is routed through oil/water separators, grease traps, or other treatment devices prior to discharge to the sanitary sewer for further treatment at the wastewater treatment plant before effluent is discharged to the Puget Sound.

JBLM – YTC

The main surface water features near the ROI include the Columbia River to the east and the Yakima River to the west. Surface water resources at JBLM – YTC include streams, seeps, springs, and 21 artificial ponds (Figure 3.10-9). Thirteen man-made sediment retention ponds are maintained for erosion control and monitoring. Greely Pond, Kiddie Pond (seasonal and uses irrigation water), and Coffin Pond are used for recreation (Department of the Army 2002). A variety of surface and ground water sources are used to support the wildland fire mission, cantonment firefighting, and training support.

Major streams discharging into the Columbia River include Alkali, Hanson, and Johnson Creeks, which are at least partially perennial; and Sourdough, Middle, and Corral Canyon Creeks, which are intermittent. Selah and Lmumma Creeks, which are perennial in their lower reaches, and intermittent Cold Creek discharge to the Yakima River. The remaining drainages on JBLM – YTC are ephemeral or intermittent flowing for a short time in the spring or immediately following a large storm event.

Hydrologic conditions vary annually depending on seasonal snowpack and runoff characteristics. Rain falling on snow or frozen ground may result in flash runoff events with minimum water retention. Gradual melting of snow creates more consistent spring flows and recharges shallow aquifers resulting in higher, more consistent summer base flows. Several years of drought conditions can cause perennial streams to become intermittent or ephemeral in certain reaches. When shallow aquifers are recharged temporarily, intermittent reaches or ephemeral reaches may return to a perennial condition (Department of the Army 2002).

The stormwater drainage system serving the cantonment area at JBLM – YTC consists of two detention basins, several oil/water separators, and open ditches that convey the runoff to several industrial stormwater outfalls (McDonald 2009b). The drainage system discharges into an

intermittent stream, which then enters the Yakima River downstream of Selah Creek. Because of the low hydraulic gradient of vegetated channels of the drainage systems and long distances to receiving waters, stormwater discharges do not affect the Yakima River (Department of the Army 2005).

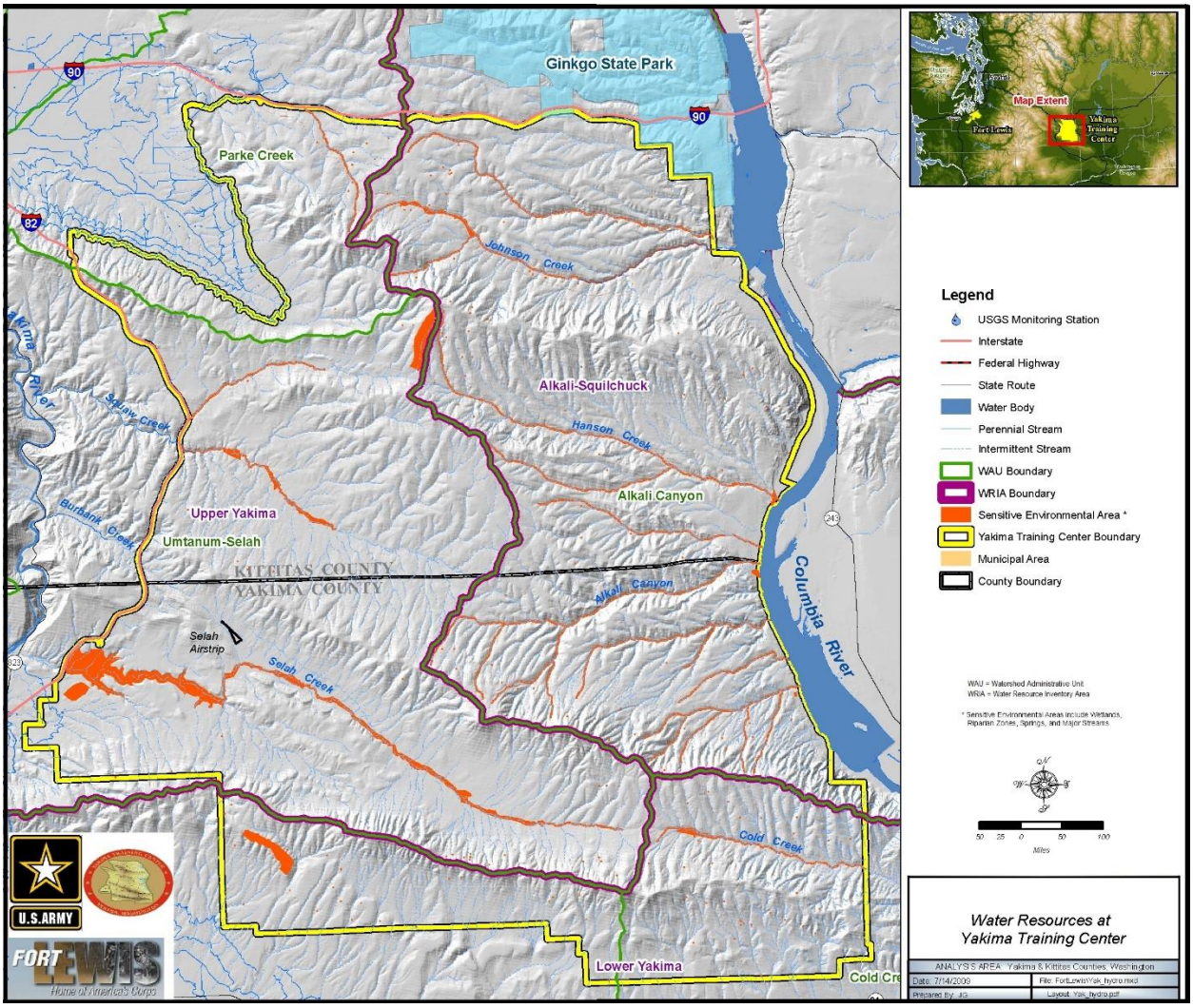

Figure 3.10-9 Water Resources at JBLM – YTC

3.10.7.1.2 Groundwater

JBLM[87]

The flow of groundwater underlying JBLM is controlled by a system of hydrogeologic units consisting of alternating aquifers: water-bearing strata of sand and gravel, and aquitards: strata

[87] The source of information for groundwater at JBLM is the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019.

composed of silts and clays not capable of producing significant amounts of water (Public Forestry Foundation 2005). Depths to groundwater in the unconfined aquifers throughout JBLM range from 10 to 30 feet, with lesser depths near lakes and streams and greater depths beneath hilly areas. The remaining aquifers are characterized by aquitards with low permeability that contain groundwater under confined conditions. Confined aquifers are generally less susceptible to surface sources of contamination than unconfined aquifers.

Groundwater recharge on a regional scale originates as precipitation on the western flank of the Cascade Mountains, is transmitted in a generally westerly direction through the hydrostratigraphic system, and discharges to the Puyallup and Nisqually river valleys and Puget Sound. Local recharge of groundwater is provided by infiltration of precipitation, stormwater runoff, and lakes and streams that lie above the prevailing water table.

Groundwater in the shallow Vashon Drift aquifer generally flows in a west/northwest direction across JBLM, but changes direction in the vicinity of discharge areas such as major lakes, creeks, and the Nisqually River. Flow of groundwater in the deeper aquifers also is generally in a west/northwest direction. Groundwater elevations decrease with aquifer depth, indicating a downward vertical gradient, and velocities have been estimated at 0.02 to 2 feet per day for the shallow Vashon Drift aquifer and 0.1 to 1 foot per day for the Salmon Springs aquifer (Envirosphere Company 1988).

JBLM – YTC

Groundwater in the ROI for JBLM – YTC occurs within four principal aquifers: surficial sedimentary units (principally Ellensburg Formation), Saddle Mountains Basalt, Wanapum Basalt, and Grande Ronde Basalt (Army 1994). The four aquifers are not present everywhere across JBLM – YTC; the occurrence and movement of groundwater at a given location depends upon rock type, geologic structure, and topography. Extensive folding of the sedimentary and basalt strata created a complex groundwater system with highly variable hydraulic properties, depths to water, and flow directions.

Groundwater is found in gravel layers within the surficial sedimentary formations, typically confined by overlying finer-grained materials. Within the sequences of basalt, groundwater is predominantly found within the weathered, more fractured contact zones and within sedimentary interflow zones. Reported subsurface depths of groundwater range from 20 feet in stream valleys to more than 200 feet at higher elevations. Groundwater springs occur where incised stream valleys intercept aquifers. Although precipitation is low within the ROI, approximately 200 springs are present on JBLM – YTC, ranging from seasonal to perennial (Department of the Army 2005).

Deeper aquifers are recharged mainly from areas west of the installation, whereas shallower aquifers are recharged primarily from precipitation falling at higher elevations on JBLM – YTC.

