HEADQUARTERS
633D AIR BASE WING
JOINT BASE LANGLEY-EUSTIS, VA

FORT EUSTIS
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

PLAN YEARS
2019-2023

HEADQUARTERS
633D AIR BASE WING
JOINT BASE LANGLEY-EUSTIS, VA

FORT EUSTIS
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
2019-2023

This Integrated Natural Resources Management Plan (INRMP) has been prepared by the Joint Base Langley-Eustis (Eustis), Fort Eustis natural resources staff in consultation with the United States Fish and Wildlife Service, National Oceanic Atmospheric Administration, and the Virginia Department of Game and Inland Fisheries. The signatures below indicate the mutual agreement of the parties concerning the conservation, protection and management of fish and wildlife, and habitat resources as presented in the INRMP to guide natural resources management at Fort Eustis from 2019-2023.

PLAN APPROVAL

SEAN K. TYLER, Colonel, USAF
Commander, 633d Air Base Wing
Joint Base Langley-Eustis

_____

Date: _____

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Fish and Wildlife Administrator
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Date:_____

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HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

OFFICE OF THE COMMANDER
125 Mabry Avenue
Joint Base Langley-Eustis VA 23665-2522

MEMORANDUM FOR DISTRIBUTION (SEE ANNEX O)

SUBJECT: Fort Eustis (FE) Integrated Natural Resources Management Plan

1. Attached is the *Fort Eustis Integrated Natural Resources Management Plan*. This plan establishes natural resource management policy for FE. Implementation of this plan is directed by the 633d Air Base Wing Commander, or designated representative, following all applicable federal, state and local regulations.

2. This plan is effective upon receipt and is distributed to JBLE units/agencies as shown in Annex R of this plan.

3. This plan shall be reviewed every five years and revised as appropriate. The office of primary responsibility is the 733d Civil Engineer Division, Environmental Element.

4. This plan is unclassified. It will be safeguarded and disposed of in accordance with AFI 37-138, Records Distribution, Procedures, and Responsibilities.

SEAN K. TYLER, Colonel, USAF
Commander, 633d Air Base Wing

Attachment:
FE Integrated Natural Resources Management Plan

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

FE INRMP
SECURITY INSTRUCTIONS/RECORD OF CHANGES/RECORD OF REVIEWS

1. The long title of this plan is the *Fort Eustis Integrated Natural Resources Management Plan*. The short title is the *FE INRMP*. Both titles are unclassified.

2. This plan is unclassified and requires no special handling.

3. This document may be reproduced in whole or in part as required for the preparation of supporting documents, checklists, briefing aids, etc.

4. The provision of AFI 10-701, *Operations Security (OPSEC) Program* has been considered in the development and implementation of this plan.

5. Record of review and changes. The FE INRMP is reviewed by the installation natural resources program manager annually. This review is accomplished in accordance with Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, by the preparation of an Annual INRMP Review Summary. The Summary includes a discussion on accomplishments since the last review, an Annual Work Plan (for the current year and at least two future fiscal years), a status of staffing sufficiency, supporting plans, and a summary of required updates that will be incorporated. The Summary is staffed with respective installation tenants/stakeholders and approved by the Director, 733d Civil Engineer Division, as delegated by the Commander, 633d Air Base Wing (see Annex G). Copies of the Summary are provided to recipients of the FE INRMP. Draft Summaries are submitted to the US Fish & Wildlife Service, National Oceanic Atmospheric Administration and the Virginia Department of Game and Inland Fisheries as part of the consultation process.

6. Five Year Updates. This INRMP covers a five-year period and shall be reviewed annually and completely revised every five years (including respective supporting plans noted as annexes to the INRMP). Draft INRMPs are staffed with respective installation tenants/stakeholders for comment and resolution. Following resolution and final draft is then submitted to the US Fish & Wildlife Service (USFWS), National Oceanic & Atmospheric Administration (NOAA), and Virginia Department of Game and Inland Fisheries (VDGIF) for concurrence. Once internal and external consultations are complete, the INRMP is forwarded to the Installation Commander (Commander, 633d Air Base Wing) for signature and approval. Implementation of an approved INRMP follows an ecosystem-based management philosophy. Ecosystem management is a dynamic process; therefore, implementation of management goals and objectives requires monitoring of the natural resources to determine management success. The information gained from inventories and monitoring provides the framework on which to base revisions to the INRMP.

7. Interim updates (less than 5 years) may be required in cases such as:

A. Changes in military mission that affect natural resources.
B. New environmental compliance requirements.
C. Other changes affecting implementation of the INRMP.
D. Identification of federally listed plant or animal species (identified as threatened or endangered in accordance with Endangered Species Act).

Special Note:

All tenant organizations functioning at FE should have a general familiarity with the INRMP as each organization and its mission could affect or enhance the sustainability of our natural resources. All members of the FE community are welcome to submit questions or suggestions regarding the INRMP. The INRMP can be accessed from:
http://www.jble.af.mil/Units/Army/Eustis-Enviromental/

FE INRMP
ACRONYMS AND ABBREVIATIONS

1FW	1st Fighter Wing
AATD	Applied Aviation Technology Directorate
ABW	Air Base Wing
ACC	Air Combat Command
ACES	Automated Civil Engineer System
ADC-WS	Animal Damage Control-Wildlife Services
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFLOA/JACE	Air Force Legal Operations Agency, Environmental Law and Litigation Division
AIT	Advanced Individual Training
AMC	Army Materiel Command
ASA	Army Support Activity
ATSC	Army Training Support Center
BASH	Bird Aircraft Strike Hazard
BMPs	best management practices
BOS	Base Operating Services contract
BRAC	Base Realignment and Closure
CAPS	Cooperative Agricultural Pest Survey
CBP	Chesapeake Bay Program
CED	Civil Engineer Division
CEIE	Environmental Element
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLS	Common Levels of Support
cm	Centimeters
CMETL	Core Mission Essential Training List
CMF	Career Management Field
COE	Current Operating Environment
CRM	Cultural Resources Manager
CRMP	Coastal Resources Management Program
CTT	Closed, Transferring, and Transferred
CWA	Clean Water Act
CX	Categorical Exclusions
dbh	diameter at breast height
DERP	Defense Environmental Restoration Program
DMAP	Deer Management Assistance Program
DOD	Department of Defense
DODD	Department of Defense Directive

DODI	Department of Defense Instruction
DPOP	Deer Population Reduction Program
EA	Environmental Assessment
EHD	Epizoonotic Hemorrhagic Disease
EIA	environmental impact assessment
EIAP	Environmental Impact Assessment Process
EIS	Environmental Impact Statement
ENRD	Environmental and Natural Resources Division
EO	Executive Order
EPR	Environmental Program Requirements
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
FCD	Flight Concepts Division
FE	Fort Eustis
FEDMMA	Fort Eustis Dredge Material Management Area
FFA	Federal Facilities Agreement
FONPA	Finding of No Practical Alternative
FONSI	Finding of No Significant Impact
FORSCOM	Forces Command
FR	Federal Register
FSS	Force Support Squadron
FY	Fiscal Year
GIS	Geographic Information System
GCN	Greatest Conservation Need
HRR	Historical Records Review
IAW	in accordance with
IET	Initial Entry Training
IMCOM	Installation Management Command
IMT	Initial Military Training
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
IRP	Installation Restoration Program
ISA	International Society of Arboriculture
ITAM	Integrated Training Area Management
JBLE	Joint Base Langley-Eustis
JBLE-E	Joint Base Langley-Eustis (Eustis)
JBLEI	Joint Base Langley Eustis Instruction
JFCOM	Joint Force Command
JLOTS	Joint Logistics Over the Shore
JTF-CS	Joint Task Force – Civil Support

LOTS	Logistics Over-The-Shore
LRAM	Land Rehabilitation and Maintenance
LTM	Long-Term Monitoring
LUC	Land use controls
MAHC	McDonald Army Health Center
MBTA	Migratory Bird Treaty Act
MMRP	Military Munitions Response Program
MOA	Memorandum of Agreement
MOS	Military Occupational Skill
MOU	Memorandum of Understanding
MSD	Mission Services Division
MSG	Mission Support Group
MSL	Mean Sea Level
NCOES	Noncommissioned Officer Education System
NEPA	National Environmental Policy Act
NER	Northeast Region
NETCOM	US Army Network Enterprise Technology Command
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
PA	Programmatic Agreement
PCBs	Polychlorinated Biphenyls
RCI	Residential Communities Initiative
RCMP	Range Control Management Plan
RCRA	Resource Conservation and Recovery Act
RFMSS	Range Facility Management Support System
RMA	Resource Management Area
ROA	Report of Availability
RPA	Resource Protection Area
RTLA	Range and Training Land Assessment
RTLP	Range and Training Land Program
SAA	Senior Airfield Authority
SAIA	Sikes Act Improvement Act
SAV	Submerged Aquatic Vegetation
SFS	Security Forces Squadron
SHPO	State Historic Preservation Officer
SJA	Staff Judge Advocate
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
SSP	Service Support Program
SWAP	VA State Wildlife Action Plan

TA	Training Area
TCM-L	Training Capabilities Manager-Live
TRADOC	Training and Doctrine Command
TRANSLOTS	Transportation Logistics-Over-The-Shore
TRI	Training Requirements Integration
TSI	Timber Stand Improvement
TSS	Training Support System
US	United States
USACE	US Army Corps of Engineers
USAF	US Air Force
USARC	US Army Reserve Component
USATCFE	US Army Transportation Center, Fort Eustis
USATSCH	US Army Transportation School
USC	US Code
USDA	US Department of Agriculture
USDA-WS	US Department of Agriculture-Wildlife Services
USEPA	US Environmental Protection Agency
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
VAC	Virginia Administrative Code
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDNH	Virginia Division of Natural Heritage
VDOF	Virginia Department of Forestry
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VPDES	Virginia Pollutant Discharge Elimination System

FE INRMP
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1.0 CHAPTER 1: EXECUTIVE SUMMARY

1.1 Purpose and Scope.

Joint Base Langley-Eustis (Eustis) (JBLE-E) meets the criteria for a Category 1 installation as specified in Section 3.2.1 of AFI 32-7064 dated 18 November 2014. An INRMP is therefore required. This INRMP establishes natural resources management policy at FE from 2019 through 2023. It provides goals, objectives and projects to manage natural resources. Natural resources include game wildlife, non-game wildlife, other fauna (such as invertebrate organisms), habitats (surface water [primarily streams/creeks and ponds], wetlands, ephemeral pools, forested areas, early successional areas, urban forests, riparian areas, and shorelines), and plants/vegetative communities associated with these habitats, commercial timber/forest products, soils and land area. The INRMP prescribes management of these natural resources in a manner that sustains the availability of said resources to meet continued and future military missions.

The previous FE INRMP version was approved April 21, 2014 with an expiration date of April 20, 2019. Preparation of a new version was initiated in January 2017 following identification of two federally listed bat species in late 2016. The original objective was to complete a new version in calendar year (CY) 2017; however, several factors affected completion. Progress toward completing the new version continued into CY 2018 to meet the April 20, 2019 deadline.

1.2 INRMP Support for the Military Mission.

FE became a joint base aligned with LAFB effectively 1 October 2010. Natural resources conservation measures and USAF activities (and tenant activities) are integrated and consistent with federal stewardship requirements. Natural resource management generally follow USAF policies and regulations. FE is a relatively small installation bordered primarily by navigable waters as well as development where federal property abuts City of Newport News property. These conditions constrain FE as a partially closed ecosystem. Consequently, consistent and prudent management of its resources is critical to long-term sustainability.

Successful military mission accomplishment is dependent on availability of natural resources. Consequently, the habitat types discussed above are critical and management must be effective and efficient. This involves maintaining the complex abiotic and biotic components of these habitats. Natural resource management generally follow USAF policies and regulations.

1.3 Goals.

The primary goal of this INRMP is to conserve the environment and related natural resources to support sustaining the installation's missions. The intent is not that natural resources be consumed or damaged by mission requirements but rather be sustained to meet future mission requirements. This supports a no net loss capability of military lands. This goal focuses on maintaining ecosystem viability and biodiversity. This remains consistent with previous editions of INRMPs and subsequent natural resources management philosophy for FE.

The goals listed in Chapter 8 of the INRMP are as follows:

Goal 1: Facilitate sustainment of natural areas for long-term use.
Goal 2: Reduce shoreline erosion.
Goal 3: Improve soil conservation.
Goal 4: Improve water quality and conserve wetland resources.
Goal 5: Improve terrestrial habitats for long-term sustainability.
Goal6: Increase/improve the biodiversity while managing wildlife/other fauna issues on the installation.
Goal 7: Integrate pest management and pesticide use with natural resources management.
Goal 8: Prevent wildland fires.
Goal 9: Foster conservation awareness across the installation to support long-term sustainment.
Goal 10: Promote appropriate habitat management techniques that contribute to sustainment of federally listed species.

1.4 Environmental impacts of implementation. Air Force Legal Operations Agency, Environmental Law and Litigation Division (AFLOA/JACE) recommends the Environmental Impact Assessment Process be completed for the projects cited in the INRMP rather than prepare EIAP documentation for the INRMP itself. In accordance with the provisions of the National Environmental Policy Act (NEPA), as articulated in federal regulations (Title 40 of the Code of Federal Regulations [CFR] Part 1500-1508 and 32 CFR Part 989), an Environmental Assessment (EA) is prepared to evaluate the potential environmental consequences of natural resource management projects cited in the INRMP covering the period of 2019-2023.

1.5 INRMP preparation. This INRMP has been prepared in accordance with AFI 32-7064, *Integrated Natural Resources Management* (18 Nov 2014) as the primary reference document. Additional supporting references include:

- *Sikes Act* of 1997 (Title 16 of the US Code [USC] Section 670a et seq.);
- Department of Defense Instruction (DODI) 4715.03, *Natural Resources Conservation Program*, 14 Feb 11;
- DODI 4150.07, *DoD Pest Management Program*, 29 May 2008;
- Air Force Instruction (AFI) 32-1053, *Integrated Pest Management*, 20 Nov 14;
- AFI 32-7001, *Environmental Quality Programming and Budgeting*, 4 Nov 11;
- Fort Eustis Range Control Management Plan;
- AR 350-19, *The Sustainable Range Program* (HQDA 2005);
- JBLEI 32-101, *Environmental Management*

2.0 CHAPTER 2: GENERAL INFORMATION

2.1 Purpose and Scope. This INRMP establishes natural resources management policy at FE from 2019 through 2023. The INRMP shall be revised in 2023 based on military operations and conditions prevalent at that time.

The INRMP describes the types of natural resources that exist on the installation and prescribes how these resources shall be managed during the five-year period for which the plan was written.

The scope of the INRMP includes management of the following natural resources:

- Wildlife and other fauna. Fauna constitute essentially any animal species. Fauna include game and non-game vertebrate wildlife and other fauna such as invertebrate organisms. All such animals are important towards maintaining biodiversity and a healthy ecosystem. Game wildlife represent species that can be harvested as part of recreational hunting programs or those species that could be included in recreational hunting programs once the population reaches a sustainable level that produces excess individuals capable of withstanding harvesting. Examples include wild turkey and bobwhite quail, respectively. Whitetail deer represent an important component of recreational hunting as well as a species that must be managed to reduce risks of disease, vehicular collisions, and habitat damage. Non-game wildlife include passerine birds, woodpeckers, ground-nesting birds, reptiles, amphibians and small mammals. Non-game species play complex roles in the installation's ecosystem and are also important to watchable wildlife opportunities. Other fauna include terrestrial and aquatic macroinvertebrates such as insects, spiders, other arthropods, snails, worms, etc.

- Habitats. Several habitat types exist at FE. These include surface waters [primarily streams/creeks and ponds], groundwater systems, wetlands, ephemeral pools, forested areas, early successional areas, urban forests, riparian corridors and shorelines. All of these habitat types support various military training activities, other military operations, aesthetics and quality of life. Each contains unique physical characteristics as well as vegetative communities. Maintaining these habitats supports their continued use as well as maintaining biodiversity. Habitat management also includes the conservation and protection of floodplains and coastal resources.

- Commercial timber/forest products. FE contains approximately 2,700 acres of commercial forest land consisting of forest products utilized by the installation community. Commercial forests serve as vital training land for military and other training events and are considered of high value. Forest products cannot be removed, altered or harvested without federal government compensation, unless deemed of no marketable value or no interested parties for forest product purchases exist. Furthermore, other forest products include firewood and mulch if available. Management involving planned harvesting to balance military needs as well as insect and disease control is a long-term necessity.

- Soils. There are several soil associations on FE including disturbed soils or urban soils. Management of soils is necessary to reduce the risk of erosion and subsequent sedimentation releases into surface water systems. Loss from erosion and damage by various activities reduces soil viability for plant growth. This affects availability of usable land, the quality of training areas and degrades aesthetics.

- Land management. Land management activities on FE involve programs that interface with habitat management and soil management as well as other programs. These activities include invasive vegetation management, other pest management activities, soil erosion control, urban forest management, landscape design, grounds maintenance and water management.

2.2 Authority.

The Sikes Act Improvement Act of 1997 (Title 16 of the United States Code Section 670a et seq. requires military departments to prepare and implement INRMPs at those installations meeting the criteria for such. FE meets the criteria of a Category I installation which requires INRMPs as articulated in AFI 32-7064, 18 November 2014.

2.3 Responsibilities.

Successful implementation of this INRMP requires a cooperative effort among the parties directly involved. The level of success can be enhanced by developing partnerships with stakeholders that have a vested interest in natural resources management at FE. A brief description of the responsible and interested parties is provided in the following sections. Specific responsibilities are noted as follows:

2.3.1 633 ABW/CC.

- Approves and signs the INRMP.

- Certifies the Annual INRMP Review Summaries (unless delegated to the Director of the 733d Civil Engineer Division).

2.3.2 733 Mission Support Group (MSG)/CC.

- Directs the overall management of base operations and facilities to include controlling access to and use of installation natural resources.

- Reviews INRMPs at the five-year revision period.

2.3.3 733d Civil Engineer Division (CED) Director.

- Incorporates natural resources management into master planning.

- Serves as the applicant/permittee for all wetland, subaqueous land, primary sand dunes, and stream permits issued as applicable by US Army Corps of Engineers (USACE), Virginia Department of Environmental Quality (VDEQ), Virginia Marine Resources Commission (VMRC) and City of Newport News Wetland Board.

- Approves the Annual INRMP Review Summaries as delegated by the 633 ABW/CC (Annex G).

2.3.4 Chief, Fire and Emergency Services (733 CED).

- Responds to wildland fires.

- Approves prescription fires.

2.3.5 Chief, Environmental Element (733 CED).

- Has overall management responsibility for all natural resources on FE property.

2.3.6 Chief, Natural Resources & Integrated Pest Management Branch, Environmental Element (733 CED).

- Serves as the natural resources program manager for the installation.

- Prepares, reviews and implements the INRMP.

- Prepares, reviews and implements supporting natural resources-related plans.

- Prepares Annual INRMP Review Summaries.

- Manages for biodiversity.

- Manages the integrated pest management program and integrates this program with the natural resources program.

- Implements and manages a forest entomology program.

- Reviews natural resource issues during the Environmental Impact Analysis Program (EIAP).

- Manages game and non-game wildlife, and other fauna populations to include responding to hazardous or nuisance wildlife.

- Manages commercial timber to include preparing a forest inventory plan, performing timber cruises/assessments, coordinating timber harvests/sales and forest rehabilitation/regeneration.

- Oversees invasive species management.
- Oversees wetlands management and permitting.
- Participates in monthly Conservation-ITAM Coordination Meetings.
- Manages the hunting, trapping and fishing program as directed by JBLEI 32-102.

2.3.7 Force Support Squadron (FSS) Director.

- Executes the recreational hunting and fishing program components as directed in JBLEI 32-102.

2.3.8 Chief, Ranges & Training Division, Army Support Activity (ASA).

- Oversees on Training Support System (TSS) Programs and non-TSS training enablers to include the SRP. The Installation Range Officer is responsible for the execution of the SRP vice the Range Control Management Plan (RCMP).
- Oversees the Range and Training Land Program (RTLP). The Fort Eustis Training Land Manager is responsible for the execution of the Integrated Training Area Management (ITAM) program vice the RCMP.
- Participates in monthly Conservation-ITAM Coordination Meetings.

2.3.9 733d Security Forces Squadron (SFS)/CC.

- Provides enforcement of hunting, trapping, and fishing, and other conservation-related laws and policies.
- Responds to situations involving vicious, or loose/stray/feral dogs.
- Assists with euthanasia of injured/sick deer when natural resources staff are not available.

2.3.10 Commanders and Directors. Coordinate with CED/Environmental Element (CEIE) regarding natural resource issues affecting missions. This includes but not necessarily limited to hazard trees/limbs, tree removal, nuisance/hazardous wildlife, arthropod pests, alteration of existing land/habitat conditions, and alteration of surface water, wetland or groundwater conditions.

2. 4 Support From Other Defense Organizations.

- United States Air Force Civil Engineer Center (AFCEC). AFCEC assists FE by providing USAF natural resources program budget guidance and entering FE natural

resources project details into the Air Force Civil Engineer System (ACES) based on input from FE natural resources staff. In addition, AFCEC reviews budget requests and disburses funding to implement many of the projects and programs described in this INRMP. Installation Support Section provides review of revised INRMPs.

- USACE, Norfolk District. The USACE, Norfolk District, is responsible for overseeing permitting activities that affect waters of the US, including wetlands, per Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. USACE has jurisdiction over wetlands on FE. Additionally, the VDEQ has jurisdictional authority including isolated wetlands. USACE can also administer commercial forest sales.

2.5 Support/Participation by Other Federal Agencies.

- US Fish and Wildlife Service (USFWS). The USFWS provides signatory concurrence concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP. USFWS is the consulting federal agency for issues regarding fish and wildlife management, as well as the regulatory authority for the Endangered Species Act of 1973 (16 USC 1531 et seq.) and the Migratory Bird Treaty Act (16 USC 703-711).

- US Department of Agriculture (USDA). The USDA provides assistance in nuisance wildlife control pending coordination through CEIE and availability of funding.

US Environmental Protection Agency (USEPA). The USEPA, Chesapeake Bay Program (CBP), coordinates the efforts of federal agencies within the Chesapeake Bay watershed. The CBP is part of an ongoing partnership established in 1990 under a Cooperative Agreement between the DOD and the USEPA to restore and protect the Chesapeake Bay. The CBP directs and conducts research and projects, provides technical assistance, and provides other resources associated with restoring the Bay.

2.6 Assistance/Participation by State Agencies.

- Virginia Department of Game and Inland Fisheries (VDGIF). The VDGIF provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP. Under Title 29.1 of the Code of Virginia, VDGIF is the primary wildlife and freshwater fish management agency in the Commonwealth. VDGIF has full law enforcement and regulatory jurisdiction over those resources, inclusive of state or federally listed endangered or threatened species but excluding listed insects. VDGIF is a consulting agency under the US Fish and Wildlife Coordination Act (16 USC 661 et seq.), and the agency provides environmental analysis of projects or permit applications coordinated through the Virginia Department of Environmental Quality (VDEQ).

- Virginia Marine Resources Commission (VMRC). The VMRC reviews and authorizes permit requests for projects involving tidal wetlands and waterways in conjunction with Newport News Wetlands Board. VMRC also provides information on guidelines and state laws governing tidal wetlands and waterways development, as well as application and enforcement procedures.

- Virginia Division of Natural Heritage (VDNH). VDNH is responsible by statutory authority under the Virginia Natural Area Preserves Act (Sections 10.1-209 through 217, Code of Virginia) for inventory, database maintenance, protection, and management of Virginia's natural heritage resources. These resources are defined as the habitats of rare, threatened, or endangered plant and animal species, rare or state significant communities, and other natural features. The VDNH conducted a survey of the rare, threatened, and endangered flora and fauna of FE during 1996 (Virginia Department of Conservation and Recreation [VDCR] 1997). VDCR promotes conservation, protection and enhancement of lands in Virginia and the improvement the quality of the Chesapeake Bay and rivers and streams.

- Virginia Department of Environmental Quality (VDEQ). The VDEQ is the lead agency for coordinating Virginia's environmental policy and focuses on natural resources planning that includes but is not limited to air, water, and waste issues. The VDEQ administers and enforces state laws (including isolated wetlands and joint permit applications) to protect Virginia's streams, rivers, bays, and groundwater. The VDEQ also issues permits to new and modified sources of air pollution and inspects emission sources to ensure compliance with state regulations. In addition, VDEQ administers programs created by the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the Virginia Water Management Act.

- Virginia Department of Historic Resources (VDHR). VDHR comprises the State Historic Preservation Office (SHPO). Its mission is to foster, encourage, and support the stewardship of Virginia's significant historic, architectural, archaeological, and cultural resources. Consultation may involve reforestation projects associated with archaeological sites.

2.7 FE Natural Resources Management Philosophy.

Natural resources are necessary to meet military mission requirements. The various habitat types at FE provide realistic training facilities to meet current needs and represent opportunities for future needs. These habitats and the organisms that inhabit them contribute to recreational opportunities for members of the FE community. The INRMP articulates how natural resources are managed to support continued military missions in accordance with respective federal and state laws and regulations, local ordinances and U.S. Air Force policies.

The INRMP was developed in an interdisciplinary manner and follows the USAF Principles for Ecosystem Management approach. This approach recognizes the incorporation of FE missions and community functions into the sustainable use of the several habitat types. This is accomplished by:

- Reducing construction of impervious surfaces.
- Manage exotic and invasive species to improve the quality of training areas and non-training areas. This includes planting/replanting with native vegetation species.
- Convert sterile, non-productive areas into natural areas to reduce maintenance costs (such as maintaining open areas as early successional or young forest as opposed to mowing).
- Convert open/cleared areas to habitats containing native herbaceous plant cover (i.e., grasses and forbs) that contribute to sustainment of beneficial insects [predators, parasitoids, & pollinators].
- Maintain hydrological processes of streams, floodplains and wetlands when feasible.
- Design and implement collaborative, innovative projects and activities mutually supporting ITAM/ military training, natural resources sustainment and outdoor recreation.
- Manage for biodiversity.
- Implement sound long-term wildlife management that contributes towards keeping native common species common thus reducing risks of impacts from listed species.
- Incorporate commercial forest management in land sustainability.
- Include natural resources sustainability consideration in all construction projects and training events.

3.0 CHAPTER 3: INSTALLATION OVERVIEW

3.1 Location and Area.

FE is located in the Hampton Roads area of Southeast Virginia on the southwest side of the Virginia Peninsula, which is bordered by the James River and Warwick River (Figure 3-1). The installation is contiguous to the City of Newport News and is located on the eastern shoreline of the James River approximately 30 miles upstream of its confluence with the Chesapeake Bay. It is bordered on the northeast by the City of Newport News, on the west and south by the James River, and on the east by the Warwick River, which separates FE from the City of Newport News. A small portion of the installation referred to as Training Area 30 (located opposite from Third Port on Skiffes Creek) is adjacent to James City County. FE is approximately 160 miles south-southeast of Washington, D.C.; 60 miles southeast of Richmond; 10 miles southeast of Williamsburg; and 30 miles northwest of Norfolk.

3.1.1 Acreage and Acquisition. The US Army purchased approximately 8,300 acres of land in 1918 to support US involvement in World War I. The current acreage is estimated closer to 7,869 based on GIS technology. The reduction in acreage may be related to improved technology and possibly erosion of shoreline on Mulberry Island from strong wave action on the James River and storm events. The cantonment area (approximately 2,000 acres), located in the northwest part of the installation on the mainland of the Virginia Peninsula, contains the highest concentration of land uses, transportation systems, and infrastructure. Mulberry Island (approximately 5,300 acres) is an adjacent peninsula that is separated from the main installation by a drainage way from the James River to Warwick River.

3.2 Installation History.

3.2.1 The land now occupied by FE has been developed since the mid-1600s when early settlers cultivated the area for tobacco. This period was followed by industrial and commercial development in the 1800s, and the construction of a railroad line in 1880 caused the population to surge.

3.2.2 Camp Abraham Eustis was established in 1918 as a training center for Coast Artillery Corps units from Fort Monroe and to establish an Army Balloonist's School (Byrd 1993). The installation was renamed FE in 1923 when it received permanent military installation status. The US Army purchased approximately 8,300 acres of land in 1918 to support US involvement in World War I. The current acreage is estimated closer to 7,869 based on GIS technology. (Figure 3-2).

3.2.3 In 1946, FE was transferred to the Chief of Transportation as the Transportation Corps Training Center for consolidation of rail, marine, and amphibious operations and other modes of transportation. In 1966, the installation was reorganized as the USATCFE. Following Base Realignment and Closing 2005 proceedings, FE was designated for realignment and aligned with Langley Air Force Base (LAFB) to become a Joint Base with the USAF as the lead (supporting) Service.

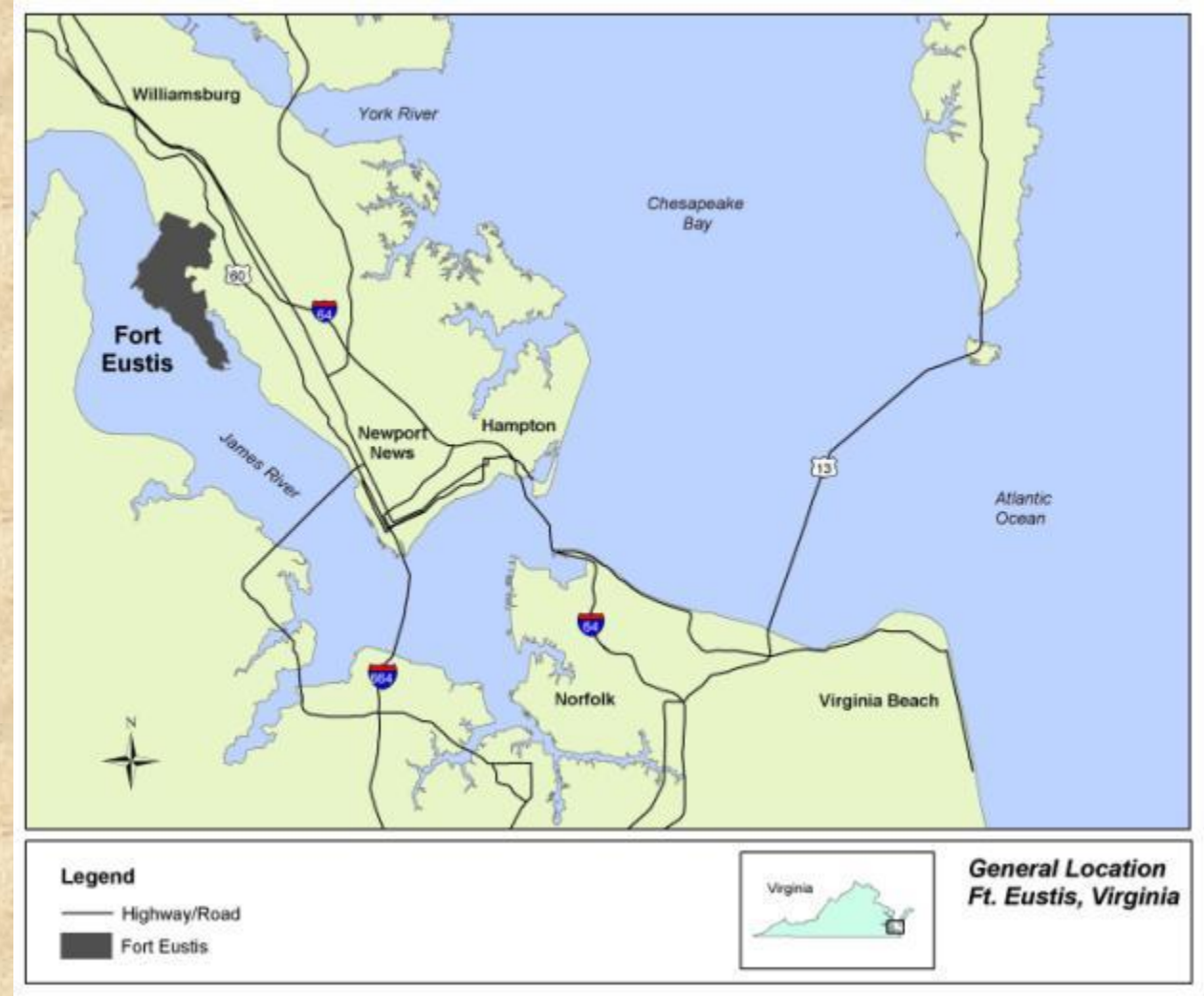

Figure 3-1. Vicinity Map of FE.

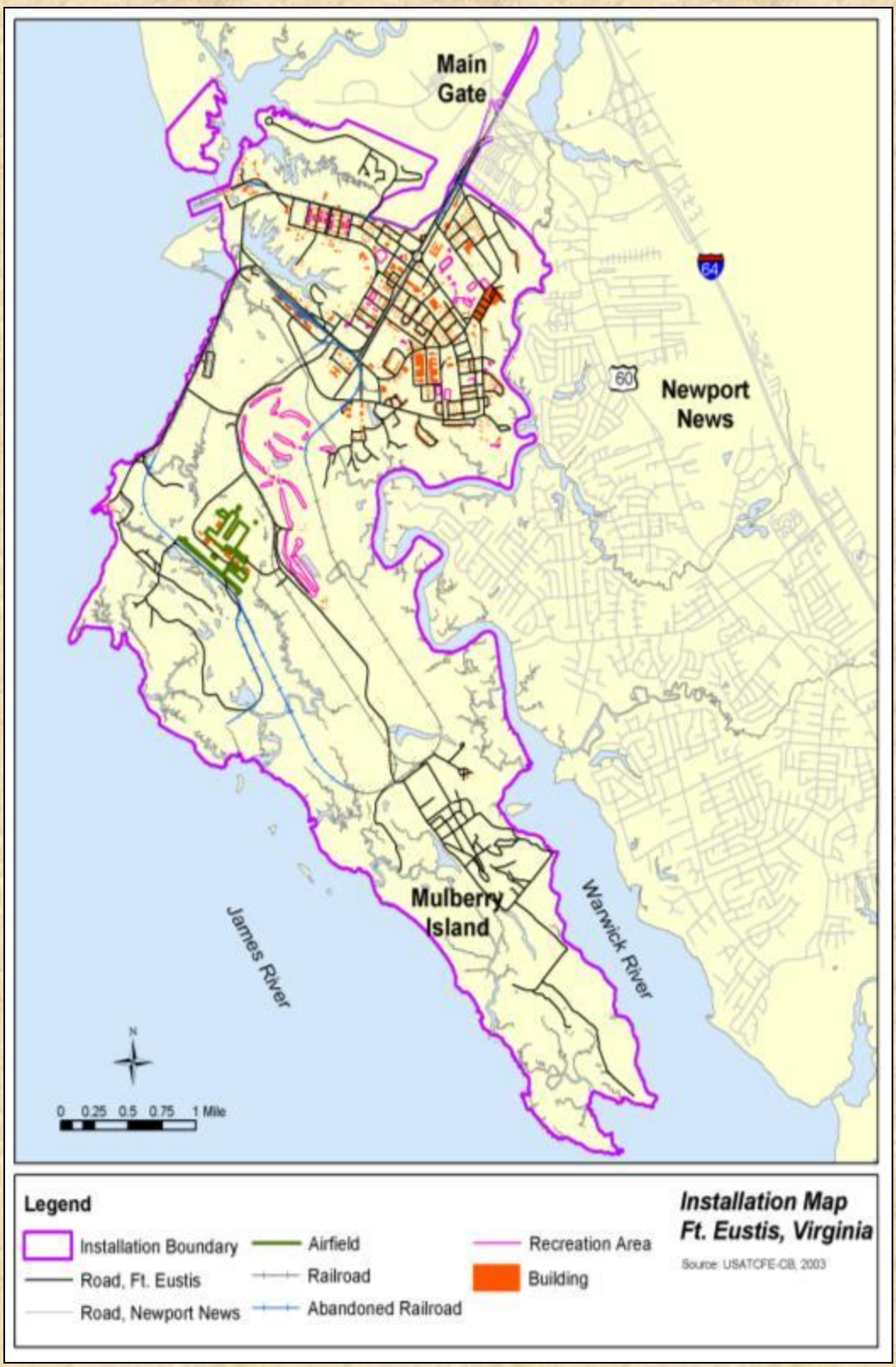

Figure 3-2. Installation Map of FE.

3.3 Military Mission.

3.3.1 Prior to October 1, 2010, FE was a US Army installation under the under the authority of the Northeast Region (NER) of the Installation Management Command (IMCOM). Since the advent of Base Realignment and Closure (BRAC) 2005, the installation transitioned from a U.S. Army IMCOM installation following the 2005 BRAC proceedings. This included aligning with LAFB under Joint Basing effective 1 October 2010. As of 1 October 2010 all real estate and natural resources become U.S. Air Force property and subject to U.S. Air Force regulations.

3.3.2 Under BRAC 2005, FE underwent realignment as a legally binding decision. In accordance with this decision, the US Army Transportation School (USATSCH) [minus rail and watercraft training components] along with respective command and control components relocated to Fort Lee while the US Army Training and Doctrine Command Headquarters (HQ TRADOC), the Joint Task Force – Civil Support, Atlantic Region IMCOM (formerly Northeast Region [NER]), US Army Contracting Agency (ACA) Northern Region Office and US Army Network Enterprise Technology Command (NETCOM) relocated to FE. Since 2010, additional restructuring of tenant organizations occurred.

3.3.3 Effective at the time of this INRMP, FE comprised the following supported Commands:

<u>TRADOC:</u>

- HQ TRADOC
- TRADOC Band
- 128th Aviation Brigade
- U.S. Army Training Support Center (ATSC)

<u>U.S. Army Forces Command (FORSCOM):</u>

- 7th Transportation Brigade (Expeditionary)

US Army Transportation School (USATSCH):

- Maritime and Intermodal Training Department (Maritime Training Division and Cargo Handling Division (CHD)

<u>Army Materiel Command (AMC):</u>

- US Army Aviation Development Directorate
- 597th Transportation Brigade

<u>U.S. Joint Forces Command:</u>

- Joint Deployment Training Center

U.S. Northern Command:

- Joint Task Force Civil Support

NETCOM:

- 93D Signal Brigade

U.S. Army Medical Command (MEDDAC):

- McDonald Army Health Center
- Mid-Atlantic Veterinary Command

U.S. Army Reserve (99th RRC):

- Army Reserve Center
- Aviation Support Facility 92
- Equipment Concentration Site 93

USAF:

- Det 1, 360th Training Squadron

U.S. Coast Guard:

- Port Security Unit 305

U.S. Department of Transportation:

- National Defense Reserve Fleet

3.3.4 Training activities at FE are primarily performed by the 128th Aviation Brigade, 7th Transportation Brigade (Expeditionary), USATSCH (watercraft and rail tasks), 80th Training Command and units assigned to the US Army Reserve Center (USARC). Additionally, some external DOD organizations train periodically at FE.

3.3.5 128th Aviation Brigade remains as a tenant at FE. It provides training to the Soldiers within Career Management Areas (CMF) 15 (Aviation) for aviation maintenance and logistics. It conducts Initial Entry Training, NCOES and AIT for reclassification under CMF 15 (CMF 15 is associated aviation logistics-related missions and tasks) and NCOES for within the Aviation Logistics area. Training exercises in support of the US Army's Warrior Ethos are culminating events for IET and AIT Soldiers attending aviation logistics Military Occupational Skills (MOS) producing course. These exercises concentrate on course instruction previously taught and mandatory Warrior Battle Tasks.

3.3.6 Operational training is conducted by both tenant unit (those US Army Active Army and Reserve Component units stationed on FE) and by non-tenant units (those US Army Active and Reserve Component, and other DOD units not physically located on FE).

3.3.7 The 7th Transportation Brigade (Expeditionary) is a FORSCOM organization that also remains at FE as a tenant organization. The Brigade's mission is to prepare and train for fixed port operations and logistics-over-the-shore (LOTS) in support of national policy; to conduct limited highway and motor transport operations; to support domestic emergency plans as required; to support the requirements of the installation, USATSCH, and the128th Aviation Brigade; and to support annual training of Reserve Component units.

3.3.8 US Army Reserve Component (USARC) units throughout all branches as well as of the DOD Services conduct training at FE. USARC Transportation Total Army Schools System Battalions conduct MOS IET and AIT training within the areas of cargo handling, cargo documentation, rail and watercraft. USARC operational units conduct Mission Essential Training List (METL), operations and exercises to include Surface Training and Rail Training. Further through the USARC deployment certification and recertification courses are conducted in conjunction with the USATSCH for 88H units and personnel.

3.3.9 Drills involve field training exercises conducted over multiple days to include aviation logistics, convoy training, urban operations and live fire operations.

3.3.10 The mission of the 733d Mission Support Group (MSG) is to provide the installation capabilities and services to support expeditionary operations in a time of persistent conflict, optimizes resources and sustains the environment, and provides a quality of life for Soldiers and Families commensurate with their service while transforming to JBLE. Essentially this includes compliance with environmental laws and regulations and management of natural resources throughout the installation.

3.3.11 As a joint base, under the management of the USAF, FE retains many U.S. Army missions including training support. The U.S. Army Support Activity (ASA) has several missions to include training support functions such as range operations and Integrated Training Area Management (ITAM).

3.4 Surrounding Communities.

FE is adjacent to the independent City of Newport News primarily on the northern boundary. The northern boundary includes Training Areas 1 and 2 as well as the Tactical Equipment Maintenance Facility which is adjacent to the Oakland Industrial Park. The main gate entrance and other portions are adjacent to private land. The installation is separated from the Newport News on the eastern boundary by the Warwick River. Residential areas primarily exist along the Newport News side of the river. The width of the Warwick River is variable but only several hundred feet at the widest point. The James River is considerably wider and borders FE on the western side. A parcel of land referred to as Training Area 30 is the only non-contiguous component of FE. It exists on the western side of Skiffes Creek (across from Third Port) and is adjacent to James City County. Training Area 30 is approximately 50 acres of total area.

Overall, the natural and man-made features described above preclude any expansion by the installation. These features also create the condition of a partially closed ecosystem. Some populations are restricted to the installation while others have limited mobility.

3.5 Regional Land Use.

The Virginia Peninsula on which FE exists includes the Cities of Newport News, Hampton and Poquoson as well as York County. Much of these municipalities comprise disturbed urban and suburban areas. Industry and businesses exist throughout the Peninsula. Some agriculture exists but to a lesser extent.

Wood Duck Nest Box Installation with Participation by Military Personnel

3.6 Local and Regional Natural Areas.

There are two parks located within approximately five miles of FE containing similar natural resources found on the installation. These include Newport News Park and the Colonial National Historic Park.

3.6.1 Newport News Park is one of the largest municipal parks in the eastern United States. It contains approximately 8,300 acres of pine-mixed hardwood forests, swamps, marshes, two large reservoirs and several ponds. The park is located both within York County and the City of Newport News. It is primarily used for outdoor recreational activities including hiking, camping, golfing, boating, biking, fishing and bird watching as well as other wildlife viewing.

3.6.2 The Colonial National Historic Park is administered by the National Park Service. Cumulatively, the property consists of approximately 8,600 acres within the boundaries of York and James City Counties, Gloucester, Surry and the City of Williamsburg. It contains mixed hardwood-pine forests, open fields, early successional habitats and wetlands. Some portions are not open to the public while the Yorktown Battlefield contains roads and trails for viewing historical landmarks as well as hiking, cycling and jogging.

4.0 CHAPTER 4 – PHYSICAL ENVIRONMENT

4.1 Environmental setting. FE is an island of biodiversity in a landscape of heavily developed land in Hampton Roads. The Virginia Peninsula is a landmass of 400 square miles and extends from a location 40 miles east of Richmond to the confluence of the James River and Chesapeake Bay. Nearby tracts of limited undeveloped land include Newport News Park, Colonial National Historic Park and Naval Weapons Station Yorktown. FE contains a chain of islands along the James River shoreline that are separated from Mulberry Island by tidal marshes. It is partially isolated ecologically by natural barriers such as the James and Warwick Rivers and physical barriers along its northern boundary such as development of fences.

4.2 Climate.

4.2.1 Moderate winters, pleasant spring and fall seasons, and long, warm summers characterize the climate of FE. Intermittent cold periods are not uncommon due to easterly winds from the Atlantic Ocean. FE is located south of the typical path taken by the principal storms generated in the higher latitudes. It is located north of the track commonly taken by the tropical storms and hurricanes generated in the lower latitudes. Severe cold periods seldom threaten the area, and occasional winters pass without any measurable snowfall. The average annual snowfall of 8.7 inches usually accumulates as flurries or light snow events that disappear within 24 hours. Total precipitation in the area averages 47.3 inches annually. July receives the most rainfall (5.3 inches), while April and November receive the least rainfall (2.9 inches).

4.2.2 The annual mean temperature at FE is 58.5 degrees Fahrenheit (°F). Typically, the warmest month is July and the coldest month is January. The average daily maximum temperature in July is 87°F, and the average daily minimum temperature is 70°F. In January, the average daily maximum temperature is 47°F and the average daily minimum temperature is 30°F. The growing season averages 196 days with the first freezing temperature in fall in October and last freezing temperature in spring in April.

4.3 Landforms and Land Use.

4.3.1 FE covers an estimated 7,872 acres. As mentioned previously, this number was originally estimated at 8,228 acres in the previous edition of this INRMP; however, improvements in GIS technology and possibly erosion of shoreline has led to a reduction in acreage. The installation is geographically divided by a drainage way into two areas: Main Installation (cantonment area) and Mulberry Island. There are approximately 2,784 acres of commercial forested land and 3,600 acres of wetlands. Approximately 42 percent of the installation is used for outdoor military training. Approximately 222 acres in the cantonment area has been conveyed to a private development firm with a 75-year lease under the Residential Community Initiative (RCI) for military family housing and redevelopment.

4.3.2 The cantonment area includes administrative offices, community facilities, military family housing, barracks, limited industrial operations, closed landfills (Environmental Restoration Program [ERP] sites), Third Port, maintenance facilities, medical and dental clinics, research facilities, supply/storage areas, recreational facilities, and some of the installation's training areas. The Third Port is a 1,000-foot pier on the James River and serves as a major force deployment facility and deepwater port for the US Army and the 7th Transportation Brigade (Expeditionary), as well as the watercraft training platform for the Transportation School and the fixed base for the 7th Transportation Brigade (Expeditionary).

4.3.3 Mulberry Island includes the Pines Golf Course, Felker Army Airfield, several historical sites, the Range and Training Complex (which includes all firing ranges and most of the Training Areas) and the impact area (Tables 4-1 and 4-2, respectively). The airfield is managed by the 1st Fighter Wing and includes aircraft operations and maintenance facilities, runways, aprons, helipads and taxiways for fixed-wing and rotary-wing aircraft. The Matthew Jones House (cantonment area) and the remains of Fort Crafford (in Training Area 28) are two historical sites listed on the National Register of Historic Places at FE. Outdoor training land uses include the Range Complex facilities for bivouac, land navigation and tactical training. Most outdoor training lands are on Mulberry Island; however, nine training areas are in the cantonment area. Figure 4-1 presents the existing training areas and ranges on FE. All total, there are six firing ranges and 25 training areas on FE available for use throughout the year.