Water level elevation maps for aquifers in this area indicate regional groundwater flow from recharge areas in the center part of JBLM – YTC toward the Yakima River on the west and south, and toward the Columbia River on the east. Locally, groundwater flow patterns are affected by topography and groundwater pumping (Army 1994).

3.10.7.1.3 Water Quality

JBLM[88]

Stormwater originating in developed areas on the installation is in accordance with applicable United States Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) Permits and Washington State water quality requirements. The NPDES permitting process addresses stormwater impacts to aquatic species and habitats downstream. Furthermore, efforts to reduce potable water consumption and efforts to manage stormwater or reclaimed water through infiltration could help increase the quantity of water in Sequalitchew Creek.

JBLM has taken several measures to assure compliance with the Washington State Coastal Zone Management Program. Erosion beyond natural processes is very minor due to management actions such as riparian enhancement projects on JBLM streams, stream crossing only occur at designated hardened crossing sites, and a 50m buffer zone is established along all bodies of water. The buffer zone excludes any ground disturbing activities within the buffer. As a result of these actions, human caused sedimentation is basically so minor that none would ever reach the coastal zone. In addition, JBLM constructed a new sewage treatment plant, which began operating in August 2016. The treatment plant is designed to support a projected population of 100,000 people by providing biological nutrient removal, tertiary membrane filtration and UV disinfection. This advanced treatment improves the quality of water discharged to Puget Sound to Class A level. This water will be re-distributed for use on the base once the infrastructure for distribution is in place.

The groundwater in the JBLM area is generally low in total dissolved solids and shows a predominance of calcium and bicarbonate as major constituents, with lower concentrations of magnesium, sulfate, and chloride (Brown and Caldwell 1985). Discharges from septic tanks and stormwater recharge systems (dry wells) have resulted in detectable increases in constituents such as nitrates and chlorides in developed portions of Pierce County. Monitoring records for the JBLM water system indicate that, with few exceptions, water quality is in compliance with state and local requirements for water supplies.[89] The groundwater quality beneath specific areas of

[88] The source of information for water quality at JBLM is the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019.
[89] https://home.army.mil/lewis-mcchord/application/files/5516/2448/3528/Lewis_CCR_2021_Final.pdf, accessed 7Jul21.

JBLM, mainly within the cantonment area, has been adversely affected by past activities, including waste disposal, leakage, and spillage of chemicals.

In May 1987, a petition for sole-source aquifer designation of the Clover/Chambers Creek basin was submitted by the Tacoma-Pierce County Health Department to the Environmental Protection Agency (EPA) as a key component of a basin-wide management strategy. The unconfined aquifer under Pierce County was designated as a sole-source aquifer by EPA in 1993; Thurston County never applied for this status. Because of the sole source designation, new solid waste landfill cells cannot be constructed on JBLM and groundwater conditions may impact future land-use decisions on the installation.

JBLM – YTC

The primary water quality concern at JBLM – YTC is introduction of fine sediment into streams with subsequent discharge to the Yakima and Columbia Rivers. Discharge of fine sediment is most likely following high, short-duration flow events, which typically involve rain falling on snow or frozen ground. Sources of fine sediment include degraded upland areas, improperly designed and located roads, degraded channels resulting from mass wasting, and natural erosion processes.

To date, conclusions based on analyzed data indicate that sediment loads from JBLM – YTC contribute a small fraction of total sediment loads in the Columbia and Yakima systems. However, the effect of timing and extent of discharge is not known.

A restoration program exists at JBLM – YTC to reduce and minimize discharge of sediment to both the Yakima and Columbia Rivers. The program includes management and rotation of training areas to allow vegetation to recover, active restoration by planting, construction of sediment trapping check dams at critical locations, and protection of critical riparian vegetation corridors by restricting use of those areas. The restoration program is consistent with the requirements for best management practices for compliance with the anti-degradation policy of the State of Washington (WAC 173–20 1 A–070) for nonpoint sources of pollution, as required by Section 319 of the Clean Water Act (Army 1994, McDonald 2009b).

Within recent years, JBLM – YTC has completed improvements in road network and structure, road closures and realignments, and channel crossings. Suspended solids discharged from JBLM – YTC add to effects of suspended solids discharged naturally and from agricultural sources, but the magnitude of contribution of suspended solids from JBLM – YTC is very small compared to other sources. Other causes of water quality impairment (bacteria, pesticides, and temperature) are not significantly affected by activities at JBLM – YTC. Nutrients may be affected as a secondary effect of soil erosion and sediment discharge.

Groundwater at JBLM – YTC is accessed for potable and non-potable uses. Quality can be evaluated for potable water because it is subject to periodic analysis. Aquifers in which drinking water wells are developed showed no evidence of degradation until recently (Bartz 2009). The Selah well on post has just been found to have elevated levels of per- and polyfluoroalkyl substances.[90]

Past industrial practices in the cantonment area have resulted in contamination of shallow groundwater associated with two locations, a former fire training pit and a former vehicle maintenance shop, with low concentrations of petroleum products and trichloroethylene, respectively. The concentrations of petroleum products have decreased over time. Monitoring for these contaminants is continuing (Bartz 2009).

3.10.7.1.4 Wetlands and Floodplains

JBLM

Wetlands[91]

Wetlands and other aquatic habitats are widely distributed over JBLM, with over 200 wetlands covering roughly 4,600 acres of the installation (Figure 3.10-10). Wetland types include open water, emergent, scrub-shrub, and forested (based on the Cowardin et al. [1979] classification system).

Freshwater wetlands consist of both small kettle and large wetland systems; aquatic beds dominated by aquatic vascular plants such as duckweed, pondweed, and Eurasian water-milfoil; emergent wetlands, which are open, marshy habitats supporting numerous species of sedge, cat-tail, and other herbaceous species; scrub-shrub habitats that support low-growing woody species such as spirea and willows; and forested wetlands, characterized by red alder and Oregon ash in the overstory, and salmonberry, vine maple, and stinging nettle in the understory.

Most large wetlands on JBLM have a hydrological connection to creek and river drainages, such as Chambers/ Clover Creek, Muck Creek and the Nisqually River. However, many wetlands are surface expressions of groundwater (closed systems) and have no inlet or outlet streams. These may act as groundwater discharge or recharge areas, depending on seasonal changes in the water table and the direction of groundwater flow (CH2M HILL 1994).

[90] Personal communication, Mr P Nissen, YTC DPW-ED, 27 July 2021.
[91] The source of information for wetlands at JBLM is the *Joint Base Lewis-McChord Integrated Natural Resources Management Plan*, January 2019.