Table 4-1. Ranges on FE.

Range	Designation	Acreage
1	Pistol Qualification Shotgun Familiarization	5.8
2	M16 and 25mm Qualification	3.4
¾	M16 Qualification, .50-cal w/ *SRTA ammunition, 9mm qualification	43.2
5	9 mm and .45-cal qualification	9.67
6	M203 Qualification, Helicopter Landing Tower Operations	16.26
	*AATD BTRACS Testing Range	3.5
14B	Hand Grenade Qualification Course-Non-Live Fire	61.7

Source: USATCFE *AATD = Aviation Applied Technology Directorate (Aviation Development Directorate), BTRACS = Ballistics Test Range, SRTA = Short Range Training Ammunition

Table 4-2. Training Areas on FE.

Training Area (Location)	Type of Area (Name)	Acreage
1 (Main Installation)	Tactical bivouac, land navigation, maneuver area/training light forces, vehicle access (Yorktown)	49.8
2 (Main Installation)	Tactical bivouac, land navigation, maneuver area/training light forces, vehicle access (Tiensen)	75.12
5 (Main Installation)	Vehicle staging, tactical operations center (TOC) (command/control), bivouac, material handling training (Cowpens)	5.1
6 (Main Installation)	Railcar loading, Vehicle and equipment storage (Hanks Yard)	12.6
7 (Main Installation)	Boy Scout camping (Chancellorsville)	14.2
8 (Main Installation)	Confidence course, small unit tactics. (Meuse-Argonne)	42.1
9 (Main Installation)	Aircraft mock-up, physical fitness, aircraft loading, and vehicle loading, material handling training (Tippecanoe)	7.7
14A (Mulberry Island)	Engagement Skills Trainer 2000, Vehicle staging area, Motorcycle training course, HMMWV Egress Assistance Trainer (HEAT) (Hue)	25.78
15 (Mulberry Island)	88H Material Handling Equipment Training (Normandy)	87.4
17A (Mulberry Island)	Tactical bivouac, small unit tactics (St. Michel)	88.1
17B (Mulberry Island)	Aviation flight operations and training, Reserve Component, Non-tactical bivouac (Fredericksburg)	258.9
17C (Mulberry Island)	Tactical bivouac, small unit tactics (Missionary Ridge)	87.8

Training Area (Location)	Type of Area (Name)	Acreage
18 (Mulberry Island)	Logistics Over the Shore (LOTS)/Tactical Operations Center, bivouac, material handling, small unit tactics, Reverse Osmosis Water Purification Unit training (Anzio Beach)	13.8
19 (Mulberry Island)	Tactical bivouac, small unit tactics	96.6
20 (Mulberry Island)	LOTS, cargo loading, Material Handling Equipment MHE Training (Quin Nhon)	11.6
21 (Mulberry Island)	Tactical bivouac (Antietam)	187.73
22 (Mulberry Island)	Tactical bivouac, Range Operations, land navigation, small unit tactics (Inchon)	50.3
23 (Mulberry Island)	Tactical bivouac, land navigation, maneuvering, vehicle parking, small unit tactics (Magruder Line)	616.4
24 (Mulberry Island)	Tactical bivouac, maneuvering, vehicle parking, land navigation, small unit tactics (Seoul)	603.6
26 (Mulberry Island)	NBC Chamber, tactical bivouac, leadership reaction course, land navigation, small unit tactics (Cold Harbor)	148.3
27 (Main Installation)	Landship & Crane, Terminal cargo handling, vessel management and operations (Third Port)	74.9
28 (Mulberry Island)	Helicopter VOR Sling-load Area, Tactical driver's training, Convoy Reaction Course, tactical bivouac, helicopter landing, small unit tactics (Junction City)	769.8
29 (Main Installation)	Railcar Loading Training Area, Material Handling Equipment MHE Training (Wonju)	35.4
30 (Main Installation)	Special operations, small unit tactics	64.49

Figure 4-1: Training Areas and Ranges on FE

4.3.4 Topography.

FE is located in the Atlantic Coastal Plain Physiographic Province. The terrain is low and flat, rising from approximately 5 feet above mean sea level (MSL) on Mulberry Island to approximately 30 feet above MSL in the cantonment area (USATCFE 1997). The elevation of the 100-year floodplain is 8.3 feet above MSL at FE. Mulberry Island lies below the 100-year floodplain. The general topography of the Virginia peninsula is characterized by a succession of plains separated by a series of scarps (Montgomery Watson 1997). The intervening scarps have a relatively sharp slope in comparison to the plains and face either east, or north towards the Warwick River, or south towards the James River.

4.4 Geology and Soils.

4.4.1 Geology. FE lies on the Pleistocene-aged (10,000 to 1.6 million years ago) Princess Anne terrace formation. Approximately 2,000 feet of unconsolidated Cretaceous (66 to 144 million years ago) and Tertiary (28 to 66 million years ago) period sediments separated by an unconformity lie between the terrace and the granite basement rock. These deposits consisting of clay, silt, sand, and gravel with variable amounts of shell material thicken and drop eastward toward the Atlantic Ocean. Virginia is considered to be relatively active seismically, but earthquakes are rarely strong. Since records have been kept, no earthquakes have been centered in the FE area. FE is located in Earthquake Hazard Zone 2, which means there is moderate probability for damage should an earthquake occur.

4.4.2 Soils. There are seven soil associations on FE in addition to disturbed or urban soils. The soil associations include two general groups: (1) low river terrace and marsh soils and (2) low coastal plain upland soils. FE does have a map of the soil associations. Hydric soils associated on FE are presented in Figure 4-2. Soil types of FE are presented in Figure 4-3.

4.4.2.1 Annex C, Appendix 1 lists the soil mapping units and provides general characteristics of the soil series, phases, and complexes occurring on FE. Drainage characteristics, textural characteristics, landscape position, and some potential limitations associated with the mapping units are provided. Mapping units that are designated as hydric or have inclusions that are hydric are also indicated. The Craven silt loam, 0 to 2 percent slopes, is considered to be a prime farmland soil. Prime farmland soils are protected under the Farmland Protection Policy Act of 1981. However, the act does not apply to the use of farmland for national defense purposes. Therefore, potential constraints related to the prime farmland soils or prime farmlands on FE are not applicable.

4.4.2.2 Soils in the Low River Terraces and Marshes associations were formed in alluvium along the James and Warwick rivers and their tributaries. Soils in these associations range from well to very poorly drained with subsoil and substrata textures that range from sandy to clayey. The soils are gently sloped or level, and are prone to flooding. These associations account for 75 percent of the soil associations.

4.4.2.3 Soils on the Low Coastal Plain Uplands were formed in fluviomarine sediments of the lower. Soils range from well to poorly drained with subsoil textures that range from loamy to clayey. These associations are deep, nearly level to steep sloping, and are not subject to flooding. They support woodlands and account for 22 percent of the soil associations.

4.4.2.4 The Urban and Disturbed Lands association contains soils that have been used at building sites. The soils are difficult to reclaim and on-site investigations are necessary to determine the potential of the area for any use. They comprise about 3 percent of the surveyed area.

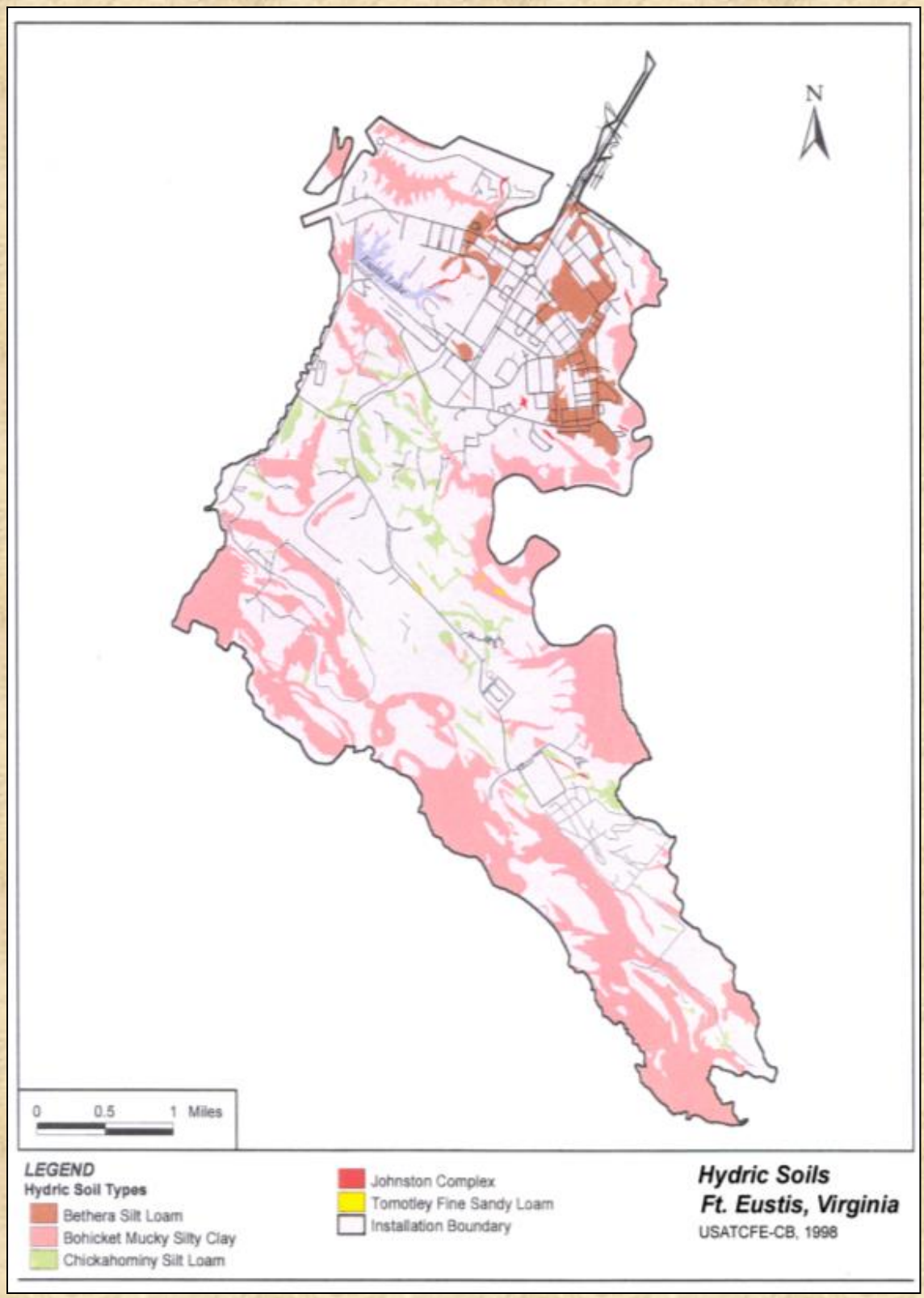

Figure 4-2. Hydric Soil Associations on FE.

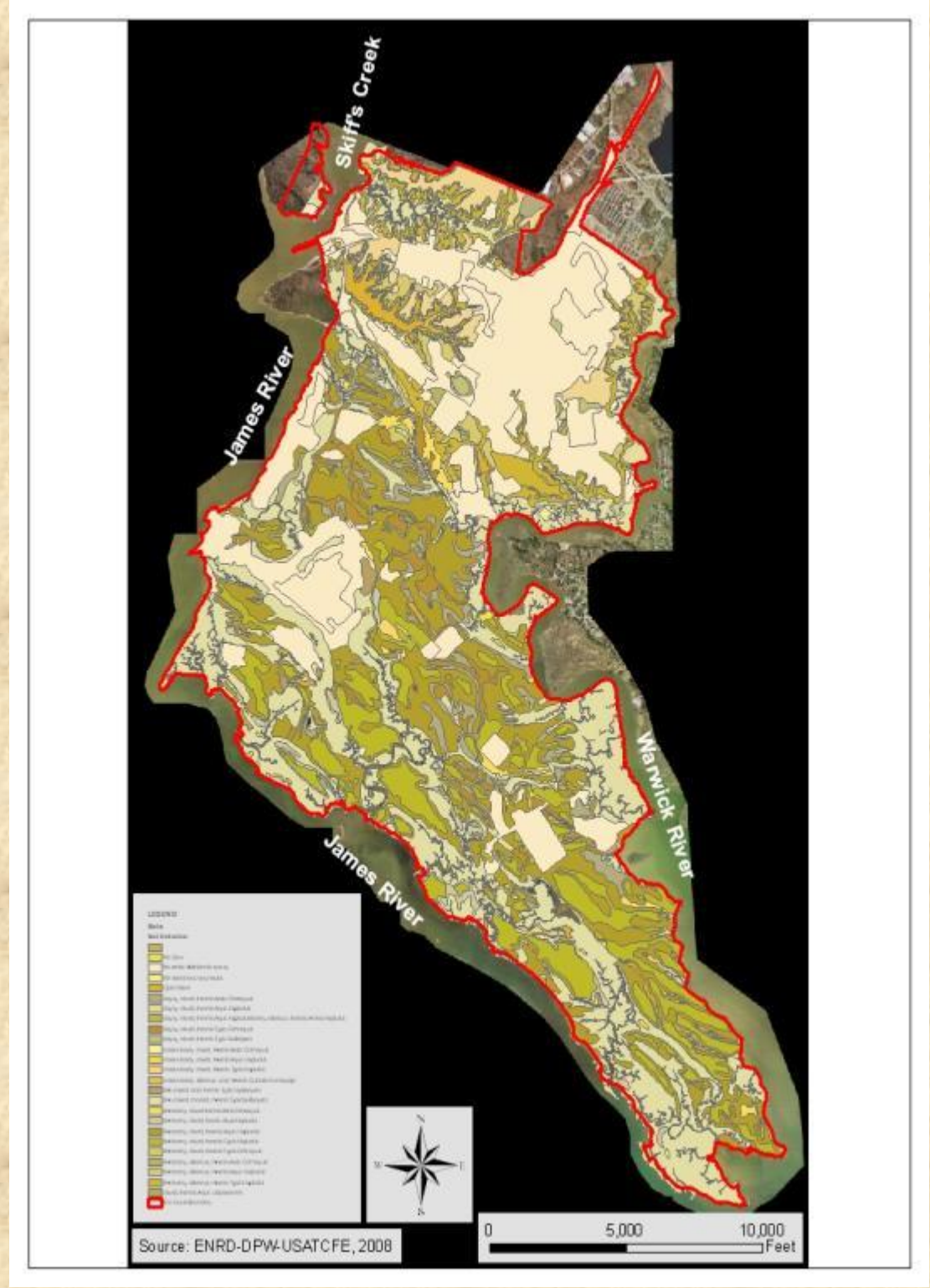

Figure 4-3. Soil Associations on FE.

4.5 Hydrology/Water Resources.

4.5.1 Groundwater.

4.5.1.1 The hydrogeologic framework in the FE area consists of a system of seven aquifers separated by intervening semi-confining units. The Columbia, Yorktown-Eastover, Chickahominy-Piney Point and Aquia aquifers and the intervening units comprise roughly the upper one-quarter of the total thickness of the coastal plain sediments on FE. The remaining sediment thickness consists of the upper, middle, and lower aquifers and the intervening units that comprise the Potomac Group. Groundwater flow is in a southeasterly direction.

4.5.1.2 The Columbia Aquifer attains a maximum thickness of 35 feet, but the aquifer is between 10 and 15 feet thick on FE. Groundwater moves under the influence of gravity to discharge along streams, rivers, and lakes. Recharge occurs primarily as infiltration of precipitation. The upper portion of the Columbia Aquifer comprises the water table (Meng and Harsh 1988). The Yorktown unit separates the Columbia Aquifer from the underlying Yorktown-Eastover Aquifer. The Yorktown unit occurs at approximately 30 to 40 feet below the ground surface near Eustis Lake and is about 30 feet thick. The top of the Yorktown-Eastover Aquifer is approximately 40 feet below the ground surface. The thickness of the aquifer ranges from 100 to 200 feet on FE. The Chickahominy-Piney Point Aquifer ranges in thickness from 50 to 100 feet. The average thickness of the Aquia Aquifer is 100 feet or more. The Aquia Aquifer is capable of supplying large quantities of water that is suitable for most uses, and the aquifer serves as a water source for many light industrial, small municipal, and domestic users on the Virginia Peninsula. The Potomac group includes the six lowermost hydrogeologic units of the Virginia Coastal Plain and consists of three aquifers and three confining units (Meng and Harsh 1988).

4.5.1.3 Potable water is supplied to FE by the City of Newport News Lee Hall Water Filtration Plant, approximately one mile from the installation. Three deep wells in the cantonment area are the primary sources of nonpotable water; two served the former sand pool (now closed) and the third is located adjacent to B401. The sandpool wells are out of service but not capped. The B401 well is still in service but rarely used.

4.5.1.4 Well for emergency situations. Three additional wells are used on the Ranges 3 (BLDG 3904) and 5 (latrines), and the golf course maintenance area. FE is the third largest water user on the Virginia Peninsula, accounting for approximately 2.7 percent of the water used in the area (USATCFE 1997).

4.5.2 Surface Water and Shoreline

4.5.2.1 FE has an estimated 21.6 miles of open tidal shoreline along the James River, Warwick River, and Skiffes Creek. In addition, there are several miles of shoreline within installation boundaries along small tidal creeks. The natural forces of waves and currents erode the open, tidal shorelines of FE.

4.5.2.2 The named waterways on or bordering FE are Bailey Creek, Skiffes Creek, Milstead Creek, Island Creek, Butlers Gut, Blows Creek, Morrisons Creek, Fort Creek, Nellis Creek and Jail Creek. Bailey Creek is located on the northern boundary of FE and is a tidally influenced tributary of Skiffes Creek. It flows in a westerly direction through a low wetlands area and empties into Skiffes Creek, which flows into the James River. Milstead Creek, Island Creek, and Butlers Gut connect the James and Warwick rivers. A canal connected the creeks early this century to create a thoroughfare between the rivers. Jail Creek drains the southern tip of Mulberry Island and discharges to the James River at its confluence with the Warwick River. Morrisons Creek, Blows Creek, and Fort Creek drain the western portion of Mulberry Island and discharge to the James River. There are several unnamed tributaries as well as six golf course ponds. The Warwick River defines the eastern boundary of the installation and flows southward into the James River (Figure 4-4). FE has 353 acres of tidal surface waters, 118 acres in the cantonment area and 235 acres on Mulberry Island. Freshwater surface waters comprise approximately 177 acres.

4.5.2.3 Eustis Lake and Browns Lake are two man-made lakes on FE (these are the only freshwater surface waters in cantonment). Both are environmental restoration program (ERP) sites that have land use controls. Eustis Lake is a 45-acre man-made recreational impoundment in the northwestern portion of the installation. The impoundment has an average depth of 4 feet, a maximum depth of 8 feet, and 38,000 feet of mostly wooded shoreline. The water level is maintained primarily by directed stormwater conveyances, overland flow, and, to a lesser degree, by groundwater. The contributing drainage area is 0.91 square miles. Installation personnel use the lake for boating (no outboard motors) and catch-and-release fishing; however, swimming and wading are prohibited. There is a nature trail that extends around the upper portion of the lake. Browns Lake is a 2.5-acre scenic pond in the southern part of the cantonment area. It was constructed in the 1950s as a stormwater retention pond to prevent contaminant release to the Warwick River. Browns Lake has a maximum water depth of 11 feet. Stormwater from vehicle maintenance facilities and a locomotive shop north of Browns Lake discharges to a stream that leads directly to the lake. Surface water discharges from Browns Lake into a natural drainage way, which eventually flows to the Warwick River. Browns Lake also offers fishing but is also restricted to catch-and-release. Boating, wading and swimming is prohibited in Browns Lake.

Figure 4-4. Surface Waters on FE.

4.6 Environmental Restoration Program.

4.6.1 The ERP includes IRP, and MMRP program elements. In 1994 JBLE-Eustis was listed on the National Priorities List (Superfund) as site ID VA6210020321. Under a Federal Facilities Agreement (FFA) with USEPA Region III ERP conducts remedial actions to address contamination and Long Term Management of sites governed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as well as applicable Federal, State, local, and DOD requirements.

4.6.2 IRP addresses the identification, and investigation of non-RCRA hazardous substances and pollutants on military lands. IRP conducts remedial actions to achieve acceptable human health and ecological risk, as agreed to by the USAF, Virginia Department of Environmental Quality and EPA Region III.

4.6.3 MMRP addresses the identification and investigation of unexploded ordnance, discarded military munitions, and munitions constituents at closed, transferring or transferred military ranges. Using a process consistent with CERCLA MMRP conducts remedial actions to achieve acceptable human health and ecological risk, as agreed to by the USAF, Virginia Department of Environmental Quality and EPA Region III.

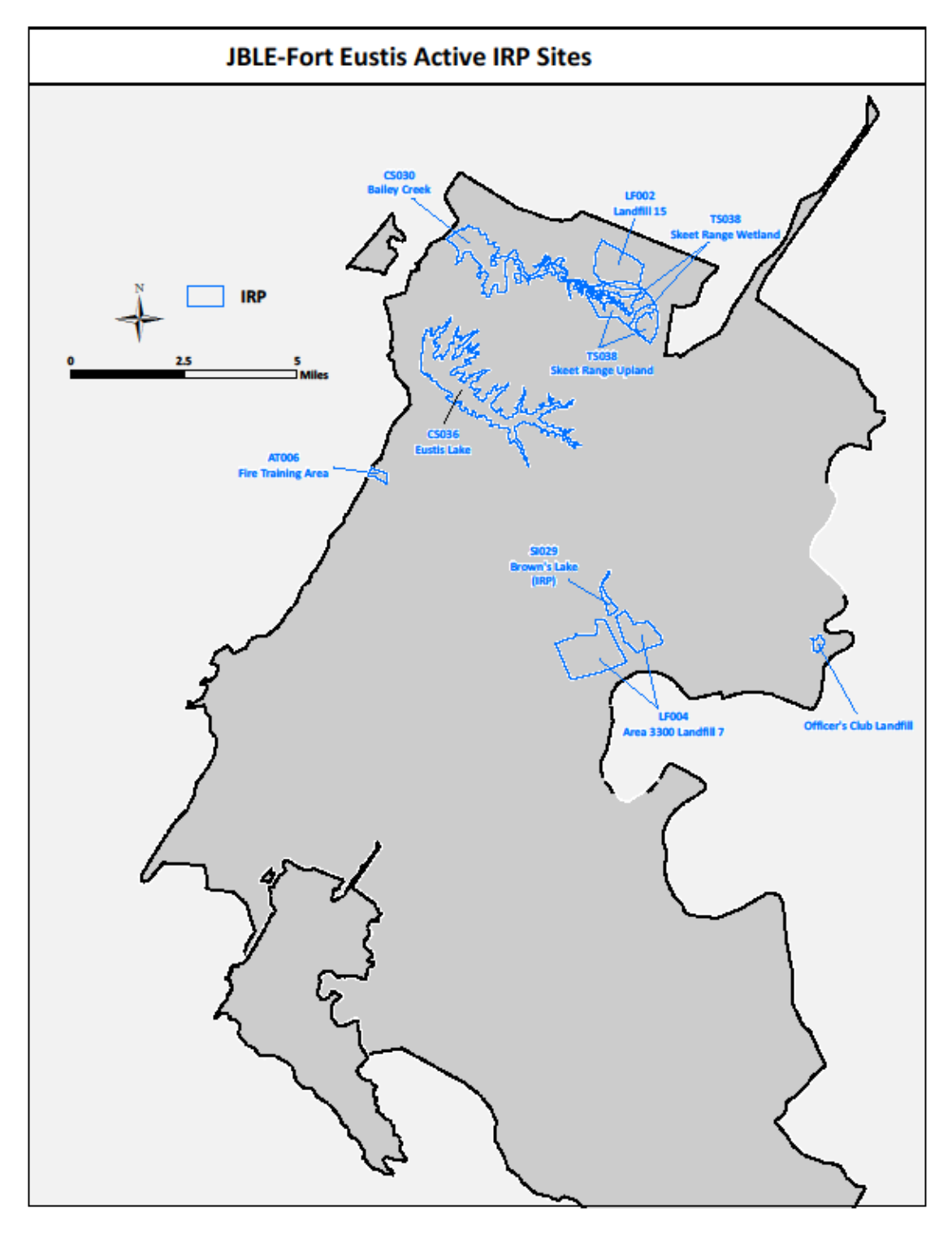

Figure 4-5. Installation Restoration Sites

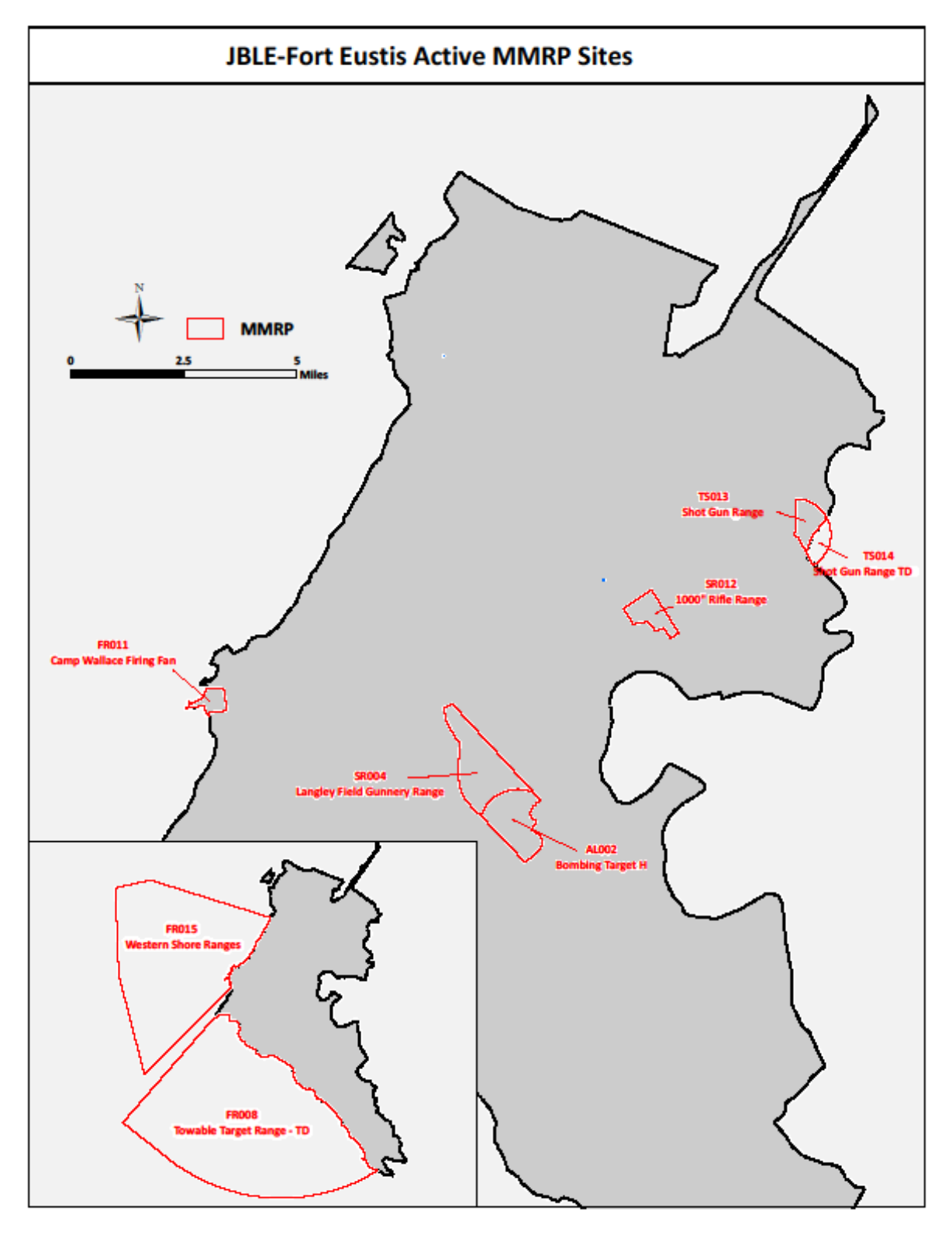

Figure 4-6. FE Military Munitions Response Program Sites

5.0 CHAPTER 5 – ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 Ecosystem Classification and General Description.

FE as an ecosystem can be classified based on the National Hierarchical Framework of Ecological Units (based on Ecoregions of the United States, U.S. Forest Service, U.S. Department of Agriculture, 1994):

- Domain: Humid Temperate
- Division: Subtropical
- Province: Outer Coastal Plain Mixed Forest
- Section: Middle Atlantic Coastal Plain

5.1.1 The Middle Atlantic Coastal Plain can be described as follows (Bailey, 1994 and Auch, undated). Topography is generally flat with elevations ranging up to 80 feet. The soil types are generally poorly drained. Land cover constitutes a combination of forest, wetlands and agriculture. Forested areas are classified primarily as oak-hickory-pine and southern flood plain forest where the primary forest cover type consists of loblolly pine-hardwood. In this case hardwood species include sweetgum, water oak, white ash, yellow-poplar, red maple and swamp hickory. Bottomland areas associated with major rivers typically include green ash, sugarberry, water oak, American sycamore, sweetgum and American elm. Wetlands are very common throughout the region and consist of several types including marshes, bottomland forests and pocosins. Additionally, this region includes surface waters and disturbed land. Climate consists of moderate to mild winters with hot, humid summers. Average annual precipitation is 40-60 inches. Land uses are primarily farming and forestry; however, urban development is locally significant in certain areas.

5.1.2 These characteristics of the Middle Atlantic Coastal Plain are generally synonymous with FE. The installation land cover consists of upland pine-mixed hardwood forests and several wetland types. The primary land use is for military operations (primarily training and administrative functions). The cantonment area and portions of Mulberry Island (such as Felker Army Airfield and the Pines Golf Course) are characteristic of urban development.

5.2 Flora/Vegetation.

5.2.1 Surveys and inventories. A number of botanical-related surveys and inventories have been conducted at FE over the past several years. Such surveys were performed for herbaceous and woody plants. The following surveys were performed:

- Forest Inventory and Vegetative Assessment of Fort Eustis, August 1997 (Terwilliger Consulting, Inc.).
- Plant Survey & Herbarium Collection Final Report for Fort Eustis and Fort Story, USA Transportation School, Virginia, June 2001 (Terwilliger Consulting, Inc.).

- Timber Inventory & Forest Management Plan of Fort Eustis, Virginia, October 2007 (Terwilliger Consulting, Inc.).
- Field Survey for Sensitive Joint Vetch (*Aeschynomere virginica*), Felker Army Airfield Wetland Restoration Area at Joint Base Langley-Eustis, Fort Eustis, Virginia, October 2013 (Resource International, LTD.).
- Evaluation of Forest Health, Fort Eustis, Virginia, December 2013 (Resource Management Associates, Inc.).
- USACE-Norfolk District wetland delineation (Preliminary Jurisdiction Determination, 18 December 2014).
- Environmental Compliance Consolidation Efforts at Joint Base Langley-Eustis, Virginia, 24 July 2015 (Resource Management Associates, Inc.) includes tasks of management of invasive species and botanical survey on 1,225 acres of natural resources.
- Environmental Support for Wetland Management at Felker Army Airfield and Taylor Avenue Marsh, Joint Base Langley-Eustis, Virginia, 28 August 2015 includes tasks of invasive species identification and botanical review.

5.2.2 Vegetative Cover and Habitats. A plant survey and herbarium collection was completed in 2001 (Terwilliger Consulting). This effort along with the Timber Inventory and Forest Management Plan (originally in 1997 and an updated plan completed in 2007, Terwilliger Consulting), USACE-Norfolk District wetland delineation and observations by natural resources staff comprise information sources about the flora found on the installation.

5.2.3 Terrestrial Habitat.

5.2.3.1 Forests cover 3,548 acres on FE, 766 acres in the cantonment area and 2,782 acres on Mulberry Island. There are 2,784 acres of commercial forestland on FE. Annex C, Appendix 2 lists the flora recorded on FE.

5.2.3.2 Woodlands are dominated by loblolly pine (*Pinus taeda*). Other coniferous species present in the canopy include Virginia pine (*P. virginiana*) and shortleaf pine (*P. echinata*). Common hardwood species include red maple (*Acer rubrum*), white oak (*Quercus alba*), northern red oak (*Q. rubra*), yellow poplar (*Liriodendron tulipifera*), mockernut hickory (*Carya tomentosa*), American elm (*Ulmus americana*), black cherry (*Prunus serotina*), American sycamore (*Platanus occidentalis*), white ash (*Fraxinus americanus*), and sweetgum (*Liquidambar styraciflua*). Bald cypress (*Taxodium distichum*) and black gum (*Nyssa sylvatica*) are present on wetter soils. Understory tree species include paw-paw (*Asimina triloba*), blueberry (*Vaccinium* spp.), American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), and wax myrtle (*Morella cerifera*). Herbaceous species include cardinal flower (*Lobelia cardinalis*), marsh fern (*Thelypteris thelypteroides*), lady fern (*Athyrium filix-femina*), royal fern (*Osmunda regalis*),

sensitive fern (*Onoclea sensibilis*), bracken fern (*Pteridium aquilinum*), false nettle (*Boehmeria cylindrica*), fox grape (*Vitis labrusca*), common greenbrier (*Smilax rotundifolia*), tickseed sunflower (*Bidens coronata*), sessile bellwort (*Uvularia sessilifolia*), and lespedeza (USATCFE 1997).

5.2.3.3 Improved grounds consist of planted species, such as fescue (*Festuca* spp.) and bermuda grass (*Cynodon dactylon*). Vegetation in semi-improved grounds includes clover (*Trifolium* spp.), lespedeza (*Lespedeza* spp.), and orchard grass (*Dactylis glomeratus*). Semi-improved grounds (such as landfills and the riparian area adjacent to the former wastewater treatment plant) and similar areas of early successional habitat (USATCFE 1997).

5.2.4 Aquatic Habitat.

Aquatic habitats on FE include the lower James and Warwick Rivers, Eustis and Browns Lakes, Skiffes Creek, Bailey Creek; and several unnamed tidal creeks and ponds. The shallow coves of Eustis Lake are characterized primarily as lacustrine wetland communities dominated by emergent species; however, there are a few coves that are dominated by stands of bald cypress. An upland community of mixed hardwood-pine forests surrounds the lake. Browns Lake has little emergent vegetation and is surrounded by shrubs. Uplands on the western and northern sides are vegetated with mixed hardwood-pines, and parkland is to the east. The drainage on the southern end flows through a riparian woodland and into a tidal marsh prior to entering the Warwick River. FE initiated a project in 1999 in cooperation with the Chesapeake Bay Alliance to restore submerged aquatic vegetation (SAV) in the James River. Follow-on studies in 2007 indicated that none of the initial plantings of SAV survived. Water turbidity may have precluded successful reestablishment of SAV. Additional information about SAV in Chesapeake Bay and coastal areas is available at http://web.vims.edu/bio/sav/gis_data.html.

5.2.5 Terrestrial and Aquatic Invasive Plants.

5.2.5.1 Several species of invasive plant species exist at FE and impact various military missions. The Environmental & Natural Resources Division (ENRD, the organizational name that preceded the Environmental Element before BRAC 2005) staff conducted several surveys to determine those species and map their percentage in various areas primarily as forest compartments. In September 2005, staff from the U.S. Army Environmental Center and BASF conducted a Pest Management

Program Assistance Visit. The purpose of the visit survey for invasive plants and recommend herbicide prescriptions. This was the initial survey in a series of additional invasive vegetation survey projects. The data from this survey was then used for more extensive surveying work in 2007 to identify invasive vegetation species percentages within timber compartments and again in 2007-2008 to develop a draft invasive management plan in July 2008. Discussions were conducted with ITAM staff to further consider adverse effects of invasive vegetation on training.

Cumulatively data from these efforts was then used to perform control plots for several species in 2008 and 2009. The data from this latter effort was completed in November 2009. ENRD staff reviewed the above data and compared this to personal observations to develop a working inventory. Figure 5-1 portrays the mapping of selected invasive plants on FE. Figure 5-2 portrays the extent of common reed (*Phragmites australis*) in FE as of 2014.

5.2.5.2 Cumulatively, the following 24 invasive plant species have been documented to date on FE:

- Common Reed (*Phragmites australis*).
- Tree of Heaven (*Ailanthus altissima*)
- Chinese Privet (*Ligustrum sinese*)
- Autumn Olive (*Elaeagnus umbellate*)
- Thorny Olive (*Elaeagnus pungens*)
- Mimosa tree (*Albizia julibrissa*)
- Beef Steak Plant (*Perilla frutescens*)
- Kudzu (*Pueraria montana*)
- Nepalese Browntop/Japanese Stiltgrass (*Microstegium vimineum*)
- Johnsongrass (*Sorghum halepense*)
- Japanese Honeysuckle (*Lonicera japonica*)
- Princess Tree (*Paulownia tomentosa*)
- Paper Mulberry (*Broussonitia papyrifera*)
- Field Bind Weed (*Convolvulus arbensis*)
- Chinaberry (*Melia azedarach*)
- Common Periwinkle (*Vinca minor*)
- Golden Bamboo (*Phyllostachys aurea*)
- Shrubby Bushclover (*Lespedeza bicolor*)
- Chinese lespedeza (*Lespedeza cuneata*)
- English Ivy (*Hedera helix*)
- Multiflora rose (*Rosa multiflora*)
- Tall fescue (*Festuca arundinacea*)
- Yellow Flag Iris (*Iris pseudacorus*)
- Wisteria (*Wisteria floribunda*/*sinensis*)

5.2.5.3 Invasive plants impact missions in different ways depending on the species and the location. Some directly affect training while others may affect other missions. All species essentially degrade the natural habitat and adversely affect biodiversity and overall ecosystem health. Of the 24 plants cited above, most tend to occur in terrestrial habitats while Common Reed tends to occur more so in aquatic environments. Of the 23 species cited above, several are of particular concern in terms of impacts on military missions:

5.2.5.3.1 Common reed. Common Reed grows in very thick, tall stands that out compete native aquatic/wetland vegetation. This causes significant degradation of line of sight thus impacting force protection as well as impeding movement through certain areas. Additionally, the thick stands can serve as fuel for wildfires. Currently, this species is beginning to encroach on manmade wetlands constructed along Harrison Road that was intended to reduce erosional impacts as well as improve shoreline aesthetics for picnics and wildlife viewing and improving habitat to support recreational sport fishing. It has colonized the dredge spoils facility serving as a propagation area and mars aesthetics in areas around the golf course.

5.2.5.3.2 Tree of Heaven. Tree of Heaven especially combined with Chinese Privet, Autumn Olive and Japanese Honeysuckle are of particular concern to training areas. These plants whether combined or separately create thick, impenetrable stands that degrade movement and operations. This degrades the quality of or in some cases prevents training tasks such as land navigation, tactical bivouac and small unit tactics.

5.2.5.3.3 Kudzu. Kudzu currently has only a minimal effect in training areas but has potential to expand. It has overwhelmed the northern portion of the installation near the second access gate. It has killed or will eventually kill a number of hardwood and pine trees that eventually become hazard trees. English ivy also poses as a threat to trees especially in cantonment areas.

5.2.5.3.4 Johnsongrass, Tall Fescue and Shrubby Bushclover. Johnsongrass, Tall Fescue and Shrubby Bushclover adversely affect open areas in portions of cantonment, some training areas and installation restoration sites. These plants out compete native vegetation degrading natural habitats, degrading aesthetics and impacting restoration efforts.

5.2.5.3.5 Aquatic invasive plants. Aside from Common Reed, little information exists on other aquatic invasive vegetation. These species should be surveyed as part of an aquatic flora survey. All of these invasive species adversely impact the biodiversity and cumulatively can restrict or even in some cases eliminate entire areas from use as training areas in the long-term.

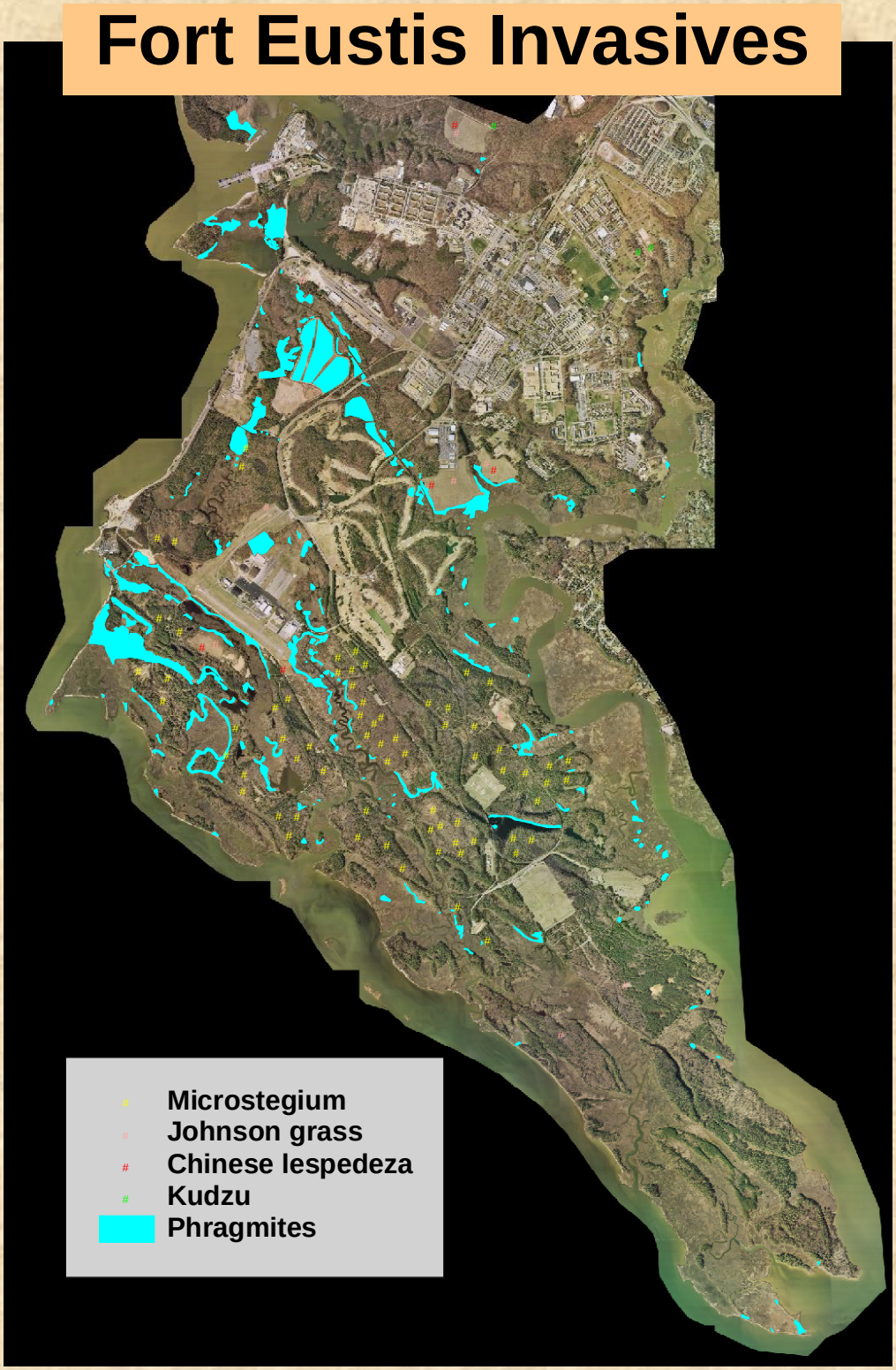

Figure 5-1 General Map of Selected Invasive Plants

Figure 5-2 Extent of Common Reed (*Phragmites australis*) as of 2014

5.3 Fish and Wildlife.

5.3.1 Surveys and inventories. A number of wildlife surveys and inventories have been conducted at FE over the past several years. Such surveys were performed for mammalian, avian, herpetofauna, fish and shellfish and insects, and to a lesser extent other terrestrial arthropods. The following surveys were performed:

- A Natural Heritage Zoological Inventory of FE, Virginia (DCR, October 1997).
- Report of Bat Survey Results at Fort Story, FE and Fort Lee (September 1998).
- Spring Migration Bird Survey Results on U.S. Army Garrisons FE and Fort Story (Waterways Experiment Station, July 2000).
- Breeding Bird Survey Results on the U.S Army Garrisons FE and Fort Story, VA (Waterways Experiment Station, July 2000).
- Assessment of Fishery Resources for Enhanced Management of Eustis Lake, FE, Virginia (U.S. Fish and Wildlife Service, June 2004).
- Planning Level Surveys for Amphibians and Reptiles, Mammals, Birds, and Fish, As Well As Pest Insects and Invasive Plants at FE, Virginia in 2004-2005 (Versar, August 2006).
- Mapping, Characterization, and Field Verification of Existing Vernal Pools at FE and Fort Story, Virginia (Versar, August 2006).
- Assessment of Vernal Pool at Fort Eustis (US Fish & Wildlife Service, 2009).
- An Inventory of Insect and Medically Important Arthropod Taxa at Joint Base Langley-Eustis, Fort Eustis, Virginia (Christensen, February 2014).
- Forest Insect Survey at Joint Base Langley-Eustis, Fort Eustis, Virginia (Parsons, 2015).
- Fauna Survey for Amphibians, Reptiles, Small Mammals, and Birds at Joint Base Langley-Eustis, Fort Eustis, Virginia (Parsons, 2015).
- Bat Survey for Ft. Eustis (The Conservation Management Institute, Virginia Polytechnic and State University, September 2016).
- Tick & Tick-Borne Disease Threat Assessment (USA Public Health Command and the College of William & Mary, 2007-2017 which includes bird and mammalian host surveys).
- Turtle Diversity of US Army Installation, Fort Eustis, Virginia (Dolan, J.D. and T.P. Christensen. 2007. Turtle diversity of US Army installation, Fort Eustis, Virginia. Catesbeiana, 27(2): 72-77.).
- 2017 Mosquito Species Inventory (Christensen, 2017).
- Bat Acoustic Survey: Natural Resource Program, Multiple Installations. 2017. University of Montana. UM-CIRE TASK ORDER-0013.

5.3.2 Additional supporting work. Additionally, other supporting work has been conducted to support data on wildlife diversity at the installation. Two separate partnerships with the College of William and Mary evaluated diamondback terrapins (*Malaclemys terrapin terrapin*) in tidal creeks and searches for rare black rails (*Laterallus jamaicensis*) were

performed in 2008. Installation natural resources staff perform small game surveys annually. Installation staff conducted a survey for Mabee's salamander (*Ambystoma mabeei*) in Training Areas 2 and 3 during 2008 (none were found) and a fish and aquatic turtle survey of Eustis Lake in 2007. A characterization study of selected vernal pools of FE was completed in 2010. Results of these various surveys and studies and observations by installation natural resources staff provide the sources of information concerning mammals, birds, fish and shellfish, reptiles and amphibians occurring at FE.