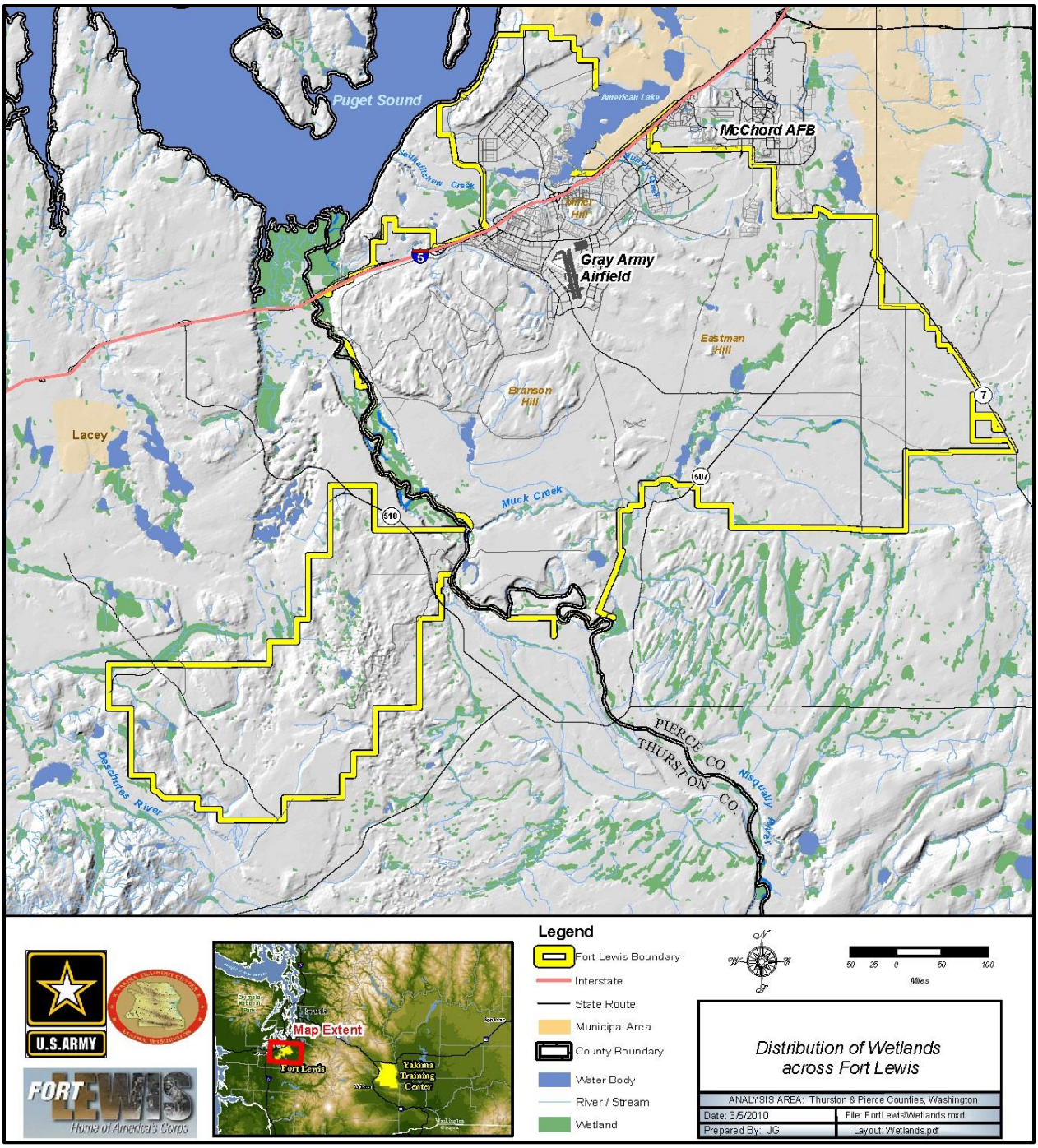

Figure 3.10-10 Wetlands at JBLM - Lewis

Wetlands are managed to maintain wetland training opportunities, enhance anadromous fish habitat, provide recreational opportunities, and control invasive species. Management of wetlands on JBLM involves protecting wetlands to ensure no net loss, protecting surface water quality in aquatic habitats, and protecting populations and habitats of listed wetland and aquatic

species. In general, wetland plant communities are managed by protecting them from vehicle disturbances, monitoring and controlling populations of invasive species, and planting native riparian vegetation. Fish and Wildlife Program biologists maintain and extend hardened crossings, as necessary, to further prevent impacts to wetlands. In addition, management for fish and wildlife benefits many native wetland plant communities.

Various vegetative control measures are used to improve habitat conditions for fish and wildlife and protect rare and endangered plant species. Most management of forested wetlands consists of protecting these areas during timber harvest of adjacent forest areas. Where wetlands are adjacent to mature forest components and intact woodlands, the forest types and their ecotones around wetlands are protected and maintained. The largest wetland/floodplain forests occur in the Nisqually Riparian Zone CUA, where direct management of forests does not occur.

Wetland habitats will be protected by:

- enforcement of the 50-meter buffer around all wetlands including reservoirs, lakes, marshes, ponds, and riparian zones that restrict vehicle traffic to established roads;
- continuation of the current practice restricting water crossings involving wheeled/tracked vehicles to authorized fords and;
- continuation of past reclamation efforts designed to maintain, monitor, and control new populations of invasive non-native species on marshes and lakes.

Two primary objectives with numerous underlying strategies support JBLM wetland habitat protection.

- Objective 1: Protect and maintain wetland and riparian ecosystems and their functions, including water quality and habitat for aquatic and terrestrial life.
- Objective 2: Develop and maintain structural elements of wetland and riverine ecosystems to support viable self-sustaining populations of species fully dependent on these ecosystems while maintaining conditions that support the part of the military training mission requiring a water environment.

Wetlands will be surveyed for populations of invasive species, and established populations will be monitored to determine whether they are increasing in size and reducing the suitability of wetland habitats for fish and wildlife. Sites where habitat has been enhanced will be monitored, as necessary, to assess the effectiveness of management actions

Water Control Structures

Wetland water levels are a key element to water quality enhancement, vegetative control and wildlife habitat. Many of the wetlands were ditched and drained in the early 1800s. Since then, wetland reclamation projects have been implemented to restore water levels to historic or near historic levels.

Dikes have been installed for water level management on Johnson, Watkins, Hardhack, and Spanaway marshes, as well as Chambers Lake. Water is impounded during the wet season, and released slowly in the dry season to augment instream baseline flows. A water control structure or headgate controls the rate of outflow of water into stream channels. Headgates are raised and lowered manually over the opening with valve wheels, controlling outflows and water levels within wetlands. To accommodate anadromous fish migration, fish ladders were built into the dikes at Johnson Marsh and Chambers Lake. Manipulations to the water control structures are used to control and balance the flow of water over the fish ladders. It is important to maintain adequate flow over the fish ladders during fish migration periods.

Floodplains

The Federal Emergency Management Agency/Flood Insurance Rate Map (FEMA/FIRM) "Special Flood Hazard Areas" maps suggest that the Nisqually River and Muck Creek are the only drainages subject to major flooding (Washington Department of Ecology 2008) (Figure 3.10-11).

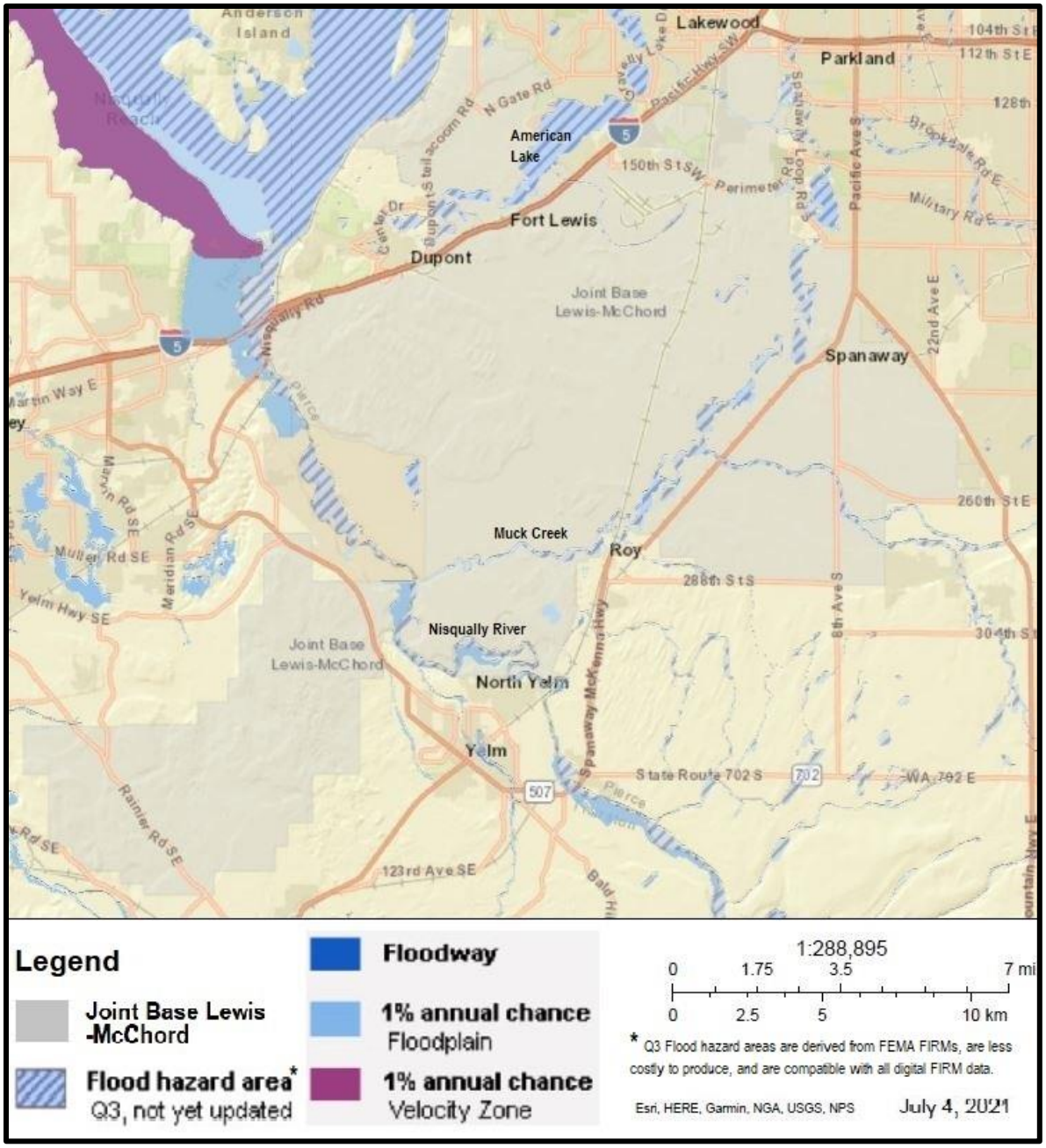

Figure 3.10-11 Floodplains at JBLM - Lewis
Source: https://apps.ecology.wa.gov/coastalatlas/tools/Flood.aspx

JBLM – YTC

Wetlands

JBLM – YTC lies in rugged topography within the Columbia Basin and averages only 6 to 16 inches (15 to 41 cm) of precipitation annually. Consequently, wetlands there are limited to the

immediate vicinity of perennial streams and the numerous springs emanating from hill slopes (ENSR 1992). Major drainages include Selah Creek, Lmumma Creek (including the North Fork), Alkali Canyon, Hanson Creek, Cold Creek, Middle Canyon, and Johnson Creek. Review of the USFWS Wetlands Mapper[92] at large scales of 1:36,112 and larger for JBLM – YTC reveals narrow riverine wetlands along drainages with scattered Freshwater Emergent Wetlands and Freshwater Ponds. Wetlands formed in these channels are composed of cattails, rushes, and sedges with occasional patches of scrub-shrub vegetation such as willows and small cottonwoods. Many of these channels have been disturbed by training activities and grazing in the past, with an overall loss of plant community structure. Erosion control programs already instituted by JBLM – YTC will enhance the overall quantity and quality of riparian ecosystems found there (Department of the Army 2001b).