5.3.3 Mammals. Some of the species captured and/or observed during surveys include the white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*) golden mouse (*Ochortomys nutalli*), cotton mouse (*P. gossypinus*), meadow vole (*Microtus pennsylvanicus*), pine vole (*M. pinetorum*), marsh rice rat (*Oryzomys palustris*), short-tailed shrew (*Blarina brevicauda*), and least shrew (*Cryptotis parva*). Other mammal species known to occur on the installation include the white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), groundhog (*Marmota monax*), Eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes* and *V.v. fulva*), gray fox (*Urocyon cinereoargenteus cinereoargenteus*), coyote (*Canis latrans*), Virginia opossum (*Didelphis marsupialis*), muskrat (*Ondatra zibethica*), Northern river otter (*Lontra canadensi lataxinas*), and beaver (*Castor canadensis*). A bat survey was conducted in 1998 to provide an inventory of the bat species present on FE (Clark et al. 1998). Four locations were sampled; the captured bats included four red bats (*Lasiurus borealis*) and one big brown bat (*Eptesicus fuscus*). Additionally, observations at that timeframe revealed the existence of evening bats (*Nycticeius humeralis*) and Eastern pipistrelles (*Pipistrellus subflavus*) [now called the tricolored bat (*Perimyotis subflavus*)]. Additionally, observations by installation natural resources staff identified the existence of evening bats using a supply warehouse (Building 1610). A more recent bat survey in 2016 identified the presence of two federally listed bat species, the Northern Long-Eared Bat (*Myotis septentrionalis*) and the Indiana Bat (*Myotis sodalis*). A black bear (*Ursus americanus*) was observed on the installation in early June 2013. Bobcats (*Lynx rufus*) have been documented but occurrence is rare. Striped skunks (*Mephitis mephitis*) have not been observed on the installation for many years and are thought to have been extirpated. A complete list of mammals known and expected to occur at FE is presented in Annex C, Appendix 3.

5.3.4 Birds. Over 190 species was encountered during the surveys, 20 of which are considered common and widespread. Common species included rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), bobwhite quail (*Colinus virginianus*), red-headed woodpecker (*Melanerpes erythrocephalus*), red-bellied woodpecker (*Melanerpes carolinus*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), fish crow (*C. ossifragus*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*P. bicolor*), Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottus*), European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoeniceus*), house sparrow (*Passer domesticus*), and house finch (*Carpodacus mexicanus*). Waterfowl included Canada geese (*Branta canadensis*), wood duck (*Aix sponsa*), and mallard (*Anas platyrhynchos*).

5.3.4.1 Less common bird species. Some of the less common species observed during the survey include common loon (*Gavia immer*), snowy egret (*Egretta thula*), yellow-crowned night-heron (*Nycticorax violaceus* [state species of special concern]), common goldeneye (*Bucephala clangula*), red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), clapper rail (*Rallus longirostris*), spotted sandpiper (*Actitis macularia*), barred owl (*Strix varia*), pileated woodpecker (*Dryocopus pileatus*), bank swallow (*Riparia riparia*), eastern bluebird (*Sialia sialis*), hermit thrush (*Catharus guttatus*), winter wren (*Troglodytes troglodytes* [state species of special concern]), palm warbler (*Dendroica palmarum*), pine warbler (*D. pinus*), indigo bunting (*Passerina cyanea*), and savannah sparrow (*Passerculus sandwichensis*). A list of birds known and expected to occur at FE is presented in Annex C, Appendix 4.

5.3.5 Fish and Shellfish.

5.3.5.1 FE survey data. Eustis Lake, Skiffes Creek, Bailey Creek, Blows Creek, Milstead Creek, Island Creek, Warwick River, James River, and Brown's Lake have been surveyed. Nearly 40 species were identified from surveys, indicating a high level of species diversity. These species included bay anchovy (*Anchoa mitchilli*), pirate perch (*Aphredoderus sayanus sayanus*), Atlantic menhaden (*Brevoortia tyrannus*), spadefish (*Chaetodipterus faber*), black bullhead (*Ictalurus melas*), pumpkinseed (*Lepomis gibbosus*), bluegill (*L. macrochirus*), rough silverside (*Membras martinica*), inland silverside (*Menidia beryllina*), largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), striped bass (*Morone saxatilis*), striped mullet (*Mugil cephalus*), golden shiner (*Notemigonus crysoleucas*), white crappie (*Pomoxis annularis*), yellow catfish, white perch, black crappie and Atlantic needlefish (*Strongylura marina*).

5.3.5.2 Crustaceans and shellfish data in waters adjacent to FE. A shellfish survey was conducted in waters adjacent to FE. The observed species included eastern floater mussel (*Anodonta cataracta cataracta*), eastern elliptio mussel (*Elliptio complanata*), and three species of crayfish (*Cambarus bartonii bartonii*, *C. robustus*, and *Orconectes immunis*). American oysters (*Crassostrea virginica*) are found in the James River and its tributaries near FE. Blue crabs (*Callinectes sapidus*) are found in tidal habitats and areas containing SAV in the James River and its tributaries. Shellfish populations in the region have been declining for many years as a result of general water quality problems in the Chesapeake Bay and its tributaries (USATCFE 1998). A list of fishes and shellfish known and expected to occur at FE is presented in Annex C, Appendix 5. However, data on crustaceans and other aquatic invertebrates associated with inland aquatic habitats within the installation boundaries is lacking.

5.3.6 Reptiles and Amphibians. A variety of reptiles and amphibians is known to inhabit FE. Common snakes include the northern watersnake (*Nerodia sipedon*), eastern ratsnake (*Pantherophis alleghaniensis*), northern black racer (*Coluber constrictor*), eastern gartersnake (*Thamnophis sirtalis*) and rough green snake (*Opheodrys aestivus*). Common turtles include the common snapping turtle (*Chelydra serpentina*), Northern red-bellied cooter (*Pseudemys rubriventris*), eastern mud turtle (*Kinosternon subrubrum*), and woodland box turtle (*Terrapene carolina*). Lizard species include the ground skink (*Scincella lateralis*) and the five-lined skink (*Plestiodon fasciatus*). Of the amphibians that inhabit the area, frogs and toads comprise the largest group. Frogs and toads found include the green frog (*Lithobates clamitans*), Coastal Plains leopard frog (*Lithobates sphenocephalus utricularius*), spring peeper (*Pseudacris crucifer*), green treefrog (*Hyla cinerea*), upland chorus frog (*Pseudacris feriarum*), Fowler's toad (*Anaxyrus fowleri*) and American toad (*Anaxyrsus americanus*). Salamanders include marbled salamander (*Ambystoma opacum*), red-backed salamander (*Plethodon cinerus*) and red-spotted newt (*Notophthalmus viridescens*). In 2008, ENRD staff conducted a survey for Mabee's salamander (*Ambystoma mabeeii*) in Training Areas 2 and 3 as part of the environmental impact assessment of Grow the Army 2008 (Training Area 3 has since been converted to a motorpool as part of Grow the Army). Several adult marbled salamanders and several red-backed salamanders (lead and red phases) were observed; however, no Mabee's salamanders were found. A list of the reptiles and amphibians documented at FE is presented in Annex C, Appendix 6. As of the date of this INRMP, none of the three Virginia medically significant venomous snakes have been documented at FE.

5.3.7 Macroinvertebrates. Macroinvertebrates include arthropods (such as insects, spiders, harvestmen, ticks, mites, crayfish, crabs, copepods, isopods, etc.), flatworms, snails, clams, and annelids (such as earthworms, leeches, etc.). These organisms are critical components of the ecosystem and have numerous ecological roles. Insects have the greatest diversity of any group of organisms and are often overlooked when one considers management of wildlife and habitats. Their species richness and high fecundity make this group substantial components of biomass. Collectively macroinvertebrates as well as multicellular microscopic forms serve as food sources, predators, parasitoids, disease vectors, soil constituents, parasites, pollinators, decomposers, seed dispersal, and herbivory. Some may be pests of habitat vegetation and wildlife.

5.3.7.1 FE conducted several arthropod surveys and inventories beginning in 2011 and completed in 2015. This data serves as a baseline. The primary focus was on terrestrial insects and to a lesser extent arachnids. Natural resources staff recorded 18 insect orders (Class Insecta) and 6 arachnid orders (Class Arachnida) with specimen identification made at the lowest taxonomic level as possible. The following tables indicate the existing insect and arachnid inventory.

Orders	Families	Genera	Species
Coleoptera	45	131	149
Hymenoptera	18	32	30
Diptera	19	23	43
Lepidoptera	18	78	92
Orthoptera	5	7	2
Mantodea	1	1	1
Phasmida	1		
Hemiptera	18	22	23
Mecoptera	1		
Blattodea	3	4	2
Neuroptera	4	2	
Odonata	5	3	
Microcoryphia	1		
Dermaptera	2	2	2
Megaloptera	2	1	2
Ephemeroptera	1		
Psocodea	1	1	1
Trichoptera			

Other arthropods particularly arachnids (Class Arachnida) were examined and documented.

The following table reflects the preliminary arachnid inventory.

Order	Families	Genera	Species
Aranae	13	16	15
Mesostigmata	2	2	2
Trombidiformes	2	3	
Ixodida	1	4	6
Opiliones	1	1	
Pseudoscorpiones			

Additional invertebrate taxa are noted in Annex C. The inventory data continues to be evaluated to identify invasive taxa and the degree of risk, taxa serving as natural biological control, pollinator competence, relationships with other wildlife, and those that may function as environmental indicators. Annual arthropod data collection continues and is incorporated into the natural resources annual work plan with an initial arthropod inventory being included in the FE Integrated Natural Resources Management Plan. Future invertebrate assessments include inventories of proturans, collembolans, diplurans, millipedes, centipedes, and both terrestrial and aquatic crustaceans.

5.3.8 Important Wildlife Diseases. Disease in wildlife is a natural phenomenon. However, various factors or conditions contribute to increased risks and adverse outcomes in certain wildlife populations and in some cases directly affecting human health. Currently, the following wildlife diseases are considered important for this INRMP period.

5.3.8.1 Rabies. This viral disease has been documented in raccoons, red foxes and opossums at FE. Consequently, this disease remains a possibility among certain mammals on the installation. Natural resources staff or 733 SFS game wardens are typically the first responders regarding human-wildlife conflicts. These personnel coordinate directly with Preventive Medicine/Environmental Health staff immediately if any risk of exposure is identified.

5.3.8.2. Chytridiomycosis. Amphibians are at risk of at least two chytrid fungi species globally. This disease causes high mortality among several anuran and caudate species.

5.3.8.2.1 *Batrachochytrium dendrobatidis* (Bd) at FE. The chytrid fungus, *Batrachochytrium dendrobatidis* adversely affects species of frogs and toads. In 2013, FE participated in a Department of Defense-wide amphibian disease survey for this fungal pathogen (Lannoo et al. 2014). Two individual anurans tested positive of fifteen individuals tested. At that time infection rate was deemed low based number and species of anurans tested and distances between sites. Future assessment shall be performed when resources are available. Additionally, JBLEI 32-102 and this INRMP prohibit the use of frogs, toads and tadpoles as fishing bait, and wildlife/fauna removal from or liberation onto FE is prohibited (Section 7.21).

5.3.8.2.2 *Batrachochytrium salamandrivorans* (Bsal) at FE. The salamander chytrid fungus *Batrachochytrium salamandrivorans* was first described in 2013 based on observations among wild and captive fire salamander (*Salamandra salamandra*) reported in Europe. It is not yet reported in the United States and consequently, would not be expected to occur at FE at this time. Nonetheless, natural resources staff shall monitor federal and state reports, and the literature. Additionally, JBLEI 32-102 and this INRMP prohibit the use of salamanders as fishing bait, and wildlife/fauna removal from or liberation onto FE is prohibited (Section 7.21).

5.3.8.3 Snake Fungal Disease (SFD). SFD is an emerging disease observed among several snake species in the Eastern United States and has been observed in Virginia. Sources suggest the fungal pathogen may be *Ophidiomyces ophiodiicola*; however, fungal pathogens may also be involved. Several species occurring at FE

have been diagnosed including Northern watersnake (*Nerodia sipedon*), Eastern black racer (*Coluber constrictor*), common ribbonsnake *(Thamnophis sauritus*) and Eastern ratsnake (*Pantherophis alleghaniensis*). This disease has not been observed in snakes at FE;, however, because of its apparent prevalence, research is needed. Natural resources staff are participating in a DOD-wide survey in 2018. This INRMP prohibits wildlife/fauna removal from or liberation onto FE (Section 7.21).

5.3.8.4 Hemorrhagic Disease (HD). HD is the most important infectious disease of white-tailed deer in the southeastern US including Virginia. This disease is caused by the Epizootic Hemorrhagic Disease virus that is transmitted from biting flies in the genus *Culicoides*. HD outbreaks can occur annually, but with annual variations of severity, related to densities of *Culicoides*, individual deer immunity and virulence of the virus. HD outbreaks occur most often in late summer and early fall (August through October). Mortality rates from HD in southeast Virginia average less than 10%, but can exceed 25% of the deer population. Environmental conditions that favor high *Culicoides* densities include mild winters, hot summers and June drought. While likely to occur at JBLE-Eustis annually, significant deer mortality as a result of HD has not occurred since 2005 in which more than 50 deer were found exhibiting signs of HD infection. The disease is not transmittable to humans though *Culicoides* are significant nuisance biting flies of humans. Common names for *Culicoides* species include biting midges, punkies and no-see-ums with at least one species occurring at FE.

5.3.8.5 Canine distemper. Canine distemper is a highly contagious and often fatal disease that affects both domestic canids and wild carnivores including raccoons. The disease is caused by a virus and is spread through contact with bodily fluids and feces. A FE 2011 wildlife disease survey of 64 raccoons revealed no infected individuals. However, the disease was observed in raccoons in earlier surveys. Immunizations of domestic animals is the best preventative measure. Symptoms are similar to those of rabies; however, canine distemper is not transmissible to humans.

5.3.8.6 Leptospirosis. Leptospirosis is a zoonotic disease caused by a *Leptospira* bacteria infection. A 2012 FE wildlife disease survey 4 infected raccoons of 10 individuals sampled.

5.3.8.7 Sarcoptic mange. No cases of mange (as caused by the *Sarcoptes scabiei* mite) have been identified in any mammalian species at FE date.

5.4 Rare, Threatened, and Endangered Species.

5.4.1 Surveys and inventories. The surveys and inventories discussed in section 5.2 and 5.3 included rare, threatened, and endangered animal and plant species. Species targeted in the

survey included mammals, birds, reptiles, amphibians, fish, invertebrates, and plants listed or determined to be candidates for listing by the USFWS, VDGIF, VDCR, or Virginia Department of Agriculture and Consumer Services. Natural resources staff request funding to conduct plant and animal surveys and inventories every five years.

5.4.2. Listed species and regulatory coordination. Consultation takes place with the USFWS regarding federally listed species occurring on the installation while consultation with the National Oceanic & Atmospheric Administration (NOAA) occurs for those species occurring in adjacent aquatic systems. Identification of species subject to USFWS jurisdiction is accomplished by comparing species identified in surveys and inventories to the Service's Information, Planning and Consultation system (IPaC). The installation boundary was sketched into the IPaC system to generate a threatened and endangered species list. The IPaC system generated one possible species, the Northern Long-Eared Bat (*Myotis septentrionalis*) that became a federally threatened species effective April 2, 2015. This species was found during the bat survey in 2016 with two males captured in mist nets as well as via acoustic means. However, the federally endangered Indiana Bat (*Myotis sodalis*) was also documented during this survey via acoustic means (no individuals were captured). The Indiana bat, which was listed in 1967, was not expected at FE. Sources suggested its presence to be in the western portion of Virginia. On 6 February 2012, the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) was listed as Federally endangered and by virtue of the Commonwealth's adoption of the federal list, this species became state endangered as of 1 January 2013. This species does not occur on Fort Eustis but does exist in the adjacent water bodies of the James River and its tributaries. Furthermore, management responsibility is the National Oceanic & Atmospheric Administration (NOAA) as opposed to USFWS. Consequently, the sturgeon does not appear in the IPaC system.

5.4.3 Rusty patched bumble bee (*Bombus affinis*). This species was listed as endangered effective March 21, 2017. It is not listed in the IPaC system for area of the installation; however, various sources include Virginia as part of the species historical range. Specific information concerning its distribution is not available. FE has conducted insect inventories; however, the limited data exists for apids. The presence of the rusty patched bumble bee on FE remains unknown; however, U.S. Air Force Pollinator Conservation Reference Guide (2017) suggests the possibility.

5.4.4 Potential Candidate Species. Candidate species are those organisms under consideration for federal listing in the future. Consequently FE natural resources staff monitors statuses of candidate species and record those known to occur at FE. Currently, the spotted turtle (*Clemmys guttata*) and the tricolored bat (*Perimyotis subflavus*) are being considered and are known to occur at FE.

5.4.5 Bald Eagle (*Haliaeetus leucocephalus*). USFWS listed bald eagles as endangered in 1978 following enactment of the Endangered Species Act of 1973 (throughout the lower 48 states with the exception of Michigan, Minnesota, Oregon, Washington, and Wisconsin where it was designated as threatened). This status was downgraded to threatened in 1995 followed by complete delisting in 2007 based on recovery success. Bald eagles have been observed at FE for many years. This species is afforded protections under the Migratory Bird Species Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Currently, fourteen bald eagle nest sites exist and these sites are protected under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act and respective federal regulations. Installation policy concerning this species is articulated in a Bald Eagle Management Plan originally dated 2008 and revised for this addition of the INRMP. The plan exists as Annex D to the INRMP and shall be is reviewed annually with the INRMP. Existing eagle nest sites are also depicted in Figure 5-3.

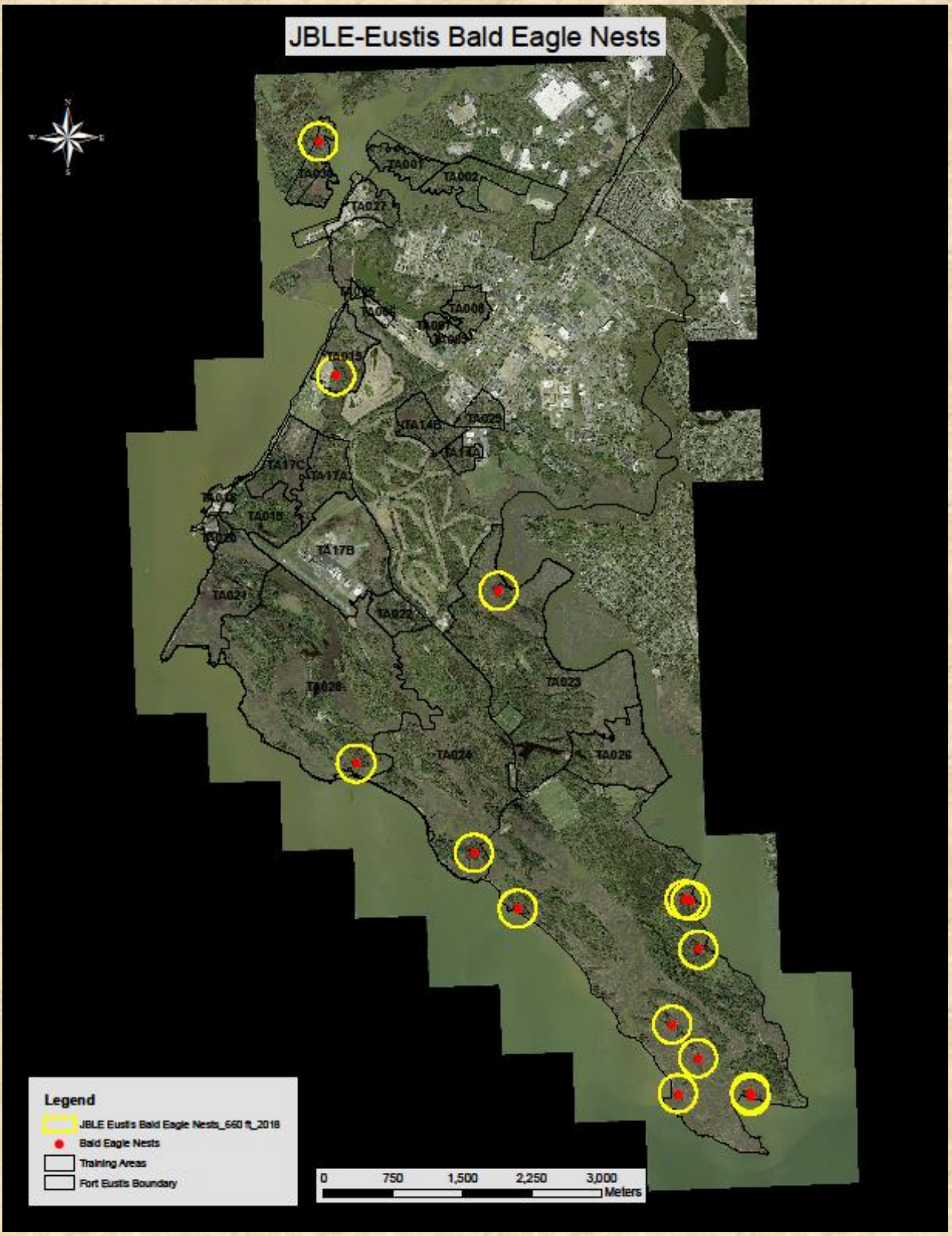

Figure 5-3. Bald Eagle Management Areas (Nest Sites) as of 2018.

5.4.6 Invasive fauna. Several vertebrate and invertebrate species are known to occur on the installation. These species have been documented during surveys and by visual encounters/specimen collection by installation natural resources staff. Additionally, several other species have the potential to become established on FE in the future. Detailed discussions concerning these species are found in Section 7.13.5 and the Invasive Species Management Plan.

5.4.7 Conservation Areas. To enhance protection and facilitate management of rare species at FE, conservation areas were established by FE and there was concurrence from the VDNH for areas that merit special protection. Originally, these included four areas designated as conservation areas because they include one or more rare species and have been ranked at least B5, General Biodiversity Significance (VDCR 1997). Two areas are referred to the North and South Seeps along the Warwick River. The North and South Seeps remain as conservation site**s** (See Figure 5-6 and Section 5.6). Two other sites were originally established due to bald eagle nest sites prior to the species being delisted; however, these areas are no longer considered conservation sites.

5.4.8 State Listed Species. During the bat survey in 2016 (and also during the 2017 survey), two state-endangered bat species, the little brown bat (*Myotis lucifugus*) and the tri-colored bat (*Perimyotis subflavus*) were documented. Both species were added to the list of state endangered species on April 1, 2016.

5.5 Wetlands and Vernal Pools.

5.5.1 Wetlands Mapping. FE contains a large wetland system in the lower James River. The USACE-Norfolk District (Regulatory Branch) evaluated 6,520 acres of Fort Eustis land (this an estimated 95% of the installation and delineated those areas determined to be jurisdictional wetlands excluding Training Area 30, a small portion of Training Area 28 containing a bald eagle nest and the majority of the Impact Area). This was completed in September 2013; however, additional review and revisions were effected in 2014. The final delineation is documented in a letter dated 18 December 2014 (Annex F). Those areas delineated as wetlands remain valid through December 2019.

FE has approximately 353 acres of surface water habitat. This equates to approximately 118 acres in cantonment and 253 acres on Mulberry Island. An estimated 84 acres of vernal pools exist at FE. Wetlands and surface waters are shown in Figure 5-4.

Any project/action proposed for any given area must be coordinated with the EE to determine wetland impacts and permitting requirements.

Estimated wetland cover types and estimated area coverage based on National Wetland Inventory (NWI) data is presented in Figure 5-1 and Table 5-1. This information is only used as a guide. Actual cover types and respective acreage is needed for accuracy.

Table 5-1. Estimated Wetland Cover Types on FE.

Wetland Classification[1]	Acreage	Wetland Classification[1]	Acreage
E1UB	386.9	PEM1	35.0
E2EM	1,683.2	PFO1/4	42.2
E2FO4	10.3	PFO4/1	4.4
E2SS1/EM1	45.4	PFO4	147.2
E2SS1	217.0	PSS1/FO1	12.3
E2SS4	3.3	PSS1	60.2
E2US	44.2	PSS4	10.67
L1UB	55.2	PUB	23.5
PEM1/SS1	6.9	PUS	0.8
		Total	2,788.7

[1] Cowardin et al. · See Figure 5-5 for names.

Delineated wetland data is used for project level analysis instead of NWI data. NWI data lacks completeness because of photo-interpretation problems, map scale, and lack of ground truthing associated with preparation of NWI maps. NWI maps are most useful as a general approximation of wetland resources and do not provide sufficient detail to evaluate potential impacts of proposed activities on specific wetlands. Therefore, a jurisdictional determination by the USACE shall be made before any land disturbances or activities that could adversely impact wetlands on FE.

Currently, there are four mitigation wetland sites on FE (see Annex M). These sites were constructed as part of compensatory mitigation for construction projects many years ago. These sites must be maintained as wetlands to perpetuity unless alteration is otherwise approved by the USACE. A map depicting the general location of these sites is located at Annex N.

5.5.2 Wetlands on FE include both tidal and nontidal wetlands. The majority of the wetlands are tidal marshes (Moore 1977). The major tidal marsh vegetation communities include 44 percent black needlerush (*Juncus roemerianus*); 28 percent saltmarsh cordgrass (*Spartina alterniflora*); 11 percent community assemblage of big cordgrass (*Spartina cynosuroides*), saltmeadow cordgrass (*Spartina patens*), and cattails (*Typha* spp.); 9 percent big cordgrass; 4 percent groundsel-tree (*Baccharis halimifolia*); 2 percent brackish and freshwater mixed species; and 2 percent pickerelweed (*Pontederia cordata*), arrow arum (*Peltandra virginica*), and other species. In non-tidal, upstream creek sections, where salinities are very low, marsh species such as marsh mallow (*Hibiscus moscheutos*), cattails, and saltbush occur.

Freshwater wetland vegetation includes duckweeds (*Lemna* spp.), watermeal (*Wolffia* spp.), cattails, willows (*Salix* spp.), and goldenrods (*Solidago* spp., Terwilliger Consulting 1998a). Figure 5-5 depicts wetlands on FE.

5.5.3 Ephemeral pools are seasonal, freshwater wetlands that hold water for a portion of the year, usually in a contained basin with no water outlet, and support the breeding activity of amphibians and macro-invertebrates, but do not contain fish populations. As temporary, aquatic environments, vernal pools are known officially in Virginia as isolated, nontidal wetlands. Monitoring of these unique wetlands would provide information on the occurrence and distribution of obligate species. The **Vernal Pool Society of Virginia** is dedicated to promoting awareness, conservation, and research for Virginia's vernal pools. Figure 5-6 depicts ephemeral pools at FE.

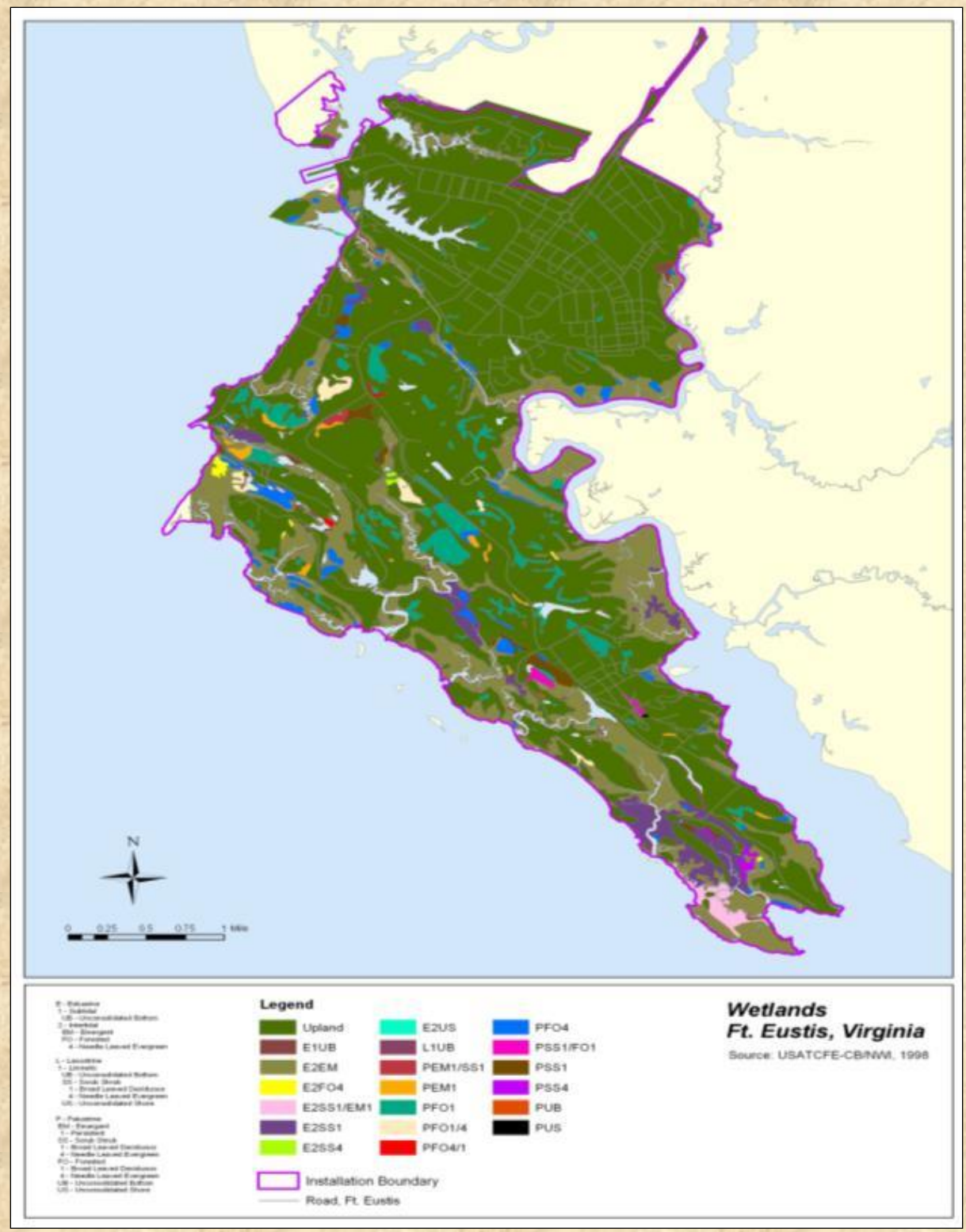

Figure 5-4. Estimated Wetland Cover Types.

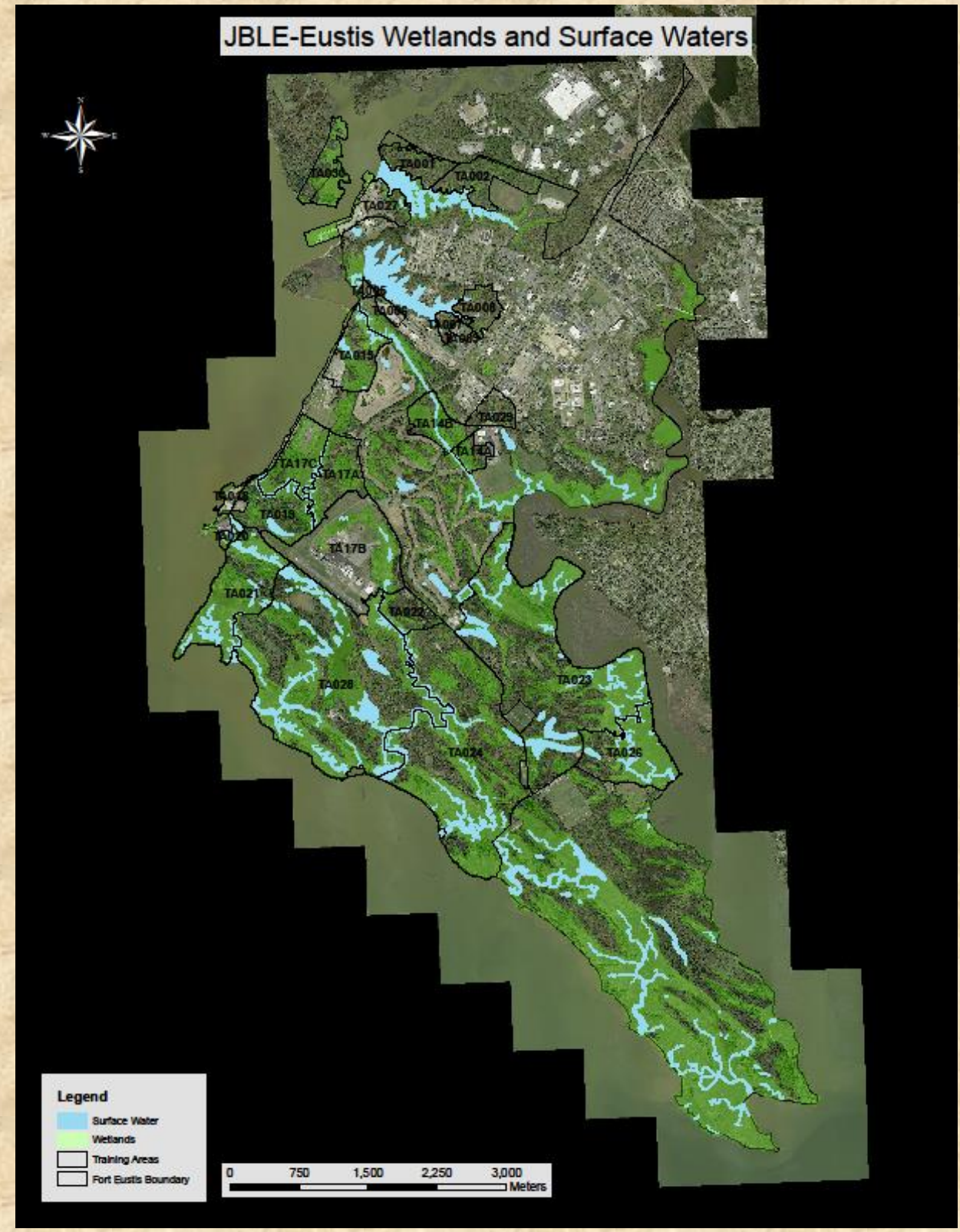

Figure 5-5. Wetlands and Surface Waters

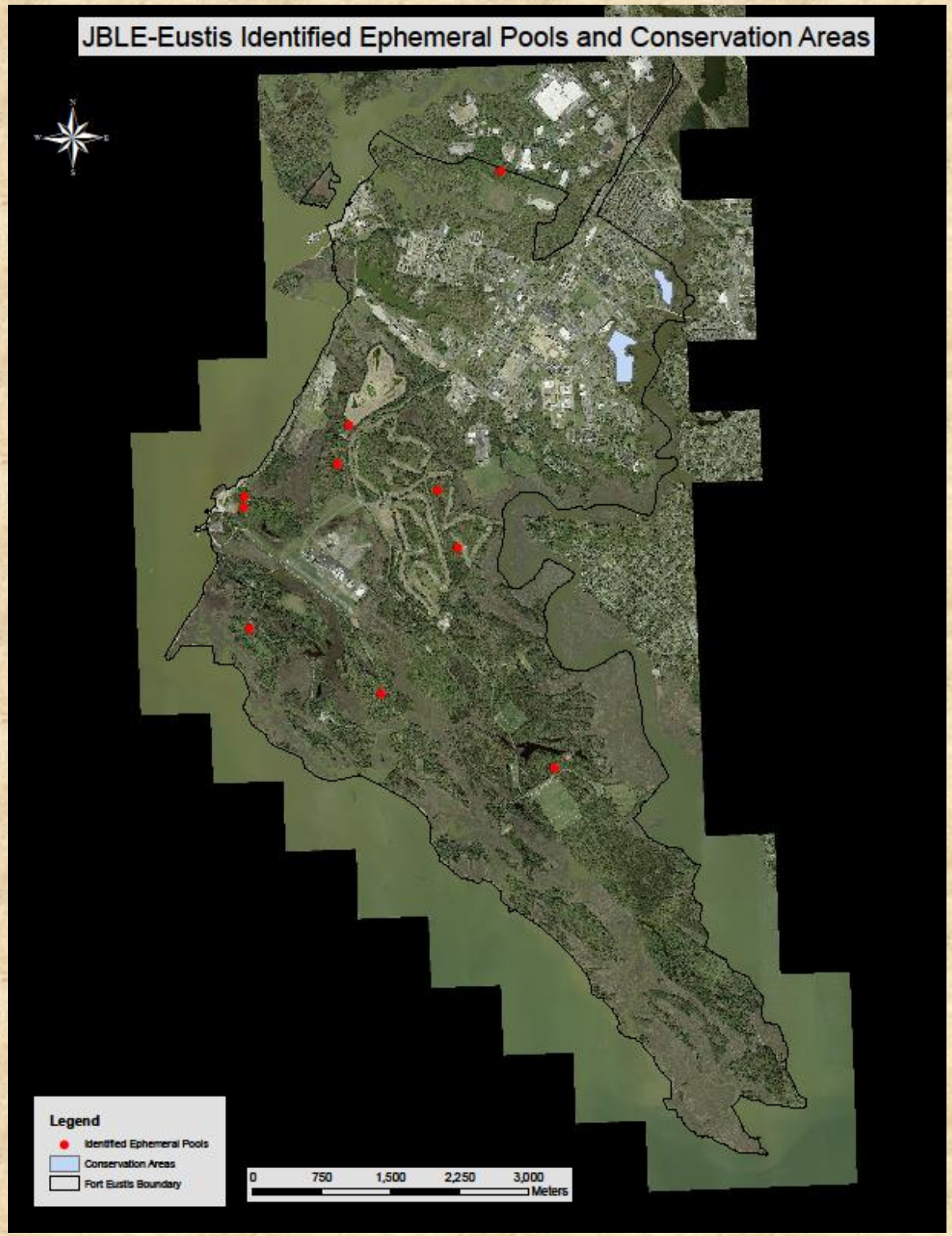

Figure 5-6 Ephemeral Pools and Conservation Areas

5.6 Conservation Areas.

Designation and protection of areas on DOD installations that warrant special conservation efforts are authorized in DOD Instruction 4715.03. Conservation areas include botanical areas, ecological reserve areas, geological areas, riparian areas, scenic areas, zoological areas, watchable wildlife areas, and traditional cultural places having officially recognized special qualities or attributes. Clearing or disturbance of the land in the conservation areas is restricted and requires prior coordination. Figure 5-6 depicts the two Conservation Areas noted below. These two areas were designated on/about 1997 and should be reevaluated.

5.6.1 Warwick River North Seeps. This 11-acre conservation area of forested hillsides and ravines occurs along the Warwick River. The tidewater interstitial amphipod (*Stygobromus araeus*), a federal species of concern and former Category 2 candidate, had been collected in two of the groundwater seepage habitats located in a ravine between the Warwick River and a residential area. Both seepages dry completely (or nearly so) in summer or early fall during years of below average precipitation. Freshwater extends downstream of the seepages for fewer than 75 feet until the tidal influence of the Warwick River predominates (VDCR 1997). Vegetation includes lizard's tail (*Saururus cernuus*) and several species of fern. The seepage areas contain a leaf pack that is 1-2 centimeters (cm) thick, which is typical of other sites where the tidewater interstitial amphipod has been found in Virginia. The conservation planning boundary includes the two seepage areas where the tidewater interstitial amphipod was documented, an additional seepage area that contains potential habitat, and a buffer area where land use activities should be evaluated to determine their impacts on groundwater quality and rare amphipod occurrences.

5.6.2 Warwick River South Seeps. This 26-acre conservation area of forested hillsides and ravines occurs along the Warwick River near the FE Youth Services Center. The tidewater interstitial amphipod was collected at six groundwater seepages in this area. All of the seepages appear to be perennial. Vegetation in the conservation area includes lizard's tail, false nettle, clearweed (*Pilea fontana*), jack-in-the-pulpit (*Arisaema triphyllum*), netted chain fern (*Woodwardia areolata*), sensitive fern, cinnamon fern (*Osmunda cinnamomea*), New York fern (*Thelypteris noveboracensis*), and cutgrass *(Leersia* spp.). The surrounding forest is dominated by red maple, yellow poplar, and sweetgum, with a few scattered loblolly pine trees present. These seepages also contain a leaf pack of 1-2 cm in depth. This area has a history of disturbance from construction of facilities. The largest seepage area harboring the tidewater interstitial amphipod is adjacent to a buried, corrugated stormwater drainage pipe upslope of an associated concrete outfall structure. The conservation planning boundary for this area includes the six seepage areas and a buffer zone (USATCFE 1997).

6.0 CHAPTER 6 – MISSION IMPACTS ON NATURAL RESOURCES.

6.1 Land Use. The total estimated land area of FE is 7,872 acres.

6.1.1 Improved grounds/land. These areas are occupied by buildings and other permanent structures, lawns, parade fields, 3d Port and athletic fields. This should include most of cantonment (including areas of BBC housing), Training Area 5, Training Area 15 (the hardstands and buildings), the new Aviation Complex, firing ranges and golf course (minus wetlands/forested areas). Collectively, this constitutes approximately 1,061 acres.

6.1.2 Semi-improved grounds/land. These areas involve periodic maintenance for operational requirements such as erosion control, bird control, visual clear zones, etc. For FE this would include the mowed grass area around the Felker Airfield runway, picnic areas along the James River, Ammunition Supply Point (ASP), golf course forested/wetland areas, horse stable/pasture, Felker Airfield Clear Zone, Landfills 7 and 15, the two MOUT training facilities and dredge spoil facility. Collectively, this constitutes approximately 857 acres.

6.1.3 Unimproved grounds/land. These are areas that do not fall into the improved or semi-improved areas where natural vegetation grows without any maintenance. Such areas include forested areas, wetlands, lakes, ponds, vernal pools and open fields/early successional habitats. These areas constitute the remaining areas not associated with improved and semi-improved areas. Collectively, this constitutes approximately 5,954 acres.

6.2 Current Major Impacts.

6.2.1 Currently, there are few impacts except construction that converts natural/vegetative communities into impervious surfaces. Training events have minimal impact in terms of movement by soldiers/military personnel through natural areas by foot (dismounted movement). Mounted/vehicular off-road movement when conducted avoids wetlands and most forested areas. Operation of tracked vehicles is generally limited except for bulldozers involved in shoreline logistical training (this is performed in accordance with regulatory permits when below mean high water). The existing firing ranges generally do not have major impacts except when operational uses cause a wildland fire. Occasionally, fallen timber or hazard trees (standing dead timber) are removed to accommodate movement or bivouac as well as safety in training areas (however, three to four 12 to 20-inch diameter logs per acre are retained as feasible).

6.2.2. Aviation Complex facility (Aviation Applied Technology Directorate (AATD) [now Aviation Development Directorate] Flight Concepts Division). Flight Concepts Division proposed construction a new research and development compound based on Flight Concepts Division Applied Technology Directorate 2011-2031 Plan (Final, August 2011). An Environmental Assessment was completed with the location of this facility sited in Training Area 28. This effected the loss of approximately 31 acres of natural area that included approximately 23 acres of forest land cover. This forest cover was removed in 2018.

6.3 Potential Future Impacts.

6.3.1 Dredge spoils management. FE operates a port facility for its military watercraft. Periodically (usually every 5 years) the channel at 3d Port must be dredged to allow for vessel movement and overall port operations. Environmental assessments for this operation have been prepared. Dredging may have impact on some anadromous fish to include the endangered Atlantic sturgeon; however, Section 7 consultation under the Endangered Species Act with the National Oceanic and Atmospheric Administration (NOAA) and an environmental impact analysis would be required. Currently, dredge spoils are placed in the Fort Eustis Dredge Material Management Area (FEDMMA). The life cycle for the FEDMMA closes in the near future. Dredging requirements generate the need to address future disposal in the form of a new facility or off-site disposal.

6.3.2 Vegetation management at airfield clearance at Felker Army Airfield. The purpose of this action is to attain and maintain vegetation clearances within the Primary Surface, the Clear Zone, and the Approach-Departure Clearance Surface Area adjacent to the Clear Zone at the Felker Army Airfield so as to provide the adequate margins of safety for aircraft take-offs and landings in accordance with the UFC 3-260-01 to the maximum, practical extent. An environmental assessment was completed in 2018. Based the chosen alternative, an estimated 20 acres of forested wetland and an estimated 100 acres of upland forest would be permanently lost. Additionally non-forested wetlands may be impacted.

6.4 Natural Resources Needed to Support the Military Mission.

Natural resources are required to perpetuate military missions. Various habitat types support different mission requirements. Healthy forested areas replicate European and other temperate zone environments. Such habitat types provide conditions for cover and concealment for soldiers/opposing forces conducting tactical training and land navigation. Beyond military training, forested areas are habitat for large and small game species harvested during recreational hunting by military personnel, retirees and civilians. Forested areas can also serve as buffers/dividing points for land areas involving different uses. Wetland areas can function as natural areas for certain dismounted training and barriers to opposing forces in training events. Furthermore, retention of wetland habitats especially marsh habitats are critical to mitigate the effects of flooding from storm events. Shoreline areas are needed to perform Joint Logistics Over the Shore (JLOTS)/Logistics Over the Shore (LOTS) and modular floating causeway pier operations.

6.5 Natural Resources Constraints to Military Missions and Mission Planning.

Generally speaking, natural resources do not preclude or eliminate accomplishing military missions at FE. The key to reducing risks of major impacts on missions is effective planning, communication and coordination. Nonetheless, some natural resources may pose constraints. However, with an understanding of the specific details in conjunction with proper planning and coordination, such constraints are minimal. The following constraints and their effects on the installation are noted.

6.5.1 Federally listed species (threatened or endangered). Currently, there are two terrestrial and one aquatic federally listed species associated with FE as discussed in Sections 5.3.3 and 5.4.2 above with discussions on management practices in Section 7.12.8.3.2 (these species being the Northern long-eared bat (*Myotis septentrionalis*), the Indiana bat (*Myotis sodalis*), and the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*).

6.5.1.1 Northern long-eared bat and Indiana bat. These two species were documented on FE for the first time during a bat survey conducted in 2016. Their impact on military missions is minimized. There are no restrictions on military training activities at this time. However, timber harvests, tree removal (with some exceptions including removal of small shrubs, trees less than 3-inch DBH and trees identified as hazard trees by natural resources staff) and forest habitat conversions to impervious surface or non-forest habitat is restricted from April 15 to September 15.

6.5.1.2 Atlantic sturgeon. The sturgeon is an aquatic organism and would not have any direct impact on military training or other missions occurring on land. There are no military watercraft operation restrictions in the James River or at 3d Port as a result of the sturgeon. Dredging of Skiffes Creek is periodic (typically every 5 years) and would require consultation with NOAA.

6.5.2 Bald eagles. Bald eagles were removed from the List of Endangered and Threatened Wildlife on June 28, 2007 because sufficient populations recovered in the lower 48 States. However, this species is afforded protective measures under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. These protective measures preclude the take of adult eagles, immatures, eggs, nests or bird parts without a permit. Generally speaking, eagles do not pose impacts to missions on FE except in the case of certain nest locations. Currently, 14 active nests exist on FE. Nest issues may exist if the location is in a training area or if the adults or fledglings pose a Bird Air Strike Hazard (BASH) risk. In training areas (or any area that a nest exists), a 660-foot buffer around the nest tree precludes entry during the breeding season (December 15-July 15).

6.5.3 Wetlands. An estimated 3,600 acres of tidal and non-tidal wetlands exist on the installation. Most of these wetlands have been delineated by the US Army Corps of Engineers Norfolk District, and this data has been incorporated into GIS data layers to assist in planning. Issues primarily arise from (1) construction projects sited in wetlands, (2) alteration of aircraft clear zones at Felker Army Airfield and (3) training activities in wetlands. Wetland impacts from construction can be prevented by using the GIS delineation data layers to site in non-wetland areas. Wetlands in portions of the clear zone at Felker Army Airfield have been altered under federal and state permits and additional loses are expected as noted from Section 6.3.2. However, conversion of affected wetlands in the clear zone to emergent wetland habitat reduces the loss and increased flooding risks as well as possibly reducing compensatory mitigation costs, but may also increase BASH risk. Marsh

habitats pose barriers to vehicular movement during certain military training activities in some training areas. Wetlands can be used for dismounted military training when the areas are properly managed and included in the ITAM program.

6.5.4 Hazard trees/fallen timber. Storm events, biotic factors and human activities can lead to stress or the death of trees. In these cases, trees may become hazards to property and safety of personnel. In training areas, standing hazard trees are removed with a small portion left to serve as habitat/microhabitat for wildlife. Over time or from specific storm events, Large numbers of fallen timber may occur in training areas to the extent that movement or use by military personnel becomes limited. Collectively, removal can be expensive depending on the volume.

6.5.5 Hazardous wildlife and zoonotic diseases. Wildlife in general do not represent actual constraints to military operations; however, certain conditions require consideration. Generally, most wildlife on the installation represent low risks as direct hazards to personnel when left alone. Certain mammalian species such as coyotes, red foxes, gray foxes and raccoons can cause serious injury if cornered, harassed or captured. Deer may pose risks to vehicular collisions. No venomous snakes have been documented to date by installation natural resources staff on FE; however, the risk is not set at zero but is considered low. The more significant aspect concerns the risks of zoonotic diseases such as rabies and species serving as hosts or reservoirs for tick-borne diseases. Several cases of rabies in wildlife have been documented on FE (raccoon, red fox and opossum).

7.0 CHAPTER 7 – NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 Natural Resources Program Management.

7.1.1 General. Installation natural resources management is directed by CEIE and includes the program components outlined herein. The natural resources program includes commercial forest management; urban forestry; wildlife, fisheries, and habitat management; protection of threatened and endangered species; wetland management, and protection and management of conservation areas. Natural resources management at FE is integrated into all projects, activities, and training and other events. CEIE integrates information from the program components with riparian, wetland, and water resource buffer zones; stream corridors; ecological communities; wetlands; threatened and endangered species; and locations of cultural and archeological sites to avoid impacts to sensitive resources.

7.1.2 Geographical Information System (GIS). A Geographic Information System (GIS) Database of natural resources data layers is maintained and updated by the Civil Engineer Division. Data layers are updated periodically as appropriate and new layers may be added as needed.

7.1.3 Ecosystem management. Ecosystem management recognizes that humans are ecosystem components and that sustainable human activity does not mutually exclude the preservation or enhancement of ecological integrity. Ecosystem management provides FE the collective means to protect biodiversity *and* provide for military readiness.

7.1.3.1 Ecosystem management is preservation and enhancing ecosystem integrity. Over the long term, this approach maintains and improves the sustainability and biological diversity of terrestrial and aquatic (including marine) ecosystems while supporting sustainable economies and communities. The specific principles and guidelines that DOD has identified to achieve this goal are:

- Maintain and improve the sustainability and native biodiversity of ecosystems;
- Administer the program with consideration of ecological units and time frames;
- Support sustainable human activities;
- Develop a vision of ecosystem health;
- Develop priorities and reconcile conflicts;
- Develop coordinated approaches to work toward ecosystem health;
- Rely on the best science and data available;
- Use benchmarks to monitor and evaluate outcomes;
- Use adaptive management; and
- Implement actions through installation plans and programs.
- Utilize disturbed, non-natural areas before converting natural areas to impervious surfaces/structures.

7.1.3.2 This INRMP implements ecosystem management by considering ecosystem management principles and guidelines in DODI 4715.03 Natural Resources Conservation Program and Air Force Principles for Ecosystem Management (from AFI32-7064). This is accomplished by:

- Maintain or improve existing natural areas in a sustainable manner that integrates biodiversity with military missions,
- Maintain hydrological processes in tidal wetlands and creeks,
- Protect the installation floodplain by avoiding construction of impervious surfaces in this area,
- Manage wetlands by type to support military operations where feasible,
- Avoid training land losses,
- Rotate training land use to schedule managed timber harvests with follow-on habitat rehabilitation (such as re-planting trees, invasive vegetation control, etc.),

- Seek partnership opportunities among installation tenant activities and with other DOD organizations, other federal agencies, state agencies and non-profit organizations that mutually support natural resource sustainment and supports military missions.

7.2 Land management. Overall land management at FE is the responsibility of CED. The land management program supports the military mission, protects environmental quality, and supports range sustainability. Management concerns include erosion and sediment control, stormwater management, nonpoint-source pollution, wetlands, coastal zone management, environmental restoration program support, shoreline management, and grounds and landscape management. Other initiatives include reviewing preconstruction plans for proposed projects, conducting periodic site inspections for erosion and sedimentation control needs, participating in the Environmental Impact Analysis Program (EIAP) review process, preparation of Federal Consistency Determinations (where appropriate) and using native plant species for landscaping when feasible.

7.3 Coastal Zone Management.

7.3.1 Coastal Zone Management Act. The **Coastal Zone Management Act** (CZMA) encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources. Though federal lands are excluded from state coastal management areas, activities on federal lands that are reasonably likely to affect any land or *water use or the natural resources of designated coastal resources management areas must be* consistent with the enforceable policies of the **Virginia Coastal Resources Management Program (VCRMP)**. Consistency reviews are triggered for all federal actions inside the coastal zone and for actions outside the coastal zone that have the potential to affect Virginia's coastal uses and resources. All federal development projects inside the coastal zone are automatically subject to consistency review and require a consistency determination in accordance with 15 CFR 930. FE is within the designated coastal resources management area (VDEQ 2002). An outline of Virginia's federal consistency review processes available on the VDEQ website at http://www.deq.virginia.gov/eir/federal.html. Project proponents are required to coordinate with CEIE regarding the preparation of Federal Consistency Determinations (FCD) in accordance with Virginia specifications and JBLE Instruction 32-101, Environmental Management.

7.3.2 FCDs . FCDs are submitted to the Virginia Department of Environmental Quality which then coordinates the document with other state and local agencies. The Commonwealth has 60 days by law to review these documents. In many cases FCDs are submitted as appendices to EAs or EIAPs.

7.3.3 VCRMP. The VCRMP establishes policies and objectives to guide the use and development of coastal management areas to ensure their protection and preservation. Included are policies on fisheries management, subaqueous lands management, wetlands, primary dunes, point and non-point source water pollution, point and non-point source air pollution, shoreline sanitation, and coastal lands management.

7.4 Grounds Maintenance.

Grounds maintenance occurs on improved and semi-improved land use categories, usually under a service contract. Landscaped and natural areas enhance the quality of life, protect property value and provide necessary ecological and infrastructure services.

7.4.1 Landscaping. The 1994 Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 Federal Register [FR] 40837) provides the primary guidance on landscaping requirements for federal properties. Greening the Government through Leadership in Environmental Management, Executive Order (EO) 13148, requires federal agencies to incorporate beneficial landscaping into landscaping programs, policies, and practices.

7.4.1.1 The term beneficial landscaping describes practices that integrate native vegetation and wildlife habitat into the landscape and minimize the adverse effects that landscaping has on the natural environment. Specific directives of the presidential memorandum are that, to the extent practicable, federal landscaping projects should:

- Use regionally native plants;
- Use construction practices that minimize adverse effects on the natural habitat;
- Reduce fertilizer and pesticide use;
- Use water-efficient practices; and
- Create outdoor demonstration nursery to promote awareness of the environmental and economic benefits of beneficial landscaping.

7.4.1.2 The purpose of this guidance is to ensure that plants suited for the local site conditions are selected and the introduction of a potentially invasive species is avoided. Using native plants ensures compliance with EO 13112 (Invasive Species). Furthermore, a plant properly selected for the site conditions require less intensive management, potentially reducing pesticide, fertilizer, and water usage. Other factors to consider when selecting plant material include rooting space, space for crown development, soil properties, tolerance for urban conditions, aesthetics, availability, quality, and expected maintenance. For more information about tree care, please visit the International Society of Arboriculture (ISA) website.

7.4.1.3 General design, security issues, and standards are considered in the development of landscapes at FE. Landscape improvements and modifications are designed to coordinate with the existing landscape patterns for consistency and unity. Providing for passive and active surveillance of perimeter and landscape areas is a primary consideration in plant selection and layout. Landscapes are installed to include opportunities for low impact development. These management strategies incorporate landscape design practices to reduce the volume of stormwater runoff and decentralize flows. Landscape design and installation are conducted in accordance with the American National Standards Institute (ANSI) for Nursery Stock (ANSI Z60.1) and Tree Care Operations (ANSI Z133.1).

7.4.2 Urban Forestry. Urban forestry is the art and science of managing trees and forests in an urban ecosystem and includes the cultivation of trees as individuals or non-commercial forest stands rather than as components of a commercial forest. The urban forest provides several benefits to the FE community. The urban forest provides a home for wildlife and a place for military personnel and their families to recreate. Management activities are conducted in accordance with the DOD Urban Forestry Manual (DOD 1996).

7.4.2.1 Inventory and Maintenance. These activities are conducted to determine program requirements and to minimize landscape maintenance whenever possible. General observations on species diversity (number of species present), regeneration (relative presence of young trees), age distribution (regeneration, immature, mature), and tree condition (excellent, good, fair, poor, dead, and hazard) are recorded during landscape inventories. Over time, hazard trees become identified whereby they result from age, environmental stressors (drought, prolonged elevated ambient temperatures, insect infestation, etc.) and anthropogenic stressors (caused by incorrect construction practices, lack of drip lines, soil compaction, etc.). There are two elements that define a hazard tree in terms of threats to life and property: (1) there must be potential for tree failure and (2) the presence of someone or something of value. For a falling tree or falling parts of a tree to be a hazard, there must be a “target” (people, vehicles, structures, etc.) within striking distance. The overall tree condition is used to determine maintenance needs for removal or pruning. CEIE maintains a prioritized hazard tree list. Urban forest cover is estimated at 1,000 acres. An urban forest compartment map is found at Figure 7-1. This map is the most current information for this habitat but will undergo adjustment in 2019.

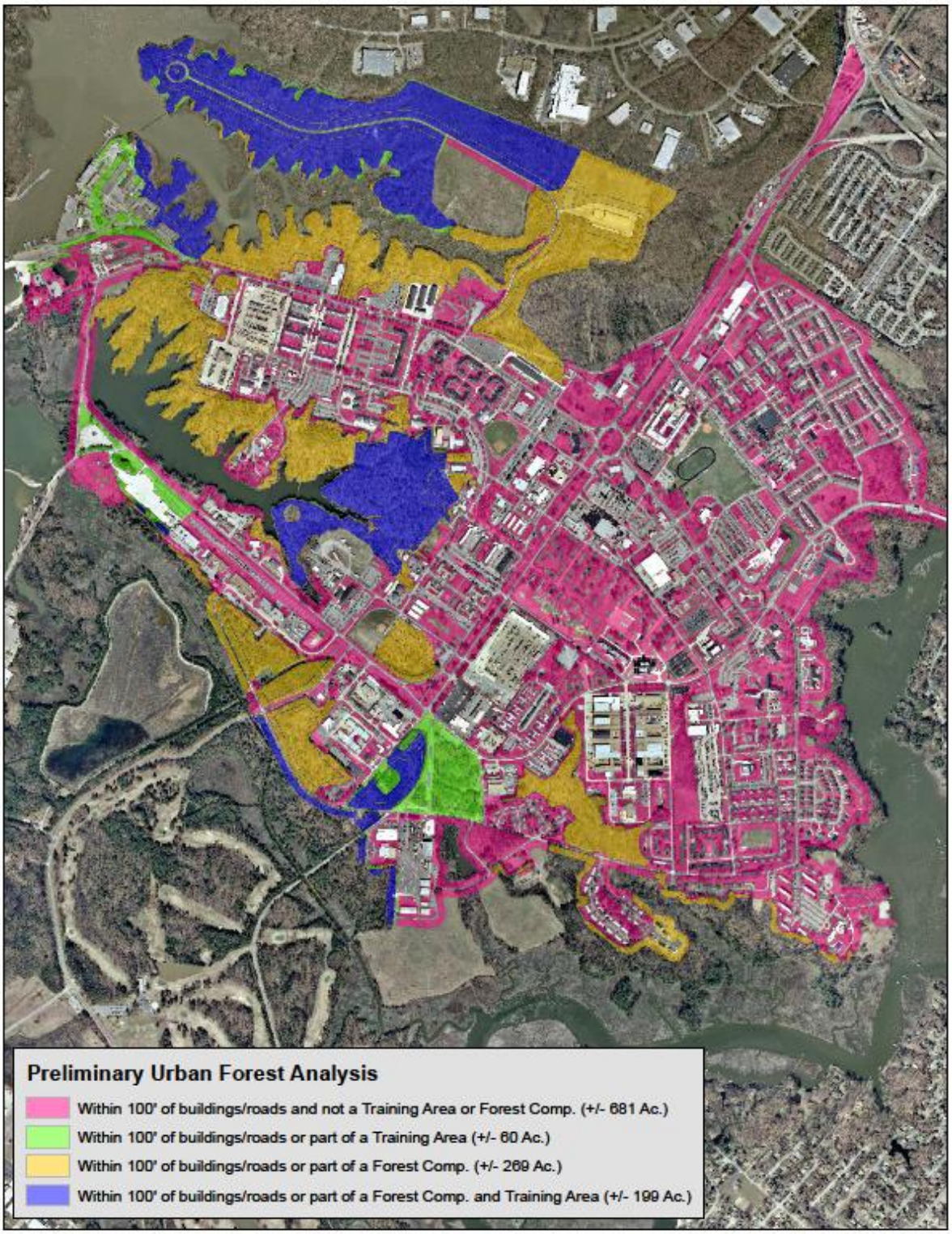

Figure 7-1: Urban forest compartments based on preliminary evaluation

7.5 Commercial Forest Management.

7.5.1 Background. The first commercial timber harvest on FE was conducted in 1951. A forester/agronomist was hired in 1966 to implement an intensive forest management program on 2,752 acres of commercial forest land (FE 1984). By 1981, the forest ecosystem was dominated by loblolly pine. This was consistent with the Army's forest management goals during that period. Effective commercial forest management at Fort Eustis; however, has been very problematic. While the installation is small in terms of acreage, military training has been a primary function where units rely on forested stands to achieve realistic training conditions. Consequently, maintaining forested stands through clear cut or selective logging has been difficult to perform. This is further exasperated by the lack of funds for reestablishing these habitats especially those that are forested wetlands. Prior to 2010, only limited logging was performed (primarily in response to construction projects) and insufficient funds were obtained through the forestry account. Since becoming a joint base under Air Force management, these issues continued. Portions of the installation are now overstocked with mature loblolly pine.

7.5.2 Forest Management Objectives. The primary objective of the FE forest management program is to maintain and enhance the installation's ecological integrity in support of the military mission (AFI 32-7064). USAF policy stipulates that forest resources must be managed for long-term sustainability and compatible with federally listed threatened and endangered species, maintaining biodiversity, protection of the Chesapeake Bay watershed, wildlife habitat enhancement and outdoor recreational activities. The forest management program must also fully comply with all applicable federal laws, policies, and regulations pertaining to forest management, including:

- Military Construction Authorization Act, Sale of Certain Interests in Lands-Logs (10 USC § 2665);
- DODI 7310.5, Accounting for Production and Sale of Lumber and Timber Products;
- Executive Order 11990, Protection of Wetlands;
- Endangered Species Act of 1973, as amended (16 USC §§ 1531 et seq.); and
- National Forest Management Act of 1976 (16 USC §§ 1601 et seq.).

As a result of past management activities, the forests have gone from mostly hardwoods with interspersed pines during presettlement times to an ecosystem dominated by loblolly pines. In some cases invasive species such as tree of heaven and Chinese privet have grown extensive stands thereby disrupting the native ecosystems. Additionally, in some cases sweet gum, though native has created thick stands that preclude a healthier hardwood forest. This INRMP emphasizes the reestablishment of native and ecologically diverse forest ecosystems as part of commercial pine timber production. Hardwood-dominated areas shall be managed under the selection silviculture system, which most closely mimics natural succession in the absence of fire. Small group selection harvest in hardwood-dominated stands shall be

conducted to maintain an oak component, important for wildlife. A rotation age of 75 to 80 years for loblolly pine stands and 100 years for mixed pine-hardwood stands shall be used; however, these harvest schedules shall be adjusted to maintain stand vigor, to salvage timber, to prevent insect and disease damage, or to meet site conditions.

Timber is commercially harvested in wetlands or in riparian and wetland buffer zones in accordance with federal/state best management practices (BMPs); however, the representations of existing ecological communities shall be retained. Logging operations shall be scheduled to avoid periods of excessively wet soil conditions in order to protect soils and to prevent erosion and possible sedimentation of streams. Diversion ditches shall be constructed on skid trails and forwarder roads to prevent erosion. BMPs developed by the Virginia Department of Forestry (VDOF) shall be implemented in all forest management activities (VDOF 2002a).

7.5.3 Forest Management Practices. FE employs a variety of forest management practices to manage complex ecosystems and achieve the desired vegetation conditions. Timber harvests; timber stand improvement (TSI); regeneration; salvage; prescribed fire; and wildfire, insect, and disease suppression/protection improve forest sustainability and are consistent with maintaining the military mission. No single set of prescriptions can be applied that capture the dynamic nature of forest ecosystems.

7.5.3.1 Timber Stand Improvement (TSI). TSI is employed when conditions of developing stands do not meet forest management objectives. It is used primarily to improve the timber quality of selected trees by removing other trees or vegetation that competes for light, nutrients, and moisture. This may include control measures for invasive plant species and is performed in accordance with the FE Integrated Pest Management Plan. Under ecosystem management, TSI concentrates not just on promoting timber value, but also on enhancing wildlife values and species diversity. Oaks are favored for their wildlife and timber value, pines for commercial production, and shade-tolerant species to promote species diversity. Trees in the cantonment area shall be harvested on an as-needed basis for TSI, safety concerns or new construction. TSI efforts shall be concentrated on recently logged areas and the more productive sites where developing small-diameter stands are becoming overcrowded. Prescribed burning when available combined with TSI to enhance wildlife habitat and increase biodiversity. Herbicides are used as part of TSI for precommercial thinning and reforestation. TSI (and other forestry work) occurring in training areas shall usually be performed in support of training missions; however, in general all such work is coordinated between the ASA and CED. Typically, representatives from ITAM and CEIE meet on the first Wednesday of each month to plan and coordinate related work.

TSI used on FE include:

- Pre-Commercial Thinning - Pre-Commercial thinning is a management tool used in overstocked forestland (mostly pine stands) 5-10 years of age. This practice is used to select the dominant trees in the stand and removing undesirable trees to maintain a 10 foot spacing or 435-450 trees per acre.
- Commercial Thinning - Commercial thinning is a management tool used in overstocked stands between the ages of 18-28 years. The objective of this type of thinning is to provide additional growing space for the more desirable healthier trees in the forest stand. Optimum thinning results is a 20-25' spacing or 80-110 trees per acre.
- Selective Harvest - is a management tool used for the selective removal of mature Pine and less desirable hardwoods and to enhance specie composition. Use of this selective harvest method provides for the overall health of the forest and the improvement of wildlife habitat.
- Clear Cut Harvest - This management tool is normally used to establish monoculture forest types (Pine Plantations) but this tool at FE would only be used to remove all the trees in a given construction site area.
- Emergency Timber Salvage - This is a non-planned sale of commercial timber, normally with storm damage, insect damage, and unplanned construction.

7.5.3.2 Forest Protection. It is necessary to maintain forest protection measures in order to prevent unacceptable degradation of the resource resulting from drought and other weather/climate phenomena, disease, insect and animal damage, invasive species, and wildfire. CEIE with assistance from the installation pest control contractor monitors for gypsy moth (*Lymantria dispar*), Asian longhorned beetle (*Anoplophora glabripennis*), southern pine beetle (*Dendroctonus frontalis*), and other forest pests. A baseline forest entomological survey was initially designed in 2010 and completed in 2015. CEIE coordinates with the VDOF and U.S. Forest Service (USFS) to determine fire danger ratings on a monthly basis to inform military trainers of potential fire danger for modifications of training activity. Salvage cutting shall be employed whenever necessary to remove dead trees or trees damaged by injurious agents other than competition in order to recover economic value and prevent the spread of insects and disease.

7.5.4 Timber sales. Timber sales and other forest management practices are coordinated through CEIE. Timber sales and other forest management practices associated with training areas are coordinated also with the Range & Training Division (ASA) to minimize disruption to military training schedules and to integrate forest management with military training.

CEIE performs timber cruises of compartments (or portions thereof) selected for timber sales to determine the fair market value. The US Army Corps of Engineers-Norfolk District normally supports these efforts for MILCON projects at a minimum. A Report of Availability (ROA) for timber is then prepared for each timber sale and submitted through AFCEC for timber sales at FE.

Trees and forest products with marketable value shall not be destroyed, removed, given away or abandoned. The Federal Government shall be compensated for all such commercial forest products. CEIE is the only authorized entity at FE to perform timber/forest product sales.

Mulch and Firewood Program. Under this program, permits were sold to FE personnel and the general public for the gathering of non-standing dead wood from approved areas on a limited-volume, personal-use basis to be used as firewood. Commercial use of this wood is prohibited. When available, mulch is sold to installation personnel and the general public. Mulch is also provided to military units or installation activities to use for the operational areas on the installation. CEIE issues permits to individuals seeking firewood and mulch when these products are available. Currently, firewood collection is suspended due to red imported fire ant risks and mulch is not expected to be available. Forest inventories are the foundation of forest management. AFI32-7064 requires installations with commercial forested land capable of producing more than 20 cubic feet/acre/year in wood biomass to maintain a forest inventory. A Timber Inventory and Forest Management Plan was prepared for FE in 2007 updating the Forest Inventory and Vegetation Assessment published in 1997. This plan provided an inventory of the installation's forest resources, organized these resources into forest compartments, described invasive plants in these compartments, and provided recommendations on compatible uses of these resources. It was intended to be a 10-year plan. CEIE submitted a funding request to AFCEC for preparation of a new forest inventory that would have been completed in 2017. However, this project was not executed despite funding approval and allocation. A new forest inventory may be prepared in 2019 but this remains uncertain. If this does not occur, a new request shall be submitted for 2020. The 2007 inventory remains in effect; however, much of that document is outdated.

The following information is based on the 2007 timber inventory (to be revised upon completion of a new forest inventory):

The total acreage of the inventory was 2,815.24 on 37 forest compartments based on the 2007 timber inventory (this information shall be adjusted upon completion of the new forest inventory anticipated in 2020-2021). These forest compartments were broken down into three classifications. Compartments meeting Classifications Number 1 are manageable without limitations. Compartments meeting Classification Number 2 are manageable with limitations (such limitations include training and eagle nest sites). Compartments meeting Classification Number 3 are non-manageable primarily due to lack of accessibility such as an inability to move equipment through surface water or wetlands (this comprises

approximately 190 acres). Compartments with classification Number 2 were the majority of the forest compartments and comprised 2,626 acres. A map depicting these 38 compartments is found at Figure 7-2A and B. A summary of each of these compartments follows.

7.5.4.1 Compartment #1 (10.18 acres). Pest management annual inspection or the application of herbicides for invasive weed control shall be performed in this natural area between July 15th and November 1st of each year to stay within guidelines of bald eagle nesting habits. This compartment contains ($4,349.79) Pine and Hardwood saw-timber and Pulp.

7.5.4.2 Compartment #2 (110.07 acres). Pest management annual inspection for southern pine beetle and invasive weed control. Mature pine and undesirable hardwood shall be tallied and considered for sale in 2022. This is a limited access area due to training & bald eagle area. This compartment contains ($259,068.43) Pine and Hardwood Saw-timber and Pulp.

7.5.4.3 Compartment #3 (59.13 acres). Pest management annual inspection for insect/disease/invasive plant problems. Tally and perform a commercial thinning on the 18-28 year old pine (after 2020) working within the guidelines of the bald eagle management plan (limited access due to bald eagle nest site). This compartment contains ($66,416.94) Pine and Hardwood saw-timber and Pulp.

7.5.4.4 Compartment #4 (28.53 acres). Pest management annual inspection for disease, insects, and invasive plants. This compartment contains ($7,014.67) Pine and Hardwood saw-timber and Pulp.

7.5.4.5 Compartment #5 (24.5 acres). Non-manageable, bald eagle nest site, Perform annual inspection of this natural area within bald eagle management guidelines (access by boat). This compartment contains ($38,219.48) Pine and Hardwood saw-timber and Pulp.

7.5.4.6 Compartment #6 (101.55 acres). Pest management annual inspections for disease and insect infestations. Tally and remove over mature pine, (selective harvest) and make available for commercial sale working within guidelines of bald eagle management plan (assess after 2020). The compartment contains ($198,293.99) Pine and Hardwood saw-timber and Pulp.

7.5.4.7 Compartment # 7 (104.05 acres). This two age class timber stand shall be inspected annually for pine beetle infestation in the young overstocked portion of this stand. This compartment contains ($134,956.32) Pine and Hardwood saw-timber and Pulp.

7.5.4.8 Compartment #8 (47.3 acres). Perform pest management annual inspections for disease/insect and hazard tree removal. This stand serves as a safety screen for range training area and is likely metal contaminated with lead. This compartment contains ($72,213.12) Pine and Hardwood saw-timber and Pulp.

7.5.4.9 Compartment #9 (252.22 acres). Perform pest management annual inspection for disease, insect and invasive species control. Perform commercial thinning targeting undesirable hardwoods and poorly formed pine (after 2020). This compartment contains ($234,066.28) Pine and Hardwood saw-timber and Pulp.

7.5.4.10 Compartment #10 (53.49 acres). Perform pest management annual inspection for disease, insect and invasive species control. This stand consists of two age classes and needs to be reevaluated after 2020. Compartment contains ($58,914.77) Pine and Hardwood saw-timber and Pulp.

7.5.4.11 Compartment #11 (78.21 acres). Perform pest management annual inspection for disease, insect and invasive species spread. Plan for a possible commercial thinning/selective commercial harvest after 2020. This Compartment contains ($109,926,47) Pine and Hardwood saw-timber and Pulp.

7.5.4.12 Compartment #12 (12.04 acres). Perform pest management annual inspection for disease/insect/invasive species. This stand shall be reviewed after 2020 for a commercial thinning including Compartment #11. This Compartment contains ($2,305.52) Hardwood saw-timber and Pulp.

7.5.4.13 Compartment #13 (177.13 acres). Perform pest management annual inspection. Tally and remove by commercial sale over mature Pine and smaller less desirable hardwoods that are hazard trees to roadways and buildings. This Compartment contains ($380,935.20) Pine and Hardwood saw-timber and Pulp and is considered for harvest after 2020.

7.5.4.14 Compartment #14 (35.35 acres). Perform pest management annual inspections for disease/insects/invasive species control. Plan for a commercial thinning in a (July) dry time frame to avoid rutting after 2020. This Compartment contains ($11,321.08) Pine and Hardwood saw-timber and Pulp.

7.5.4.15 Compartment #15 (143.7 acres). Perform pest management annual inspections for insect and disease control. Tally and make available by commercial sale a selective cut in the southern and central portion of this compartment. A historic site lies within this area and all guidelines must be met. This Compartment contains ($364,151.64) Pine and Hardwood saw-timber and Pulp.

7.5.4.16 Compartment #16 (81.78 acres). Due to access issues this compartment is considered non-manageable. This Compartment contains ($152,318.18) Pine and Hardwood saw-timber and Pulp.

7.5.4.17 Compartment #17 (106.06 acres). Perform annual pest management inspections and make available for sale a commercial thinning of the smaller pine and a selective harvest of the more mature pine in this compartment. This Compartment contains ($155,842.02) Pine and Hardwood saw-timber and Pulp.

7.5.4.18 Compartment #18 (80.15 acres). Perform annual inspection for disease, insect and fungus control, relook growth rates on center Island for a possible selective cut after 2020. This Compartment contains ($81,242.45) Pine and Hardwood saw-timber and Pulp.

7.5.4.19 Compartment #19 (75.45 acres). Perform annual inspections for disease, insect and red heart fungus on pine. Make available through a selective harvest a timber sale on the mature pine in this compartment. This Compartment contains ($114,955.29) Pine and Hardwood Saw-timber and Pulp.

7.5.4.20 Compartment #20 (69.48 acres). Perform annual inspections for disease and insect control. Perform controlled burn on Northern portion of this compartment and a selective harvest in the Southern portion. This Compartment contains ($138,392.92) Pine and Hardwood saw-timber and Pulp.

7.5.4.21 Compartment #21 (46.61 acres). Perform annual inspections for disease and insect control. Relook compartment in after 2020 for growth rates to determine sale availability. This Compartment contains ($109,645.33) Pine and Hardwood saw-timber and Pulp.

7.5.4.22 Compartment #22 (51.29 acres). Perform annual inspection for disease and insect control. Tally mature pine for a selective cut and commercial sale. This Compartment contains ($169,088.) Pine and Hardwood saw-timber and Pulp. Due to safety concerns from hazard trees, The compartment portion that constituted Training Area 17C was been shut down in 2011 due hazard trees until further notice. This site was overstocked with mature loblolly pine that had been impacted by fungal disease and insect damage. A forest health study was initiated in 2012 and completed in December 2013. A sale of Training Area 17C portion was conducted in 2014 involving approximately 20 acres. Following the sale this training area has undergone reforestation. Approximately 1,500 mixed oak saplings was planned and loblolly overgrowth controlled annually with the exception of FY 17 as no contract was in effect until mid-2018.

7.5.4.23 Compartment #23 (89.79 acres). Perform annual inspections for disease and insect control. Tally and make available a selective cut of mature pine saw timber for commercial sale. Make sale available when water tables are low. This Compartment contains ($259,206.47) Pine and Hardwood saw-timber and Pulp.

7.5.4.24 Compartment #24 (74.39 acres). Perform annual inspection for disease and insect control. Make preparations for a commercial thinning for the southern portion of this compartment after 2020. This Compartment contains ($91,226.20) Pine and Hardwood saw-timber and Pulp.

7.5.4.25 Compartment #25 (18.96 acres). Perform annual inspection for disease and insect control. Prepare for a commercial thinning operation after 2020 time frame. This Compartment contains ($4,318.43) Pine and Hardwood saw-timber and Pulp.

7.5.4.26 Compartment #26 (133.05 acres). Perform annual inspections for insect and disease control to include hazard tree removal. This compartment is considered a riparian buffer due to sloped terrain and drainage patterns. This Compartment contains ($350,578.39) Pine and Hardwood saw-timber and Pulp.

7.5.4.27 Compartment #27 (110.09 acres). Perform annual inspections for insect and disease. Tally and make available for commercial sale a selective cut of mature pine in this compartment.

7.5.4.28 Compartment #28 (61.95 acres). Perform annual inspections for disease, insects, storm water runoff and hazard trees. This compartment is non-commercial due to its value as a water quality buffer. This Compartment contains ($111,284.90) Pine and Hardwood saw-timber and Pulp.

7.5.4.29 Compartment #29 (183.31 acres). Perform annual inspections for insect and disease control. This compartment is highly valuable to wildlife and is one of few upland forested areas at FE. A 20- acre tract of this forest was sold in 2008 to meet the construction of a Tactical Equipment Maintenance Facility as part of the Grow the Army 2008 program. The remaining portions of the compartment are not slated for harvesting at the time this INRMP was prepared. A review of compartment shall be made after 2020. This Compartment contains ($323,211.29) Pine and Hardwood saw-timber and Pulp.

7.5.4.30 Compartment #30 (95.77 acres). Perform annual inspections for disease, insect, erosion from excessive storm water runoff. Tally and prepare for commercial timber sale of foot print of proposed construction (5 acres). This timber would be removed by a selective or clear cut operation. This Compartment contains ($263,583.29) Pine and hardwood saw-timber and Pulp. Compartment shall be reviewed in 2020.

7.5.4.31 Compartment #31 (222.45 acres). Perform annual inspections for insect, disease and hazard trees and limbs. This compartment is vital in the filtering nutrients from the golf course. This Compartment contains ($611,709.43) Pine and Hardwood saw-timber and Pulp.

7.5.4.32 Compartment #32 was part of the previous timber inventory; however, this compartment has been removed because the property known as Goose Island was transferred to the Commonwealth of Virginia.

7.5.4.33 Compartment #33 (4.1 acres). Due to access this compartment is considered non-manageable. This Compartment contains ($2597.47) Pine and Hardwood saw-timber and Pulp.

7.5.4.34 Compartment #34 (23.38 acres). This compartment is non-commercial (eagle nest area). This Compartment contains ($54,812.21) Pine and Hardwood saw-timber and Pulp.

7.5.4.35 Compartment #35 (8.76 acres). Due to access limitations this compartment is considered non-manageable. This Compartment contains ($18,127.58) Pine and Hardwood saw-timber and Pulp.

7.5.4.36 Compartment #36 (29.72 acres). Due to access limitations this compartment is considered non-manageable. This compartment contains ($45,898.51) Pine and Hardwood saw-timber and Pulp.

7.5.4.37 Compartment #37 (12.61 acres). Due to access limitations this compartment is considered non-manageable.

7.5.4.38 Compartment #38 (4.64 acres). Due to access limitations this compartment is considered non-manageable. An eagle nest is located in this compartment.

7.5.5 Annual Work Plans. CEIE prepares an Annual Work Plan as the framework for conducting forest management activities on FE and identifies conditions and prescriptions (management actions and timing) for each stand. The prescriptions provide for overall regulation of the forest based on the objectives presented in this INRMP. In addition, the Annual Work Plan provides a basis for timber harvest availability reports.

Figure 7-2A. Forest Compartments of FE (based on 2007 timber inventory).

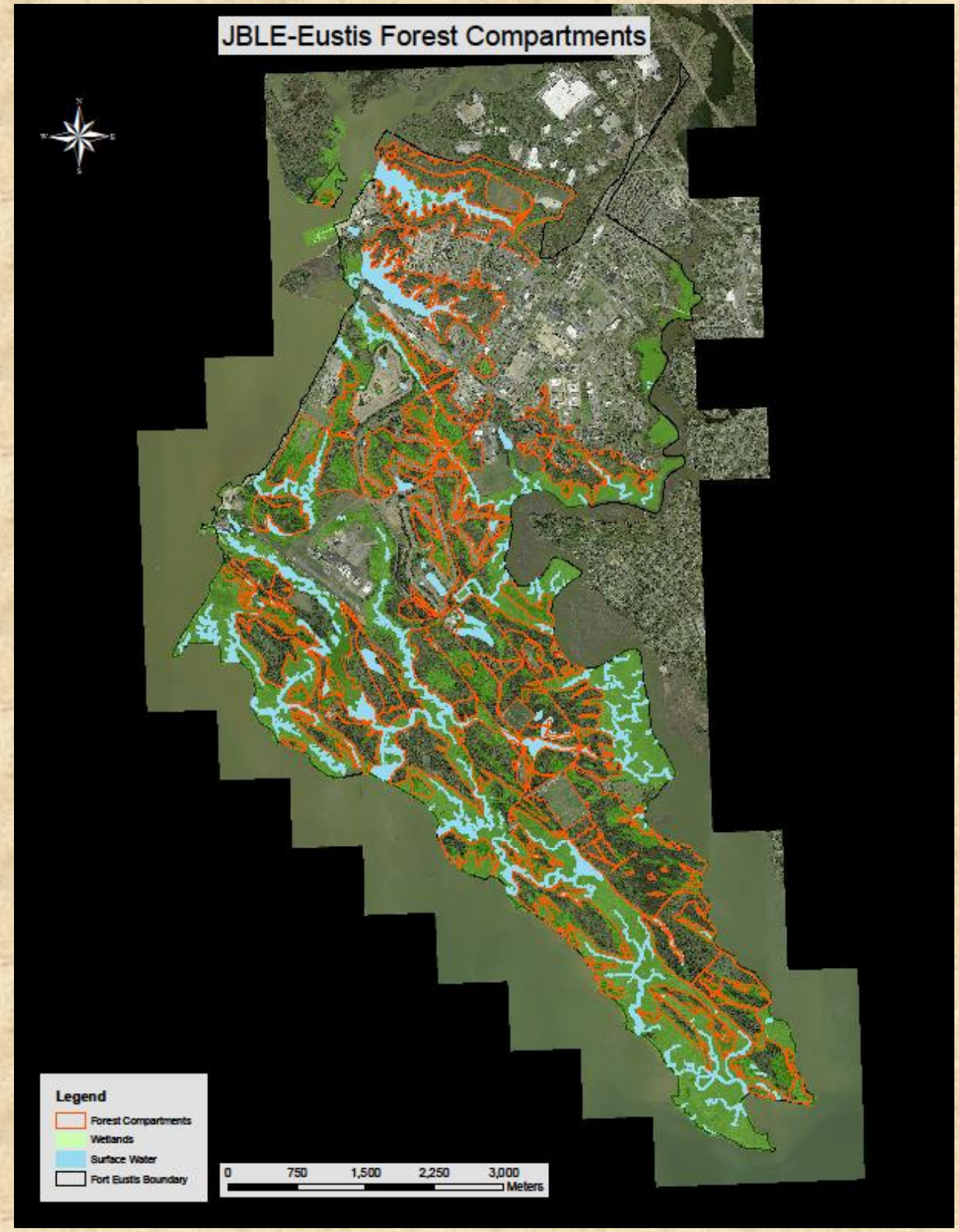

Figure 7-2B. Forest Compartments of FE (based on 2007 timber inventory) with slight adjustments.

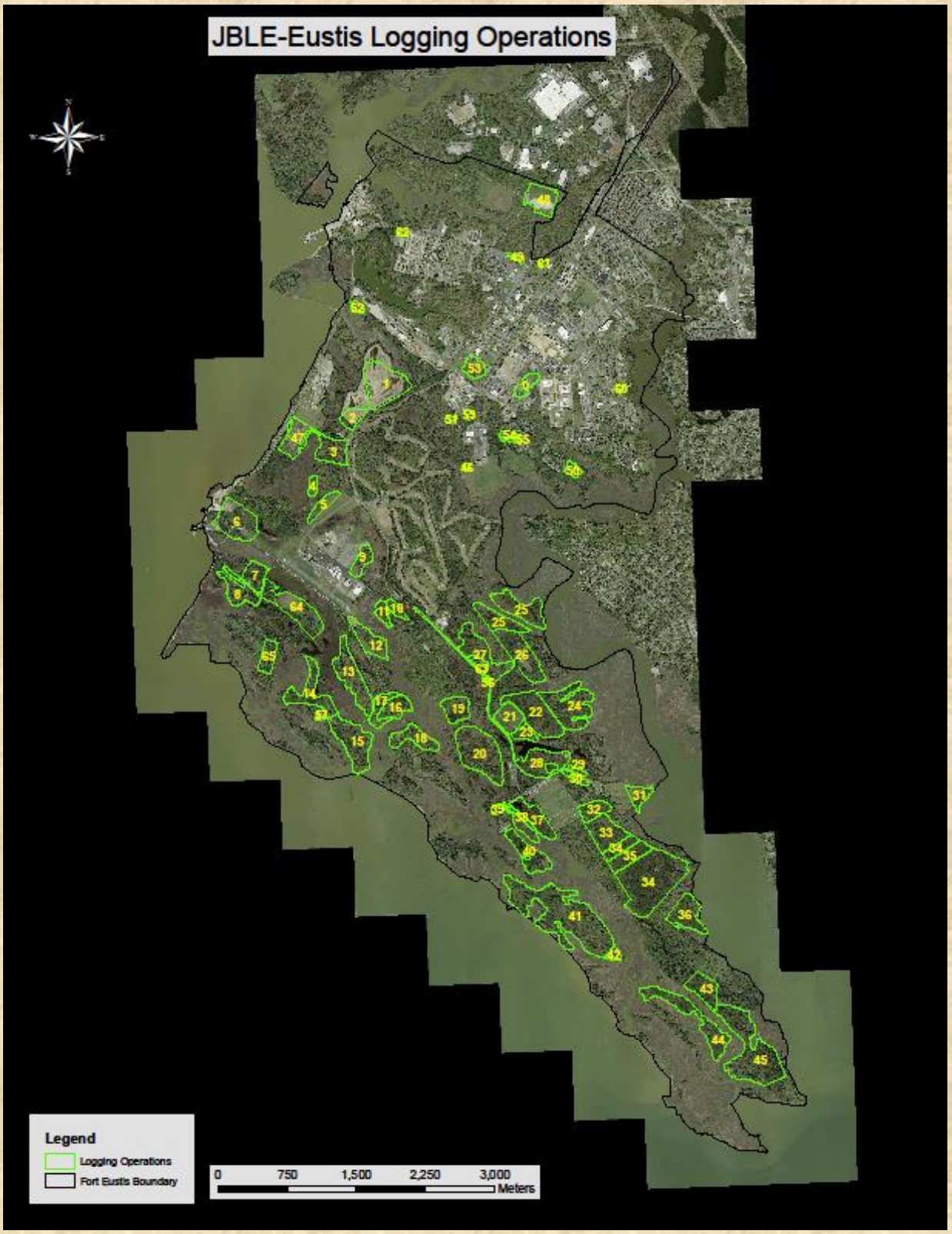

Figure 7-3: Historical and current logging and forest management areas.

Table 7-1: Historical and current logging & forest management areas based on Figure 7-3.

Site #	Year cut	Cut type	Comments	Hardwood board feet	Pine board feet	Acres
0	No data	Clear cut	cut year not specified on source map	21860	17680	8.727809
1	1988	Clear cut	cut for dredge spoil dumping, no tree data			41.466238
2	1974	Clear cut		3000	102000	9.869883
3	1975	Not specified	cut type not specified on source map (additionally, hazard tree & limited log removal in 2008 and thinning of 10 acres of pine in 2013)			31.098819
4	1971	Not specified	cut type and tree info not specified			4.254385
5	1993	Clear cut	tree information not specified			8.219522
6	1975	Not specified	same area clearcut in 1993	20000	45000	33.688039
7	1967	Clear cut				14.23946
8	1969	Seed tree cut	125 cords of pine	0	106975	19.147923
9	1993	Clear cut	tree info not specified			10.39551
10	1991	Clear cut	tree info not specified			5.280715
11	1993	Clear cut	tree info not specified			7.127187
12	1993	Clear cut	tree info not specified			19.445694
13	1981	Pine removal	No other info specified			33.260981
14	1968	Seed tree cut		11000	422000	26.846305
15	1968	Seed tree cut	120 cords	22000	340000	37.699028
16	1971	Not specified	total pilings, listed to include 3 other sales at least			15.243746
17	1973	Clearcut		0	260341	11.896637
18	1976	Not specified		24048	446985	18.492669
19	1993	Clear cut	No tree info specified			16.50116
20	1995	Pine removal			550000	50.474849
21	1981	Not specified		16000	206000	16.773365
22	1966	Thinning	Area clearcut in 1991	24000	202000	40.478543
23	1970	Clear cut		0	86000	6.861304
24	1969	Seed tree cut	41 Acres	0	337343	42.409967
25	1979	Not specified		0	528076	45.957933
26	1991	Clear cut	Tree info not specified			34.111686
27	1986	Clear cut	Tree info not specified			36.839197
28	1972	Not specified	Same area clearcut in 1988			28.134959
29	1983	Not specified	tree info not specified			2.438755
30	1971	Not specified	tree info not specified			4.461801
31	1966	Clear cut		0	73600	10.20683
32	1989	Clear cut	tree info not specified			12.679861

Table 7-1 continued.

Site #	Year cut	Cut type	Comments	Hardwood board feet	Pine board feet	Acres
33	No data	Pole & piling harvest	Year not specified, heavy metal contaminated			26.990409
34	1984	Clear cut	112 Acres	40000	1650000	91.926272
35	1969	Clear cut	22 Acres	0	416025	17.46255
36	1983	Not Specified	Not tree info specified			23.53641
37	1989	Clear cut	Cut includes interior polygon cut in 1971			28.863421
38	1971	Not Specified	Tree info not specified			3.746319
39	1989	Clear cut	No tree info specified			2.773697
40	1989	Clear cut	no tree info specified			21.7803
41	1968	Seed tree cut	Area clearcut in 1971	91000	1617000	104.976227
42	1972	Not specified	Hardwoods listed as all B. Walnut	10154		4.143646
43	1983	Not specified	add on for 1983 timber cuts			18.804026
44	1983	Not specified	Boardfeet listed here are totals for all of 1983			37.22418
45	1967	Seed tree cut	150 cords, 80 Acres			71.551992
46	1975	Not specified	1 acre	3000	2000	1.368731
47	2014	Clear cut	TA 17C: 20 acres, replanted 1,500 mixed oak saplings, 1104 tons of pine saw timber	0	174000	19.827601
48	2008	Clear cut	20.5 acres, TEMF Project (formerly TA3)	130000	7500	20.734978
49	2009	Clear cut	2 acres, Grow The Army facility construction along Lee Blvd	4000	3000	1.534801
50	2010	Clear cut	2900 Block General Quarters, 26,000 BF Tulip Popular	9000	40000	4.458493
51	2003	Clear cut	CID building vic Wilson Ave & Washington Blvd	7000	5000	1.511605
52	2011	N/A	Reforestation of Wastewater Treatment Plant, 600 mixed oaks			3.082565
53	2013	TSI	Planted 100 mixed oaks			9.641684
54	2012	TSI				3.091775
55	2012	N/A	Planted 100 mixed oaks in NWSG and Wildflower area			1.416497
56	2010	Clear cut	Ditch Line	0	33000	3.124999
57	2006	Clear cut	UOS	0	7000	2.16407
58		N/A	Reforest abandoned area, planted red oaks			0.386861
59	2011	TSI	50% standing pine removal			1.742664
60	2011	TSI	50% standing pIne removal			0.752968
61		TSI	30% standing pine removal, planted 20 red oaks			0.818054
62		TSI	Planted 20 mixed oaks			1.155668
63	2012	N/A	Planted 200 mixed oaks			4.864552
64	2018	Clear cut	Aviation Complex Facility			16.00000
65	2018	Clear cut	Aviation Complex Facility			8.00000
	2016	TSI	Eustis Lake-Taylor Ave- removal of 6 hazard trees and pine overgrowth			2.00000

7.6 Wildland Fire Management.

In accordance with USAF policy, a Wildland Fire Management Plan (WFMP) was originally prepared and included in the 2014 INRMP version. However, beginning in January 2018, AFCEC was in the process preparing a new WFMP for FE. Completion is expected later in CY 2019 and shall be incorporated as an annex. All military, civilian, contractor and emergency services personnel involved in wildland fire management must possess certifications appropriate for their expected level of involvement in the wildland fire program.