Protection of wetlands, riparian areas, and water sources at JBLM – YTC is accomplished by the following constraints on unit training activities:

- Reverse Osmosis Water Purification Unit and Tactical Water Purification System training must coordinate in advance with Range Operations and the DPW ED. Backwash water may only be disposed of by approved methods. If flocculants are used, the backwash water must be captured and transported back to the cantonment area for disposal into the sanitary sewer system. If sumps are required, units must receive an approved dig permit.
- Units planning to conduct river crossing or amphibious training activities must begin coordination with Range Operations and DPW at least six months in advance. River crossing or amphibious training activities will be limited to July through November.
- Off road maneuver will be temporarily suspended or redirected during periods of soil saturation.
- Vehicle movement parallel to drainages should remain 60m from the riparian area.
- Bivouacking and POL vehicle parking must remain 100m from drainages.
- Vehicle operators should avoid sharp and neutral steer turns.
- Use hardened areas to administratively assemble or bivouac when possible.
- Use existing roads to the greatest extent possible to avoid creating new roads.

Floodplains

Based on the FEMA/FIRM maps, flooding is not an issue within the JBLM – YTC boundaries (Washington Department of Ecology 2008).

3.10.7.2 Environmental Consequences

Neither JBLM – Lewis nor JBLM – YTC plan to construct new facilities or ranges to support the IDDS-A. Also, live-fire range usage is predicted to increase by 0.7%, which is negligible. The

[92] USFWS Wetlands Mapper at https://www.usfws.gov/wetlands/Data/Mapper.html accessed 5Jul2021.

tactics used during IDDS-A training will not require extensive maneuver or ground clearing activities. Most IDDS-A training events will be accomplished using simulations with no firing of live ordnance. The live ordnance fired by IDDS-A is designed for air intercept and will not have extensive ground explosions. Impacts to all water resources are adequately addressed in section 3.2.6.2 and are expected to be negligible and less than significant.

3.10.7.3 Cumulative Effects

When combined with the Action Alternative, fielding of the seven planned capabilities is expected to have less than significant cumulative adverse effects to all water resources. The impacts are described in section 3.2.6.2. The MDTF impacts are expected to be less than significant with a facility growth and improvement plan identified in areas that are outside of wetlands and floodplains, minimizing impacts to those resources. The anticipated cumulative population increase is 2.0% for soldiers on JBLM and including all family members is 0.12% within the ROI resulting in minor or negligible impacts to surface and groundwater, water supplies, water use, and potential water quality degradation.

The Army has plans and funding to construct a Shadow UAS Training Facility at JBLM – Lewis and an IPBC at JBLM – YTC. Impacts from construction would be like those described in Section 3.2.6.2. The IDDS-A system is not expected to use the new range or facility. Soldiers from the IDDS-A battery may use the IPBC for individual or small unit training. Use of the ranges could increase ground disturbance and deposition of undesirable chemicals and compounds in the soil at that location. The new ranges will reduce the intensity of use on other ranges, distribute impacts over a wider area, and reduce the negative impacts at any one location. Routine range assessments and maintenance will ensure undesirable chemicals and compounds are not migrating to water resources. There are expected to be minor, less than significant impacts from the construction and use of the new ranges when combined with the Action Alternative.

4 APPENDIX A ACRONYMS AND ABBREVIATIONS

§ .....Section

AAF .....Army Airfield
AASLT .....Air Assault
ABCT .....Armored Brigade Combat Team
ABN .....Airborne
ACEC .....Area of Critical Environmental Concern
ACHP .....Advisory Council on Historic Preservation
ACM.....Army Capabilities Manager
ACOM.....Army Command
ACP .....Army Campaign Plan; *or* .....access control point
ACUB.....Army Compatible Use Buffer
ADA .....Air Defense Artillery
ADP.....Area Development Plan
AFB .....Air Force Base
AGL.....Above Ground Level
AIAMD .....Army Integrated Air and Missile Defense
AIRFA.....American Indian Religious Freedom Act
AMC.....U.S. Army Materiel Command
AMD.....Air and Missile Defense
AMPTR .....Automated Multi-Purpose Training Range
AMPV .....Armored Multi-Purpose Vehicle
AMS .....Army Modernization Strategy
ANG .....Air National Guard
APA.....Administrative Procedure Act
APE .....Area of Potential Effect
APHC .....Army Public Health Center
AR .....Army Regulation
ARF .....Automated Record Fire
ARNG.....Army National Guard
ARPA .....Archaeological Resources Protection Act
ARRM.....Army Range Requirements Model
ARSTAF .....Army Staff (an HQDA component)
ASCC .....Army Service Component Command

BA .....Biological Assessment
BCC.....Birds of Conservation Concern
BCT.....Brigade Combat Team
Bde .....Brigade
BGEPA .....Bald and Golden Eagle Protection Act
BLM.....Bureau of Land Management
BMC.....Battle Management Center
BMP .....best management practice
Bn.....Battalion
BO .....Biological Opinion
BRAC.....Base Realignment and Closure

C-RAM .....Counter Rocket, Artillery, and Mortar
C-UAS.....Counter Unmanned Aerial Systems
CAA .....Clean Air Act
CAB .....Combat Aviation Brigade
CBHD .....Clarksville Base Historic District
CDR .....Commander
CEQ.....Council on Environmental Quality
CFR.....Code of Federal Regulations
CG .....Commanding General
CM .....Cruise Missile
CMD .....Cruise Missile Defense
CNIC.....Comanche National Indian Cemetery
COM .....commercial (telephone number)
Commo.....Communications

CONUS .....Continental United States
COS .....Chief of Staff
CR.....cultural resources
CRBM .....Close Range Ballistic Missile
CRFC.....Conservation Reimbursable and Fee Collection
CRM .....Cultural Resources Manager
CRMP.....Cultural Resources Management Program
CSA .....Chief of Staff of the Army
CUA .....Controlled Use Area
CWA.....Clean Water Act
CX .....Categorical Exclusion
CZMA .....Coastal Zone Management Act

DA .....Department of the Army
DA PAM .....Department of the Army Pamphlet
DAR .....Department of the Army Representative (to the FAA)
DASA-ESOH ..Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health
DASA-IH&P ...Deputy Assistant Secretary of the Army for Installations, Housing and Partnerships
db.....decibel (used to measure sound level)
DBH .....diameter at breast height
DCG .....Deputy Commanding General
DCS .....Deputy Chief of Staff
DD Form .....Department of Defense Form
DE-SHORAD..Directed Energy Short Range Air Defense
DEIS .....Draft Environmental Impact Statement
DES .....Director of Emergency Services; *or*
.....Directorate of Emergency Services
DFC .....Desired Future Conditions
DHS .....U.S. Department of Homeland Security
DIV.....Division
DLA .....Defense Logistics Agency
DMM.....Discarded Military Munitions
DMPTR.....Digital Multi-Purpose Training Range
DNR .....Department of Natural Resources
DoD.....Department of Defense
DoDI .....Department of Defense Instruction
DOE .....U.S. Department of Energy
DOPAA.....Description of Proposed Action and Alternatives
DOTMLPF-P ..Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, Facilities, Policy
DPTMS .....Director of Plans, Training, Mobilization and Security; *or*
.....Directorate of Plans, Training, Mobilization and Security
DPW.....Director of Public Works; *or*
.....Directorate of Public Works
DPW-ED.....Directorate of Public Works, Environmental Division
DPW ENV .....Directorate of Public Works, Environmental Division
DRU .....Direct Reporting Unit
DSN.....Defense Switched Network (telephone number)
DVD.....Digital Versatile Disc

EA .....Environmental Assessment
ECL.....Environmental Checklist
ED .....Environmental Division
E-Date .....Effective Date
e.g.....exempli gratia (Latin, meaning “for example”)
EIS.....Environmental Impact Statement
EISA.....Energy Independence and Security Act
EMU.....Ecological Management Unit
encl.....enclosure
EO .....Environmental Officer; *or*
.....Executive Order