7.7 Prescription Fires.

Prescription fires have not been used extensively on FE as a forest management tool due to a lack of available staffing, lack of ability to schedule prescribed burns in needed areas and frequent high ground moisture that limits the effectiveness of prescribed burning. Nonetheless, it remains as a potential tool when sufficient resources are available and targeted areas can be scheduled. When prescription fires are used, the FE forester/prescribed burn manager (within CEIE) prepares an prescription fire plan that follows the guidelines of the State Prescribed Burn Program (VDOF 2002b) and is fully coordinated with Fire & Emergency Services, Training Division (ASA) and 1st Fighter Wing (when planned in training areas or affecting flight operations), PAO and Installation Safety Office. This plan includes a map that indicates each burn unit and the location of all fire lines, firebreaks, roads, adjacent properties, and other important landscape features. In addition, the burn plan identifies smoke-sensitive areas and wind direction and speed, and smoke dispersal is considered before conducting a burn. Smoke management guidelines are presented in the Prescribed Fire Smoke Management Guide (VDOF 1998). Weather guidelines set by the VDOF Fire Protection Team (VDOF 1998) are followed to ensure a safe, effective burn. Fire weather forecasts are available from the Felker airfield control tower and at the National Weather Service website: www.bio.noaa.gov/firewx.htm. CEIE requests prescription fire support from the Air Force Wildland Fire Center. The Air Force Wildland Fire Center (a component of AFCEC) is headquartered at Eglin AFB, Florida, and was established in 2012 to manage wildland fire issues at Air Force installations. Prescription fire support is provided when available.

7.8 Agricultural Outleasing. Currently, there is no agricultural outleasing at Fort Eustis.

7.9 Water Resource Protection.

7.9.1 General. Water resources are protected on FE through recognition of special natural areas, application of buffer zones around significant resources, and implementation of regional management goals, and objectives as required by the Clean Water Act, Chesapeake Bay Preservation Act and Coastal Zone Management Act. Several federal and state laws and regulations reinforce the ecological and human health importance of maintaining healthy water bodies at FE. Federal Compliance with Pollution Control Standards (EO 12088) and the CWA require federal facilities to comply with all substantive and procedural requirements applicable to point and nonpoint sources of pollution. In accordance with these requirements, FE must obtain all appropriate federal, state, interstate, and local certifications and permits required by point and nonpoint pollution control, groundwater protection, dredge and fill operations, and stormwater management programs for any action that may impact water quality. USACE permits are required under Section 10 of the Rivers and Harbors Act of 1899 prior to commencing any work or building any structures in a navigable water of the United States.

7.9.2 Conservation Area Management. The Warwick River North Seeps and Warwick River South Seeps conservation areas may contain the tidewater interstitial amphipod. Potential threats to this rare species include changes to the groundwater or seepage areas such as groundwater pollution, lowering of the water table, timber harvest, and land disturbance.

7.9.3 Chesapeake Bay Program. Executive Order 13508, Chesapeake Bay Protection and Restoration, dated May 12, 2009 (74 FR 23099, May 15, 2009), established a Federal Leadership Committee, chaired by EPA, and including senior representatives from the departments of Agriculture, Commerce, Defense, Homeland Security, Interior and Transportation. It directed these agencies to prepare and publish a strategy for coordinated implementation of existing programs and projects to guide efforts to protect and restore the Chesapeake Bay. All military installations in the Chesapeake Bay watershed, including FE, participate in the DOD Chesapeake Bay Program Action Team. Although each installation conducts its own individual projects to benefit the Bay, the quarterly meetings serve as a forum for the representatives to share their ideas and pursue joint projects and funding.

The Chesapeake Bay Preservation Act (also known as The Bay Act) required the Virginia communities that border on the tidal portions of rivers (that drain into the Chesapeake Bay (Tidewater jurisdictions)) to institute water quality protection measures to improve the declining health of Bay and its tributaries. The goal was to plan for and manage the adverse environmental impacts of growth and development in a manner that balances the objectives of improved water quality and continued growth. Areas within the Chesapeake Bay watershed, on which land use activities have the potential to impact the Bay, are designated as **Resource Protection Areas** (RPAs) or **Resource Management Areas** (RMAs).

FE is required by the federal Coastal Zone Management Act to follow the Chesapeake Bay Preservation Act (Virginia Code §10.1-2100) to the maximum extent practicable. FE established 100-foot upland buffers as the **Resource Protection Areas** at tidal creeks, streams and wetlands in conjunction with the 100-foot buffers established by the city of Newport News. The objective is to maintain these as vegetated with native vegetation to the greatest extent practical.

7.9.4 Water Quality Monitoring. Water quality monitoring on FE is important from a natural resources perspective. FE complies with a Virginia Pollutant Discharge Elimination System (VPDES) permit. This involves monitoring seven outfalls for contaminants at Eustis Lake and Browns Lake as well as other outfalls that discharge into the James and Warwick Rivers.

7.9.5 Riparian Buffers. Maintaining vegetated riparian buffers serves many important functions in protecting wetlands and water quality. Stabilizing stream banks and shorelines with vegetation reduces erosion and sedimentation rates. In addition, riparian buffers are critical for dissipating stream energy associated with high water flows, filtering sediment and pollutants, improving floodwater retention and groundwater recharge, providing habitat for instream and upland species, and supporting biodiversity (USEPA 1993).

7.9.6 Pollutant Input Control. Pollutants adversely affect the health of water bodies by stressing fish and other aquatic organisms in the water column and in bottom sediments and lead to bioaccumulation and related food chain events. The establishment or enhancement of wetland vegetation in these areas would be helpful for reducing pollutant input to water bodies on FE. Excess nutrients in water bodies may cause algal blooms, increase nuisance plant growth and odors, disrupt species diversity, reduce dissolved oxygen levels, and cause human health impacts. The most effective method of reducing pollutant levels in water bodies is to limit the use of these substances in the surrounding watershed, particularly in areas adjacent to the water body.

7.9.7 Erosion and Sedimentation. Regulation of erosion and sedimentation is provided by the **Virginia Erosion and Sediment Control Law** (Virginia Code §10.1-560). This law requires an erosion and sedimentation plan be written and approved for any land-disturbing activity equal to or exceeding 10,000 square feet in area. If a construction project is located within a Chesapeake Bay Preservation Area, an erosion and sedimentation control plan must be developed for disturbed areas greater than 2,500 square feet (VDCR 2003). Land-disturbing activities include, but are not limited to, clearing, grading, excavating, transporting, and filling of land. Regulated land-disturbing activities must comply with minimum standards outlined in the Virginia Erosion and Sediment Control Handbook (VDCR 1992).

7.9.8 Stormwater Management. FE has a Stormwater Pollution Prevention Plan for management of stormwater runoff and pollution prevention. It identifies the locations of buildings in which regulated and nonregulated industrial activities occur, provides locations for all 144 stormwater outfalls, and describes local drainage patterns. Stormwater runoff is conveyed off installation into the James River or Warwick River. Approximately 32 miles of stormwater infrastructure is available to collect and transport stormwater runoff from the cantonment area into nearby waterways.

7.10 Wetland Protection.

Several federal and state laws and regulations reinforce the ecological and human health importance of maintaining healthy water bodies at FE. Federal Compliance with Pollution Control Standards (EO 12088) and the CWA require federal facilities to comply with all substantive and procedural requirements applicable to point and nonpoint sources of pollution. In accordance with these requirements, FE must obtain all appropriate federal, state, interstate, and local certifications and permits required by point and nonpoint pollution control, groundwater protection, dredge and fill operations, and stormwater management programs for any action that may impact water quality. USACE permits are required under Section 10 of the Rivers and Harbors Act of 1899 prior to commencing any work or building any structures in a navigable water of the United States.

7.10.1 Permitting. Under Section 404 of the CWA discharge of dredge and fill material into waters of the U. S., including wetlands is prohibited unless a permit is issued by the USACE **Norfolk District**. However, state and local agencies may also have jurisdiction regarding impacts to wetlands. Such agencies include VMRC, VDEQ, Newport News Wetlands Board, and Virginia Institute of Marine Science (VIMS). Military construction, training and other activities that could potentially affect wetlands may require permits from these agencies.

Information on individual and state permit requirements and application procedures (including joint permit applications) is available on the VDEQ website at http://www.deq.state.va.us/wetlands/.

7.10.1.1 Permits are requested by submitting a Joint Permit Application coordinated through EE to the VMRC in accordance with JBLE Instruction 32-101, Environmental Management (DRAFT). This application process results in either an individual or Nationwide/Regional permit issued by the USACE and separate permits by the state and local agencies as appropriate or denial of the permit(s). If permits are issued that encompass loss of wetlands, the installation works towards the goal of no net loss of wetlands as stated in the Cooperative Agreement Between DOD and Environmental Protection Agency Concerning Chesapeake Bay Activities, dated 20 April 1990, paragraph 7. This may require

creation of in-kind wetlands at other locations on the installation, purchase of wetland mitigation bank credits or payment into the Virginia Aquatic Resources Trust Fund. Such projects that potentially or are known to impact wetlands require an environmental impact assessment in accordance with JBLE Instruction 32-101, Environmental Management (DRAFT) and Title 32 of the Code of Federal Regulations Part 989.

7.10.1.2 Nationwide Permits (NWPs) may be used to streamline the permitting process for activities that would have minimal adverse effects on aquatic environments when applicable. Activities such as the maintenance of existing structures, residential construction, reshaping existing drainage ditches, and recreational facilities that do not alter the existing landscape may be permitted under NWPs. The maximum acreage limits for most NWPs is 0.5 acre, though notification to the District Engineer for activities that result in the loss of greater than 0.1 acre of water of the US is required (67 FR 2080). If project impacts are expected to exceed these criteria, an individual permit must be sought. CEIE evaluates projects/actions that may impact wetlands to determine the type of permit required.

7.10.1.3 The **Virginia Water Protection Permit Program** (Virginia Administrative Code 25-210) requires additional state permits for any impacts to state waters and wetlands, including isolated wetlands. Activities requiring a permit include dredging, filling, or discharging any pollutant into or adjacent to surface waters, or otherwise altering the physical, chemical, or biological properties of surface waters, excavating in wetlands, or conducting any of the following activities in a wetland:

- Filling or dumping (to include vegetation debris such as from clearing and grubbing);
- Permanent flooding or impounding; and
- New activities that cause significant alteration or degradation of existing wetland acreages or functions.

7.10.2 Environmental Impact Analysis Process (EIAP). All projects and activities shall be evaluated through the USAF EIAP to determine whether wetlands may be impacted. Permitting requirements shall be identified through this process and coordinated through CEIE.

7.10.3 No Net Loss. FE strives to achieve a goal of no net loss of values and functions of existing wetlands and shall also take a progressive approach toward protecting existing wetlands and rehabilitating degraded wetlands. Military construction and other projects with the potential to disturb wetlands are reviewed individually with regard to wetland impacts, and individual permits are sought as needed. Although permits may be obtained that allow for the filling of wetlands, in accordance with EO 11990, Protection of Wetlands, federal agencies may do so only after finding no practicable alternative. FE policy is to first avoid impacts to wetlands/aquatic resources where practical. In situations where avoidance is not possible, means to minimize the impacts shall be considered. When avoidance and minimization are not possible, mitigation in the form of compensatory mitigation must be met. Such mitigation is articulated as a mitigation plan with a Joint Permit Application. When wetland permitting is required, FE may need to pursue wetland mitigation banking or the In-Lieu of Fee Fund (Virginia Aquatic Resources Trust Fund) as mitigation of wetland impacts because land availability is limited.

7.10.4 Ephemeral pools (also referred to as vernal pools). Wetlands and vernal pools are of critical importance to the protection and maintenance of living resources, quality of surface waters, and flood protection. While not protected by the USACE, they are protected by Virginia Code 9, VAC 25-210-10. Ephemeral pools lack many of the wetland indicators and therefore identification is often difficult, thus the need for delineation of these seasonal wetlands for proper classification. Ephemeral pools provide essential breeding, spawning, nesting, and wintering habitats for many wildlife species. Ephemeral pools are temporary bodies of water that do not support fish populations. Several amphibian species intolerant of fish predation on eggs and larvae are dependent on vernal pools for their survival. FE is committed to protection of ephemeral pools for their importance in maintaining biodiversity in the area where feasible. FE inventoried and characterized ephemeral pools existing on the installation in 2009 in order to aid in their management as well as evaluate their contribution to biodiversity and sustainability of natural resources. FE contains an estimated 80 acres of vernal pools.

7.11 Integrated Training Area Management

The Integrated Training Area Management (ITAM) program is a core program of the Sustainable Range Program (SRP) and is responsible for maintaining the land to help the Army to meet its training requirements. This requires understanding and balancing Army training requirements and land management practices with close coordination with USAF installation natural resources staff.

7.11.1 The Army's goal in establishing the ITAM program is to achieve optimum, sustainable use of training lands by implementing a standardized methodology for inventorying and monitoring land condition, integrating training requirements with land capacity, educating land users to minimize adverse impacts, and providing for land rehabilitation and maintenance.

7.11.1.1 The ITAM program was initiated in 1996 as part of the Army's commitment to environmental stewardship. The ITAM Program relies on its four components and the SRP Geographic Information System (GIS) component to accomplish its mission.
The four ITAM components are:

- Training Requirements Integration (TRI);
- Range and Training Land Assessment (RTLA);
- Land Rehabilitation and Maintenance (LRAM); and
- Sustainable Range Awareness (SRA).

7.11.1.2 These components combine to provide the means to understand how the Army's training requirements impact land management practices, what the impact of training is on the land, how to mitigate and repair the impact, and communicate the ITAM message to soldiers and the public. The SRP GIS component is a foundational support element that provides spatial location information that assists land managers in making their decisions.

7.11.1.3 The ITAM program at FE is staffed by one full-time Government civilian Training Land Management Specialist (ITAM Coordinator), and GIS analyst. Technical support for natural resource planning is obtained from CEIE, CED. Contract support for the conduct of LRAM projects is received from a centrally managed contract. All FY 2018 & 2019 LRAM projects have been included in that contract work statement. GIS support is provided as a separate contract.

7.11.1.4 Funding for the ITAM program has decreased over the past 3 years. Historically, not all requested and validated projects have been funded. Over the past five years, ITAM projects have supported the Range Operations requirements within the training areas and live fire ranges; correction of maneuver damage, and vegetation management to meet training requirements.

7.11.1.5 Projects have included the rehabilitation of the training area maneuver corridors (trails), creation of new maneuver trails and special use sites (i.e., convoy reaction course clearings for urban operations site), timber stand improvements, invasive species treatment and monitoring, and the re-vegetation of special use sites using native plants.

7.11.1.6 Within the next five years training area maneuver trail rehabilitation, training area vegetation management, and the reduction of training related soil erosion continues to be major focus areas of the ITAM program. Vegetation management includes timber stand improvements including invasive species management, deadfall debris and hazardous tree removal in support of the military training requirements. Projects such as these continue to be cooperatively planned, conducted and managed with the CEIE natural resource branch.

7.11.2 Training Land Integration (TRI). TRI is the component of the ITAM Program that provides a decision support procedure to integrate training requirements with land management, training management, and natural and cultural resources management processes and data derived from RTLA and USAF conservation program components. The integration of all requirements occurs through continuous consultation between the ASA and CED (natural and cultural resources managers, and other environmental staff members).

7.11.3 Range and Training Land Assessment (RTLA). RTLA component focuses on sustaining doctrinal training through the acquisition and assessment of data. Typically, RTLA Coordinators inventory and monitor natural resources conditions, and manage and analyze natural resource information. Results are pertinent to management of training and testing lands from training area to installation scales and provides input to decisions that promote sustained and multiple uses on military lands. The RTLA Program evaluates relationships between training land use and condition through the collection of physical and biological resource data. Some range and training land assessments are long term, while others are relatively short. The FE ITAM program is not funded for a full RTLA program; however, limited data collection and analysis are completed with the in-house ITAM staff.

7.11.3.1 The RTLA program component tasks that are completed with the in-house staff include:

- Identification of LRAM projects;
- Ensuring that biological considerations are part of the LRAM project prioritization process;
- Determining the effectiveness of LRAM projects;
- Calculating the land condition (i.e. the cover, land use, and load curves);
- Creating maps that depict the availability, suitability, accessibility, and capacity of training lands;
- Conducting internal encroachment assessments.

7.11.4 Land Rehabilitation and Maintenance (LRAM). LRAM component is tasked to repair, sustain, and enhance Army training and testing lands to support realistic training conditions for Soldiers. LRAM implements and maintains the most effective best land management practices for the sustainment of the Army's training and testing mission, directly supporting and benefiting the US Soldier. The majority of the FE ITAM funding is dedicated to the LRAM component.

7.11.4.1 The FE LRAM projects focus on erosion control, drainage repair, vegetation control, trail repairs and improvements and training area maintenance and repair. To achieve LRAM objectives, projects are identified and executed to either prevent or solve specific problems.

7.11.4.2 The LRAM program component tasks that are completed with the ITAM government staff include:

- Identification of project sites that require restoration, rehabilitation, or reconfiguration to improve access to training areas and increase duration of use;
- Identification of land maintenance requirements;
- Development of prioritization lists based on RTLA data, GIS data, input from TRI, and other information available;
- Development of scopes of work for the projects that includes a site description, design, resources required and expected outcome;
- Execution of projects as resources are made available;
- Conducting preventative maintenance and monitoring of completed projects; and
- Coordination of long-term land maintenance plans with other real property management programs on the installation.
- Coordination between ASA (ITAM) and CED (EE) is required prior to conducting activities.

7.11.5 Sustainable Range Awareness (SRA). SRA component of the ITAM Program provides a proactive means to develop and distribute educational materials to users of range and training land assets. ITAM SRA addresses specific environmental sensitivities at the installation level, to inform land users of restrictions and activities so as to prevent damage to natural and cultural resources.

7.11.5.1 The SRA component also includes efforts to inform environmental professionals of Army and installation mission and training activities. Educational SRA tools available include pamphlets/brochures, posters/photos displays, detailed maps and overlays, briefings, and environmental awareness playing cards.

7.12 Management of Fish, Wildlife & Other Fauna. An important function of the natural resources program is to maintain sustainable wildlife, fish, and other fauna populations and enhance habitats to support a diversity of native species. Controlled harvest of game species and habitat manipulation are the primary methods used to manage game wildlife and fisheries on FE. White-tailed deer and wild turkey comprise the big game species hunted on FE while small game includes gray squirrel, cottontail rabbits, and migratory waterfowl. Non-game wildlife include those animal species not typically hunted as well as federally and state listed species. Other fauna include various invertebrate animal species.

7.12.1 Whitetail deer (*Odocoileus virginianus*).

7.12.1.1 Importance of deer management. This species is common on the installation and consequently, its relationship to the mission is of special concern. Whitetail deer management is the top wildlife management priority for FE because of four primary impacts on the military mission. The population must be maintained at appropriate carrying capacities to (1) support a viable recreational hunting program for the installation community, (2) reduce risks of vehicular collisions, (3) reduce risks of tick-borne diseases, and (4) avoids habitat degradation from over browse of vegetation. Deer have been hunted on FE since World War II. Annual records have been kept since 1968.

7.12.1.2 Historical management insight. Effective deer management did not exist until 1998 based on reorganization of a natural resources and pest management staff in FY 1995. Although recreational hunting occurred since 1961, data collection consisted of sex and antler points prior to 1998. During this time period, age was not determined and thus the data could not be analyzed. In August 1998, an Abosomal Parasite Count study revealed that parasite levels exceeded expected values suggesting the deer population exceeded the installation carrying capacity. Subsequent deer management was necessary to reduce the overall population. However, proactive measures were not implemented to force the reduction probably due to the lack of doe harvests in the past, and thus the population was only stabilized. In 2002, proactive measures were implemented to reduce the population. During 2001-2005, average annual doe harvest was approximately 38% higher than previous years. The steady increased harvest of doe caused the lowest doe harvest in recorded history at 21. During the fall of 2006, Hemorrhagic Disease was observed in the population with an estimated 60 animals affected. The deer population remained in a reduction management until 2016 when survey data indicated the female segment of the population was reduced and doe harvested were limited. Doe harvest was limited again in 2017 and was eventually eliminated prior to the conclusion of the 2017 recreational season. Low doe sightings with a significantly reduced fawn harvest, coupled with coyotes and numerous fawn carcasses found prior to the commencement of the recreational deer season triggered the elimination of antlerless deer harvests. For the first time, the FE deer population shall be placed under population increase status. Antlerless deer harvest shall be eliminated during 2018 recreational deer season on Mulberry Island, except on Saturdays. The cantonment will always have a limitless doe harvest due to refugia occurring in locations where hunting is prohibited. Depredation events continue in areas where hunting is prohibited and deer densities increase and cause a rise in vehicular collision incidents.

7.12.1.3 Management program for the INRMP period. The 2018 pre-season estimate is 515 deer based on population reconstruction techniques. However, this estimate does not consider coyote depredation of fawns which makes the estimation difficult.

7.12.1.3.1 Goal for the INRMP period. The deer population goal for this INRMP period is to achieve a population number that is (1) below the biological carrying capacity on Mulberry Island (south of Milstead Island Creek), (2) below the cultural carrying capacity in the urban areas of the installation (north of Milstead Island Creek), and to (3) balance the ability of the deer population to support hunter interest towards maintaining an effective hunting program that serves as the primary tool for deer population control. The ideal pre-hunting season deer population on FE that will meet these goals are 400-450 deer.

7.12.1.3.2 Recreational hunting via archery in urban areas (north of Milstead Island Creek) continues to harvest all deer (antlered and antlerless).

7.12.1.3.3 Biological data is collected and analyzed each season throughout the INRMP period.

7.12.1.3.4 Continue coyote control during the INRMP period.

7.12.1.3.5 Biological carrying capacity is defined as the ability of the environment to sustain a wildlife population without detrimental effect to the environment or the wildlife species. Cultural carrying capacity is defined as the population level (as a threshold or density) of a wildlife species to which human attitudes are positive without negative impacts to human activities.

7.12.2 Wild turkey (*Meleagris gallopavo silvestris*) . The eastern wild turkey occurs on FE following successful reintroduction efforts in 1999. 24 adult birds were released at FE. Populations increased to sustainable levels allowing a limited spring season of male turkeys by lottery beginning in 2005. Numbers of male turkeys available for harvest is determined each year following fall and winter surveys and spring gobbling surveys. The allowable number of male turkeys for harvest ranges from 3-13. The largest harvest occurred in 2007 with 6 of 9 allowable male turkeys being harvested. The turkey population was estimated to be approximately 200-250 birds in 2008 based on available resources and habitat. Turkey hunting was suspended in 2013 as population numbers appeared to be low. This situation was possibly due to dismounted training disrupting nesting and/or coyote depredation. The hunting continued in 2014. However, the turkey population was estimated at 150 birds in 2017. This number is estimated due to lack of resources to effect a reliable survey. There is strong likelihood that the populations remains low due to coyote depredation.

The monitoring of turkey populations by field surveys and observations by the CEIE biologists is crucial due to limited habitat. In addition to limited resources, nest predation by mammals and reptiles constitute the primary source of mortality. Limited habitat and nest predation affects bobwhite quail also.

7.12.3 Small Game Species. Typical small game species hunted on FE include eastern cottontail rabbit, eastern gray squirrel, mourning dove, and migratory waterfowl. Red fox, raccoon, gray fox, opossum, and coyote comprise furbearer species that may be hunted IAW VDGIF regulations, the FE INRMP, and JBLEI 32-102 trapped at FE. Extremely low bobwhite quail and woodcock population numbers have precluded hunting of these two species and is expected to remain so during this INRMP period.

7.12.4 Furbearers. The goal of furbearer management on FE is to reduce or eliminate nuisance populations in a manner consistent with land use and training objectives and to ensure that sustainable populations exist for their ecological values. Furbearer species on FE include beaver, raccoon, muskrat, otter, grey fox, red fox and coyotes. Some of the furbearers fall under predator management.

7.12.4.1 All licensed trappers are required to provide an annual trap harvest report to CEIE.

7.12.4.2 The need to trap nuisance wildlife is assessed on a case-by-case basis and animals are removed by the CEIE wildlife biologist and installation pest management personnel under permit. Additional technical assistance on nuisance animal control is obtained by CEIE from USDA, Animal Damage Control-Wildlife Services (ADC-WS).

7.12.5 Nongame Species. Effective management of nongame wildlife and other fauna contributes biodiversity and healthy habitats. Nongame wildlife habitat enhancement shall be integrated with forest management to promote a diversity of age structures and retain snags and active den trees to increase habitat complexity and biodiversity. Forest management tools used to promote diversity include TSI, prescribed burning, and regeneration cuts. CEIE establishes permanent survey points to monitor avian populations.

7.12.6 Fisheries management. The goal of fisheries management at FE is to maintain a balanced and diverse aquatic ecosystem, which in turn provides sustainable recreational fishing opportunities. Fishing opportunities on FE are limited to Eustis Lake, Browns Lake, the James River along Harrison Road, and the Warwick River pier. Fishing at Eustis Lake and Browns Lake is catch and release only.

7.12.7 Habitat Management. Rehabilitation of degraded areas to natural conditions benefits biodiversity and contributes to land sustainability. There are numerous locations on the installation where the ground cover has been degraded by various activities. Restoring the vegetation on these sites reduces erosion, enhances wildlife habitat values in the immediate area, improve diversity on the installation, and restore conditions suitable for training.

7.12.7.1 Habitat diversity. Habitat diversity is crucial to ecosystem based management. Quality and diversity of grasslands, meadows, early successional

habitat, young forests, and forests of varying age is vital to sustaining wildlife and military training. These habitat types can be created and maintained through forestry operations such as clearcutting, TSI, and maintaining areas already in early successional stages. The desired ratio is 1 acre of early successional habitat (that includes grasslands and meadows) to 10 acres of forest. Many tools such as prescribed fire and fertilization of native vegetation can be used to maintain these areas and prevent degradation by encroachment of non-native species such as Chinese lespedeza, Johnson grass, Bermuda grass and fescue.

7.12.7.2 Edge habitat. Edge habitat occurs wherever two different plant communities or successional stages meet. Maintaining edge habitat is one means of enhancing biological and structural diversity on FE. Wildlife species richness in edges is typically higher than in surrounding areas as a result of the increased plant and habitat diversity. Many bird species are attracted to edge habitats because of the greater structural diversity found there; preference for edge habitat by game species is due to the close association of cover and foraging areas. For some species such as bobwhite quail, soft edge is critical to long-term sustainment.

7.12.7.3 Fields containing fescue. Fescue fields in the training areas and cantonment area are not considered part of early successional habitat for wildlife. Fescue eradication and subsequent planting of native wildflowers and forbs in these areas would benefit wildlife and pollinator species on FE.

7.12.7.4 Snags and cavity trees. Dead and dying trees (otherwise referred to as “snags”) and live trees with natural cavities are important habitat components for many wildlife species. Snags and cavity trees provide foraging, nesting, roosting, and perching sites. The abundance of woodpeckers, raptors, passerines, small mammals, and bats in an area is often directly related to the availability of snags and tree cavities. All snags within 100 yards of lakes and ponds on FE, consistent with personal safety and the protection of facilities, shall be retained for wildlife values. Similarly, all snags, active den trees, and active raptor nest trees shall be retained during timber harvest operations.

7.12.7.5 Artificial cavities or nest boxes. Artificial cavities or nest boxes have been used on FE in areas where snags are limited or nonexistent. Originally, 25 wood duck, 10 bluebird and 2 bat boxes were installed. Currently, there are 4 wood duck nest boxes in close proximity to open water habitats. There were 7 eastern bluebird nest boxes installed on the closed landfills. One bat box has been installed. A more thorough survey of existing artificial nest boxes shall be performed and monitored annually. Additional nest boxes/bat boxes shall be installed.

7.12.7.6 Where feasible, 3-4 logs of approximately 12-inch to 20-inch diameter by approximately 12 to 20-foot length, per acre are retained. This is the objective for

non-training area forest land. This is the objective for training lands as well though based on coordination with Range & Training Division, ASA.

7.12.8 Federally Threatened and Endangered Species Management

7.12.8.1 General. Section (7)(a)(1) of the Endangered Species Act (ESA) of 1973 (16 USC 1536(a)(1)) directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for species listed as Threatened or Endangered. The ESA requires federal agencies to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed species or result in the destruction or adverse modification of federally designated critical habitat. The ESA also requires federal agencies to confer with the USFWS or the NOAA, as appropriate, on any action that is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat.

7.12.8.2 Status of listed species on FE. The Installation Commander and Natural Resource Managers develop and implement policies and strategies for maintaining viable native plant and animal populations and genetic variability, preserving functioning representations of ecosystems and biological communities, and integrating human activities with conservation goals. These tasks include management of federally listed species that occur on the installation. The American bald eagle (*Haliaeetus leucocephalus*) was the last federally listed species on the installation (prior to its delisting in 2007) until 2016. Currently, there are two federally listed species occurring on the installation and one that occurs in waters adjacent to the installation. Consequently, management techniques are implemented. In 2016, two federally listed bat species were documented on FE. These species are the Northern long-eared bat (*Myotis septentrionalis*) and the Indiana Bat (*Myotis sodalis*). The Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*) occurs in river systems adjacent to FE.

7.12.8.3 Management of the Atlantic sturgeon. This species is a large estuarine-dependent fish. It is a long-lived and anadromous species (adults spawn in freshwater habitats but migrate back to estuarine and marine habitats where they spend the majority of their lives. Spawning adults migrate upriver in spring, beginning in April-May in the mid-Atlantic region and those individuals occurring in aquatic habitats near FE are considered components of the Chesapeake Bay Distinct Population Segment (DPS). This DPS is considered federally endangered as published in the Federal Register on April 6, 2012 (Federal Register/Vol. 77, No. 24/February 6, 2012). The Atlantic sturgeon occurs in waters adjacent to the installation primarily the James River and Skiffes Creek. Military operations on FE proper would not be

expected to have any direct impact on this species. However, potential impacts on the Atlantic sturgeon shall be considered through the EIAP for certain water-borne projects and operations including (but not necessarily limited to) watercraft operations, JLOTS/LOTS exercises, channel dredging, and 3d Port infrastructure maintenance.

7.12.8.4 Management of the Northern long-eared bat and Indiana Bat. A bat survey conducted in 2016 identified two federally listed bat species on FE, the Indiana bat (*Myotis sodalis*) and the Northern long-eared bat (*Myotis septentrionalis*). The Northern long-eared bat was listed as federally threatened in the Federal Register on April 2, 2015 (80 FR17974)). The Indiana bat was originally listed in 1967 (Federal Register/Vol 32/No. 48/March 11, 1967). The occurrence of the Indiana bat at FE was unexpected since its distribution in Virginia appeared to be restricted to the western portion of the Commonwealth (as opposed to the Coastal Plain) and that the species was not recorded for the region of FE in the USFWS' Information for Planning and Consultation system (IPaC). Two male Northern long-eared bats were captured in mist nets (as well being documented via acoustic analysis). The Indiana bat was documented via acoustic analysis. An additional bat survey was conducted at FE in 2017 as part of a larger AF-wide survey (Natural Resource Program, Multiple Installations Bat Acoustic Survey [Project AFCESO979317]). This survey (performed via acoustic analysis) documented the Northern long-eared bat but not the Indiana bat. Despite the disparity of results (which could be due to many reasons), the Indiana bat is still considered to occur on the installation pending more survey work.

The extent of occurrence on the installation of either species remains unknown. Consequently, all projects and operations consider both species during EIAP. The following actions represent management of these two species:

- All tree cutting, removal, or trimming is restricted installation-wide from April 15 through September 15 with exception of trees with a 3-inch diameter at breast height (dbh) or less, and trees deemed hazard risks to personnel safety or property damage as per informal Section 7 consultation with USFWS (natural resources staff shall determine whether a given tree meets the criteria for a hazard tree and is based on the following: any hazard tree within 150 feet of any facility, building, structure, road, rail road, generator, utility or security fence/structure).
- Reporting of any species of dead bats found by members of the installation community to the Natural Resources Manager.

- Requesting wildlife management support from the Natural Resources Manager in the event of human-wildlife bat issues/conflicts regarding any bat species.
- Conduct wildlife surveys that include bat surveys at least every 5 years unless funding can be obtained for more frequent surveys (i.e., surveys for Indiana bat should occur annually from 2018-2020 to better assess the presence on the installation).
- Evaluate impacts of new military training smoke and obscurants beyond the current usage.
- Inspect buildings identified for demolition (or have been unused) for possible bat harborage.
- Coordinate prescribed fire operations in advance to include with USFWS.

7.12.8.5 Candidate species. Species that are candidates for federal listing or are state-listed as endangered, threatened, or of special concern are not protected under the ESA. However, because candidate species may be listed in the future, FE natural resources staff monitors statuses of candidate species and identifies potential issues. At a minimum, installation shall document the presence of a candidate if sufficient information exists to do and identify the distribution of such species on the installation to the extent practical. Currently, the spotted turtle (*Clemmys guttata*) and the tri-colored bat (*Perimyotis subflavus*) are under consideration for listing and are documented at FE.

7.12.8.6 Rusty patched bumblebee (*Bombus affinis*). This species was listed as federally endangered effective January 20, 2017 (Department of the Interior Fish and Wildlife Service, 50 CFR Part 17 [Docket No. FWS–R3–ES–2015–0112; 4500030113]. FE has an extensive insect inventory but is limited in apids. This species does occur in Virginia but its presence on the installation remains unknown due to limited regional distribution information. It does not appear in the USFWS IPaC system. However, the U.S. Air Force Pollinator Conservation Reference Guide (2017) suggests the possibility of occurring at FE as discussed in section 5.4.3. Consequently, survey work for the Rusty patched bumble bee is suggested especially regarding certain pest management work during habitat management. This species shall be included in HERT215331.

7.12.8.7 State Listed Species. During the bat surveys performed in 2016 and 2017, two state-endangered bat species, the little brown bat (*Myotis lucifugus*) and the tri-colored bat (*Perimyotis subflavus*) were documented. Both species were added to the list of state endangered species on April 1, 2016. The installation follows Virginia of Department of Game and Inland Fisheries Guidance Document on Best Management Practices for Conservation of Little Brown Bats and Tricolored Bats (see Annex A, Appendix 3) dated 16 Feb 16, to the extent

practical. Currently, the installation operates under a time of year restriction for tree removal/harvest of trees exceeding 3-inch DBH between 15 April and 15 September as discussed in Section 7.12.8.4 for the federally listed Indiana bat and Northern Long-eared bat. The dates of this time of year restriction varies only slightly from the dates noted for the Little Brown Bat and Tricolored Bat noted in Virginia of Department of Game and Inland Fisheries Guidance Document on Best Management Practices for Conservation of Little Brown Bats and Tricolored Bats. Additionally, all human-wildlife conflicts involving bats are reported to CEIE or the game warden for action. No data on maternity roost or hibernacula sites for the Little Brown Bat and Tricolored Bat exists for the installation. However, funding opportunities shall be explored to incorporate these species with the two federally listed species where practical.

7.12.8.8 Rare plants and animals. Rare plants and animals in Virginia have been designated as such by the VDCR-VDNH based on the number of individuals of a particular species that are estimated to occur within the state. Although the state rarity ranking itself does not mandate protection, FE considers management of rare species and species of special concern to the extent practical. Currently, the hymenopteran *Orussus sayi* (a rare parasitoid wasp) and the lepidopteran *Satyrium kingi* (considered rare in Virginia) have been documented. Annex A, Appendix 3 provides a list of Special Status Faunal Species in Virginia.

7.12.9 Other fauna. Other fauna include various invertebrate taxa such as arthropods, molluscs, and annelids. Resources are needed to sustain invertebrate taxa. Forested land shall retain 3-4 logs of approximately 12-inch to 20-inch diameter by approximately 12 to 20-foot length per acre where feasible to support habitat/microhabitat for insects, spiders, centipedes, sow bugs, collembolans, proturans, and diplurans. Dead or dying trees shall remain standing as habitat/microhabitat for these and other invertebrates to serve as food sources for woodpeckers and other wildlife. Exceptions however, must be made based on risks to personnel safety and property damage such as training areas. Leaf litter in forested areas shall remain undisturbed except as required to meet military training requirements. Early successional habitats shall be planted with native forbs and grasses to serve as food sources and refugia. Aquatic habitats (streams, wetlands, ephemeral pools) should contain native aquatic vegetation and natural benthic vegetation debris for those arthropods (and other invertebrates) having an aquatic life stage such as dragonflies, damselflies, some beetles, some hemipteran bugs, megalopterans, and certain arachnids. Various terrestrial and aquatic habitats are equally important to other arthropod and non-arthropod invertebrates such as gastropods, other mollusks, bryozoans, annelids and crustaceans.

7.13 Pest Management Integration with Natural Resources.

7.13.1 General. Integrated pest management (IPM) is a key component to natural resources management and consequently, these two programs shall be integrated. Pest species include those impacting operations both in cantonment and natural areas but also those that may affect wildlife or habitats. These include hematophagus arthropods (such as mosquitoes, ticks, deer flies, and others), other arthropods with parasitic stages (such as chiggers, bot flies, etc.) as well as invasive or undesirable plants, and forest insect pests affecting the health and quality of forest resources. Some biting arthropods vector serious disease organisms pathogenic to humans and wildlife. Additionally some vertebrate species may be nuisances or hazards. In some cases these organisms also affect the biodiversity. Pest management activities shall be coordinated with CEIE biologists to ensure the success of those actions. The FE Integrated Pest Management Plan (IPMP) addresses the relationship of pest management activities to other natural resources management activities at FE and is cross-referenced with the INRMP. The relevant pest management policy regulations are provided in DODI 4150.07 (Pest Management Program) and AFI 32-1053 (Integrated Pest Management). Currently, the Natural Resources Manager and the Installation Pest Management Coordinator (IPMC) are both within the Conservation Branch of CEIE which supports integrating these programs.

7.13.2 Pollinator protection & conservation.

7.13.2.1 General. The INRMP and IPMP shall be cross-referenced to ensure all pest control techniques are evaluated to determine whether such actions pose significant risks to pollinator species.

7.13.2.2 European honey bees (*Apis mellifera*). Feral colonies of domestic European honey bees occur on the installation. These colonies may conflict with operations at times and corrective action shall be ascertained by the Installation Pest Management Coordinator (IPMC) in consultation with the Natural Resources Manager.

A. European honey bees are considered fauna on the installation and shall not be removed, disturbed or killed unless approved by the IPMC.

B. The following prioritized course of action shall be implemented in cases with honey bees and military operations conflict:

(1) Leave the colony in its current location if it does not pose a significant health & safety risk. Options include (but are not necessarily limited to) installing a barrier or warning signage /markers, or waiting a short period (i.e., 24 hours or several day) to see of the colony disperses.

(2) If it appears to pose a health and safety risk, the IPMC shall attempt to contact a local beekeeper to acquire the bees.

(3) If no beekeeper can be contacted or is not able/interested, the colony may be euthanized in accordance with the FE Integrated Pest Management Plan/appropriate techniques under the direction of the IPMC.

7.13.2.3 Rusty patched bumble bee (*Bombus affinis*). This federally endangered species is discussed in Sections 5.4.3 and 7.12.8.6. It is not documented at FE; however, surveys should be implemented to determine presence/absence. Additionally, removal of those pollinator species that pose health and safety conflicts with personnel shall be evaluated on a case-by-case situation.

7.13.3 Conservation of insects and other arthropods. As discussed in Section 5.3.7, insects and other arthropods have critical ecological roles that directly or indirectly influence habitats including food sources for wildlife, predation, parasitoidism, parasitism, disease vectoring, soil constituents, pollination, decomposition, seed dispersal, and herbivory. Such functions are significant in terrestrial and aquatic environments. Consequently, pest management activities in natural resources require careful examination and planning. Examples include (but are not limited to) control of Southern pine beetle (*Dendroctonus frontalis*) and other bark beetles in forested areas, control of gypsy moth in forested areas, control of other native & invasive forest insects, control of insects in areas of the airfield when/if they are deemed to increase BASH risks, beech blight aphid (*Grylloprociphilus imbricator*), and control of invasive vegetation.

7.13.4 Veterinary entomology. Several hematophagus arthropods that adversely affect native wildlife have been documented on FE. These arthropods primarily consist of ixodid ticks, mosquitoes, tabanid flies and ceratopogonid biting midges (*Culicoides* spp.).

7.13.5 Surveillance in 2018-2022:

7.13.5.1. Continuation of the Tick & Tick-Borne Disease Threat Assessment. Tick drags and wildlife examinations continue annually with support from US Army Public Health Command in disease pathogen analysis.

7.13.5.2. Surveillance for Red Imported Fire Ant (RIFA). Establishment of RIFA on the installation poses serious impacts on wildlife such as ground-nesting birds, small mammals and herpetofauna as well as health and safety risks to personnel. Surveillance is performed by CED natural resources and pest control staff.

7.13.5.3. Monitoring of biting flies (mosquitoes, tabanid flies, and ceratopogonid biting midges). Monitoring consists of annual mosquito species inventories and disease vector surveillance performed by McDonald Army Health Center Preventive Medicine (MAHC) and CED. Additionally CED monitors for tabanid flies at several locations throughout the installation to monitor numbers and duration of seasonal activity.

7.13.5.4. Curculionidae: Scolytinae (bark and ambrosia) beetles. Surveillance for bark beetles, particularly *Dendroctonus* and *Ips* shall be designed and implemented based on available resources. This includes Southern pine beetle (*Dendroctonus frontalis*), black turpentine beetle (*Dendroctonus terebrans*), eastern six-spined engraver (*Ips calligraphus*), eastern five-spined engraver (*Ips grandicollis*), and the southern pine engraver *(Ips avulsus*). As of 2015, only *Dendroctonus terebrans* and *Ips grandicollis* have been documented. Surveillance shall include installation over flights when it can be supported and trapping. Monitoring of natural enemies of ark beetles particularly *Thanasimus dubius* shall be included to determine predator-prey population relationships. Formal contracted support is requested for FY 20 annually for HERT20535336-HERT225336.

7.13.5.5. Additional surveillance for other invasive taxa are noted in Section 7.13.6.

7.13.6 Invasive Species Management. An invasive species is defined as a species that is (1) nonnative (or alien) to the ecosystem under consideration and (2) whose introduction harms or is likely to harm economic, environmental, or human health (EO 13112, Invasive Species, February 1999). EO 13112 established the National Invasive Species Council, co-chaired by the Secretaries of Agriculture, Commerce, and Interior. The National Invasive Species Management Plan recognizes that human actions are the primary means of invasive species introductions. It is a blueprint for federal action to prevent the introduction of invasive species, provide for their control, and minimize their economic, environmental, and human health impacts (National Invasive Species Council 2001). EO 13112 directs federal agencies to "prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause" and identifies actions that may affect the status of invasive species. Subject to availability of appropriations and to the extent practicable and permitted by law, each federal agency shall use relevant programs and authorities to:

- Prevent the introduction of invasive species;
- Detect and control such species in a cost-effective manner;
- Monitor invasive species populations;

- Provide for restoration of native habitats that have been invaded;
- Conduct research on invasive species to prevent introduction and for scientifically sound control; and
- Promote public education on invasive species.

Primary management objectives recommended in EO 13112 are to eradicate small infestations and contain expansive infestations. Early eradication of small infestations save significant time and money and will be more successful than attempts to eradicate larger infestations.

An advisory list published by VDCR to inform land managers of potential risks associated with certain plant species known to exhibit invasive behavior in some situations is presented on their website at http://www.dcr.virginia.gov/natural_heritage/invsppdflist.shtml. The Virginia Native Plant Society and VDCR have combined their resources in an Invasive Alien Plant Project.

Invasive plant species on FE include common reed (*Phragmites australis*), tree of heaven (*Ailanthus altissima*), Chinese lespedeza (*Lespedeza cuneata*), Chinese privet (*Ligustrum sinense*), golden bamboo (*Phyllostachys aurea*), Wisteria (*Wisteria floribunda*/*sinensis*), English ivy (*Hedera helix*), johnson grass (*Sorghum halepense*), Japanese stiltgrass (*Microstegium vimeneum*), and kudzu (*Pueraria spp.)*. Some are more important than others based on their ability to spread, complexity of control and impact on the military mission. Dense stands of common reed exist extensively in wetlands and to some extent in damp upland areas. Many of these areas include training areas where line of sight is greatly impaired creating safety issues, force protections challenges, wildland fire potential and overall degradation of the local ecology. Tree of heaven, bamboo, wisteria, kudzu, Chinese privet and Japanese honeysuckle have a major impact on training areas by creating dense, impassable stands that preclude effective training. Wisteria, kudzu and English ivy can also kill trees.

Based on previous surveys, an Invasive Species Management Plan was prepared in 2008 with a primary focus on vegetation. This plan was revised in 2011 and again 2013 as well as in 2017 to update the status of invasive plant species and include known and potential invasive vertebrate organisms. This revised plan is included as an annex to this INRMP (Annex I).

Management of invasive species is performed in accordance with the INRMP and the Invasive Species Management Plan. In most cases, eradication of any given species is unrealistic. Management is the operative word and is dependent on flexibility and implementation of integrated control measures. It must be perpetual and requires resources annually to achieve acceptable levels. Control measures do not necessarily comprise a one-time action. Surveillance for invasive species not yet established is instrumental in managing for these organisms.

Invasive vertebrate species include the Eastern coyote (*Canis latrans*). This species increases risks of tick-borne diseases, potential rabies exposures, and adversely impacts native wildlife. Nutria (*Myocastor coypus*) are large aquatic rodents native to South America. This species damages native marsh habitats which could be problematic for the installation in terms of flooding and ecological functions. Populations exist in the local area and one individual was observed on the installation. Surveillance is critical to preventing their establishment on the installation. European starling (*Sturnus vulgaris*) is common at FE as expected where it competes with native bird species, nests in structures to include living quarters where it presents health issues from fecal deposition and fowl mites (*Ornithonyssus sylviarum*) as well as a BASH issue at Felker Army Airfield. Mute swans (*Cygnus olor*) have been observed locally but no nesting activity has been noted at FE to date.

Several invasive invertebrate species are known to occur on the installation including Japanese beetle (*Popillia japonica*), kudzu bug (*Megacopta cribraria*), Asian tiger mosquito (*Aedes albopictus*), and brown marmorated stink bug (*Halyomorpha halys*). One colony of red imported fire ants (*Solenopsis invicta*) was found and neutralized on FE in 2013.