EOD.....Explosive Ordnance Disposal; *or* Explosive Ordnance Detachment
EPA .....U.S. Environmental Protection Agency
EPAct .....Energy Policy Act of 2005
EQ.....Environmental Quality
EQCC .....Environmental Quality Control Committee
ERCA .....Extended Range Cannon Artillery
ES^2.....Energy Security & Sustainability
ESA .....Endangered Species Act
ESCP .....Erosion and Sedimentation Control Plan
ESMC .....Endangered Species Management Component
ESMP .....Endangered Species Management Plan

FA.....Field Artillery
FAA .....Federal Aviation Administration
FBI.....U.S. Federal Bureau of Investigation
FBTC.....Fort Bliss Training Center
FBWSC .....Fort Bliss Water Services Company
FEIS.....Final Environmental Impact Statement
FEMA.....Federal Emergency Management Agency
FGS.....Final Governing Standard
FIRM .....Flood Insurance Rate Map
FMP.....Forest Management Plan
FNSI .....Finding of No Significant Impact (as used in current 32 C.F.R. Part 651; to be changed to 'FONSI')
FOB .....Forward Operating Base
FONPA.....Finding of No Practicable Alternative
FONSI .....Finding of No Significant Impact (to be used by the Army when the 32 C.F.R. Part 651 revision is promulgated)
FORSCOM .....U.S. Army Forces Command
FoV .....Family of Vehicles
FR.....Federal Register
FRUS.....Fort Riley Utility Services
ft .....feet
ft^2.....square feet
FTUAS.....Future Tactical Unmanned Aerial System
FY .....fiscal year
FYXX-YY.....fiscal year range (XX = start of range; YY = end of range)

GC.....Garrison Commander
GHG.....greenhouse gas
GIS .....Geographic Information System
GM .....Garrison Manager
GO.....General Officer
GSA.....General Services Administration
GSF .....Gross Square Feet
GTA .....Grow the Army (a past Army restructure initiative)
GW.....gigawatt

H&S .....health and safety
ha.....hectare
HAP.....hazardous air pollutant
HEL.....highly erodible land
HEMTT.....Heavy Expanded Mobility Tactical Truck
HET.....Heavy Equipment Transporter
HHQ.....higher headquarters (e.g., above garrison)
HIMARS.....High Mobility Artillery Rocket System
HM .....hazardous material
HMMP .....Hazardous Materials Management Program
HMP.....Habitat Management Plan
HPC.....Historic Properties Component
HPO.....Historic Preservation Officer
HQ.....Headquarters

HQDA .....Headquarters, Department of the Army
HUC .....Hydrologic Unit Code
HW .....hazardous waste

IAW.....in accordance with
IBCS .....Integrated Air and Missile Defense Battle Command System
IBCT.....Infantry Brigade Combat Team
ICRMP .....Integrated Cultural Resource Management Plan
ICUZ.....Installation Compatible Use Zone (re: noise)
ID.....identification
IDDS-A .....Iron Dome Defense System – Army
i.e. .....id est (Latin; meaning "that is", "namely", or "in other words")
IFPC .....Indirect Fires Protection Capability
IMC .....Information for Members of Congress
IMCOM.....U.S. Army Installation Management Command
M-SHORAD....Maneuver Short Range Air Defense
INRMP .....Integrated Natural Resource Management Plan
IONMP .....Installation Operational Noise Management Plan
IOSC.....Installation On-Scene Coordinator (e.g., emergency response)
IPBC .....Infantry Platoon Battle Course
IPM.....Integrated Pest Management
IPMP.....Integrated Pest Management Plan
ISBC .....Infantry Squad Battle Course
ISOWPP .....Initial Scope of Work Planning Package
ISWMP.....Integrated Solid Waste Management Plan
ITAM .....Integrated Training Area Management
IWFMP .....Integrated Wildland Fire Management Plan

JAG .....Judge Advocate General
JBLM .....Joint Base Lewis-McChord
JLUS .....Joint Land Use Study

k.....thousand
KDFWR .....Kentucky Department of Fish and Wildlife Resources
KDHE .....Kansas Department of Health and Environment
KEPPC .....Kentucky Exotic Pest Plant Council
km .....kilometer
km^2 .....square kilometer
KSTC .....Kansas Training Center
kV.....kilovolt
kW.....kilowatt

LAS.....land application system
LFA.....live-fire area
LID.....low impact development
LINR .....Locally Important Natural Resource
LOS.....Level of Service (e.g., transportation and traffic)
LRAM.....Land Rehabilitation and Maintenance
LRC.....Logistics Readiness Center
LRHW.....Long Range Hypersonic Weapon
LTAMDS .....Lower Tier Air and Missile Defense Sensor
LTC.....Lieutenant Colonel
LUA .....Limited Use Area

M.....million
m .....meter
m^2 .....squarems
mi^2 .....square mile
mm .....millimeter
MBMS.....Migratory Bird Management Strategy

MBTA .....Migratory Bird Treaty Act
MC.....munitions constituent
MCL .....Maximum Contaminant Level
MDO.....Multi-Domain Operations
MEC .....munitions and explosives of concern
MFR .....Memorandum for Record
MFU .....Missile Firing Unit
MILCON .....Military Construction Account
MLRA .....Major Land Resource Area
MLRS .....Multiple Launch Rocket System
mm/dd/yyyy ....month, day, year date format
MMPA.....Marine Mammal Protection Act
MMR .....Multi-Mission Radar
MMRP.....Military Munitions Response Program
MOA.....Memorandum of Agreement; *or*
.....Military Operations Area (airspace)
MOU.....Memorandum of Understanding
MPMG.....Multipurpose Machinegun
MPTR .....Multi-Purpose Training Range
MRAP.....Mine Resistant Ambush Protected Vehicle
MS4 .....Municipal Separate Storm Sewer System
MSL.....above mean sea level
mtg.....meeting
MU .....management unit
MW.....megawatt
MWh.....megawatt hour
MWR.....Morale, Welfare, and Recreation

N/A .....Not Applicable
NAAQS .....National Ambient Air Quality Standards
NAGPRA .....Native American Graves Protection and Repatriation Act
NDAA .....National Defense Authorization Act
NDS.....National Defense Strategy
NEPA .....National Environmental Policy Act
NESHAP .....National Emission Standards for Hazardous Air Pollutants
NFH.....North Fort Hood
NHPA.....National Historic Preservation Act
NLT.....no later than
nm .....nautical mile
NMDGF .....New Mexico Department of Game and Fish
NOA.....Notice of Availability
NOAA .....National Oceanic and Atmospheric Administration
NOI .....Notice of Intent
NOV.....Notice of Violation
NPDES.....National Pollutant Discharge Elimination System
NPS .....National Park Service
NRCS .....Natural Resources Conservation Service
NR.....natural resources
NRHP.....National Register of Historic Places
NWI.....National Wetlands Inventory

O&M.....operations & maintenance
OC.....Office of Counsel
OCONUS .....Outside the Continental United States
ODASA-ESOH Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health
OMFV .....Optionally Manned Fighting Vehicle
OSC.....On-Scene Coordinator (e.g., emergency response)
OSD.....Office of the Secretary of Defense
OSHA.....Occupational Safety and Health Administration

OSJA .....Office of the Staff Judge Advocate
OTJAG .....Office of the Judge Advocate General

P2.....Pollution Prevention
PA.....Programmatic Agreement
PAO.....Public Affairs Office; *or*
.....Public Affairs Officer
PCMS .....Piñon Canyon Maneuver Site (p/o USAG Fort Carson)
PEA .....Programmatic Environmental Assessment
PEIS.....Programmatic Environmental Impact Statement
P.L. .....Public Law
PM .....Program Manager; *or*
.....Project Manager
$PM_{2.5}$.....particulate matter equal to or less than 2.5 microns in diameter
PM_{10} .....particulate matter equal to or less than 10 microns in diameter
p/o.....part of
POC .....point of contact
POL .....petroleum, oils, and lubricants
POV .....Personally Owned Vehicle
PrSM.....Precision Strike Missile
PSD.....Prevention of Significant Deterioration (Clean Air Act)
PW.....Public Works
PWS.....Public Water System

Qtr.....Quarter (e.g., 3rd Qtr of FY)

RAM.....Rocket, Artillery, and Mortar
RCMP.....Range Complex Master Plan
RCS .....Radar Control Station
RCW.....Red-cockaded woodpecker
RD .....Range Day
RDP .....Range Development Plan
RDT&E .....Research, Development, Test, and Evaluation
ReARMM.....Regionally Aligned Readiness and Modernization Model
REC.....Record of Environmental Consideration
REEO .....Regional Environmental & Energy Office
REPI.....Readiness and Environmental Protection Integration
RFMSS.....Range Facility Management Support System
RL .....Readiness Level
RMPA .....Resource Management Plan Amendment
ROD .....Record of Decision
ROI.....region of influence
RONA .....Record of Non-Applicability (Clean Air Act)
ROW .....Right of Way
RPLANS .....Real Property Planning and Analysis System
RPMP.....Real Property Master Plan
RTLP.....Range and Training Land Program