Installation natural resources staff observed Japanese beetles attacking marsh mallow (*Althaea officinalis*) in wetlands where common reed (*Phragmites australis*) was being controlled. Asian tiger mosquitoes are significant biting nuisances and potential disease vectors and can impact some native mammals. The European hornet (*Vespa crabro*) and the Chinese mantis (*Tenodera sinensis*) are two non-native insects documented on the installation. The European hornet is predatory on other insects and is known to girdle twigs by which to obtain sap while the Chinese mantis is a general predator that competes with native mantids and is known to feed on small vertebrate prey (including anurans, lizards and hummingbirds). Natural resources staff observed competition behaviors between European hornets and other insects for food sources.

Several other invasive invertebrate species have potential for establishment on the installation in the near future. These include (but not necessarily limited to) red swamp crayfish (*Procambarus clarkii*), rusty crayfish (*Orconectes rusticus*), Asian long-horned beetle (*Anoplophora glabripennis*), European gypsy moth (*Lymantria dispar*), Sirex woodwasp (*Sirex noctilio*), spotted lanternfly (*Lycorma delicatula*), redbay ambrosia beetle (*Xyleborus glabratus*), and beech scale (*Cryptococcus fagisuga*).

Invasive invertebrate management 2018-2022:

1. Continuation of participation in Cooperative Agricultural Pest Survey (CAPS). FE began participating with Virginia Polytechnic Institute and State University performance of the CAPS program in 2005 with continued involvement annually since

then (with data collection through 2017). These efforts focus on wood-boring invasive beetle taxa (cerambycids, buprestids & curculionids) that may enter through port facilities. Virginia Polytechnic and State University entomologists continue conducting surveillance for invasive woodboring coleopterans that could enter through 3d Port at FE in 2018. This is assumed to continue through the remainder of the INRMP period. The following taxa are the focus for 2018:

- *Callidiellum rufipenne*
- *Pityophthorus juglandis*
- *Monochamus alternatus*
- *Monochamus urussovii*
- *Agrilus auroguttatus*
- *Dendroctonus micans*
- *Pityogenes chalcographus*
- *Agrilus biguttatus*
- *Hylobius abietis*
- *Platypus quercivorus*
- *Agrilus planipennis*
- *Ips sexdentatus*
- *Tetropium castaneum*
- *Anoplophora chinensis*
- *Ips typographus*
- *Tetropium fuscum*
- *Anoplophora glabripennis*
- *Megaplatypus mutatus*
- *Tomicus destruens*
- *Callidiellum villosulum*
- *Monochamus alternatus*
- *Trichoferus campestris*
- *Chlorophorus annularis*
- *Monochamus urussovii*
- *Trypodendron domesticum*
- *Chlorophorus strobilicola*
- *Orthotomicus erosus*

2. European gypsy moth (*Lymantria dispar*) and RIFA. Natural resources and pest control staff continue surveillance for these species as part of the Base Operating Services (BOS) contract.

3. Red swamp crayfish (*Procambarus clarkii*), rusty crayfish (*Orconectes rusticus*), Asian long-horned beetle (*Anoplophora glabripennis*), Sirex woodwasp (*Sirex noctilio*), spotted lanternfly (*Lycorma delicatula*), redbay ambrosia beetle (*Xyleborus glabratus*), and beech scale (*Cryptococcus fagisuga*) shall be included in the FY 21 planning level survey (HERT215331).

4. Natural resources staff shall develop a draft forest insect pest surveillance plan by 2019. This plan shall include native and invasive taxa. Collectively, the plan shall include the following taxa at a minimum:

- Southern pine beetle
- Black turpentine beetle
- *Ips* spp.
- Asian long-horned beetle
- European gypsy moth
- Sirex woodwasp
- Spotted lanternfly
- Redbay ambrosia beetle
- Beech scale

7.14 Zoonotic Diseases. Zoonotic diseases are infectious diseases that can be transmitted to humans from animals. This primarily refers to several wildlife species but can include feral domestic animals. Rabies and tick-borne diseases comprise some of the more potentially serious diseases known to occur on the installation. Since 2006, four confirmed cases of rabies in wildlife have been documented including red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*) and Virginia opossum (*Didelphis virginiana*). A Tick and Tick-borne Disease Threat Assessment was initiated in 2007 and continues annually with data collected through 2017.This effort revealed six ixodid tick species and ten tick-borne disease pathogens existing in wildlife hosts/reservoirs and ticks including *Borrelia burgdorferi* (agent of Lyme disease), *Borrelia lonestari* (agent for Southern Tick Associated Rash Illness), *Babesia macroti* (agent for human babesiosis), *Babesia canis* (agent for canine babesiosis), *Ricketsia parkerii* (agent for Tidewater Spotted Fever), *Ehrlichia chaffeensis* (agent for Human Monocytic Ehrlichiosis), *Ehrlichia ewingii* (agent for Canine Granulocytic Echrlichiosis), *Rickettsia amblyommii* (Rickettsiosis), *Rickettsia parkerii* (Tidewater spotted fever), *Borrelia miyamotoi* (Borrelia miyamotoi disease), and *Anaplasma phagocytophilum* (agent for Human Granulocytic Anaplasmosis). In 2011, 64 raccoons were screened for the infectious roundworm *Baylisascaris procyonis*. Two raccoons were found to be infected with the roundworm (which is an internal parasitic macroinvertebrate that is highly pathogenic to humans). The egg stage of parasite can remain viable in soil for many years. Once ingested by humans or wildlife other than raccoons, the eggs hatch. The number of eggs ingested correlates to the extent of harm to the host.

7.15 Nuisance and Undesirable Wildlife. Wildlife that interfere with the military mission, well-being of domestic animals, other wildlife, or pose safety/health risks to humans are considered nuisance wildlife and undesirable wildlife. Nuisance wildlife include those species designated in Virginia under 4VAC15-20-160 (Nuisance Species Designated) as

- House mouse (*Mus musculus*);
- Norway rat (*Rattus norvegicus*);
- Black rat (*Rattus rattus*);
- Coyote (*Canis latrans*);
- Feral hog (*Sus scrofa*; any swine that are wild or for which no proof of ownership can be made);
- Nutria (*Myocastor coypus*);
- Woodchuck (*Marmota monax*).
- European starling (*Sturnus vulgaris*);
- English (house) sparrow (*Passer domesticus*); and
- Pigeon (Rock Dove) (*Columba livia*).
- Other nonnative species as defined in the Migratory Bird Treaty Reform Act of 2004 and regulated under 50 CFR 10.13.

Woodchuck/groundhogs, coyotes, European starlings, English (house) sparrow and pigeon represent Virginia-designated nuisance wildlife occurring on the installation. Nutria have not been documented on the installation; however, annual surveillance work is performed as resources permit.

Undesirable wildlife include any species (excluding listed species) that also impact the military mission. This includes any number of species however, this varies considerably annually based on several factors. Examples of undesirable wildlife at Fort Eustis can include (but not necessarily limited to) resident Canada geese, raccoons, beavers, and other species depending on the situation. Additionally, feral domestic animals (primarily cats) pose ecological and human health issues though such as not considered wildlife. The Air Force uses the term “nuisance wildlife” broadly to encompass Virginia-designated nuisance wildlife and any undesirable wildlife species collectively particularly for project funding such as Project # HERT195339-HERT235339.

7.15.1 Resident Canada geese. Both resident and migratory Canada geese are protected under provisions of the Migratory Bird Treaty Act (MBTA). Depredation of undesirable Canada geese is managed by the natural resources staff of CEIE under permits issued by USFWS. CEIE maintains appropriate permits to deal with nuisance geese should depredation be necessary.

7.15.2 Beavers. Beavers can become undesirable species when their dam-constructing activities block culverts and cause flooding of roads or training areas. Beaver damming can be environmentally beneficial and create or improve wildlife habitat; therefore, control actions are taken only when necessary. Several cases have resulted in the need to remove beavers on FE.

7.15.3 Domestic animals. Domestic cats and dogs that have been abandoned by owners or allowed roam freely can become serious pests on military installations. Feral domestic animals may serve as hosts for ticks and subsequent tick-borne diseases, as well as other diseases such as rabies, distemper, and feline leukemia (cats) posing a serious health threat to humans, other family pets and wildlife. Furthermore, cats and dogs can be destructive of certain wildlife populations by predation. CED Pest Control live trap domestic cats when feasible and individuals are taken to the Peninsula Regional Animal Shelter.

7.15.4 Coyotes.

7.15.4.1 Documentation of coyotes on FE. Coyotes were first observed on the installation in 2008. Trapping efforts removed five individuals (1 adult male, 1 adult female and 3 juveniles) from the golf course in 2010. Visual encounters and signs were not observed until 2016 when several installation community members reported seeing coyotes. This included a possible sighting in the BBC housing area and one individual was observed behind the elementary school on a wildlife camera. Trapping was initiated by USDA in 2016 and supplemented by natural resources staff; however, no coyotes were caught. A group of five individuals (possibly a family group) were observed at the golf course by law enforcement personnel in 2017. Trapping efforts were initiated in June 2017 with one juvenile captured and a second juvenile captured in March 2018. Wildlife cameras installed at selected locations throughout the installation documented additional sightings suggesting this species occurs throughout the installation.

7.15.4.2 Surveillance. Natural resources staff continue with surveillance based on reports from the installation community members, visual encounters by the staff, and wildlife cameras deployed all year. Information from these sources is used to determine coyote travel corridors.

7.15.4.3 Impact on mission. Coyote management is considered the 2d wildlife management priority behind whitetail deer management. Coyotes can inflict significant losses on several wildlife species and pose potential health & safety risks to personnel. Natural resources staff recovered 7 whitetail deer fawn carcasses killed by coyotes as evidenced by crushed skulls, canine teeth punctures and bone markings from July-September 2017. Recreational deer harvest of the fawn and doe segments in 2017 were significantly reduced. The reduction of fawn harvests is due to the coyote depredation, and the reduction of doe harvest is at least partially due to coyote depredation. Coyotes are particularly detrimental to ground-nesting avian species such as wild turkey and bobwhite quail with the conditions potentially leading to population collapse and species expirtation. Other mammalian and herpteofauna wildlife can also be adversely affected. Coyotes can pose an additional source of rabies exposure to mammalian wildlife and humans. All 7 coyotes that have been removed contained heavy ixodid tick loads and several were infected with tick-vectored pathogens known to cause disease in humans. Additionally, one individual capture in 2018 appeared infested with the louse *Trichodectes canis*. Potential transfer of this louse to humans or military working dogs is

feasible but risk assessments requires further research. No cases of mange (as caused by the *Sarcoptes scabiei* mite) have been identified in coyotes (or other mammals) on the installation to date. Various reports of coyote sightings in Newport News and York County suggests potential for additional individuals to enter the installation.

7.15.4.4 Control efforts. Removal of coyotes from FE is critical based on the impacts described in Section 7.15.4.3 above. Control efforts are considered a high priority for natural resources staff in this INRMP period. Control techniques are typically resource-intensive in terms of manpower and time. Access to affected training areas and ranges limits the time of day and time frames due to military unit training area occupancy and range fire schedules. Natural resources staff have expended overtime to conduct trapping and sharpshooting efforts because funding was not provided for HERT175339 (nuisance wildlife management) and funding for HERT185339 was not executed until late September 2018.

7.15.5 Other vertebrate species. A number of other vertebrate species such as snakes, raccoons, bats, squirrels, groundhogs, mice, rats, and opossums are considered pests when inside and around buildings (or other structures/facilities) and require periodic removal in accordance with applicable regulations. Building occupants/users shall contact CEIE if nuisance wildlife exists in these areas. All other problematic wildlife incidents (whether real or perceived) shall be coordinated with CEIE staff to avoid potential violations of state and/or federal laws as well as appropriate disposition of the animal regarding disease issues or wildlife management. It is a violation of certain federal and state laws as well as installation policy to feed wildlife with the exception of bird feeders. Bird feeders are discouraged however, as these create conditions that encourage rodents (and subsequently snakes) to the area. An occupied supply warehouse (Building 1610) has been impacted by the presence of evening bats (*Nycticeius humeralis*) for several years despite repeated requests by the installation to AFCEC for funding. Annually, this species enters the building through unknown access resulting in high mortality of the individual bats and rabies risks to contract employees. Several individual bats contained bat bugs (*Cimex adjunctus*). The building had been evaluated and potential entrance points sealed; however, the problem continues. Groundhogs (*Marmota monax*) can present a threat to the integrity of earth-covered magazines, range fire targeting systems, landfill caps, building footings, and underground wiring/piping. When groundhog activity becomes detrimental, individuals are live captured and released elsewhere on the installation or euthanized. Whitetail deer can become nuisances by over browsing vegetation or pose health and safety risks in terms of vehicular accidents, BASH or contributing to maintenance of tick-borne disease pathogens in the environment.

7.15.6. Ospreys, bald eagles and other nesting birds. Nesting activities of certain avian species pose conflicts with mission requirements at times. Ospreys (*Pandion haliaetus*) sometimes build nests on military watercraft or cranes at 3d Port. Bald eagles sometimes build nests in military aircraft flight paths creating potential BASH issues. Passerine birds construct nests in military

vehicles that remain parked in motorpools for extended periods or in structures. Large numbers of mixed species flocks including common grackles (*Quiscalus quiscula*), European starlings, and brown-headed cowbirds (*Molothrus ater*) pose BASH issues. Brown-headed cowbirds also impact populations of warblers and other songbird species.

7.16 Bird Air Strike Hazard (BASH). BASH is an important component of safe operations at Felker Army Airfield. Since BRAC 2005 and joint basing, the US Department of Agriculture-Wildlife Services (USDA-WS) as an agent for 1ST Fighter Wing (1FW) prepared a consolidated BASH Plan for LAFB and FE. Bird species, including various gulls, Canada geese, and blackbirds, create potential hazards because of their attraction to the short turf grass in the airfield clear zone for loafing and feeding. Other birds that present a potential hazard are killdeer, which are attracted to old taxiways and bare ground, and turkey vultures and raptors, which circle over food sources and fields when hunting. Wading birds such as herons and egrets are also a potential threat where there is standing water that supports aquatic vegetation and wildlife. White-tailed deer also represent a potential hazard to aircraft operations during takeoffs and landings.

7.16.1 BASH Plan. 1FW is the lead activity that prepares the BASH Plan. Drafts are formally staffed with 733 MSG (including CED and other installation staff) for comment before being finalized. The plan shall be consistent with the FE INRMP.

7.16.2 BASH Activities. Control of wildlife posing BASH risks occurs within the airfield Senior Airfield Authority (SAA). Any need to control wildlife outside the SAA is requested formally through CED to CEIE.

7.16.3 INRMP preparation and implementation. New/revised INRMPs and the Annual INRMP Review Summaries are prepared by CEIE. These documents shall be staffed with 1FW for review and comment before being finalized.

7.16.4 Information exchanges. CEIE (through CED) and USDA-WS (through 1FW) assist each other regarding potential BASH risks and removal actions since tasks performed by either activity may be mutually beneficial. For example, removal of resident Canada geese by either USDA-WS or CEIE may support reducing BASH risks and reduce fecal matter deposition at physical fitness sites, parade fields and the golf course. Exchange of survey reports contributes to both activities' work. 1FW provides quarterly (AOB/BASH meetings; FAAF Safety Council) and an annual USDA reports for activities USDA performed at FE to CED. CED provides tick-borne disease pathogen data to 1FW.

7.16.5 Habitat management. Projects to alter habitats are Felker Army Airfield are submitted to CED for approval.

7.16.6 Pest management at Felker Army Airfield. All pest management activity is accomplished in accordance with the JBLE-E Integrated Pest Management Plan.

7.16.7 CEIE and 1FW (via USDA agent) shall develop a specific agreement regarding wildlife issues and management to promote operational efficiency. This agreement shall be reviewed annually.

7.16.8. Memorandum of Understanding between the 633d Air Base Wing (633 ABW) and the 1st fighter wing (1 FW) Delineating Senior Airfield Authority (SAA) and Base Operating Support-Integrator (BOS-I) Roles, Responsibilities, Rrelationships, and Authorities. This document is found in Annex Q.

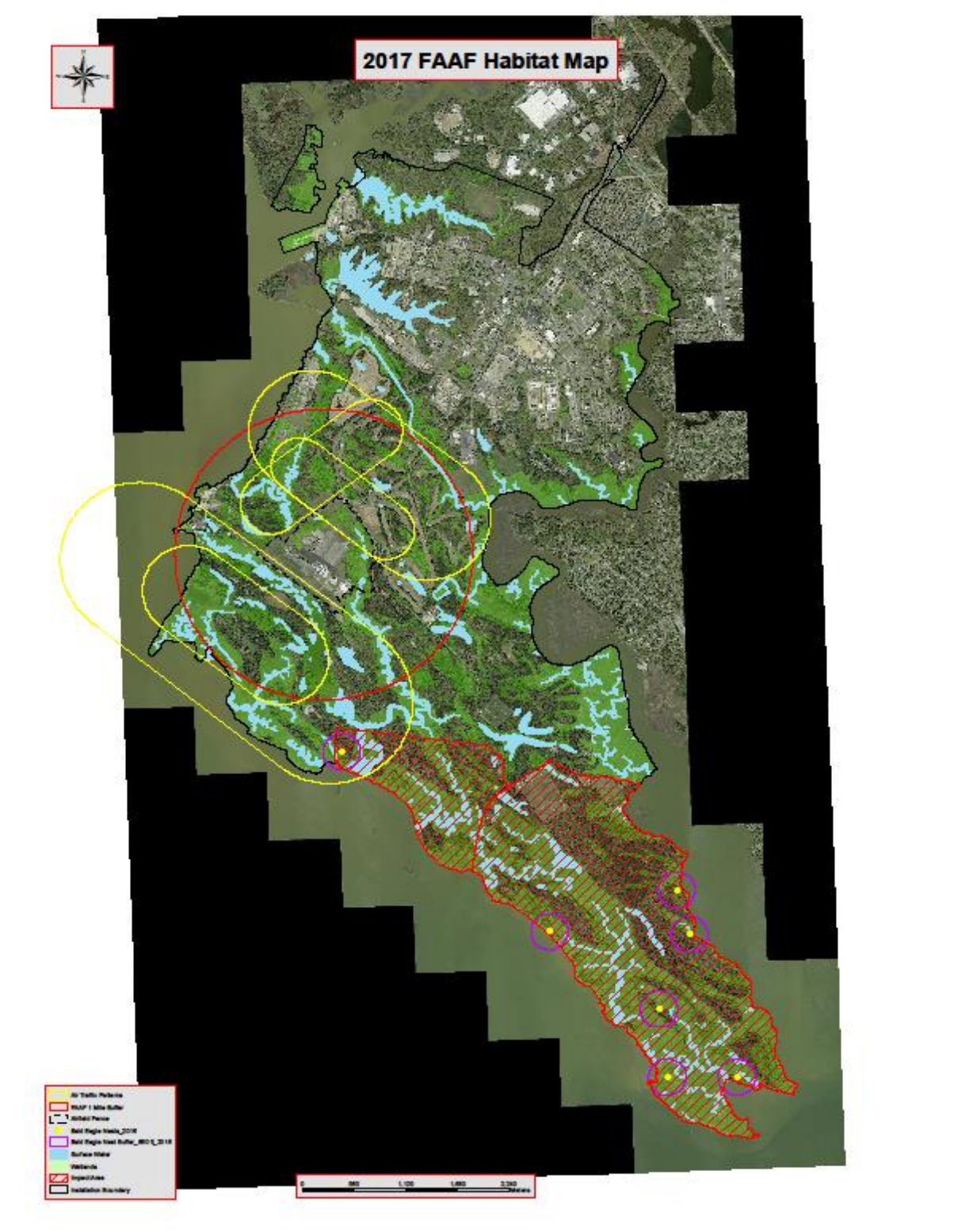

Figure 7-4: Military Aircraft Flight Map

7.17 Outdoor Recreation.

The outdoor recreation program, administered by FSS and is intended to provide military personnel, military/civilian retirees, federal employees, and the general public with opportunities to participate in enjoyable outdoor activities that are compatible with the military mission. All recreational activities must be consistent with the INRMP, compatible with the military mission, and do not exceed the recreational carrying capacity of the land and associated natural resources.

The outdoor recreation program includes many activities that fall into three categories of developed recreation areas, dispersed recreation areas, and special interest areas. Developed recreation areas are intended to accommodate intensive, congested activities. Dispersed recreation areas are those areas that can offer less intensive and non-congested activities. Special interest areas contain valuable resources such as archaeological or natural resources and requires limited, non-intensive use.

Developed recreation areas at FE include:

- Sports/athletic fields
- Jogging/walking trail (Mulberry Island Road and Wilson Avenue)
- Mini-Park (batting cages, putt-putt golf)
- The Pines Golf Course
- Go-Kart Track
- Privately-Owned Weapon Range (at Range 3)
- Horse-back riding (restricted to existing road networks)
- Warwick Pier (boat launch and fishing)
- MWR Campground
- Picnic areas (Harrison Road and Warwick Pier)

Dispersed recreation areas at FE include:

- Hunting areas (as designated in Annex N and articulated in JBLEI 32-102)
- Fishing (Harrison Road shoreline, Eustis Lake and Browns Lake)
- Canoeing & kayaking (Eustis Lake, launch sites at Training Area 20, area immediate southwest of Training Area 18, and Warwick Pier)

Special interest recreation areas:

- Fort Eustis Nature Trail (hiking, wildlife watching)

- Bird watching point (of Goose Island cove at intersection of Harrison Road and Taylor avenue)
- Matthew Jones House (educational tour scheduled through the CEIE archaeologist)

Maintaining a quality outdoor recreation program is dependent on proper management of the natural resources and efficient program administration and oversight.

Special restrictions with selected outdoor recreation activities:

1. Horse-back riding. Horseback riding is restricted to improved surface roads and the vicinity of the horse stables. This activity must refrain from impacting training areas and avoid wetlands and shorelines (such as the wetlands and shoreline along Harrison Road).

2. Fishing. Fishing in Eustis Lake and Browns Lake is strictly catch and release only regardless of fish species or size. All fish must be immediately released back into the either of the two lakes from which they were caught. There are no exceptions.

3. Fort Eustis Nature Trail. The Fort Eustis Nature Trail is specifically intended for walking, hiking and wildlife watching. All users of the trail network shall remain on the trail itself. Personnel are not permitted to move about the forested area and adjacent training area. Damaging trees by removing limbs, cutting or carving in the bark is strictly prohibited. Harassing, killing, capturing or removing wildlife or other fauna is strictly prohibited. Collection of plants or animals is strictly prohibited. Jogging, use of bicycles (such as mountain bikes) and use of motorized conveyances (including but not limited to vehicles, all-terrain vehicles, and motorcycles) are strictly prohibited.

4. Currently, there are no authorized recreational off-road vehicle or mountain bicycle areas.

5. New outdoor recreation opportunities. New opportunities may arise in the future. Such opportunities shall be articulated in a written proposed program with supporting maps and other information. The proponent shall prepare an AF Form 813 and submit the form with the supporting documentation to CEIE (and the weekly service and work order board). The natural resources staff within CEIE shall review and process the proposal to the Installation Commander (633 Air Base Wing Commander) if deemed compatible with the military mission, the INRMP, and the carrying capacity of the land.

6. All hunting, trapping and fishing activities conform to this INRMP and JBLEI 32-102.

7.17.1 Hunting and Trapping. Recreational hunting program management and oversight is the responsibility of CEIE, while the daily operation staffing of hunting facilities is the responsibility of FSS. Approximately 3,184 acres are available for recreational hunting when training activities are not conducted. All hunting on FE complies with FE INRMP and

JBLEI 32-102. CEIE manages and administers all aspects of all early and late waterfowl and deer hunting seasons, special deer management hunts, furbearer trapping seasons and spring turkey hunts.

7.17.1.1 Responsibilities.

7.17.1.1.2 CED/CEIE. CED/CEIE is responsible for:

- Management and oversight of the hunting program
- Establishes all wildlife harvest numbers
- Establishes operational procedures to include hunting activities, hunting area boundaries, fee schedules, map production, stand placement, training area scheduling, coordination of hunting activities and features,
- Prepare EIAP documentation of hunting activities,
- Development and acquisition and reporting of all wildlife permits.

7.17.1.1.3 FSS. FSS is responsible for:

- Coordination of volunteer work details
- Hunting website maintenance
- Development and production of brochures and paperwork
- Staffing of the hunter check station from 0400-2000 hours Friday through Monday each week from the first Friday in October through the first Saturday in January and 0400-1200 hours through the last Saturday in January during operational times until such time that staffing is replace by automated systems.

7.17.1.2 Fees. Hunting permits are purchased through 633 FSS Outdoor Recreation. Hunting permits purchased are two part permits. A $15 hunting permit fee is charged by CEIE and a $30 administrative fee is charged by FSS. CEIE's portion is collected by FSS and transferred to Installation Management Flight, Civil Engineering Division to deposit into the 57R5095 accounting classification. The spring turkey lottery fee is $25 and collected by CEIE. All fees collected by CEIE are deposited into the 57R5095 account. The funds are then dispersed back to the installation in the 57X5095 appropriation. FSS staffing may be offset by the charging of an administrative fee by FSS at the time of hunting permit purchase.

7.17.1.3 Required permits and licenses. An installation hunting, which requires a valid VA State Hunting License and a VA big game license (for deer and turkey), is required to hunt on FE. Federal Migratory Bird Hunting and Conservation Stamp and a VA Migratory Waterfowl Conservation Stamp are also required for waterfowl hunting. All hunters are required to have completed a state approved Hunter Education Course and must be in possession of certificate at the time of FE hunting permit purchase.

7.17.1.4 Hunting Guidelines. Harvest guidelines and hunting policies are published annually and posted on the installation hunting website and at the hunter check station. Hunting seasons and bag limits are set in accordance with VDGIF regulations and CEIE population determinations. Seasonal limits and harvest regulations are often modified by CEIE to meet installation specific goals, but never exceed state limitations. When necessary, CEIE obtains state wildlife permits, such as Deer Management Assistance Program (DMAP) and Deer Population Reduction Program (DPOP) to allow exceeding of daily or hunter specific bag limits of deer.

7.17.1.5 Game Species. Game species on FE include white-tailed deer, eastern gray squirrel, cottontail rabbit, mourning dove, bobwhite quail, woodcock, snipe, wild turkey, and migratory waterfowl. Bobwhite quail, bobcat and woodcock hunting is prohibited due to their low population numbers on the installation. Red fox, raccoon, gray fox, opossum, and coyote comprise furbearer species that may be hunted IAW VDGIF regulations, the FE INRMP, and JBLEI 32-102 at FE.

7.17.1.6. Herpetofauna. Herpetofauna consist of reptiles and amphibians. All herpetofauna are prohibited from harvesting on FE. This includes (but is not limited to) snapping turtles and frogs.

7.17.1.7 Trapping. Furbearer species that can be trapped on FE include raccoon, muskrat, and otter. Bobcat and fisher trapping are prohibited. Trapping of furbearer species is authorized IAW this INRMP and JBLEI 32-102. Special installation policies include:

- Trapping is limited to 4 trappers per year on a first come first serve basis as requested through CEIE.
- Participants must hold a valid Virginia trapping license.
- Trapping permits are $50, purchased through FSS and deposited in the deposit into the 57R5095 AF Wildlife Account.
- Trapping is limited to 4 trappers per year on a first come first serve basis.
- Trapping is limited to 15 December through 31 January.
- Upland trapping is prohibited.
- Snares are prohibited.
- Leg hold traps are prohibited, unless attached to a drowning set and leg holds must be offset.
- Dog proof traps are authorized in wetlands along waters edges.
- Body gripping traps larger than #220 are prohibited.
- Body gripping traps set along water edges, but not below high water mark, with a jaw spread greater than 5 inches must be approved by CED prior to deployment.

- Trapping in wetlands and water is authorized with CED coordination.
- Trapping area allotment is handled case by case.
- Trappers shall submit an annual catch report to CED by 15 March.
- All trapping activities shall be IAW Federal and State laws, and installation polices.
- Otter harvests are limited to 4 per trapper per year.

7.17.1.8 Access Categories. FE contains two access categories as defined in AFI 32-7064: open and off-limits. An open area is considered open access to authorized hunting activities. Off-limit areas are precluded to hunting activities without prior 633 ABW Commander approval. A map depicting authorized hunting areas is found at Annex N. Revisions to this map requires 633 ABW Commander approval.

7.17.1.9 Participant Categories. Participant categories include Active Duty Military (includes Reserve and National Guard on active duty or full time manning), Department of Defense Civilians, Active Duty Military Dependents and Family Members, Military Retirees, Department of Defense Civilian Retirees, Employees of Installation Prime Contractors (defined as a contractor with a five or more year term contract) and General Public. All participant categories are authorized to participate in hunting and trapping activities in all open areas. No participant category is authorized in off-limit areas.

7.17.2 Fishing. CEIE is responsible for management and oversight of the fishing program. Approximately 47 acres of fresh water is available for recreational fishing at Eustis Lake and Browns Lake. Game fish available in Eustis Lake and Browns Lake include largemouth bass, channel catfish, white crappie, and various species of bream. Approximately 2 miles of shoreline along Harrison Road extending to Mulberry Point and the Warwick Pier allow for recreational saltwater fishing. USEPA health advisory mandates restricting fishing in Eustis Lake to catch-and-release only. Fishing in Browns Lake is catch-and-release only. Fishing in Browns Lake is restricted to the overlook platform. Fishing is prohibited at all golf course ponds. Boat ramps are maintained for access by fishermen and for boating at the Warwick Pier. Fishermen are expected to follow federal and state laws that any Atlantic sturgeon snagged or caught must be released unharmed back in to the James River or Warwick River.

7.17.2.1 Policies. Fishing is conducted IAW this INRMP and JBLEI 32-102.

7.17.2.2 Fees. Fishing permits are purchased through 633 FSS Outdoor Recreation. Fishing permits consist of two parts. A $10 administrative fee is charged by FSS.

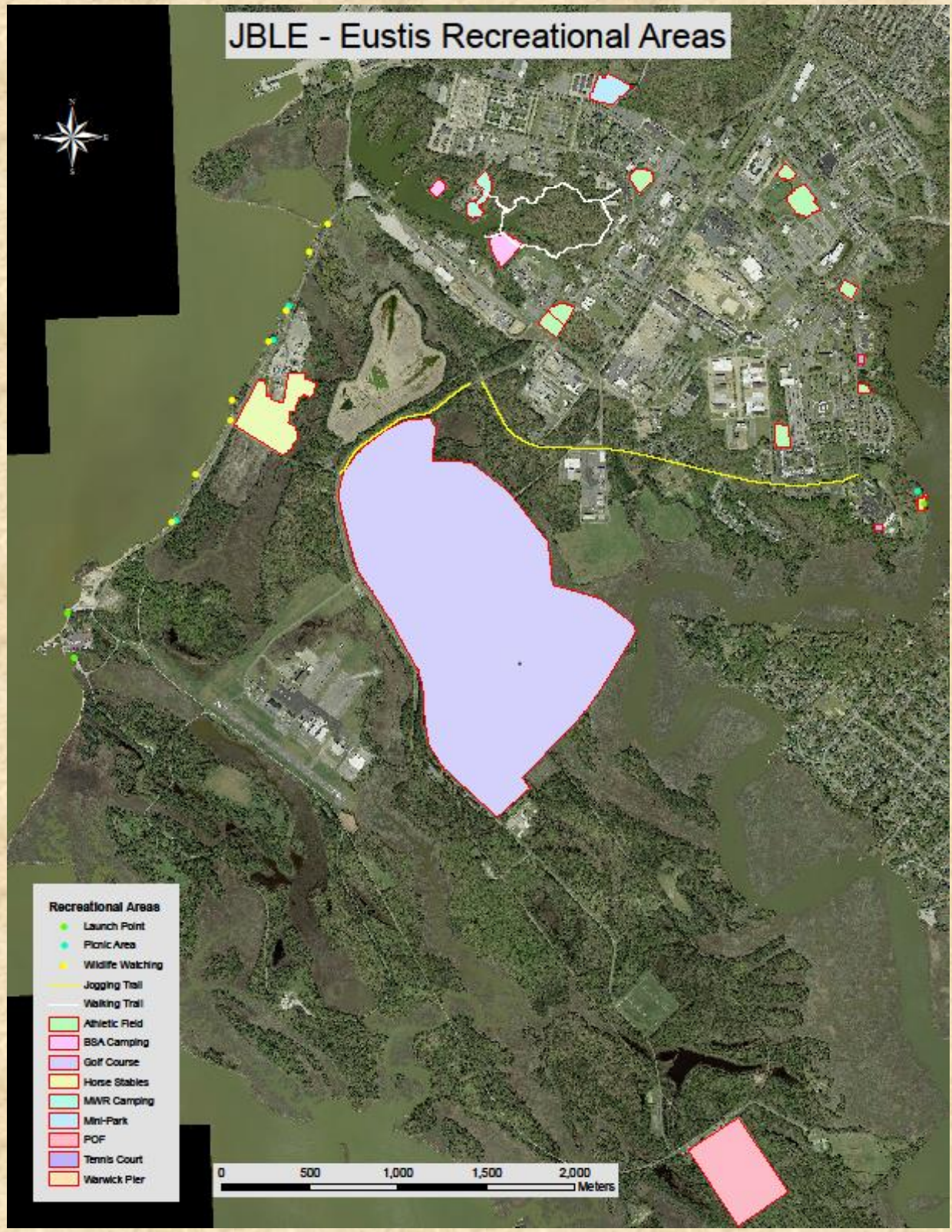

Figure 7-5: Outdoor recreation areas

7.18 Cultural Resources Protection

Cultural resources are managed in accordance with the Fort Eustis Integrated Cultural Resources Management Plan. The primary connection between cultural and natural resources protection and management concerns coordination of work. In some cases habitat management or restoration may involve excavation or other intrusive tasks that could affect cultural resources.

7.19 Natural Resources Law Enforcement.

Conservation law enforcement executed by the 733d Security Forces Squadron protects against unauthorized habitat disturbance and damage, illegal wildlife harvest or impacts, damage to installation property and facilities, vandalism, illegal removal of archaeological resources, unauthorized removal of wildlife and other fauna, unauthorized removal of plants, and unauthorized liberation of animals (wildlife, invertebrate fauna, exotic animals, or domestic pets)

7.19.1 Natural resources law enforcement is the function of the 733d Security Forces Squadron. The 733d Security Squadron has two civilian full-time game warden positions for natural resource law enforcement. Law enforcement functions include (but are not necessarily limited to) responding to incidents of trespassing, poaching, cruelty to wildlife, violations of the Migratory Bird Treaty Act, violations of the Endangered Species Act, wetland violations, unauthorized removal of commercial timber and unauthorized forestry products, unauthorized liberation of animals onto the installation (wildlife, invertebrate fauna, exotic animals, or domestic pets), and unauthorized removal (killing or capturing) or harassing wildlife.

7.19.2 CEIE natural resources staff apprises 733d Security Forces Squadron personnel of any suspected natural resource violations. 733d Security Forces Squadron personnel seek advice/assistance from CEIE natural resources staff regarding relocation or otherwise disposition of nuisance wildlife to which they may respond.

7.20 Conservation Awareness

Conservation education is the primary tool used to promote community awareness. At FE, this is accomplished through various media, community lectures, classroom activities, and special events. CEIE personnel participate in the following initiatives and events for community awareness.

7.20.1 *Peninsula Warrior*. *Peninsula Warrior*, a weekly newspaper of JBLE, is the most accessible and efficient method of conveying environmental awareness on the installation. Natural resources activities on FE are published in the weekly newspaper. During these

events, the PA Office coordinates with local television and radio stations to further promote awareness. In addition, *Peninsula Warrior* publishes CEIE talks and presentations that are given by request to community groups and civic clubs.

7.20.2 Earth Day. Earth Day is an annual conservation event on FE and was initiated in 1992. It involves civilian and military volunteers, official visitors, and youth. The activities include storm drain stenciling, installation contests, a wetlands tour, tree plantings, a tour of the installation's recycling center and various other activities.

7.20.3 Clean the Bay Day. FE participates in Clean the Bay Day each year. Participation in Clean the Bay Day has contributed to the Secretary of the Army Environmental Award and the Virginia Governor's Award for Volunteer Excellence.

7.20.4 CEIE provides information to FSS to increase conservation awareness of natural resources activities conducted on the installation.

7.21 PROHIBITED PRACTICES/ACTIVITIES

Biological organisms and their ecosystem relationships is very complex. Consequently, these functions must be monitored and managed properly. Without this the ecosystems can become damaged leading to disruption of military missions,, damage to natural functions, damage to infrastructure, and increases risks to human health. To prevent these impacts the following practices and actions are strictly prohibited at FE:

- Walking in or riding horses in wetland vegetation associated with the artificial wetlands along the entire length of the Harrison Road shoreline. These wetlands (that include vegetation) were constructed in order to prevent erosion of Harrison Road. Damage to or removal of the vegetation associated with this shoreline increases this risk.
- Off-road vehicle driving in wetlands, shorelines, beaches, forested areas, and streams.
- Allowing domestic pets such as dogs and cats to run loose. Dogs and cats must be on a leash, confined to homes or respective yards, retained in an appropriate animal kennel/carrier, or within the Dog Park.
- Intentionally or voluntarily releasing any sort of wild animal onto the installation. It is illegal to relocate native wildlife from a given location to FE. It is illegal to release or liberate non-native or exotic animals to include pets onto the installation.
- Intentionally or voluntarily releasing or liberating insects, other arthropods, or other invertebrate animals onto the installation. Examples include (but are not limited to) releasing butterflies for weddings or other events, and predatory insects into gardens.
- Intentionally or voluntarily releasing captive-raised frogs, toads, insects or other organisms associated with school forums or any other activities.
- Intentionally or voluntarily releasing or abandoning domestic dogs or cats onto the installation.

- Intentionally or voluntarily removing any wildlife, other fauna (including but not limited to, insects [such as honey bees, other pollinators, caterpillars, or any insect species], crayfish, etc.), or animal parts (such as but not limited to skulls, feathers, turtle carapaces/plastrons, carcasses, tails, claws, talons, fur, etc.) from the installation except as authorized by JBLEI 32-102 regarding hunting, fishing and trapping.
- Cut down or remove trees without prior authorization by CEIE.
- Cut or remove forestry products or trees such as standing timber (dead or live), timber laying on the ground, logs, limbs, or sticks, or collect as firewood.
- Remove or otherwise collect herbaceous plants from the installation without prior authorization from CEIE.
- Create or operate a domestic cat colony on the installation (sometimes referred to as a "Trap-Neuter-Return colony").
- Utilize crayfish, frogs (adults or tadpoles), or salamanders as fishing bait on the installation or while fishing from the Harrison Road shoreline.
- Harvest or remove any frog or toad species on the installation (such as frog gigging or collection for retention as pets or for sale).
- Capture, trap, collect or remove any native wild animal from the installation. Animals are defined as any vertebrate or invertebrate species that includes mammals, birds, reptiles, amphibians, arthropods (insects, crayfish, spiders, etc.), annelids, or other species.
- Kill, injure, capture or harass any wildlife or other fauna except as permitted installation recreational hunting, fishing and trapping policies as articulated in JBLEI 32-102.
- Collect or trap minnows or other bait fish from Eustis Lake or Browns Lake.
- Discharge or discard refuse, soil, sediments, or any debris including vegetation debris into wetlands or streams.
- Cut or remove tree limbs or other native vegetation to camouflage duck blinds, other structures, etc.
- Remove, damage, tamper with or otherwise disrupt official government (or government contracted) animal traps or nets.
- Removing any fish from Eustis Lake or Browns Lake (all fish must be released back into these water bodies during fishing).

Collectively, these prohibitions are intended to prevent the following types of issues:

- Violation of federal or state law.
- Introduction of less than optimum genes into naturally-occurring gene pools that could negatively affect the viability and health of a given species or population and in turn affect the natural community and the habitat.
- Alter the normal intraspecific competition into a detrimental outcome from saturating the biological system.
- Creation of pest issues that may affect other organisms and habitats including individual tree and forest health.

- Introduction of parasites or disease pathogens that could affect the natural populations or human health.
- Causing severe erosion or wetland fill that requires corrective action at a cost to the government.
- Compromising safety and other health concerns.

8.0 CHAPTER 8 – MANAGEMENT GOALS AND OBJECTIVES

The overlap of similar management measures for different natural resources management issues is indicative of the interrelationship between the various components of an ecosystem. For example, significant portions of the training lands are forested and provide the cover required to support the military mission. In addition to being essential for the military mission, the condition of the forests directly influences the quality of wildlife habitat, outdoor recreation, and other components of the natural resources program. The condition of the forested watersheds also directly influences water quality, the condition of the fisheries, and sensitive habitats, such as the wetlands and conservation areas. These habitats are necessary to maintain or to increase the biodiversity at FE and sustainment for long-term use.

Implementation of projects requires coordination with various organizations including AFCEC, other components of the 733d MSG including CED, FSS, and SFS as well as ASA, and 1FW. Additional consultation may be required with NOAA, USACE, USDA, USFWS, VDEQ, VDGIF, VDCR, VDOF, VDNH, VIMS, VMRC, and other natural resources agencies and organizations. CEIE oversees all natural resources management projects identified in this INRMP unless contractor support is needed to complete a specific task. In these situations, CEIE develops contract specifications for project development, monitors contractor performance, and provides project oversight. Invasive plant species control, deer management, control of arthropod disease vectors, forest pest control and habitat improvements comprise the more significant tasks requiring resourcing to achieve a sustainable future.

8.1 Goal 1: The overarching goal is to facilitate sustainment of natural areas for long-term use.

The objectives established by CEIE for the natural resources management program are to maintain ecosystem viability across the entire installation, support the Sustainable Range Program and ensure overall sustainability of natural resources.

8.1.1 Objective 1: All projects and actions shall integrate natural resources conservation into the planning phases and shall first assess use of existing disturbed areas before converting natural areas into permanently altered areas.

8.1.2 Objective 2: Provide realistic and healthy habitat in the training and non-training areas.

8.1.3 Objective 3: Conduct a natural resources management program that utilizes the principles of ecosystem management.

8.1.4 Objective 4: Use adaptive management techniques to provide the flexibility to adapt management strategies based on increased knowledge and data gained from monitoring programs and science literature.

8.1.5 Objective 5: Seek to maintain or increase the level of biodiversity of native species.

8.1.6 Objective 6: Protect forest resources from unacceptable damage and degradation resulting from insects and disease, animal damage, invasive species, and wildfire; provide occasional income; and manage the resources in a manner that supports the military mission.;

8.1.7 Objective 7: Prevent the degradation of water quality, protect aquatic and riparian habitats, and identify and restore degraded habitats.

8.1.8 Objective 8: Protect soil resources from erosion and destabilization through prevention and restoration efforts.

8.1.9 Objective 9: Provide special protection and management that lead to the recovery of threatened and endangered species and protect species of special concern (as appropriate).

8.1.10 Objective 10: Protect rare and unique wildlife and plant species identified as state or locally rare through conservation measures to the maximum extent practical.

8.1.11 Objective 11: Protect the ecologically sensitive significant habitats located in the conservation areas on FE.

8.1.12 Objective 12: Manage wildlife and fisheries resources within the principles and guidelines of ecosystem management to maintain diverse and productive habitats and viable populations of native species.

8.1.13 Objective 13: Provide outdoor recreational opportunities that avoid conflict with the military mission.

8.1.14 Objective 14: Provide a positive contribution to the community by offering informative and educational instruction and opportunities.

8.2 Goal 2: Reduce shoreline erosion.

The objectives of shoreline management are to monitor areas where excessive shoreline erosion is occurring; evaluate the feasibility and effects (both positive and negative) of implementing

BMPs to stabilize the shoreline; design, install, and maintain shoreline stabilization practices where it is determined that they will be effective in controlling erosion with minimal impacts on existing downshore or upshore habitats, and comply with regulations. Where excessive coastal erosion is occurring, the shoreline should be stabilized and repaired in a timely manner to avoid impacts to adjacent habitats or existing infrastructure.

VIMS, in cooperation with USACE and VDCR, completed a FE Shoreline Management Plan in February 1997. This comprehensive shoreline management approach is necessary because of the high potential for shoreline erosion on FE. Eight reaches of shoreline were identified in the plan and brief characterizations of erosion in the reaches were provided (VIMS 1997). The plan provided recommendations for BMPs to address shoreline erosion on the eight stream and river reaches on FE. The Harrison Road Stabilization Project was initiated in 2003 to construct offshore breakwaters, create wetlands with dredge spoil, and employ headland control along the James River shoreline. Regulatory coordination for the FCD was conducted in accordance with the 1997 FE Shoreline Management Plan. Placement of dredge spoil behind the breakwaters was conducted in 2004. Monitoring and maintenance activities were conducted in 2005-2008. Since 2008, approximately 700 additional plugs of *Spartina patens* were planted annually in this area as part of Earth Day and Boy Scout projects. .

8.2.1 Objective 1: Identify shoreline erosion issues associated with the installation.

8.2.1.1 Project 1: Review Shoreline Erosion Study for FE dated May 1993 prepared by the US Army Corps of Engineers-Norfolk District as a baseline.

8.2.1.2 Project 2: Conduct a new shoreline erosion study to determine the extent of land area losses on Mulberry Island and provide recommendations on means of mitigating such effects.

8.2.2 Objective 2: Implement mitigations or BMPs to correct erosion.

8.2.2.1 Project.1: In FY 2017, an environmental assessment was initiated for a corrective action plan that was prepared in 2015 to address erosion known to be impacting Training Area 1 and associated archaeological site 44NN0024 (ACES Project # HERT175701).

8.2.2.2 Project 2: In all years, continue to monitor the shoreline area and implement corrective action for the Harrison Road stabilization project as appropriate.

8.3 Goal 3: Improve soil conservation.

The objectives of soil conservation are to avoid disturbance of soils, implement BMPs, stabilize and repair eroded areas, avoid the development of sites that are considered to be moderately or

severely susceptible to erosion, and comply with regulations. Where these areas are disturbed, either as a result of human activities or due to natural causes, they shall be stabilized and repaired subject to funding and manpower. Sources of erosion, sedimentation, runoff, and dust shall also be controlled to prevent damage to land, water resources, equipment, and facilities on both the installation and adjacent properties.

Many of the current or planned projects detailed in the LRAM component of the ITAM program are designed to address erosion problems resulting from land disturbance. A comprehensive soil conservation approach is necessary because of the high potential for soil erosion on FE. The current policy of addressing erosion areas as they occur through the LRAM program shall be continued. A GIS map of the soils has been created and available for use.

8.3.1 Objective 1: Implement LRAM projects for soil erosion control as part of training area ITAM program (on-going and managed by ASA).

8.3.2 Objective 2: Evaluate projects to determine feasibility of avoiding construction in non-disturbed areas (on-going).