SA .....Secretary of the Army
SAR.....Species at Risk
s/b.....should be
SC.....Senior Commander
SDS .....Safety Data Sheet
SDWA.....Safe Drinking Water Act
SDZ.....surface danger zone
SECDEF.....Secretary of Defense
SEIS .....Supplemental Environmental Impact Statement
SHPO .....State Historic Preservation Officer (or Office)
SIP.....State Implementation Plan (re: CAA)
SLRC.....Strategic Long Range Cannon
SME .....subject matter expert
SOAR.....Special Operations Air Regiment
SOC.....Species of Concern
SOH.....Safety and Occupational Health
SOP .....standard operating procedure
SOW.....Scope of Work

SPCCP.....Spill Prevention Control and Countermeasures Plan
SR.....Standard Range
SRM .....Sustainment, Restoration, and Modernization (e.g., real property maintenance); *or*
.....Sustainable Readiness Model
SRP.....Sustainable Range Program
SSA.....sole source aquifer
SWMP .....Stormwater Management Plan
SWPPP .....Stormwater Pollution Prevention Plan

T&E.....threatened and endangered
TA.....Training Area
TADSS .....Training Aids, Devices, Simulators, and Simulation (e.g., warfighting training)
TBD.....to be determined
TC.....Training Circular
TCP.....Traditional Cultural Property
TEMF .....Tactical Equipment Maintenance Facility
THPO .....Tribal Historic Preservation Officer (or Office)
TMDL.....Total Maximum Daily Load
TNEPPC.....Tennessee Exotic Pest Plant Council
TPDES.....Texas Pollutant Discharge Elimination System
TRADOC .....U.S. Army Training and Doctrine Command
TRI .....Toxic Release Inventory
TSCA.....Toxic Substances Control Act
TSS.....Total Suspended Solids
TWRA .....Tennessee Wildlife Resources Agency

UAS.....Unmanned Aerial System
UAV .....Unmanned Aerial Vehicle
UDC .....Unit Deployment Cycle
UFC.....Unified Facilities Criteria
UGS.....Unmanned Ground System
UIC.....Underground Injection Control
URC.....Unit Readiness Cycle
URO.....Unit Readiness Objective
U.S. .....United States
USACE .....U.S. Army Corps of Engineers
USAEC .....U.S. Army Environmental Command
USAEUR.....U.S. Army, Europe
USAG.....U.S. Army Garrison
USASOCOM ..U.S. Army Special Operations Command
U.S.C.....United States Code
USDA.....U.S. Department of Agriculture
USFS.....U.S. Forest Service
USFWS .....U.S. Fish and Wildlife Service
USGS .....U.S. Geological Survey
USMC .....U.S. Marine Corps
UV.....Ultraviolet
UXO.....unexploded ordnance

w/.....with
w/o.....without
WAU.....Watershed Administrative Unit
WFH.....West Fort Hood
WOUS.....Waters of the United States
WPA.....Works Progress Administration
WRIA.....Water Resource Inventory Area
WSA.....Wilderness Study Area
WWTP .....Waste Water Treatment Plant

YTC.....Yakima Training Center

5 APPENDIX B LITERATURE CITED

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6 APPENDIX C DOCUMENT REVIEWERS

The USAEC would like to thank the following personnel for their assistance providing information, reviewing, or providing comments to ensure a complete and accurate document.

6.1 Organizations and Individuals Consulted to Complete the IDDS-A PEA

Table 6.1-1. Individuals Consulted

Organization	Name
Office of the Assistant Secretary of the Army, Installation, Energy, and Environment	Ms Poppy Harrover
Office of the Deputy Assistant Secretary of the Army, Environment, Safety, and Occupational Health	Ms Katherine Ready
Headquarters, Department of the Army, Deputy Chief of Staff, G-3/5/7	Mr Robert Floyd
	Ms Kelly Pew
	MAJ Catalina Rosales
	Mr Terry Ivester
Headquarters, Department of the Army, Deputy Chief of Staff, G-9	Ms Andrea Pahlevanpour
	Ms Anne Jewell
	Mr Paul Martin
	Mr Jason Farquhar
U.S. Army Futures Command	Mr Samuel Chard
U.S. Army Forces Command	Mr Shawn Wussow
U.S. Army National Guard Bureau	Ms Debra Benford
U.S. Army Legal Services Agency, Environmental Law Div.	Mr David Howlett
U.S. Army Materiel Command	Ms Julie Halstead
	Mr Walter King
U.S. Army Combined Arms Center	Mr James N Moore
Aviation & Missile Life Cycle Management Command, G4	Ms Leslie Trippe
Project Office, Short and Intermediate Effectors for Layered Defense (SHIELD)	MAJ William Warren
	Mr Michael Steves
	Mr Kevin Woodsinger
	Ms Natalie Whitlow
	Ms Charlsie Porter

Army Capability Manager, Air Defense Artillery	MAJ J Parker Staggs
	MAJ Michael Flint
Army Capability Manager, Ranges	Mr Ronald Moring
	Mr Cory Kozielski
Headquarters, U.S. Army Installation Management Command	Mr Darren Corbiere
	Ms Yvonne Tyler
	Mr David Boatwright
U.S. Army Environmental Command	Mr Frank Minogue
	Ms Pam Klinger
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	Ms Jenny Lechuga
	Mr Roger Paugh
	Mr Karl Kleinbach
	Ms Cathy Kropp
Fort Bliss	Ms Yvette Waychus
	Ms Kelly Mulvey
	Ms Myra Guerrero
	Ms Marie Helwig
	Mr Isaac Trejo
	Mr Chris Taylor
	Ms Rita Crites
	Mr Victor Garcia
	Ms Elisa Garcia
	Mr Ricardo Mendoza
	Mr Donald Sevigny
Fort Hood	Ms Timi Dutchuk
	Ms Vicki Dean
	Mr Tim Buchanan
	Ms Kristina Manning
	Mr Mario Perez
	Mr Christopher Hoffman
	Mr Kevin Cagle

Fort Campbell	Mr Dan Etson
Fort Riley	Mr Herbert Abel
	Mr Thomas Duckworth
	Ms Theresa de la Garza
	Mr Kyle Kirchner
	Mr Mike Houck
	Mr Steve Stanislow
	Ms Kelley Paskow
	Mr Steve Elstrom
	Mr Bill Rayman
	Mr William Watson
Smoky Hill Air National Guard Range	Lt Col. Robert H. Campbell
	Mr Galen Wiens
Fort Stewart	Ms Melissa Kendrick
	Mr Mel Meleka
	Mr Lawrence Carlile
	Mr Brian Greer
	Mr David Montano
	Mr Dale Kiefer
	Mr David Lavender
	Mr Christian Montano
	Mr Kevin Montano
	Mr James Pearson
	Ms Amber McCormick
	Ms Amanda Price
	Mr Johnny Davis
	Mr Drew Brown
	Mr Craig Christopher
Fort Sill	Ms Sarah Sminkey
	Ms Krista Richardson-Cline
	Mr Michael Hardsaw
	Mr David Fritz

	Ms Selena Bagnara Milan
	Mr Scott Sherman
	Mr Richard McDaniel
Joint Base Lewis-McChord	Mr Peter Nissen
	Mr Christopher Runner
	Ms Frances Love
	Mr Colin G. Leingang
	Ms Bethany Mills
	Mr Nathaniel Perhay
	Ms Rebecca Kowalski
	Ms Rebecca Leavitt

7 APPENDIX D RECORD OF ENVIRONMENTAL CONSIDERATION, CHECKLIST, AND PRELIMINARY EVALUATION

This checklist is intended to provide a framework for identifying any NEPA requirements beyond this PEA for anticipated impacts associated with the fielding of one or two IDDS-A batteries at an Army installation in the United States. This checklist would certify that both the installation staff and proponent understand and support the requirements and discussions in this PEA, particularly the site conditions, the Proposed Action and its effects, and any required mitigations. The considerations in this PEA and the Record of Environmental Consideration (REC) checklist are comprehensive, but may not be sufficiently exhaustive to address site-specific conditions at every installation. For this reason, the installation's environmental staff must review this PEA, evaluate the checklist conditions and requirements, and determine the appropriate course of action.

CATEGORY I: For the seven installations addressed in the PEA, if after reviewing the PEA and completing the REC checklist and all conditions described in the analysis are met, then they may adopt this PEA, complete a REC, and implement the Proposed Action.

CATEGORY II: For the seven installations addressed in the PEA, if all conditions are not met after completing the REC checklist, or if impacts change, any of the seven installations may adopt the PEA, prepare a supplemental EA and FONSI before implementing the Proposed Action. If impacts are significant, then the installation would prepare a NOI announcing the preparation of an EIS before fielding the IDDS-A can proceed.

CATEGORY III: If an installation not covered under this PEA wishes to implement the Proposed Action, they may complete the REC checklist, adopt this PEA, and produce a tiered EA that describes the affected environment and impacts of the Proposed Action, prepare a FONSI, and fielding of the IDDS-A battery can proceed. If impacts are significant, then the installation would prepare a NOI announcing the preparation of an EIS before fielding the IDDS-A can proceed.

To use the attached checklist to evaluate the Proposed Action, the following format is recommended:

- "Yes" implies an issue may require further NEPA analysis.
- "No" implies applicability of this PEA
- "N/A" implies the question does not apply

The "Response Documentation" column may be used for any comments pertaining to the Proposed Action or identify existing programs or BMPs, regulations, or policies that mitigate an issue identified in the questionnaire.

Any questions regarding the completion of this checklist should be directed to the installation's environmental staff. This checklist references portions of Title 32, CFR Part 651, "Environmental Analysis of Army Actions."

MEMORANDUM FOR RECORD DATE:

SUBJECT: Evaluation, Under the National Environmental Policy Act (NEPA) of fielding the Iron Dome Defense System-Army (IDDS-A) at (*installation name*).

1. Brief description: (Provide details of facility locations, live-fire range dimensions and locations, and any differences in the Affected Environment that are described in the PEA.)

2. It has been determined that fielding the IDDS-A battery as described above (choose a. b. or c.):

a. Is adequately addressed in a completed: EA____ EIS____

Title and date:

b. Qualifies for Categorical Exclusion under provisions of 32 CFR Part 651, Appendix B, Paragraph _____ and no extraordinary circumstances apply.

c. Qualifies for a Record of Environmental Consideration, based on the evaluation of the criteria in the checklist below because the issues requiring consideration under NEPA are addressed in the Programmatic Environmental Assessment entitled, "Programmatic Environmental Assessment for the Iron Dome Defense System - Army," dated November 2021.

The following signatories certify their understanding of the Programmatic Environmental Assessment and the analyses therein and certify compliance with the provisions and mitigations that are presented. This includes compliance with the procedures (Standard Operating Procedures and Best Management Practices) that are specified and the funding necessary to ensure that the required mitigations will be implemented.

_____	_____
Proponent signature	Environmental Officer signature
_____	_____
Proponent, printed name	Environmental Officer, printed name
_____	_____
e-mail	e-mail
_____	_____
Phone number	Phone number

	CATEGORY	Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
	General NEPA		
1	Are any training requirements of the IDDS-A battery at the installation inconsistent with the description in the PEA?		If yes, a REC may not be sufficient; further analysis may be required. If no, continue to question #2.
2	Will construction of the required facilities exceed 5 acres or occur in previously undisturbed terrain?		If yes, a REC may not be sufficient; further analysis may be required. If no, continue to question #3.
	Biological Resources		
3	Is construction of the IDDS-A battery facilities likely to affect one or more threatened or endangered species not addressed in the PEA and not addressed in a Biological Opinion covering same or similar actions?		If yes, further analysis and coordination and/or informal or formal consultation with the USFWS, NOAA Fisheries, or state wildlife agency will be required. If no, continue to question #4.
4	Is training the IDDS-A battery likely to affect one or more threatened or endangered species not addressed in the PEA and not addressed in a Biological Opinion covering same or similar actions?		If yes, further analysis and coordination and/or informal or formal consultation with the USFWS, NOAA Fisheries, or state wildlife agency will be required. If no, continue to question #5.
	Cultural Resources		
5	Would construction of the IDDS-A battery facilities affect one or more cultural resources not addressed in the PEA?		If yes, and there is no PA or Program Comment addressing the actions, then further analysis and coordination / consultation with the SHPO / THPO will be required. If no, continue to question #6.
6	Would training the IDDS-A battery affect one or more cultural resources not addressed in the PEA?		If yes, and there is no PA or Program Comment addressing the actions, then further analysis and coordination / consultation with the SHPO / THPO will be required. If no, continue to question #7.

	CATEGORY	Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
	Soils		
7	Would construction of the IDDS-A battery facilities adversely affect one or more soil types or lead to excess soil losses not addressed in the PEA?		If yes, further analysis will be required. If no, continue to question #8.
8	Would training the IDDS-A battery adversely affect one or more soil types or lead to excess soil losses not addressed in the PEA?		If yes, further analysis will be required. If no, continue to question #9.
	Land Use and Compatibility		
9	Would construction or training of the IDDS-A battery change a land use designation, create incompatible land use, or adversely affect prime farmland ?		If yes, further analysis will be required. If no, continue to question #10.
	Facilities		
10	Would fielding the IDDS-A battery require the construction of facilities not addressed in the PEA or different locations than addressed in the PEA?		If yes, further analysis will be required. If no, continue to question #11.
	Water Resources		
11	Would construction of the IDDS-A battery facilities adversely affect one or more water resources not addressed in the PEA?		If yes, further analysis will be required and appropriate permits may be required. If no, continue to question #12.
12	Would training the IDDS-A battery adversely affect one or more water resources not addressed in the PEA?		If yes, further analysis will be required, and appropriate permits may be required. If no, continue to question #13.

	CATEGORY	Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
	Cumulative Effects		
13	Are other actions underway, or proposed, that when combined with the potential effects of fielding the IDDS-A battery could significantly affect human health or the environment?		If yes, coordinate with the proponents of the other action(s); conduct further analysis as needed. If no, and all 13 questions have been answered "no" or "n/a," proceed as described on the first page of this appendix for Category I. If any questions were answered "yes" proceed as described in Category II. Installations not covered in the analysis should proceed as described in Category III.

8 APPENDIX E ALTERNATE RANGE TYPES

Effective live-fire training is the cornerstone of readiness. The United States Army is committed to providing the highest quality live-fire training ranges to support individual, team, squad, crew, platoon, and company live-fire training to include collective and Air-Ground Operations venues.

This appendix identifies primary and alternate ranges and ranges that may be locally modified that are used for training and qualification with specific weapons and weapon systems, based on applicable Training Circulars and the expected annual live-fire range requirements for the IDDS-A battery. The training requirements of the IDDS-A battery were derived from a review of the requirements of a Patriot air defense battery that provides capabilities similar to the IDDS-A battery. The requirements were adjusted to account for the lower manning level of the IDDS-A battery

The table below shows the primary ranges that the IDDS-A battery would use to complete the required training events in the left column. The right column lists the alternate ranges or locally modifiable ranges that can support all or portions of the required training that would occur on the primary range. In determining the impacts of live-fire training in the PEA, the use of all alternate range types available at each installation was considered to accommodate the required training.

8.1 Alternate Range List

Table 8.1-1. Alternate Range Types Suitable for IDDS-A Training

Designated Range Type	Alternate Range Types That Can Support Required Training
BASIC 10M-25M FIRING RANGE (ZERO)	DIGITAL AIR GROUND INTEGRATION RANGE (DAGIR)
	CONVOY LIVE-FIRE RANGE/ENTRY CONTROL POINT (CLF/ECP)
	AUTOMATED FIELD FIRE RANGE (AFF)
	AUTOMATED RECORD FIRE RANGE (ARF)
	MODIFIED RECORD FIRE (MRF)
	AUTOMATED QUALIFICATION TRAINING RANGE (QTR)
	KNOWN DISTANCE RANGE (KD)
	AUTOMATED SNIPER FIELD FIRE RANGE (SFF)

Designated Range Type	Alternate Range Types That Can Support Required Training
	AUTOMATED COMBAT PISTOL/MP FIREARMS QUALIFICATION COURSE (CPQC/MPFQC)
	AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
	SCOUT/RECCE GUNNERY COMPLEX (SRGC)
	DIGITAL MULTIPURPOSE TRAINING RANGE (DMPTR)
	DIGITAL MULTIPURPOSE RANGE COMPLEX (DMPRC)
	BATTLE AREA COMPLEX (BAX)
	URBAN ASSAULT COURSE (UAC)
	AUTOMATED INFANTRYSQUAD BATTLE COURSE (ISBC)
	AUTOMATED INFANTRY PLATOON BATTLE COURSE (IPBC)
AUTOMATED RECORD FIRE RANGE (ARF)	MODIFIED RECORD FIRE RANGE (MRF)
AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)	BASIC 10M-25M FIRING RANGE (ZERO)
	AUTOMATED QUALIFICATION TRAINING RANGE (QTR)
	SCOUT/RECCE GUNNERY COMPLEX (SRGC)
MULTIPURPOSE RANGE COMPLEX-HEAVY (MPRC-H), AUTOMATED BATTLE AREA COMPLEX (BAX)	DIGITAL AIR GROUND INTEGRATION RANGE (DAGIR)
	SCOUT/RECCE GUNNERY COMPLEX (SRGC)
	DIGITAL MULTIPURPOSE TRAINING RANGE (DMPTR)
	BATTLE AREA COMPLEX (BAX)