8.4 Goal 4: Improve water quality and conserve wetland resources.

Aquatic habitat management measures are directed towards maintaining healthy aquatic ecosystems. Similarly, riparian management measures are implemented to protect water quality and fisheries resources, with an emphasis on maintaining adequate riparian buffer areas. Wetland management actions at FE are directed toward protecting existing wetlands, rehabilitating degraded wetlands, and (if applicable) restoring former wetlands.

8.4.1 Objective 1: Maintain a complete inventory of wetlands on the installation and recertify this every 5 years with the USACE-Norfolk District in 2019.

8.4.2 Objective 2: Retain all wetland permitting responsibility within the CEIE.

8.4.3 Objective 3: Evaluate direct and indirect impacts to jurisdictional wetlands during all project planning review/development and formulate options for avoidance or mitigation. Ensure the design, construction, and maintenance of stream crossings in training areas provides maximum erosion protection; minimize adverse effects on wildlife, aquatic life, and their habitats; and maintain hydrologic processes and water quality (on-going: this is a review area for all projects).

8.4.4 Objective 4: Protect and maintain Resource Protection Areas (100 foot buffer) as natural areas where feasibly possible to meet military mission needs to the extent practical. Publish restrictions against disruptive activities in riparian buffer zones and aquatic sites in the installation range operations regulations (on-going: this is a review area for all projects).

8.4.5 Objective 5: Utilize 2009 ephemeral pool study to update the ephemeral pool inventory by 2020 and to consider impacts to these resources during project review.

8.4.6 Objective 6: Monitor for unauthorized (unpermitted) damage of wetlands/surface waters/ephemeral pools and implement corrective action accordingly (on-going).

8.4.7 Objective 7: Monitor and identify vegetation improvements for riparian habitats (on-going).

8.4.7.1 Project 1: Continue annual monitor and maintenance of the Matthew Jones House Plantation riparian forest constructed along Mistead Island Creek at the site of the former wastewater treatment plant.

8.4.8 Objective 8: Reduce invasive species impacts on wetlands.

8.4.8.1 Project 1: Manage invasive common reed (*Phragmites australis*) by performing annual control projects (ACES Project #: HERT195336 – HERT235336). Includes aerial and ground spraying with herbicide.

8.5 Goal 5: Improve terrestrial habitats for long-term sustainability.

Terrestrial habitat management is conducted to manipulate habitats for the benefit of native wildlife, other native fauna, and native flora and to maintain or improve the biological diversity of wildlife, other fauna, and flora on the installation. In general, management actions focus on rehabilitating degraded areas to natural conditions and maintaining natural areas.

Forests on FE are managed to maintain ecosystem viability and the forest cover required for military training and long-term sustainability. Historically, forest management objectives favored commercial production of loblolly pine. However, an ecosystem management approach to forest management shall be followed to provide for the production of timber as well as enhancement of wildlife, biodiversity, outdoor recreation, soil and water conservation, air quality, and training missions. The primary commercial objective of the forest management program will be to produce high-quality pine and hardwood saw timber without adverse effects on ecosystem integrity and the military mission.

8.5.1 Objective 1: Improve the commercial forest resources for long-term sustainability. Utilize the new forest inventory report upon completion (anticipated in 2018-2019).

8.5.1.1 Project 1: Manage invasive vegetation species that impact commercial forest stands (ACES Projects: HERT195336-HERT235336).

8.5.1.2 Project 2: Manage forest habitats annually by obtaining equipment, obtaining and re-planting native tree species, managing loblolly pine stands, limited planting of longleaf pine in selected areas when feasible, removing diseased trees and other timber stand improvements (ACES Projects: HERT195337-HERT235337).

8.5.1.3 Project 3: Prepare Forest Inventory update in 2020 (ACES Project: HERT205337).

8.5.1.4 Project 4: Conduct annual maintenance on forest roads and firebreaks.

8.5.2 Objective 2: Determine risks of forest insect/arthropod pests.

8.5.2.1 Project 1: Obtain a baseline inventory/survey of forest insects. The project was completed in 2015; however, data collection is an annual task.

8.5.2.2 Project 2: Incorporate forest entomology into the IPMP.

8.5.3 Objective 3: Improve urban forest resources for long-term sustainability.

8.5.3.1 Project 1: Manage urban forest habitats in cantonment and non-training areas by removing hazard trees, replanting trees, maintaining/monitoring new tree growth, implementing landscape designs, controlling invasive/undesirable vegetation and identifying urban forest compartments, (ACES Project: HERT195338-HERT235338).

8.5.4 Objective 4: Reduce mowing requirements for unused, open areas, and fescue-dominated natural areas.

8.5.4.1 Project.1: Plant selected locations with warm season grasses, forbs, native wildflowers, and other native herbaceous plants.

8.5.5 Objective 5: Manage whitetail deer population to prevent over browse/habitat degradation.

8.5.5.1 Project 1: Obtain state permits for and management hunts (in urban areas, Pine Golf Course, Impact Area, reforestation sites, and other high deer density areas not appropriate for recreational hunting) based on routine harvest data as appropriate annually.

8.6 Goal 6: Increase/improve the biodiversity while managing wildlife, fisheries, and other fauna issues on the installation.

The objectives of wildlife management are to maintain wildlife populations on FE for biodiversity, periodically review/revise and implement a BASH plan, provide outdoor recreation, reduce vehicular collisions with wildlife, reduce the risks of zoonotic disease transmission, and conduct nuisance animal control. In addition, planning level surveys of wildlife species and populations shall be conducted to maintain records of game harvests, manage furbearers for predator management, conduct nuisance animal control, and enhance overall biodiversity on the installation. Incorporate insects, other arthropods, and other invertebrate taxa as significant components in an ecosystem-based philosophy.

8.6.1 Objective 1: Ensure this goal is consistent with the Goals # 3 and 4 and related objectives.

8.6.2 Objective 2: Monitor wild turkey population.

8.6.2.1 Project 1: Conservation Branch staff conduct an annual spring wild turkey hunt (by lottery) to obtain data for monitoring population.

8.6.3 Objective 3: Perform planning level faunal surveys for vertebrate species, and macroinvertebrate species, and botanical/flora species every 5 years and specific surveys more frequently based on planning level surveys or natural resources staff observations.

8.6.3.1 Project 1: Perform faunal planning level survey for vertebrate species particularly, mammals, birds, reptiles and amphibians in 2019 (ACES Project # HERT195331).

8.6.3.2 Project 2: Perform survey for federally endangered Indiana bat (*Myotis sodalis*), and compare with 2016 and 2017 bat surveys (ACES Project HERT195361).

8.6.3.3 Project 3: Analyze terrestrial and aquatic macroinvertebrate survey/inventory data collected between 2011-2018.

8.6.3.4 Project 4: Perform faunal surveys for invertebrates and botanical/flora in 2021 (ACES Project # HERT215331).

8.6.3.5 Project 5: Perform survey and population estimation for bobwhite quail.

8.6.3.6 Project 6: Perform woodland box turtle survey in Training Areas 1-2 annually as an Earth Day event.

8.6.4 Objective 4: Perform wildlife surveys and analyses in the event of emergencies, zoonotic disease outbreaks, significant changes in invasive vertebrate species statuses, identification of federally listed species not previously documented, to support special project requirements or other unexpected critical situations.

8.6.4.1 Project 1: Participate in the DOD-wide Snake Fungal Disease study in 2018.

8.6.5 Objective 5: Manage nuisance and hazardous wildlife annually to reduce risks to the installation community.

8.6.5.1 Project 1: Annually implement surveillance and control procedures for feral domestic animals, and nuisance and hazardous wildlife such as (but not necessarily limited to) resident Canada geese, nutria, raccoons, and coyotes as well as special cases involving deer, bats, or other fauna, and analyze impacts of ticks, mosquitoes and other invertebrates on wildlife and habitat use (ACES Project # HERT195339-HERT235339).

8.6.6 Objective 6: Improve fauna resources for nesting, basking, feeding, and sheltering.

8.6.6.1 Project 1: Preserve snags and trees with natural cavities.

8.6.6.2 Project 2: Install barn owl boxes, install/maintain (or replace) existing wood duck nest boxes, bat motels, purple martin houses and bluebird houses. Monitor these boxes, motels and houses for use by designated species.

8.6.6.3 Project 3: Survey and evaluate the two existing Conservation Sites.

8.6.7 Objective 7: Implement practices to create one acre of early successional habitat per ten acres of forest.

8.6.8 Objective 8: Update fish taxa inventory.

8.6.8.1 Project 1: GPS culverts and survey for fish taxa in creeks associated with culverts and determine whether impacts exist to anadromous fish taxa. Project was addressed to AFCEC for FY 20.

8.6.9 Objective 9: Reevaluate the North and South Seeps Conservation Areas.

8.6.9.1 Project 1: GPS the original area and confirm acreage.

8.6.9.2 Project 2: Assess habitat conditions.

8.6.9.3 Project 3: Survey for the interstitial amphipod.

8.7 Goal 7: Integrate pest management and pesticide use with natural resources management.

Integrated pest management (IPM) activities at FE include identification and control of invasive and undesirable vegetation, native and invasive pest arthropods, disease-vectoring arthropods and nuisance vertebrate species in training areas, recreational areas such as the golf course; turf management at the golf course; nuisance animal control; forest and landscape pest control; urban pest control, and invasive species control.

IPM is conducted to provide maximum pest control at the installation while minimizing the use of pesticides. The objectives of IPM are to use mechanical and physical control (physical removal and exclusion of pests), cultural control (altering specific environmental features to make an area less suitable for or attractive to pests), and biological control (use of natural predators to control a pest) methods before using chemical control methods (pesticides). Pest control operations are implemented in accordance with the FE Integrated Pest Management Plan.

8.7.1 Objective 1: Retain the responsibilities of the Installation Pest Management Coordinator (IPMC) within the Conservation Branch, CEIE.

8.7.2 Objective 2: Certify natural resources staff to perform pesticide applications for categories of Forestry (2), Ornamental & Turf (3), Aquatics (5), Right-of-Way (6), Industrial/Institutional/Structural/Health-Related (7), Public Health (8) and Aerial Application (11).

8.7.3 Objective 3: Perform annual reviews of the Integrated Pest Management Plan concurrently with the INRMP annual review.

8.7.4 Objective 4: Develop a forest entomology program that examines potential forest insect/arthropod pest issues by 2019.

8.7.4.1 Project 1: Consolidate and analyze the baseline general & forest insect taxa surveys (completed in 2018) and incorporate the data into the INRMP and IPMP by 2019.

8.7.4.2 Project 2: Develop a plan for continuous forest pest surveillance by 2019.

8.7.5 Objective 4: Routinely monitor arthropod vectors of zoonotic diseases and other arthropod/other invertebrates impacting wildlife.

8.7.5.1 Project 1: Continue annual assessment of Tick and Tick-borne Disease Assessment initiated originally in 2007 (partially supported by HERT195339-HERT235339).

8.7.5.2 Project 2: Perform mosquito (Diptera: Culicidae) inventories/surveys annually.

8.7.6 Objective 5: Manage invasive vegetation across the installation (as discussed under Goals 3, 4 and 5) to include aquatic, early successional and forest habitats.

8.8 Goal 8: Wildland Fire Prevention.

Fire management at FE consists of wildfire prevention and control, and use of prescribed fire for habitat improvement. Historically, wildfires have not a major concern because high soil moisture, wetlands, and a road and trail network that could prevent large, damaging fires from developing. However, the potential exists based on small arms fire combined with conditions of extended drought and high densities of fire fuel such as (but not limited to) large stands of common reed (*Phragmites australis*). Firebreaks at the installation were located primarily behind small arms ranges, where the danger of accidental fire is greatest. An adequate system of firebreaks is essential for controlling wildfires and protecting forest resources.

8.8.1 Objective 1: Prepare draft Wildland Fire Management Plan (WFMP) as an annex to the INRMP in 2018 (AFCEC contractors began researching and writing a new WFMP for FE 2018.

8.8.2 Objective 3: Implement new WFMP upon completion.

8.8.2.1 Project 1: Conduct prescribed burning for fire control, wildlife habitat enhancement, and forest management objectives if resources are available.

8.8.2.2 Project 2: Conduct fire effects monitoring to determine plant community response to prescribed fire.

8.9 Goal 9: Foster conservation awareness across the installation to support long-term sustainment.

The objective of conservation awareness is to foster understanding and awareness of the environment through educational programs. The conservation awareness program sponsors or cooperates in a number of other outreach programs that build community ties and partnerships and that teach environmental responsibility in the community.

Conservation education is instrumental in creating the conditions needed to conduct sound, professional practices that produce both user opportunities and resources protection. Conservation education also promotes awareness of critical natural resource projects and an appreciation of the rationale behind them.

8.9.1 Objective 1: Retain topics of natural resources and IPM in Advanced Environmental Management and Marine Warrant Officer Advanced Courses.

8.9.2 Objective 2: Provide opportunities for conservation and IPM awareness.

8.9.2.1 Project 1: Continue to include natural resource activities during Earth Day events.

8.9.2.2 Project 2: Promote annual Clean the Bay Day.

8.9.2.3 Project 3: Promote Arbor Day and tree-planting activities.

8.9.2.4 Project 4: Provide overview of wildlife and IPM issues during the Facility Manager training.

8.9.2.5 Project 5: Provide unit-level training at the request of tenant activities.

8.9.3 Objective 4: Provide environmental information to all base personnel and contractors through use of available media.

8.9.3.1 Project 1: Continue to publish natural resources related articles in the *Peninsula Warrior*.

8.10 Goal 10: Promote appropriate habitat management techniques that contribute to sustainment of federally listed species.

8.10.1 Objective 1: Conduct wildlife/fauna surveys at least every 5 years.

8.10.1.1 Project 1: Perform planning level survey for vertebrate species as HERT195331.

8.10.1.2 Project 2: Preclude timber removal between April 15-September 15 annually to avoid impacts of timber removal on the Indiana bat with the exception of hazard trees.

8.10.3 Project 3: Perform planning level survey for flora and invertebrate organisms as HERT215221.

9.0 IMPLEMENTATION, UPDATE & REVISION PROCESS.

Funding requests are worked through the Automated Civil Engineer System (ACES). Natural resource projects have been addressed to AFCEC/ISS for inclusion into ACES through FY 2023. Funding and execution of these projects are required to implement this INRMP. Changes in

scopes of work and subsequent funding requirements may change during the plan years due to mission changes, lack of funding or execution during some plan years, results following eventual completion of the forest inventory (the last inventory is now more than 10 years old), new invasive species becoming established, changes in federal species listing, or other unforeseen issues.

9.1 PROJECTS

9.1.1 Annually recurring natural resource projects requested through ACES through ACES 2018-2023.

9.1.1.1 Invasive species management (HERT185336-HERT235336). Invasive species management requires annual implementation of control techniques. Currently, invasive vegetation constitute the greatest issues; however, conditions and actual fauna or flora species can change annually. There are several invasive plant species that affect mission requirements that include common reed, tree of heaven, golden bamboo, kudzu, Chinese privet, autumn olive, English ivy, Johnson grass and Japanese stiltgrass. Funding requests for this INRMP period are: HERT185336 ($120,000), HERT195336 ($120,000), HERT205336 ($220,000), HERT215336 ($220,000), HERT225336 ($220,000),and HERT235336 ($220,000). Increases of $120K (FY19) to $220K (FY 20 through FY 23) is based on expansion of common reed (and other invasive vegetation) as well as impacts to the FEDMMA. This estimate also includes overhead costs for project execution by the USACE or other executing agency.

Estimated out years FY 24 & 25: $230K.

9.1.1.2 Equipment purchase & maintenance support (HERT185335-HERT235335). This is a must fund, recurring project to maintain an18-ft flat-bottom 90-hp motor/boat, three (3) Kubota tractors, three (3) bush hog mowers, four (4) water sprayers, six (6) chainsaws, all-terrain vehicle, various tools, and ancillary equipment, or to replace nonfunctional/old equipment or new items deemed necessary by installation natural resources staff. Funding requests for this INRMP period are:

HERT185335: $8K for equipment maintenance, HERT195335: purchase a walk-behind mower [$15K] and GPS Data Logger [$13,740], and existing equipment maintenance [$9K]); HERT205335: to replace an old boat/engine/trailer originally purchased in 1996 [$30K/$15K/$4K], purchase Kabota tractor [$65K] and maintenance of other existing equipment [$8K]); HERT215335: $10K maintenance, HERT225335: $10K for maintenance, and HERT235335: $10K for maintenance.

Estimated out years FY 24 & 25: $12K.

9.1.1.3 Forest/Habitat management (HERT195337-HERT235337). FE has over 2,700 acres of commercial forest resources and early successional areas that are affected by various unforeseen abiotic and biotic factors particularly weather/climatic conditions (droughts, extreme temperatures, excessive rainfall, insects, fungal diseases, bald eagle nesting, and human activities). Funding provides for tree seedling and sapling planting to replace damaged or lost trees as well as warm season grasses, wildflowers, and forbs to maintain soil continuity as well as improve pollinator habitat through successional processes. Additionally, this funding supports control of undesirable vegetation and removal or trimming of hazard trees in commercial forested areas that could affect training or other military missions, conduct other timber stand improvements, and reforestation to maintain habitats for continued military use. Funding requests for this INRMP period are:

HERT195337 ($85,000), HERT205337 ($220,000)*, HERT215337 ($120,000), HERT225337 ($121,000), and HERT235337 ($121,000).

* HERT205337 has been increased by $100K to fund a forest inventory. As per AFI32-7064 (Section 9.1.6) a forest inventory must be completed or updates every 10 years. The last inventory was prepared in 2007. A forest inventory project was approved for FY 2017; however, the funding was not executed. Attempts to fund in FY 18 also failed. No funding was expected to be available for FY 19.

Estimated out years FY 24 & 25: $125K.

9.1.1.5 Management of nuisance/hazardous wildlife (HERT195339-HERT235339). Several wildlife species exist on the installation that can cause physical damage to property, create unsanitary conditions near operations and contribute to several zoonotic disease (rabies, tick-borne pathogens, mosquito-borne pathogens) maintenance in the installation environment. These include (but are not limited to) resident Canada geese, whitetail deer, coyotes, European starlings, brown-headed cowbirds, common grackles, raccoons, bats, and foxes and other species. Currently, evening bats (and possibly other bat species) frequent a contract warehouse (BLDG 1610) despite several attempts to seal the building. Numerous requests for funding were submitted over the course of several years. Some vertebrate species such as nutria and mute swans require surveillance to prevent establishment. Biotic factors lead to unpredictable incidents and unexpected situations frequently arise. Actual annual needs vary because species, conditions and conflicts can change annually. Funding requests for this INRMP period are:

HERT195339 ($38,000), HERT205339 ($98,000)*,
HERT215339 ($40,000), HERT225339 ($40,000), and HERT235339 ($42,000).

*HERT205339 is adjusted by adding $60K for a bat biologist to assess the situation of bat association with BLDG 1610. This was addressed to AFCEC.

Estimated out years FY 24 & 25: $42K.

9.1.1.6 Supplies for conservation operations (HERT185342-HERT225342). Various expendable supplies unique to natural resources management are needed annually. These may include roost/nesting boxes (for wood ducks, bats and purple martins), wetland marking tape, forestry marking tape, tree marking paint, batteries, silt fencing, signage, specialized marking flags, panel/lindgren traps, work gloves, snake tongs, anti-bite gloves, animal carriers, boots, mudders, disposable gloves, field notebooks, lumber, stakes, light traps, animal traps, tools and others. Funding requests for this INRMP period are:
HERT195342 ($9,000), HERT205342 ($9,000), HERT215342 ($10,000), HERT225342 ($12,000), and HERT235342 ($12,000).

Estimated out years FY 24 & 25: $13K.

9.1.1.7 Management of urban forest habitat (HERT195338-HERT235338). FE contains approximately 1,000 acres of urban forest. Trees associated with the urban forest are at risk of weather impacts (storm events involving high winds, lightning, flooding, extreme summer heat, drought, and extreme seasonal temperature fluctuations), disease, insect damage and various human activities. Management activities include replacing dead or dying trees, removal of hazard trees posing risks to human safety of property damage, designing landscapes to reduce monocultures, and monitoring tree health. Funding requests for this INRMP period are:

HERT195338 ($90,000), HERT205338 ($110,000), HERT215338 ($110,000), HERT225338 ($120,000), and HERT235338 ($120,000).

Estimated out years FY 24 & 25: $125K.

9.1.1.8 Fauna Planning Level Surveys (HERT195331). Project is intended to provide current information regarding vertebrate taxa (mammals, birds, reptiles and amphibians). The last planning level survey was completed in 2015. A new survey initiated in 2019 would be completed by 2020. HERT195331 ($150,000)

Additionally, the federally endangered Indiana bat was documented on the installation during the 2016 bat survey but was not recorded in 2017 bat survey. Additional surveys should be conducted annually that include both acoustic and mist netting techniques. Funding could not be obtained for FY 18. HERT195361 (Listed Bat Survey/$60K) is programmed for FY 19. Request for funding in subsequent years (FY 20 and FY 21) have been addressed to AFCEC.

A new planning level survey for vertebrate species shall be programmed for FY 24. Estimate: $200K.

9.1.1.9 Invertebrate and flora survey (HERT215331/$200,000). Survey data is either lacking or outdated for various aquatic invertebrates (including crustaceans, mollusks and insects), some terrestrial arthropods, potentially invasive forms (rusty crayfish, red swamp crayfish, invasive forest pests), and the endangered rusty-patched bumble bee. A survey for these organisms combined with a flora/botanical survey (the latter being older than 5 years) is planned for FY 21 as HERT215331: $200,000.

A new invertebrate and botanical/flora survey shall be programmed for FY 26. Estimate; $250K

9.1.2 ITAM Funds.

Military training in designated training areas requires maintenance of these training lands. ITAM funding used to perform these tasks via the Department of the Army, G3 via IMCOM, G7. The portion of the ITAM requirement for fiscal years 2019 through 2022 used to support the natural resources program in training areas is presented in Table 9-1. Budget details are presented in separate ITAM Annual Work Plans prepared in accordance with the Range Control Master Plan and focus on site restoration from maneuver/training-related damage, beach replenishment, and soil conservation.

9.2 Implementation of Funding Options.

The natural resources program at FE receives financial support from appropriated funds (e.g., operations and maintenance) and funded reimbursements (forestry) and user fees (hunting, fishing, and trapping). The use of funded reimbursements and user fees is restricted by Federal law. Funded reimbursements can be used only for forest management-related expenses, and user fees may be used only to fund projects related to fish & wildlife management. Expenses not directly associated with timber management or with fish and wildlife management activities must be funded from appropriated funds.

9.2.1 **Forestry Funds**. Managing the installation forest resources is particularly challenging because the installation is small (less than 7,900 acres) and it must maintain healthy forests to meet military/Army training requirements as well as prevent soil and shoreline erosion. Additionally, the installation lacks sufficient forest acreage to use harvest proceeds as a primary means to fund forest management projects (FE has an estimated 2,700 acres of forest land). Consequently, funding for most forest management projects must be obtained via appropriated funding. However, some commercial timber sales do occur more typically as a result of construction projects. Commercial timber sales are coordinated through AFCEC.

Shortfalls between revenues generated by forestry activities and the funds required to operate the forestry program may, if money is available, come from the DOD Forestry Reserve Account. Otherwise shortfalls must be appropriated directly from the Operations and Maintenance (O/M) account.

9.2.2 **Fish and Wildlife Management Reimbursement Funds**. The Sikes Act (16 USC Part 670a(b)(3)(B) permits reimbursement of hunting, fishing, and trapping (and other outdoor recreation) fees to the installation. Fees associated with fish and wildlife are collected into the 57 5095 accounting classification and the AFCEC/CZ sends these fees back to FE in the 57X5095 appropriation. These funds are solely for protection, conservation and management of fish and wildlife (which includes habitat improvement and related activities) per AFI 32-7064 (Section 16.3.4).These funds are not for the construction of recreational structures such as duck blinds or fishing piers (16 USC § 670a-f).

9.3 Natural Resources Management Staffing.

The professionally trained natural resources conservation personnel at FE, in cooperation with other installation personnel, are necessary to implement this INRMP. The natural resources management staff at FE are assigned within CEIE and are listed in Table 9-2.

Table 9-1. Natural Resources Management Staff at FE.

Number	Position	Status
1	Chief, Conservation Branch/Natural Resources Program Manager (Biological Scientist) (GS-0401-12)	Full-time, permanent
1	Wildlife Biologist (GS-0486-11)	Full-time, permanent

9.3.1 Command support is essential for implementation of this INRMP. The 733d Mission Support Group Commander and other personnel in command positions at FE shall fully support this INRMP to ensure the long-term sustainability of natural resources and the military mission.

9.3.2 Subject to funding, CEIE might find it necessary to hire temporary labor (i.e., seasonal employees, university students, outside agency reimbursable employees) to assist in the completion of some projects and tasks. However, the permanent natural resources management professionals provide the foundation, continuity, and fulfill the supervisory roles necessary to continue the successful natural resources program at FE.

9.4 Personnel Training.

Various sources for natural resources staff training exist such as The Wildlife Society, Society of American Foresters, and the U.S. Fish and Wildlife Service National Conservation Training Center (amongst many other sources). However, funding for training/related professional development is generally not available except in very special cases where a specific requirement exists. Some training opportunities exist during the National Military Fish and Wildlife Association annual conferences when funding is available for installation staff to attend. Consequently, professional development of installation natural resources staff is generally not available.

Natural resources program managers are required to complete DOD Natural Resources Compliance Course (AFI 32-7064 18.1). However, this course is of limited value to experienced installation natural resources staff.

733 SFS game wardens who enforce fish, wildlife, and natural resources laws on AF lands must have specialized training and certification. Training may be obtained by acquiring certification as a state fish and wildlife conservation law officer or by successfully completing the Natural Resources Police Training at the Federal Law Enforcement Training Center (FLETC).

9.5 Annual Coordination Requirements.

The INRMP remains posted on the JBLE webpage making it immediately available for other installation staff and tenants to view. The Chief of the Conservation Branch/Natural Resources Manager serves as the INRMP manager. The point of contact and contact information is noted on this webpage.

The review process follows two procedures:

- Any person or organization associated with FE can submit comments to the Chief, Conservation Branch/Natural Resources Manager at any time. Chief, Conservation Branch/Natural Resources Manager considers such comments on a case-by-case situation.

- The formal annual review process shall be performed annually. The Chief, Conservation Branch/Natural Resources Manager prepares an Annual INRMP Review Summary and a draft Summary with key installation staff and tenants requesting their review. The following installation staff/tenants who typically participate in this review include:

- ASA
- 633 FSS
- SJA
- 1st Fighter Wing
- 733d Security Forces Squadron
- Master Planning (CED)
- Fire & Emergency Services (CED)
- 7th Transportation Brigade (Expeditionary)
- 128th Aviation Brigade

Following this review, the Chief, Conservation Branch/Natural Resources Manager reviews comments, finalizes the Summary and coordinates changes if needed. The objective is to complete this by 31 July. Following this, the final Summary is provided to USFWS and VDGIF for comment/concurrence. This process begins at the anniversary date and is completed within four months of that date.

9.6 Monitoring INRMP Implementation.

At the end of the annual review process, the Chief, Conservation Branch/Natural Resources Manager submits a report to the Commander, 633d ABW (or Director, Civil Engineer Division when so delegated) articulating the outcome of the review which includes insight on the following areas:

- Projects have been budgeted for the future.
- Status of required trained natural resources positions.
- Projects and activities for the upcoming year have been identified and are included in the INRMP.
- All required coordination with the U.S. Fish and Wildlife Service, National Oceanic & Atmospheric Administration, and Virginia Department of Game and Inland Fisheries have occurred.
- Any significant changes in the installation's mission requirements or its natural resources have been identified.
- Any significant issues related to natural resources management or losses of natural resources that have been identified.
- Accomplishment of natural resource-related projects.

Chapter 10 - REFERENCES

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HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Annex A to FE INRMP
Regulatory Coordination including:
Agency & Tribal Consultation
List of Native and Naturalized Fauna of Virginia
State Listed Species
Relevant Environmental Laws

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Joint Base Langley-Eustis, Virginia 23665-2291

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Appendix 1 to Annex A to FE INRMP
Regulatory Agency (State and Federal) & Tribal Consultation

MEMORANDUM FOR RECORD DEC 1 8 2018

SUBJECT: Regulatory Agency and Tribal Consultation

1. Joint Base Langley-Eustis, Fort Eustis, VA meets the criteria requiring preparation and implementation of an Integrated Natural Resources Management Plan (INRMP) as articulated in Air Force Instruction (AFI) 32-7064 and required by the Sikes Act. A revised INRMP was prepared based on significant changes regarding the installation since the previous INRMP was approved 21 April 2014, and this existing INRMP is reaching its 5-year life cycle.

2. Consultation with the US Fish & Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF) is required when preparing an INRMP as articulated in Section 101(a)(2) of the Sikes Act Improvement Act (SAIA). Additionally, consultation with the National Marine Fisheries Service (NMFS) within the National Oceanic and Atmospheric Administration (NOAA) was necessary since Fort Eustis is adjacent to the James and Warwick Rivers where the federally endangered Atlantic sturgeon occurs. Few natural resource projects discussed in the INRMP occur in the James River or Warwick River.

3. Initial notifications of intent to prepare a revised INRMP. 733d Civil Engineer Division, Environmental Element (CEIE) notified USFWS, VDGIF and NOAA of the intent to prepare a (new) revised INRMP as follows:

- USFWS: 10 May 2017
- VDGIF: 17 April 2018
- NOAA: 31 March 2018

4. Notification of availability for comment. Once a final draft was prepared and internal stakeholder review completed, the draft was made available to these agencies. The final draft was made available to these agencies on 28 September 2018 via email and mailed hardcopy letters with instructions on how to access and download the document. The installation requested feedback by 19 November 2018. Additionally, CEIE staff offered to deliver installation-specific natural resources information briefings and on-site tours as part of this review/consultation process. No agencies accepted this latter opportunity.

5. Outcome of the consultation. CEIE did not receive any communication or comment from any of these agencies by the 19 November deadline. Reminders were sent via email on 26 November 2018. These email messages were forwarded with "Request for Delivery Receipt" and "Request for Read Receipt".

A. USFWS. Additional steps were taken to achieve consultation from USFWS. CEIE Chief contacted the Virginia Field Office telephonically on 26 November 2018 and spoke with Mr. Troy Anderson. Mr. Anderson indicated that his office had not reviewed the document and that his agency would only focus on projects that impact federally listed species. It should be noted that the revised INRMP is not a "project" but rather a "plan" that USFWS should provide concurrence or rationale for a non-concurrence as required by the SAIA. As a result, the 733d Civil Engineer Division Director sent an email to Ms. Schulz who is the supervisor for the

Virginia Field Office requesting feedback by 12 Dec 2018. No response was received. The Virginia Field Office had over 73 calendar days to review the document. As of the date of this memorandum for record, the comment period is considered closed and no involvement by USFWS occurred with the preparation of the revived INRMP. Previous INRMP versions received concurrence from USFWS.

B. VDGIF. VDGIF responded to the 26 November 2018 reminder the following day recommending revision of portions of Sections 7.12.8.7 and 7.15. CEIE concurred with VDGIF comments and offered a written revision of these sections on 29 November 2018. VDGIF accepted these proposed revisions on 5 December 2018 and CEIE incorporated these revisions into the document.

C. NOAA. No response has been received from NOAA as of the date of this memorandum. As of the date of this memorandum for record, the comment period is considered closed and no involvement by NOAA occurred with the preparation of the revived INRMP.

6. Native American Tribe Consultation. CEIE conducted consultation with the following federally recognized tribes: Catawba (Catawba Cultural Preservation Project), Delaware Nation, Delaware Tribe, and Pamunkey Indian Reservation. A notice was forwarded on/about 11 October 2018 with a request for comment by 19 November 2018. No communication or comments were received.

TIMOTHY P. CHRISTENSEN
GS-12
Biological Scientist
Chief, Natural Resources & IPM Branch

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

OCT 1 1 2018

Wenonah G. Haire DMD
THPO and Director, Catawba Cultural Preservation Project
1536 Tom Steven Road
Rock Hill, SC 29730

Dear Dr. Haire,

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis (Eustis), Fort Eustis prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). This document articulates the conditions of the natural resources at Joint Base Langley-Eustis (Eustis), Fort Eustis and the program/policy for the management of natural resources upon approval of the INRMP for a 5-year period. The period is expected to be 1 January 2019 – 31 December 2023 with slight adjustments pending the approval date by the installation commander.

As part of the consultation process with your Tribe, we request your review of this draft. Please note that this INRMP is also being staffed with Delaware Nation, the Delaware Tribe of Indians, the Pamunkey Tribe, U.S. Fish and Wildlife Service, the National Oceanic & Atmospheric Administration and the Virginia Department of Game and Inland Fisheries.

This draft INRMP is available for public comment. The document can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link go the "NATURAL RESOURCES/PEST MGMT" box and then click on "JBLE-E_INRMP Final Draft Apr 2018". Comments can be sent by regular mail to Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Boulevard, Fort Eustis, VA 23604. Additionally, comments may be sent via email to timothy.p.christensen.civ@mail.mil.

Additionally, this office can provide a briefing to your staff regarding the revised INRMP via a conference call.

We would request comments by provide comments by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Sincerely,

Donald W. Calder Jr

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

OCT 1 1 2018

Kimberly Penrod,
Delaware Nation
Director, Cultural Resources/106, Archives, Library and Museum
31064 State Highway 281,
PO Box 825
Anadarko, OK 73005

Dear Director Penrod,

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis (Eustis), Fort Eustis prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). This document articulates the conditions of the natural resources at Joint Base Langley-Eustis (Eustis), Fort Eustis and the program/policy for the management of natural resources upon approval of the INRMP for a 5-year period. The period is expected to be 1 January 2019 – 31 December 2023 with slight adjustments pending the approval date by the installation commander.

As part of the consultation process with your agency, we request your review of this draft. Please note that this INRMP is also being staffed with the National Oceanic & Atmospheric Administration and the Virginia Department of Game and Inland Fisheries.

This draft INRMP is available for public comment. The document can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link go the "NATURAL RESOURCES/PEST MGMT" box and then click on "JBLE-E_INRMP Final Draft Apr 2018". Comments can be sent by regular mail to Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Boulevard, Fort Eustis, VA 23604. Additionally, comments may be sent via email to timothy.p.christensen.civ@mail.mil.

Additionally, this office can provide a briefing to your staff regarding the revised INRMP via a conference call.

We would request comments by provide comments by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Sincerely,

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

OCT 1 1 2018

Susan Bachor
Delaware Tribe Historic Preservation Representative
P.O. Box 64 Pocono Lake, PA 18347

Dear Ms. Bachor,

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis (Eustis), Fort Eustis prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). This document articulates the conditions of the natural resources at Joint Base Langley-Eustis (Eustis), Fort Eustis and the program/policy for the management of natural resources upon approval of the INRMP for a 5-year period. The period is expected to be 1 January 2019 – 31 December 2023 with slight adjustments pending the approval date by the installation commander.

As part of the consultation process with your agency, we request your review of this draft. Please note that this INRMP is also being staffed with the U.S. Fish & Wildlife Service, the National Oceanic & Atmospheric Administration and the Virginia Department of Game and Inland Fisheries.

This draft INRMP is available for public comment. The document can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link go the "NATURAL RESOURCES/PEST MGMT" box and then click on "JBLE-E_INRMP Final Draft Apr 2018". Comments can be sent by regular mail to Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Boulevard, Fort Eustis, VA 23604. Additionally, comments may be sent via email to timothy.p.christensen.civ@mail.mil.

Additionally, this office can provide a briefing to your staff regarding the revised INRMP at your location as well as offer a site visit.

We would request comments by provide comments by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Sincerely,

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

SEP 2 8 2018

David L. O'Brien
NOAA Fisheries Service
Virginia Field Office
1375 Greate Rd.
P.O. Box 1346
Gloucester Point, VA 23062

Dear Mr. O'Brien:

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis-Ft Eustis (JBLE-Eustis) prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). As part of the consultation process with your agency, we request your review of this draft document by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Please note that the U.S. Fish & Wildlife Service and the Virginia Department of Game and Inland Fisheries are also reviewing the document. Upon approval, this document articulates the conditions of the natural resources at JBLE-Eustis and the program/policy for the management of our installation's natural resources over a 5-year period, with annual reviews.

A comment/review period for our draft INRMP is currently underway, and can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link, go the "NATURAL RESOURCES/PEST MGMT" box, then click on "JBLE-E_INRMP Final Draft Apr 2018". You may submit your review comments via regular mail or by email. Please address regular mail comments to: Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Blvd, JBLE-Eustis, VA 23604. Please send email comments to timothy.p.christensen.civ@mail.mil with a subject line of "INRMP Review Comments".

For any further information or clarifications please contact Tim Christensen at 757-878-4231 or by email at timothy.p.christensen.civ@mail.mil. Additionally, we can provide a briefing to your staff regarding the revised INRMP at your location as well as offer a site visit if you prefer.

Sincerely,

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

OCT 1 1 2018

Dr. Ashley Atkins Spivey
191 Lay Landing Rd
Pamunkey Indian Reservation
King William, VA 23086

Dear Dr. Atkins Spivey,

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis (Eustis), Fort Eustis prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). This document articulates the conditions of the natural resources at Joint Base Langley-Eustis (Eustis), Fort Eustis and the program/policy for the management of natural resources upon approval of the INRMP for a 5-year period. The period is expected to be 1 January 2019 – 31 December 2023 with slight adjustments pending the approval date by the installation commander.

As part of the consultation process with your agency, we request your review of this draft. Please note that this INRMP is also being staffed with the U.S. Fish & Wildlife Service, the National Oceanic & Atmospheric Administration and the Virginia Department of Game and Inland Fisheries.

This draft INRMP is available for public comment. The document can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link go the "NATURAL RESOURCES/PEST MGMT" box and then click on "JBLE-E_INRMP Final Draft Apr 2018". Comments can be sent by regular mail to Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Boulevard, Fort Eustis, VA 23604. Additionally, comments may be sent via email to timothy.p.christensen.civ@mail.mil.

Additionally, this office can provide a briefing to your staff regarding the revised INRMP via a conference call.

We would request comments by provide comments by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Sincerely,

Donald W. Calder Jr

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

SEP 2 8 2018

Ms. Cindy Schulz
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Dear Ms. Schulz:

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis-Ft Eustis (JBLE-Eustis) prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). As part of the consultation process with your agency, we request your review of this draft document by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Please note that the National Oceanic & Atmospheric Administration and the Virginia Department of Game and Inland Fisheries are also reviewing the document. Upon approval, this document articulates the conditions of the natural resources at JBLE-Eustis and the program/policy for the management of our installation's natural resources over a 5-year period, with annual reviews.

A comment/review period for our draft INRMP is currently underway, and can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link, go the "NATURAL RESOURCES/PEST MGMT" box, then click on "JBLE-E_INRMP Final Draft Apr 2018". You may submit your review comments via regular mail or by email. Please address regular mail comments to: Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Blvd, JBLE-Eustis, VA 23604. Please send email comments to timothy.p.christensen.civ@mail.mil with a subject line of "INRMP Review Comments".

For any further information or clarifications please contact Tim Christensen at 757-878-4231 or by email at timothy.p.christensen.civ@mail.mil. Additionally, we can provide a briefing to your staff regarding the revised INRMP at your location as well as offer a site visit if you prefer.

Sincerely,

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS VA

SEP 2 8 2018

Amy Ewing
Virginia Department of Game and Inland Fisheries
7870 Villa Park Drive, Suite 400 (Villa Park 3)
Henrico, VA 23228

Dear Ms. Ewing:

In accordance with the Sikes Act Improvement Act (16 USC 670a-f), the Joint Base Langley-Eustis-Ft Eustis (JBLE-Eustis) prepared a revised (draft) Integrated Natural Resources Management Plan (INRMP). As part of the consultation process with your agency, we request your review of this draft document by November 19, 2018. Please indicate in your correspondence whether you concur with the document along with any respective comments.

Please note that the U.S. Fish & Wildlife Service and the National Oceanic & Atmospheric Administration are also reviewing the document. Upon approval, this document articulates the conditions of the natural resources at JBLE-Eustis and the program/policy for the management of our installation's natural resources over a 5-year period, with annual reviews.

A comment/review period for our draft INRMP is currently underway, and can be accessed from the following link: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. From this link, go the "NATURAL RESOURCES/PEST MGMT" box, then click on "JBLE-E_INRMP Final Draft Apr 2018". You may submit your review comments via regular mail or by email. Please address regular mail comments to: Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733d Civil Engineer Division, 1407 Washington Blvd, JBLE-Eustis, VA 23604. Please send email comments to timothy.p.christensen.civ@mail.mil with a subject line of "INRMP Review Comments".

For any further information or clarifications please contact Tim Christensen at 757-878-4231 or by email at timothy.p.christensen.civ@mail.mil. Additionally, we can provide a briefing to your staff regarding the revised INRMP at your location as well as offer a site visit if you prefer.

Sincerely,

Donald W. Calder, Jr.
Chief, Environmental Element
733d Civil Engineer Division

Global Power For America

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Tab A to Appendix 1 to Annex A to FE INRMP
Public Notice of Availability & Comment

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DAILY PRESS MEDIA GROUP

PO Box 100611
Atlanta, GA 30384-0611

adbilling@tronc.com
844-348-2440

Invoice Details

Billed Account Name:	Joint Base Langley-Eustis.Dolan
Billed Account Number:	CU00552327
Invoice Number:	000768680000
Invoice Amount:	$742.64
Billing Period:	08/20/18 - 08/26/18
Due Date:	09/25/18

INVOICE

Invoice Details

Date	tronc Reference #	Description	Ad Size/ Units	Rate	Gross Amount	Total
08/19/18 08/22/18	DPR768680	Classified Listings, Online 8.19 & 22 Public Notice 5753312				742.64

Invoice Total: $742.64

Account Summary

Current	1-30	31-60	61-90	91+	Unapplied Amount
0.00	0.00	0.00	0.00	0.00	0.00

Daily Press | The Virginia Gazette | Williamsburg Magazine | Tidewater Review | MOTIV8

Please detach and return this portion with your payment.

DAILY PRESS MEDIA GROUP

PO Box 100611
Atlanta, GA 30384-0611

Return Service Requested

Remittance Section

Billed Period:	08/20/18 - 08/26/18
Billed Account Name:	Joint Base Langley-Eustis.Dolan
Billed Account Number:	CU00552327
Invoice Number:	000768680000

For questions regarding this billing, or change of address notification, please contact Customer Care:

JOINT BASE LANGLEY-EUSTIS.DOLAN
1407 WASHINGTON BLVD
FORT EUSTIS VA 23604-1283

The Daily Press
PO Box 100611
Atlanta, GA 30384-0611

0005523270005523270500076868 0 00074264 00000000 7

All orders for (i) print, digital and/or preprint advertising ("Advertising Services") are subject to Publisher's Advertising Agreement Standard Terms and Conditions ("Ad Publication Terms and Conditions") available at **http://www.tronc.com/ad-io-terms/adplacement** and (ii) services other than or in addition to publication and/or insertion of advertisements (such as sponsored content creation, website development, advertising strategy design, and search engine optimization, collectively "Creation and Digital Services") are subject to Publisher's Terms and Conditions Content Creation and Digital Services ("Digital Services Terms and Conditions" and collectively with the Ad Publication Terms and Conditions, the "Standards Terms and Conditions") available at **http://www.tronc.com/ad-io-terms/adcreation.** The Standard Terms and Conditions may be updated from time to time. Your order will be subject to these invoice terms and conditions and the Standard Terms and Conditions as from time to time in effect on the date you place your order. By placing an order, you accept and agree to the Standard Terms and Conditions as from time to time in effect.

As used in these invoice terms and conditions, tronc, Inc. and any and all of their respective affiliates, as defined in the Ad Publication Terms and Conditions as "Publisher" and in the Digital Services Terms and Conditions as "TI" shall be collectively referred to herein as "Publisher." The Client, as set forth on the face of this invoice, for whose benefit the Advertising Services and/or Creation and Digital Services have been provided, as defined in the Ad Publication Terms and Conditions as "Advertiser" and in the Digital Services Terms and Conditions as "Client," shall be collectively referred to herein as "Advertiser."

FINANCIAL RELATED TERMS

Payments and Disputes

Payment: All invoices shall be paid within 15 days of invoice date or as otherwise stated on the invoice/payment schedule set forth in the Insertion Order or the Statements of Work ("SOWs").

Agency Liability: Any obligation of an Advertiser, pursuant to the terms stated herein and as set forth in the Standard Terms and Conditions, may be satisfied by an advertising agency which has been duly appointed by Advertiser (or its duly appointed agent) to act on Advertiser's behalf or is otherwise authorized to act on behalf of the Advertiser, whether by express, implied, apparent or other authority (the "Agency"). As set forth in Section 11 of the incorporated Ad Publication Terms and Conditions and in Section 24 of the incorporated Digital Services Terms and Conditions, the Agency shall be liable (jointly and severally with the Advertiser) for payment for all Advertising Services and/or Creation and Digital Services provided and invoiced by each Publisher regardless of any contrary language in any past, contemporaneous or future writing, regardless of whether it receives payment from Advertiser and regardless of whether the identity of the Agency's client is known to such Publisher. In addition, Agency agrees: (a) Publisher will not be bound by any terms, conditions or provisions in any document contrary to the terms of this invoice; and (b) represents and warrants that, as agent for the Advertiser, it has all necessary authority to submit or enter into the Insertion Order or SOW and place an order with Publisher on behalf of the Advertiser. Agency will make available to Publisher upon request written confirmation of the relationship between Agency and Advertiser. This confirmation must include, among other representations, Advertiser's acknowledgement that Agency is its agent and is authorized to act on its behalf in connection with the Insertion Order, the SOW, the terms stated in this invoice and the Standard Terms and Conditions. In addition, upon the request of Publisher, Agency will confirm whether Advertiser has paid to Agency in advance funds sufficient to make payments pursuant to the Insertion Order or SOW.

Credit: Credit privileges may be suspended on any Advertiser account that is not paid in accordance with terms or exceeds approved credit limit. For prepaid Advertiser accounts, payment in the form of check, credit card or ACH must be received in advance of space deadline for Advertiser accounts that have not established credit with Publisher. If the Advertiser's account has established credit terms, payments on such accounts may be made by using a credit card; however, such payments must be made by the due date on the invoice. Payments in excess of $2,500.00 cannot be paid using a credit card. It is the Advertiser's and its agent's responsibility to advise the Publisher's credit department immediately, via registered mail, of any change in business structure or status.

Pricing: For advertising inserts distributed via insertion in Publisher's newspaper and/or via Publisher's non-subscriber distribution program(s), quantity billed is based on the delivery quantity requirements provided by Publisher to Advertiser. Delivery quantity requirements are based on an estimate of circulation ordered plus an estimate for non-subscriber distribution, if any, plus provision for unsold copies of the newspapers, and an estimated amount for shipment and machine spoilage. Newspaper circulation is variable, therefore, it is recommended that Advertiser or its agent confirm delivery quantity requirements with their advertising sales representative just prior to ordering a print run. However, Publisher shall not be responsible nor provide rate adjustments for shortages or overages in delivery quantity requirements realized through circulation fluctuations or for circulation missed caused by shortages in the Advertiser's insert quantity provided. The terms and conditions of the Rate Cards that apply to the publications in which Advertiser has requested that Ads be published are expressly incorporated herein. If there is a conflict between your Insertion Order and the Rate Card, the Insertion Order will control.