Designated Range Type	Alternate Range Types That Can Support Required Training
	DIGITAL AIR GROUND INTEGRATION RANGE (DAGIR)
	DIGITAL MULTIPURPOSE RANGE COMPLEX (DMPRC)
	MULTIPURPOSE RANGE COMPLEX-HEAVY (MPRC-H), AUTOMATED
AIR DEFENSE MISSILE FIRING RANGE (ADFR)	DIGITAL AIR GROUND INTEGRATION RANGE (DAGIR)
	DIGITAL MULTIPURPOSE TRAINING RANGE (DMPTR)
	DIGITAL MULTIPURPOSE RANGE COMPLEX (DMPRC)
	AERIAL GUNNERY RANGE (AGR)
	AERIAL GUNNERY RANGE (AGR)
HAND GRENADE QUALIFICATION COURSE (NONFIRING) (HGQC)	NO ALTERNATE RANGE TYPE DESIGNATED
HAND GRENADE FAMILIARIZATION RANGE (LIVE) (HGFR)	NO ALTERNATE RANGE TYPE DESIGNATED
GRENADE LAUNCHER RANGE (GLR)	NO ALTERNATE RANGE TYPE DESIGNATED

9 APPENDIX F FINDING OF NO SIGNIFICANT IMPACT

FINDING OF NO SIGNIFICANT IMPACT

for Fielding the Iron Dome Defense System - Army

November 2021

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Finding of No Significant Impact for Fielding the Iron Dome Defense System - Army

The National Environmental Policy Act of 1969 (NEPA) (42 U.S. Code Section 4321 et seq.) requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. The Department of the Army (Army) prepared a Programmatic Environmental Assessment (PEA) in accordance with NEPA, the regulations issued by the Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) Parts 1500-1508 (40 CFR § 1500-1508), and the Army's procedures for implementing NEPA, Environmental Analysis of Army Actions (32 CFR Part 651). This PEA is titled *"Programmatic Environmental Assessment for the Iron Dome Defense System - Army."* This PEA is incorporated by reference in this Finding of No Significant Impact (FONSI), and addresses environmental effects of the proposed fielding of one or two batteries of the Iron Dome Defense System – Army (IDDS-A). The intent of the fielding is to begin the process of enhancing the Army's air defense capabilities in accordance with the 2019 Army Modernization Strategy and the 2019 Nation Defense Authorization Act.

The PEA provided a broad and programmatic analysis to determine potential impacts on the environmental and socioeconomic areas of concern at each of the seven installations under consideration. The PEA also considers the general capacity of each installation to support one or two IDDS-A batteries given its existing baseline conditions. The programmatic approach is designed to allow for early planning, coordination, and flexibility throughout implementation of the Army's process of fielding IDDS-A batteries.

Prior to making a final decision on which installation(s) of the Action Alternative to field the IDDS-A, or implement the No Action Alternative, other relevant information, such as deployment time, cost, and strategic implications will be considered. The Army decision-maker regarding the environmental impacts of this action is the Department of Army's Deputy Chief of Staff, G-9. The final decision on fielding location will be made by the Department of Army's Deputy Chief of Staff, G-3/5/7.

PROPOSED ACTION

The Army plans to field[93] two IDDS-A batteries to enhance the defensive capability of fixed and semi-fixed assets against cruise missile (CM), un-manned aerial system (UAS), and rocket, artillery, and mortar (RAM) attacks. The IDDS-A is a mobile all-weather air defense system designed to intercept RAM fired from distances of up to approximately 70 km but is also effective against CM, UAS, airplane, and helicopter threats. The PEA addresses the fielding at seven installations in more detail: Fort Bliss, Fort Hood, Fort Campbell, Fort Riley, Fort Sill, Fort Stewart, and Joint Base Lewis-

[93] "Field" – refers to sending new equipment and technology to an installation(s). As part of the fielding action, soldiers will be stationed at an installation(s) to train with and maintain the IDDS-A.

McChord.

ALTERNATIVES

The PEA looked at one Action Alternative and a No Action Alternative. The alternatives considered and analyzed in the PEA were:

No Action Alternative

The No Action Alternative is required by CEQ regulations and provides baseline conditions and a benchmark against which to compare environmental impacts from the Proposed Action alternatives (40 CFR § 1502.14(d)). Under the No Action Alternative, IDDS-A batteries would not be fielded to any installation. Training and operations at the assessed installations would continue in the current manner and rate. This would not meet the objectives of the 2019 Army Modernization Strategy or the intent of the 2019 National Defense Authorization Act and fail to begin the process of enhancing the air defense capability of Army fixed and semi-fixed assets.

Proposed Action Alternative

The Proposed Action analyzed within the PEA was to field one or two batteries of IDDS-A to one or two of the seven installations assessed. One IDDS-A battery would consist of approximately 60 soldiers, 13 Heavy Expanded Mobility Tactical Trucks, six Missile Firing Units, one radar system, battle management and communications systems, and support equipment. In addition, all soldiers would be equipped with a standard selection of small arms and equipment.

SUMMARY OF ENVIRONMENTAL EFFECTS

No significant impacts are anticipated as a result of implementing the Proposed Action at any of the seven installations assessed in this PEA. Each of the resource areas identified in the Appendix to this FONSI was analyzed for potential impacts resulting from implementing the Proposed Action and any known cumulative actions. Potential impacts were broken down into the following categories: beneficial impacts, no impacts, and potential adverse impacts (negligible, minor, moderate, or significant). These impacts are summarized in Table 9.1-1 in the FONSI Appendix A.

Impacts are anticipated to be minimized through avoidance, and the implementation of existing environmental protection measures. Avoidance strategies depend on the installation selected, the increase in training tempo, and the increase in the number of soldiers at the installation. Environmental protection measures such as erosion and stormwater controls; maintaining vehicles and equipment; and sustaining vegetation cover at the training sites would be implemented. Currently, no

construction activities are planned to support the IDDS-A fielding. In the future, if construction activities were to occur, the protection measures would be implemented at those sites also. Buffers for sensitive resources (biological and cultural) would be employed during construction and training, depending on the requirements of the installation. For the proposed action, no new mitigation measures are needed nor have any been identified. The Army will continue to adhere to legal and regulatory requirements, and continue to implement its approved management plans, standard operating procedures, and best management practices (BMPs).

PUBLIC REVIEW AND INTERAGENCY COORDINATION

Introduction

The PEA and draft FONSI were made available for public, agency, and Tribal review on March 3, 2022 when a Notice of Availability was published in the Federal Register. That same day, electronic copies of the PEA and draft FONSI were made available for download from the United States Army Environmental Command (USAEC) website at: https://aec.army.mil/index.php?cID=352. Comments were requested to be submitted at U.S. Army Environmental Command, ATTN: IDDS-A Public Comments, 2455 Reynolds Road Mail Stop 112, JBSA-Fort Sam Houston, Texas 78234-7588, or by email to: usarmy.jbsa.imcom-aec.mbx.nepa@army.mil using the subject IDDS-A Public Comment.

Comments Received and Responses

Provide summary of comments received.

CONCLUSION

Based on a careful review of the PEA and comments received as a result of the March 3, 2022 Notice of Availability publication, I have determined that no significant direct, indirect, or cumulative impacts to the human or natural environment are anticipated at any of the seven installations as a result of implementation of either Alternative. The information in public comments and other new information discussed in the Public Review and Interagency Coordination section of this document do not constitute significant new circumstances or information relevant to environmental concerns that would require supplementation of the PEA. Nevertheless, all comments were taken into account in making this decision. The Army's review indicates that the PEA's analysis is adequate and that its conclusion that there would be no significant impacts from either alternative at any combination of the assessed installations is still valid. The Army concludes that the Proposed Action and No Action Alternative are not major Federal actions that would significantly affect the quality of the environment per Section 102(2)(c) of NEPA; an environmental impact statement is not required, and will not be prepared. My decision is based on the PEA's analysis of potential environmental impacts

associated with the Proposed Action and No Action Alternative. This decision meets the requirements of the NEPA and its implementing regulations and has been made after taking into account all submitted information and considering a full range of reasonable alternatives and all environmental impacts. This concludes the NEPA process for this action.

_____ _____

[INSERT SIGNATURE BLOCK] Date

_____ _____

[INSERT SIGNATURE BLOCK] Date

9.1 FONSI APPENDIX A: Summary of the Effects from Both Alternatives

Table 9.1-1. Summary of the Potential Effects on the Evaluated Alternatives

Resource Area	**Proposed Action** *Direct, Indirect, and Cumulative*	**No Action Alternative** *Direct, Indirect, and Cumulative*
Biological Resources	Less than significant adverse effects	Less than significant adverse effects
Cultural Resources	Less than significant adverse effects	Less than significant adverse effects
Soils	Less than significant adverse effects	Less than significant adverse effects
Land Use and Compatibility	Less than significant adverse effects	Less than significant adverse effects
Facilities	Less than significant adverse effects	Less than significant adverse effects
Water Resources	Less than significant adverse effects	Less than significant adverse effects