Invoice Disputes: Advertiser and its agents waive any dispute regarding any item included in an invoice unless notice of such dispute is provided to Publisher within a reasonable period not to exceed 10 days.

Late Payment and Collections: Except for invoiced payments that Advertiser or its agent has successfully disputed, Advertiser and the Agency shall be responsible for all costs incurred by Publisher in connection with the collection of any amounts owing hereunder including, without limitation, collection fees, court costs and reasonable attorneys fees.

No Set-Off

Unless otherwise agreed to by all parties, neither Advertiser nor the Agency may set off against amounts due to Publisher under this invoice any amounts owed by Publisher to Advertiser or the Agency.

Taxes

All prices are exclusive of all sales, use and excise taxes, and any other similar taxes, duties and charges of any kind imposed by any governmental authority on any amount payable by Advertiser or the Agency. Advertiser and the Agency shall be responsible for all such charges, costs and taxes and all amounts paid and payable by Publisher in discharge of the foregoing taxes. This provision shall survive the termination of any agreement between Publisher and the Advertiser or Agency.

Other Services

Except as stated otherwise, payments by or on behalf of Advertiser to Publisher for services or goods other than advertising space, inserts and color shall not be applied toward any revenue totals set forth in the any agreement between Advertiser and Publisher.

Rate Changes & Postal Changes

Publisher shall have the right to revise the advertising rates for Advertising Services, as set forth in Section 7.3 of the Ad Publication Terms and Conditions, at any time upon notice to Advertiser or the Agency of such rates. Advertiser may terminate its agreement on the date the new rates become effective by giving written notice within 30 days of such termination. In the event of such termination, Advertiser and the Agency shall be liable for Ads published prior to such termination at the "Current Agreement Rate," defined as the billing rate in effect at the time of publication.

If the United States Postal Service implements a postage cost increase at any time, Advertiser and the Agency understand and agree that the advertising rates for Advertising Services shall be adjusted to reflect that increase automatically upon the effective date of the United States Postal Service increase.

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DAILY PRESS MEDIA GROUP

COMMONWEALTH OF VIRGINIA
CITY OF NEWPORT NEWS

5753312

This day, personally appeared before me, George Hunt, and made oath as follows:

1. He/She is employed in the Office Services Department of the Daily Press, LLC., a newspaper publishing company in the City of Newport News, Virginia.
2. The annexed advertisement of Order No. 5753312 was published for 2 insertion(s) in the Daily Press on the following dates:

Aug 19, 2018; Aug 22, 2018

Sold To:
Joint Base Langley-Eustis.Dolan - CU00552327
1407 Washington Blvd
Fort Eustis,VA 23604-1283

Bill To:
Joint Base Langley-Eustis.Dolan - CU00552327
1407 Washington Blvd
Fort Eustis,VA 23604-1283

George Hunt

George Hunt

8/22/2018
Date

Subscribed and sworn to before me:

This 22 day of August 20 18 ,

My commission expires: September 30, 2021

Tracy D. Byrd

Signature of Notary Public

Registration Number: 305169

TRACY D. BYRD
NOTARY PUBLIC
REG. # 305169
MY COMMISSION EXPIRES 9/30/2021
COMMONWEALTH OF VIRGINIA

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DAILY PRESS MEDIA GROUP

PUBLIC NOTICE

Joint Base Langley-Eustis (Eustis),
Fort Eustis Notice of Availability
Draft Joint Base Langley-Eustis (Eustis), Fort Eustis Integrated Natural Resources Management Plan.

Notice is hereby given that Joint Base Langley-Eustis (Eustis), Fort Eustis has prepared a draft Integrated Natural Resources Management Plan (INRMP) in accordance with the provisions of the Sikes Act. This document articulates the conditions of the natural resources at Joint Base Langley-Eustis (Eustis), Fort Eustis and the program/policy for their management upon approval of the INRMP for a 5-year period. Approval of the INRMP is anticipated in late 2018 and will remain in effect until approximately late 2023. Natural resources include wildlife, other fauna, habitats (including tidal and nontidal wetlands, ephemeral pools, forests, early successional habitats, riparian habitats, surface waters, and shorelines), forestry products and soils. This draft INRMP is available for public comment. The document can be accessed from the following link: **https://www.jble.af.mil/Units/Army/Eustis-Enviromental/**. From this link go the "NATURAL RESOURCES/PEST MGMT" box and then click on "JBLE-E_INRMP Final Draft Apr 2018". Comments can be sent by regular mail to Joint Base Langley-Eustis (Eustis), ATTN: Timothy Christensen, 733 Civil Engineer Division, 1407 Washington Boulevard, Fort Eustis, VA 23604. Additionally, comments may be sent via email to timothy.p.christensen.civ@mail.mil. Please provide comments by October 1, 2018.

5753312

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DAILY PRESS MEDIA GROUP

COMMONWEALTH OF VIRGINIA
CITY OF NEWPORT NEWS

5835926

This day, personally appeared before me, George Hunt, and made oath as follows:

1. He/She is employed in the Office Services Department of the Daily Press, LLC., a newspaper publishing company in the City of Newport News, Virginia.
2. The annexed advertisement of Order No. 5835926 was published for 1 insertion(s) in the Daily Press on the following dates:

Aug 21, 2018

Sold To:
Joint Base Langley-Eustis.Dolan - CU00552327
1407 Washington Blvd
Fort Eustis,VA 23604-1283

Bill To:
Department of Environmental Quality (Tidewater) - CU00430727
Tidewater Regional Office 5636 Southern Blvd
Virginia Beach,VA 23462

George Hunt
George Hunt

8/21/2018
Date

Subscribed and sworn to before me:

This 21 day of August 20 18,

My commission expires: September 30, 2021

Tracy D. Byrd
Signature of Notary Public

Registration Number: 305169

TRACY D. BYRD
NOTARY PUBLIC
REG. # 305169
MY COMMISSION EXPIRES
9/30/2021
COMMONWEALTH OF VIRGINIA

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

DAILY PRESS MEDIA GROUP

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the permanent filling of wetlands and open water ditches at Langley Air Force Base, Virginia.

PUBLIC COMMENT PERIOD: For 30 days, starting from the day after the notice is in the newspaper: August 22, 2018 to September 21, 2018

PERMIT NAME: Virginia Water Protection Permit issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Joint Base Langley-Eustis, Langley; 125 Mabry Avenue, Langley Air Force Base, Hampton, Virginia 23665; VWPP No. 17-0458

PROJECT DESCRIPTION: Joint Base Langley-Eustis has applied for a new permit for the EOR 08 & 26 Clear Zone Drainage Project. The project is located around the runway at Langley Air Force Base. The permit will allow the applicant to improve drainage around the airfield. The proposed activity would permanently impact 2.28 acre of tidal emergent wetlands, 30.39 acres of palustrine emergent wetlands, 5.56 acres of tidal open water ditch, and 1.45 acres of non-tidal open water ditch. The activity proposed in the permit will affect Back River in the Chesapeake Bay watershed. A watershed is the land area drained by a river and its incoming streams. To compensate for the affected area, the applicant would be required to purchase 32.67 wetland credits from a DEQ approved mitigation bank, in-lieu fee fund, or a combination thereof that is authorized and approved by DEQ to sell credits in the area in which the impacts will occur and has credits available (as released by DEQ). DEQ's preliminary decision is to issue the permit.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: Larissa Ambrose; Tidewater Regional Office, 5636 Southern Boulevard, Virginia Beach, Virginia 23462; Phone: 757-518-2124; E-mail: Larissa.Ambrose@deq.virginia.gov; Fax: (757) 518-2009. The public may review the draft permit and application at the DEQ office named above by appointment or may request copies of the documents from the contact person listed above.

5835926

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

MEMORANDUM FOR RECORD

DEC 1 8 2018

SUBJECT: Public Review and Comment Opportunity

1. Joint Base Langley-Eustis (JBLE), Fort Eustis, VA meets the criteria requiring preparation and implementation of an Integrated Natural Resources Management Plan (INRMP) as articulated in Air Force Instruction (AFI) 32-7064. A revised INRMP was prepared based on significant changes regarding the installation since the previous INRMP was approved 21 April 2014, and this existing INRMP is reaching its 5-year life cycle.

2. Section 2905(d) (1) of the Sikes Act Improvement Act requires JBLE-Eustis to provide the general public an opportunity to review and submit comments for the draft revised INRMP. The availability of the INRMP was announced in the Daily Press newspaper offering a 30-day comment period from August 22, 2018 to 21 September 2018.

3. No communications or comments were received via any means (email, phone calls, written letters) were received.

TIMOTHY P. CHRISTENSEN
GS-12
Biological Scientist
Chief, Natural Resources & IPM Branch

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

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Appendix 2 to Annex A to FE INRMP

List of Native and Naturalized Fauna of Virginia

A complete Virginia Department of Game and Inland Fisheries List of Native and Naturalized Fauna of Virginia, dated March, 2014 is available from the following link:
https://www.dgif.virginia.gov/wp-content/uploads/virginia-native-naturalized-species.pdf

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Appendix 3 to Annex A to FE INRMP
State Listed Species, dated May 8, 2018

A complete Virginia Department of Game and Inland Fisheries List of Special Status Faunal Species in Virginia/Threatened and Endangered Faunal Species dated October 24, 2017 is available from the following link:

https://www.dgif.virginia.gov/wp-content/uploads/virginia-threatened-endangered-species.pdf

Additionally, the Virginia Department of Game and Inland Fisheries Guidance Document on Best Management Practices for Conservation of Little Brown Bat and Tricolored Bat (16 Feb 2016) is posted here.

VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES GUIDANCE DOCUMENT ON BEST MANAGEMENT PRACTICES FOR CONSERVATION OF LITTLE BROWN BATS AND TRI-COLORED BATS

(Approved February 16, 2016)

Summary: This guidance document specifies the best management practices and processes to be utilized in conserving little brown and tri-colored bats and in determining whether a specific practice is eligible for incidental take of either of these species.

Electronic Copy: An electronic copy of this guidance in PDF format is available online on the Virginia Department of Game and Inland Fisheries (VDGIF) Web site at http://www.dgif.virginia.gov/wildlife/LBBA_TCBA_Guidance.pdf.

Contact Information: Please contact the Department of Game and Inland Fisheries at Rick.Reynolds@dgif.virignia.gov or by calling 540-248-9360 with any questions regarding the application of this guidance.

Disclaimer: This document is provided as guidance and, as such, sets forth standard operating procedures of the Board of Game and Inland Fisheries and the Department of Game and Inland Fisheries that administers the program on behalf of the Board. This guidance provides a general interpretation of the applicable Code and Regulations, but is not meant to be exhaustive in nature. Each situation may differ and may require additional interpretation of the Virginia Endangered Species Act and attendant regulations.

I. Background:

The Virginia Endangered Species Act, Article 6 of Title 29.1 of the Code of Virginia, specifies that the Board of Game and Inland Fisheries may allow the incidental take of state-designated endangered or threatened species under certain provisions. State endangered and threatened species are designated as such by regulation of the Board (4VAC15-20-130.B); the updated list may be found online at http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+4VAC15-20-130. The Act also clearly indicates that the taking of state endangered or threatened species is illegal unless specifically allowed by Code or regulation. The Code of Virginia specifies that any regulation adopted by the Board that allows the incidental take of state endangered or threatened species must describe the circumstances that must exist to allow for incidental take, include appropriate conservation actions that must be taken that enhance the survival of the species, and require the actual taking to be at a minimum.

This guidance document shall provide additional details on the circumstances under which the Board will allow the incidental take of little brown bats and tri-colored bats, consistent with the designation of these species as state endangered.

II. Definitions (pursuant to Article 6, Title 29.1, Code of Virginia and 4VAC15-20-140):

"Species" are defined as any subspecies of fish or wildlife and any distinct population segment of any species or vertebrate fish or wildlife which interbreed when mature.
"Take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, possessing, or collecting, or attempting to do any of these activities.

"Incidental take" is defined as any taking of an endangered or threatened species of fish and wildlife, excluding those species appearing on the federal list of endangered and threatened species, that otherwise would be prohibited by law or regulation, if the taking is incidental to, but not the purpose of, an otherwise lawful activity.

III. Authority:

The Endangered Species Act in the Code of Virginia contains the following authorities applicable to this guidance:

§ 29.1-564. Taking, transportation, sale, etc., of endangered species prohibited.
The taking, transportation, possession, sale, or offer for sale within the Commonwealth of any fish or wildlife appearing on any list of threatened or endangered species published by the United States Secretary of the Interior pursuant to the provisions of the federal Endangered Species Act of 1973 (P.L. 93-205), or any modifications or amendments thereto, is prohibited except as provided in § 29.1-568.

§29.1-566. Regulations.
The Board is authorized to adopt the federal list, as well as modifications and amendments thereto by regulations; to declare by regulation, after consideration of recommendations from the Director of the Department of Conservation and Recreation and from other reliable data sources, that species not appearing on the federal lists are endangered or threatened species in Virginia; and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any threatened or endangered species of fish or wildlife.

§ 29.1-568. When Board may permit taking of endangered or threatened species; designated experimental populations.

A. The Board may permit the taking, exportation, transportation, or possession of any fish or wildlife which is listed by the provisions of this article, for zoological, educational, or scientific purposes and for propagation of such fish or wildlife in captivity for preservation purposes. Any person may, in accordance with all applicable federal and state laws, possess, breed, sell, and transport any nonnative wildlife included on any list of threatened or endangered species published by the United States Secretary of the Interior pursuant to provisions of the federal Endangered Species Act of 1973 (P.L. 93-205), as amended, when (i) the federal designation does not specifically prohibit such possession, breeding, selling, or transporting and (ii) the nonnative wildlife is not included on the list of predatory or undesirable animals specified by regulations of the Board adopted pursuant to § 29.1-542.

B. The Board may adopt regulations that:

1. Allow the taking, possession, exportation, transportation, or release of fish or wildlife within or among designated experimental populations of a specific species, within the context of an approved conservation plan for the species. Any regulation designating an experimental population shall (i) specify the circumstances under which taking of an individual member of an experimental population will be exempt from the prohibitions and penalties authorized under this article and (ii) describe the geographic extent of the experimental population, which shall be distinct from naturally occurring populations continuing to be subject to the prohibitions and penalties authorized under this article.

2. Allow incidental take provided such regulations shall (i) describe the allowable circumstances; (ii) include provisions that ensure offsets through the implementation of conservation actions specified by the Department to enhance the long-term survival of the species or population; and (iii) require any actual taking to be at a minimum.

IV. Discussion and Interpretation:

Little brown bats and tri-colored bats have experienced substantial declines across the Commonwealth since the discovery of white-nose syndrome (WNS) in2009. Recent monitoring surveys document that populations of both species have declined more than 95% across the state since then. The following best management practices are provided as guidance for maintaining and improving habitats for these species, minimizing purposeful or accidental take of these animals, and enhancing the long-term survival of these species in Virginia.

Hibernacula: Current Knowledge of Hibernacula and Conservation Measures

The VDGIF knows about 132 hibernacula (places where these animals hibernate during the winter) with little brown and or tri-colored bats present. These hibernacula typically are located in western Virginia and are typically caves. Of the 132 hibernacula, 50 have combined little brown and tri-colored counts of 50 or more individuals and supported over 95% of the hibernating populations pre white-nose syndrome. Of the 50, 10 are on public lands, and an additional four have private landowner protections (e.g., easements). Our goal is to protect and manage these 50 hibernacula and surrounding fall swarm habitat (roost trees, open areas, riparian, and other habitats within a 0.25-mile radius of a hibernaculum used by bats for roosting or foraging before hibernating) that historically supported 97.5% of the hibernating populations of these two species.

While there is no literature guiding the decision to protect a specific number of hibernacula or percentage of a population to maintain these species in Virginia during hibernation, the VDGIF thinks that protecting and managing approximately one-third of the known hibernacula, that supported a majority of known pre-WNS hibernating populations, is appropriate. As new information is gathered through surveys, monitoring and modeling, sites may be added or removed from the list.

- *Conservation Measures:* For hibernacula containing over 50 individuals of little brown and/or tri-colored bats (documented between 1995 to present), a two tiered buffer zone is recommended:
  - Between December 1 and April 30, implement a 250-foot radius buffer zone with the following restrictions: no tree removal, prescribed fire, or land disturbance impacting the entrance(s) to the hibernacula. This action will protect the immediate area around the hibernacula by reducing disturbance during fall swarm, hibernation, and spring emergence. Tree removal and prescribed fire are permitted outside of these dates.
    - *Incidental Take Protocol:* If tree removal needs to occur due to public safety or property damage concerns, and there are no known roost trees, then no further action is necessary. If there are known tree roosts, follow the guidance under Roost Trees below.
  - Between September 1 and November 30, increase the buffer to a 0.25-mile radius, with the following conditions: for timber harvests greater than 20 acres, retain snags (dead, broken-off trees), "wolf" trees (large trees with wide spreading crowns that may have broken branches, cavities or sloughing bark) (if not presenting public safety or property risk) and small tree groups (1 per 20 acres harvested) of up to 15 trees of 3 inches diameter at breast height (dbh) or greater. Because of the significant decline (greater than 90%) documented for little brown and tri-colored bats, the VDGIF does not anticipate that fall swarm roost trees will be a limiting factor in the protection and conservation of these species. These timber harvest actions will retain and provide fall roost trees for these species near their winter hibernating areas. Tree removal and prescribed fire are permitted outside these dates.
    - *Incidental Take Protocol:* If there are known tree roosts that need to be removed due to public safety or property damage concerns, follow the guidance under Roost Trees below.

Under these circumstances and conditions, we anticipate little to no lethal take of little brown bats or tri-colored bats.

<u>Roost Trees: Current Knowledge of Roost Trees and Conservation Measures</u>

The VDGIF has not tracked and is not aware of any little brown or tri-colored bat roost trees (places where the animals live when not hibernating) in Virginia. The VDGIF is in the process of surveying for roost trees and will provide updated guidance as new information becomes available. Typically, both species utilize human dwellings (barns, sheds, attics, buildings, etc.) as well as trees for maternity roosts. Our goal is to identify and protect as many of the remaining maternity colonies as possible

- *Conservation Measures:*
  - Between June 1 and July 31, implement a 150-foot radius buffer zone with the following restrictions: no tree removal, prescribed fire, or land disturbance within the buffer zone. This will protect the known roost tree(s) and foraging habitat close to the roost tree during the maternity season. Tree removal and prescribed fire are permitted outside these dates.

- If a little brown or tri-colored maternity roost needs to be excluded due to public safety or property damage concerns, then the following *Incidental Take Protocol* will apply:
  - The exclusion will be performed by a Nuisance Wildlife Control Operator (NWCO) or individual that is certified in bat exclusion techniques through a program recognized by the VDGIF and is permitted by the VDGIF.
  - Exclusion devices will be used to allow volant (capable of flight) individuals to escape.
  - Individual animals incapable of sustaining themselves will be collected and transport to a willing and appropriate VDGIF-permitted wildlife rehabilitation facility.

  Under these circumstances and conditions, we anticipate little to no lethal take of little brown bats or tri-colored bats.

<u>Human Structures: Current Knowledge of Human Structure Use and Conservation Measures</u>

Little brown and big brown bats are the two species most commonly found in human-occupied dwellings and the ones most likely to cause human conflicts. The VDGIF is currently aware of three structures that serve as roosts for little brown bats. Tri-colored bats utilize human structures as well, but are more commonly found in barns, sheds, and abandoned structures and less so in occupied dwellings. Currently, the VDGIF is not aware of any tri-colored bat roosts in Virginia. The VDGIF is in the process of surveying for roost trees and artificial roost structures and will provide updated guidance as new information becomes available.

- *Conservation Measures*: Between May 15 and August 31, no exclusion of bats from maternity colonies, except for human health concerns or property damage, as determined by the landowner.
  - If a little brown or tri-colored maternity roost needs to be excluded due to human health or property damage concerns, then the following *Incidental Take Protocol* will apply:
    - The exclusion will be performed by a Nuisance Wildlife Control Operator (NWCO) or individual that is certified in bat exclusion techniques through a program recognized by the VDGIF and is permitted by the VDGIF.
    - Exclusion devices will be used to allow volant (capable of flight) individuals to escape.
    - Individual animals incapable of sustaining themselves will be collected and transport to a willing and appropriate VDGIF-permitted wildlife rehabilitation facility.

  Under these circumstances and conditions, we anticipate little to no lethal take of little brown bats or tri-colored bats.

Facility or Project Operations: Operation under a VDGIF-approved plan

The VDGIF understands and recognizes that white-nose syndrome is the primary cause for the rapid and significant decline of little brown and tri-colored bats in Virginia. However, additional losses that result from other activities may exacerbate these losses. Under certain approved circumstances, the VDGIF can allow facility operations that might otherwise result in taking of bats when those operations are conducted in a manner than implements measures to specifically minimize impacts to these species.

- *Conservation Measures*: Project or facility operations that might incidentally take little brown or tri-colored bats can be allowed when conducted in accordance with a plan developed by the project or facility operator and approved by the VDGIF. The plan must include, but is not limited to, the following information:
  - the specific circumstance/operational activity or condition that may result in taking:
  - the specific measures to be implemented that avoid, minimize and/or mitigate incidental take associated with an otherwise lawful activity;
  - the expected incidental take;
  - the implementation schedule; and
  - an explicit point of contact for communications to and from the VDGIF.

  The operator must acknowledge and implement practices to report bats taken, even in circumstances where specific measures have been approved and implemented. If project operations occur within areas described in other parts of this document (e.g., Hibernacula; Known Roosts), the operator is expected to abide by the conservation measures described in those sections.

  Under these circumstances and conditions, we anticipate little to no lethal take of little brown bats or tri-colored bats.

In any instance of allowable incidental take, it is the landowner's responsibility to document the circumstance, actions taken, and number of animals taken (if any), in making a determination that these species should be removed to address human health, public safety or property damage issues. The landowner is responsible for retaining this documentation.

V. Adoption, Amendments, and Repeal:

This document will remain in effect until rescinded or superseded.

Robert W. Duncan — 02/16/2016

Robert W. Duncan — Date

Executive Director, Department of Game and Inland Fisheries

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Joint Base Langley-Eustis, Virginia 23665-2291

Appendix 4 To Annex A to FE INRMP
Relevant Environmental Laws

1. Federal

1.1. **Archaeological and Historic Data Preservation Act of 1974** (16 O.K. 469 *et seq.*). Directs Federal agencies to notify the Secretary of the Interior when any Federal construction project of a Federally licensed activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archaeological data.

1.2. **Archaeological Resources Protection Act (ARPA) of 1979** (16 USC. 1982 *et seq.*). Prohibits the removal, sale, receipt, and interstate transportation of archaeological resources obtained illegally (without permits) from public or Native American lands and authorizes Agency permit procedures for investigations of archaeological resources on public lands under the Agency's control.

1.3. **Bald and Golden Eagle Protection Act (BEPA) of 1940**, as amended (16 USC. 668 *et seq.*). Amended in 1972, prohibits the killing, harassment, possession, or selling of bald eagles. Also imposes penalties for the possession of bald eagles or eagle parts taken from birds after June 1940.

1.4. **Chesapeake Bay Preservation Act**. The Chesapeake Bay Preservation Act, commonly known as "The Bay Act" in Virginia, was adopted by the Virginia General Assembly in 1988. The Bay Act is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring the use of effective conservation planning and pollution prevention practices when using and developing environmentally sensitive lands called Chesapeake Bay Preservation Areas.

1.5. **Clean Water Act (CWA) of 1977** (see Federal Water Pollution Control Act).

1.6. **Coastal Zone Management Act (CZMA) of 1972** (16 USC. 1451 *et seq.*). Provides incentives for coastal States to develop and implement coastal area management programs. Plays a significant role in water-pollution abatement, particularly with regard to nonpoint source pollution. State coastal zone management programs frequently incorporate flood control, sediment control, grading control, and stormwater runoff control statutes. Under the CZMA, Federal actions that have a direct impact on the coastal zone must be consistent to the maximum extent practicable with the State program.

1.7. **Conservation Programs on Military Reservations** (see **Sikes Act**).

1.8. **Endangered Species Act (ESA) of 1973** (16 USC. 1531 *et seq.*). Determines and protects both plant/animal species and their critical habitats that are threatened or endangered. Prohibits any Federal action that may jeopardize such species and provides for the designation of critical habitat of such species wherein no action is to be taken concerning degradation of the habitat. Requires a Biological Assessment of Federal agency actions when an endangered or threatened species may be present in the area affected by the actions.

1.9. **Federal Noxious Weed Act of 1974** (7 USC. 2801 *et seq.*). Provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Requires a general or specific permit from the Secretary of Agriculture for the movement of noxious weeds identified in the regulation into or through the United States unless such movement is from Canada.

1.10. **Federal Water Pollution Control Act (FWPCA) of 1972**, as amended (33 USC. 1251 *et seq.*). As the precursor to the CWA, contains virtually all the same tools and enforcement mechanisms that the CWA contains. The CWA amendments of the FWPCA in 1977 redefined the contaminants of concern, which had previously been oxygen-demanding materials. FWPCA is usually referred to as the CWA.

1.11. **Clean Water Act (CWA) of 1977**, as amended (Public Law 95–217, 33 USC. 1251 *et seq.*). The major Federal legislation concerning improvement of the Nation's water resources. A compilation of decades of Federal water pollution control legislation amended the Federal Water Pollution Control Act (FWPCA) and requires Federal agency consistency with State nonpoint source pollution-abatement plans. Amended in 1987 to strengthen enforcement mechanisms and to regulate stormwater runoff. Provides for the development of municipal and industrial wastewater treatment standards and a permitting system to control wastewater discharges to surface waters. Contains specific provisions for the regulation of dredge soil disposal within navigable waters and for the placement of material into wetlands. Permits are required under sections 401, 402, and 404 for proposed actions that involve wastewater discharges and/or dredging/placement of fill in wetlands or navigable waters. These permits are required prior to the initiation of proposed actions.

1.12. **Fish and Wildlife Conservation Act of 1980** (16 USC. 2901 *et seq.*). Promotes State programs for the purpose of conserving, restoring, or otherwise benefiting nongame fish and wildlife and their habitat.

1.13. **Fish and Wildlife Coordination Act** (Public Law 85–624; 16 USC. 661 *et seq.*). Passed in 1934, assures that wildlife conservation receives equal consideration and be coordinated with other features of water resource development. Federal agencies (or other agencies with Federal permit) proposing to impound, divert, or control waters are required to consult with USFWS and the State wildlife agency. The Act authorized project modification, acquisition of land, and other measures necessary to protect wildlife.

1.14. **Migratory Bird Conservation Act** (16 USC. 715–715d, 715e, 715f–715r) of 18 Feb 29, (45 Stat. 1222). Established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. Authorizes the Secretary of the Interior to cooperate with local authorities in wildlife conservation and to conduct investigations, to publish documents related to North American birds, and to maintain and develop refuges.

1.15. **Migratory Bird Treaty Act (MBTA) of 1918** as amended, (16 USC. 703 *et seq.*). Prohibits taking or harming a migratory bird, its eggs, nests, or young, without the appropriate permit.

1.16. **Military Construction Authorization Act** (Public Law 97–321, 10 USC. 2665 *et seq.*). Passed annually, an annual update of military construction projects. Provides for the production and sale of forest products and the outleasing of public lands, including outleasing for agricultural purposes. Installations containing forested lands or lands with the potential to grow and produce forest products must ensure the optimum sustainable yield of forest products and the improvement of forest resources, consistent with the military mission and local ecosystem condition.

1.17. **Military Reservation and Facilities: Hunting, Fishing and Trapping** (10 USC. 2671). Requires that hunting, fishing, and trapping will be in accordance with State laws.

1.18. **National Environmental Policy Act (NEPA) of 1969** (42 USC. 4321 *et seq.*). Ensures that environmental factors are given the same consideration as other factors in decision-making by Federal agencies. Through the environmental impact assessment process, NEPA mandates that all Federal agencies consider the environmental effects of, and any alternatives to, all proposals for Federal actions that may or will significantly affect the quality of the human environment. Also established the Council on Environmental Quality in the Executive Office of the President.

1.19. **National Historic Preservation Act (NHPA) of 1966** (16 USC. 470 *et seq.*). Provides for the nomination, identification (through listing on the National Register of Historic Places (NRHP)), and protection of historical and cultural properties of significance. The Act establishes specific procedures for compliance, including initial review authority by the cognizant State Historic Protection Officer.

1.20. **North American Wetlands Conservation Act** (16 USC. 4401). Encourages partnerships among Federal agencies and others to protect, restore, enhance, and manage wetlands and other habitats for migratory birds, fish, and wildlife.

1.21. **Noxious Plant Control Act of 1968** (43 USC. 1241 *et seq.*). Requires the head of Federal departments and agencies to allow a State having a program for the control of noxious plants to enter upon any Federal lands, for the purpose of controlling noxious plants, if certain criteria are met.

1.22. **Sikes Act Improvement Act (SAIA)** (see also **Conservation Programs on Military Reservations of 1960**), as amended (16 USC. 670(a) *et seq.*). Requires each military department to (1) manage natural resources and ensure that necessary services are provided for the management of fish-and-wildlife resources on each installation, (2) provide their personnel with professional training in fish-and-wildlife management, and (3) give priority to contracting work with Federal and State agencies responsible for the conservation or management of fish and wildlife. Authorizes cooperative agreements with State and local governments, non-Governmental organizations, and individuals who call for each party to provide matching funds or services to carry out natural resources projects and initiatives.

1.23. **Soil Conservation Act of 1938** (16 USC. 5901 *et seq.*). Provides for the application of soil conservation practices on Federal lands.

1.24. **Timber Sales on Military Lands** (10 USC. 2665). Allows the proceeds from the sale of recyclable material to be credited to the installation to cover specified costs. The President may sell any interest in land acquired for the production of lumber or timber products except land under control of the Army or Air Force and may also sell forest products produced on land owned or leased by a military department. The President must determine the prices for such sales and may use the proceeds to reimburse DOD appropriations for production costs. The States where military installations selling forestry products are located are entitled to compensation and may expend that compensation on for the benefit of public schools and public roads in the county where the military installation is located.

1.25. **Watershed Protection and Flood Prevention Act** (16 USC. 1001; 33 USC. 701). Authorizes Federal assistance to local organizations for planning and carrying out projects in watershed areas for conservation and use of land and water, and flood prevention.

2. Executive Orders (EOs)

2.1. EO 11514 Protection and Enhancement of Environmental Quality (5 Mar 70). Requires the Federal Government to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies are to initiate measures needed to direct their policies, plans, and programs so as to meet National environmental goals. See https://www.denix.osd.mil/denix/Public/Legislation/EO/note1.html.

2.2. EO 11593 Protection and Enhancement of the Cultural Environment (13 May 71). Directs Federal agencies to a take a leadership role in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies must locate, inventory, and nominate to the National Register all historic resources under their jurisdiction or control. Requires the Federal Government to provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. See https://www.denix.osd.mil/denix/Public/Legislation/EO/note37.html.

2.3. EO 11988 Floodplain Management (24 May 77). Requires each Agency, including military departments, to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. See https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation/EO/note2.html.

2.4. EO 11990 Protection of Wetlands (24 May 77). Supports the avoidance of long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Directs each Agency, including military departments, to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the

Agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. See https://www.denix.osd.mil/denix/Public/Legislation/EO/note9.html.

2.5. EO 12372 Intergovernmental Review of Federal Programs (14 Jul 82). Allows States, after consultation with local officials, to establish their own process for review and comment on proposed Federal financial assistance and direct Federal development; increases Federal responsiveness to State and local officials by requiring Federal agencies to accommodate State and local views or explain why those views will not be accommodated. See https://www.denix.osd.mil/denix/Public/Legislation/EO/note34.html.

2.6. EO 12962 Recreational Fisheries (7 Jun 95). Directs each Federal agency to the extent permitted by law and *where practicable*, and in cooperation with States and tribes, improve the quantity, function, sustainable productivity, and distribution of US aquatic resources for increased recreational fishing opportunities.

2.7. EO 13112 Invasive Species (3 Feb 99). Establishes the National Invasive Species Council (see www.invasivespecies.gov). Directs that each Federal agency whose actions may affect the status of invasive species will, ***to the extent practicable*** and permitted by law (1) identify such actions; (2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them; and (3) not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species.

2.8. EO 13186 Responsibilities of Federal Entities to Protect Migratory Birds (10 Jan 01). Directs each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement, by 10 Jan 03, a Memorandum of Understanding (MOU) with the USFWS that will promote the conservation of migratory bird populations.

See https://www.denix.osd.mil/denix/Public/Legislation/EO/note76.html

1. Presidential Memorandum on Environmentally Beneficial Landscaping (26 Apr 94). The report of the National Performance Review contains recommendations for a series of environmental actions, including one to increase environmentally and economically beneficial landscaping practices at Federal facilities and Federally funded projects.

2. Department of Defense Documents.

2.1. DOD Directive 4165.59 (29 Dec 75). DOD Implementation of the Coastal Zone Management Act.

2.2. DOD Directive 4150.7 (22 Apr 96). DOD Pest Management Program.

2.3. DOD Directive 4700.4 (24 Jan 89). Natural Resources Management Program.

2.4. DOD Directive 4715.DD-R (Apr 96). Draft Integrated Natural Resources Management in DOD.

2.5. DOD Directive 4715.2 (3 May 96). DOD Regional Environmental Coordination.

2.6. DOD Directive 4715.3 (3 May 96). Environmental Conservation Program.

2.7. DOD Directive 6050.2 (19 Apr 79) (as amended). Use of Off-Road Vehicles on DOD Lands.

2.8. DOD Instruction 6055.6 (10 Oct 00). DOD Fire and Emergency Services Program.

2.9. DOD Instruction 4150.07 (29 May 08). DOD Pest Management Program DOD Instruction 4715.3 (3 May 96). Environmental Conservation Program.

2.10. DOD Instruction 4715.9 (3 May 96). Environmental Planning and Analysis.

3. U.S. Air Force Regulations: AFI32-7064, Integrated Natural Resources Management Plans.

4. Virginia Regulatory Guidance.

4.1. Virginia Department of Conservation and Recreation (VDCR). 2003. Virginia's Erosion and Sediment Control Program. http://www.dcr.state.va.us/sw/e&s.htm.

4.2. Virginia Department of Conservation and Recreation (VDCR). 1992. Virginia Erosion and Sediment Control Handbook. Third Edition. Richmond, Virginia.

4.3. Virginia Department of Forestry (VDOF). 2002. Forestry Best Management Practices for Water Quality in Virginia. Virginia Department of Forestry, Richmond, Virginia.

4.4. Virginia Administrative Code 9 VAC 25-210-10 et seq. Virginia Water Protection Individual and General Permit.

Annex B to FE INRMP
Environmental Impact Assessment Process

As discussed in Section 1.4, Environmental impacts of implementation, AFLOA/JACE recommends the Environmental Impact Assessment Process be completed for the projects cited in the INRMP rather than prepare EIAP documentation for the INRMP itself.

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Annex C to FE INRMP
Existing Conditions

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Appendix 1 to Annex C to FE INRMP
Soils

Soils Mapped on FE - General Characteristics

Soil Series	Map Unit	Approx Acres	Texture/ Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Altavista FSL, 0-2% slopes	1A	114	surface: FSL subsoil: SCL	moderately well drained	no	seasonal high water table; IIw	medium to broad stream terraces
Augusta FSL, 0-2% slopes	2A	146	surface: FSL subsoil: SCL	somewhat poorly drained	no	seasonal high water table; IIIw	stream terraces and broad flats
Axis VFSL	3A	2	surface: VFSL substratum: SL	very poorly drained	yes	tidal flooding; high salinity; low strength; VIIw	tidal marshes
Beaches, 2-6% slopes	4B	58	-	-	-	-	-
Bethera SiL, 0-2% slopes	5A	24	surface: SiL subsoil: CL	poorly drained	yes	seasonal high water table; ponding; slow permeability; VIw	upland flats and depressions
Bohicket mucky SiC, 0-2% slopes	6A	1424	surface: mucky SiC substratum: SiC	very poorly drained	yes	tidal flooding; low strength; high shrink swell; VIIIw	tidal marshes
Bojac SL, 0-2% slopes	7A	22	surface: SL subsoil: FSL	well drained	no	seasonal high water table; coarse texture; IIs	low stream terraces

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Soils Mapped on FE - General Characteristics

Soil Series	Map Unit	Approx Acres	Texture/ Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Chickahominy SiL, 0-2% slopes	9A	290	surface: SiL subsoil: SiCL	poorly drained	yes	seasonal high water table; very slow permeability; shrink swell potential; IVw	flats and in depressions on stream terraces
Craven-Uchee complex, 6-10% slopes	11C	6	Craven surface: L subsoil: SiC Uchee surface: LS subsoil: SCL	Craven moderately well drained Uchee well drained	no	seasonal high water table; slope; slow permeability; moderate shrink swell; IVe	narrow ridge tops
Dogue L, 0-2% slopes	12A	14	surface: L subsoil: CL, C	moderately well drained	no	seasonal high water table; shrink swell potential; IIw	broad ridges on terraces along rivers
Dragston FSL, 0-2% slopes	13A	50	surface: LFS subsoil: FSL	somewhat poorly drained	no	seasonal high water table; IIIw	broad low lying terraces
Emporia FSL, 2-6% slopes	14B	8	surface: FSL subsoil: SCL	well drained	no	moderate erosion hazard; low strength; moderate shrink swell; seasonal high water table; IIe	medium and broad upland terraces

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Soils Mapped on FE - General Characteristics

Soil Series	Map Unit	Approx Acres	Texture/ Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Emporia complex, 10-15% slopes	15D	114	surface: FSL subsoil: SCL	well drained	no	severe erosion hazard; slope; IVe	sideslopes along rivers, creeks, and drainage ways
Emporia complex, 15-25% slopes	15E	56	surface: FSL subsoil: SCL	well drained	no	severe erosion hazard; slope: VIe	sideslopes along rivers, creeks, and drainage ways
Emporia complex, 25-50% slopes	15F	216	surface: FSL subsoil: SCL	well drained	no	severe erosion hazard; slope; VIe	sideslopes along rivers, creeks, and drainage ways
Johnston complex	17	18	surface: mucky L substratum: LFS and FSL	well drained	yes	flooding; ponding; VIIw	floodplains and major drainage ways
Levy SiC	21	52	surface: SiC substratum: SiC	very poorly drained	yes	flooding; ponding; high shrink swell; VIIw	tidal marshes
Munden LFS, 0-2% slopes	22A	2	surface: FSL subsoil: SL	moderately well drained	no	seasonal high water table; IIw	ridges and depressions

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Soils Mapped on FE - General Characteristics

Soil Series	Map Unit	Approx Acres	Texture/ Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Newflat SiL, 0-2% slopes	23A	280	surface: SiL subsoil: CL	somewhat poorly drained	no	seasonal high water table; slow permeability; high shrink swell; IIIw	flats on river terraces
Nimmo FSL, 0-2% slopes	24A	2	surface: FSL subsoil: SL	poorly drained	yes	seasonal high water table; IVw	broad inland flats
Peawick SiL, 0-2% slopes	27A	244	surface: SiL subsoil: C	moderately well drained	no	seasonal high water table; high shrink swell; IIw	broad ridges of high stream terraces
Seabrook LFS, 0-2% slopes	28A	10	surface: LFS substratum: S	moderately well drained	no	seasonal high water table; sandy texture; IIIs	low terraces along drainageways
Slagle FSL, 0-2% slopes	29A	106	surface: FSL subsoil: L	moderately well drained	no	seasonal high water table; IIw	low lying terraces and sideslopes of uplands
State soils, 0-2% slopes	30A	1348	surface: SiL, L, or FSL subsoil: L	well drained	no	seasonal high water table; I	low lying terraces
Tetotum SiL, 0-2% slopes	32A	1382	surface: L subsoil: CL	moderately well drained	no	seasonal high water table; low strength; IIw	low lying river terraces

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Soils Mapped on FE - General Characteristics

Soil Series	Map Unit	Approx Acres	Texture/ Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Tomotley FSL, 0-2% slopes	33A	18	surface: FSL subsoil: CL	poorly drained	yes	seasonal high water table; IVw	broad flats
Udorthents, loamy	35	820	-	-	-	onsite characterization needed to determine uses and limitations	-
Udorthents-Dumps complex	36	114	-	-	-	onsite characterization needed to determine uses and limitations	-
Urban land	37	930	-	-	-	onsite characterization needed to determine uses and limitations	-
Yemassee FSL	38A	18	surface: FSL subsoil: SCL	somewhat poorly drained	no	seasonal high water table; IIw	broad low lying uplands

Source: Hodges R. L. and K.W. Molten, 1984.

Note: L=Loam LS=Loamy sand SiCL=Silty clay loam
SL=Sandy loam LFS=Loamy fine sand FSL=Fine sandy loam
SiL=Silt loam VFSL=Very fine sandy loam SiC=Silty clay

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HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Appendix 2 to Annex C to FE INRMP
Flora Recorded on FE

The following list of flora recorded on FE is based on the Plant Survey and Herbarium Collection Final Report (Terwilliger Consulting, 2001), Fort Eustis Timber Inventory and Forest Management Plan (Terwilliger Consulting, 2007) and the USACE-Norfolk District wetland delineation. The Specimen No. and Symbol USDA fields refer to actual specimens collected as part of the Plant Survey and Herbarium Collection Final Report.

Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Acer rubrum	213	Red Maple	Aceraceae	ACRU
Achillea millefolium	48	Yarrow	Asteraceae	ACMI2
Agalinis purpurea	163	Purple False Foxglove	Scrophulariaceae	AGPU5
Alisma subcordatum	73	American Water Plantain	Alismataceae	ALSU
Allium vineale	69	Field Garlic	Liliaceae	ALVI
Alnus serrulata	107	Common Alder	Betulaceae	ALSE2
Amelanchier stolonifera	3	Running Serviceberry	Rosaceae	AMST80
Amphicarpa bracteata	148	American Hogpeanut	Fabaceae	AMBR2
Anagallis arvensis	45	Scarlet Pimpernel	Primulaceae	ANAR
Apios americana	106	Groundnut	Fabaceae	APAM
Aralia spinosa	99	Devils Walking Stick	Araliaceae	ARSP2
Arisaema triphyllum	249	Jack in the Pulpit	Araceae	ARTR
Asclepias incarnata	93	Swamp Milkweed	Asclepiadaceae	ASIN
Asclepias lanceolata	63	Smooth Orange Milkweed	Asclepiadaceae	ASLA2
Asclepias syriaca	206	Common Milkweed	Asclepiadaceae	ASSY
Asimina triloba	224	Pawpaw	Annonaceae	ASTR
Asparagus officinalis	37	Garden Asparagus	Liliaceae	ASOF
Asplenium platyneuron	181	Ebony Spleenwort	Aspleniaceae	ASPL
Aster pilosus	161	Heath Aster	Asteraceae	ASPI2
Athyrium filix-femina	80	Common Ladyfern	Dryopteridaceae	ATFI
Baccharis halimifolia	144	Groundsel Tree	Asteraceae	BAHA
Bidens bipinnata	209	Spanish Needles	Asteraceae	BIBI7
Bidens frondosa	180	Sticktight or Beggar Ticks	Asteraceae	BIFR
Bidens polylepis	162	Beggar Ticks	Asteraceae	BIPO
Boehmeria cylindrica	94	False Nettle	Urticaceae	BOCY
Boltonia caroliniana	139	Carolina Doll's Daisy	Asteraceae	BOCA2
Botrychium dissectum var obliquum	154	Common Grape Fern	Ophioglossaceae	BODIO
Cackile edentula	147	American Searocket	Brassicaceae	CAED
Callicarpa americana	112	French Mulberry	Verbenaceae	CAAM2
Campsis radicans	221	Trumpet Creeper	Bignoniaceae	CARA2
Carex folliculata	67	Northern Long Sedge	Cyperaceae	CAFO6
Carex longii	214	Long's Sedge	Cyperaceae	CALO5
Carex lupulina	255	Hop Sedge	Cyperaceae	CALU4
Carex lurida	117	Shallow Sedge	Cyperaceae	CALU5
Carya cordiformis	166	Bitternut Hickory	Juglandaceae	CACO15
Carya tomentosa	182	Mockernut Hickory	Juglandaceae	CATO6

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Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Cassia nictitans	200	Partridge Pea	Fabaceae	CANI4
Celtis laevigata	137	Sugarberry	Ulmaceae	CELA
Celtis occidentalis	167	Hackberry	Ulmaceae	CEOC
Cephalanthus occidentalis	232	Buttonbush	Rubiaceae	CEOC2
Chaerophyllum tainturieri	12	Wild Chervil	Apiaceae	CHTA
Chenopodium ambrosioides	116	Mexican Tea	Chenopodiaceae	CHAM
Clematis dioscoreifolia	129	Clematis	Ranunculaceae	CLDI7
Clitoria mariana	54	Butterfly Pea	Fabaceae	CLMA4
Conyza canadensis var pusilla	179	Canadian Horseweed	Asteraceae	COCAP3
Cornus florida	4	Flowering Dogwood	Cornaceae	COFL2
Cryptotaenia canadensis	86	Canadian Honewort	Apiaceae	CRCA9
Cuscuta indecora	127	Common Dodder	Cuscutaceae	CUIN
Cuscuta pentagona	142	Five Angled Dodder	Cuscutaceae	CUPEP2
Cynodon dactylon	197	Bermudagrass	Poaceae	CYDA
Cynoglossum virginianum	228	Wild Comprey	Boraginaceae	CYVI
Cyperus pseudovegetus	177	Marsh Flatsedge	Cyperaceae	CYPS
Cyperus strigosus	158	Strawcolored Flatsedge	Cyperaceae	CYST
Cytisus scoparius	33	Scotch Broom	Fabaceae	CYSC4
Daucus carota	111	Queen Annes Lace	Apiaceae	DACA6
Decodon verticillatus	95	Swamp Loosestrife	Lythraceae	DEVE
Desmanthus illinoensis	75	Prairie Bundleflower	Fabaceae	DEIL
Digitaria sanguinalis	149	Flat Top Goldentop	Poaceae	DISA
Diodia teres	152	Poor Joe	Rubiaceae	DITE2
Diospyros virginiana	118	Persimmon	Ebenaceae	DIVI5
Draba verna	223	Spring Draba	Brassicaceae	DRVE2
Duchesnea indica	21	Indian Strawberry	Rosaceae	DUIN
Echinochloa crus-galli	169	Barnyard Grass	Poaceae	ECCR
Eclipta alba	130	False Daisy	Asteraceae	ECAL
Elaeagnus umbellata	122	Autumn Olive	Elaeagnaceae	ELUM
Eleocharis obtusa	91	Blunt Spikerush	Cyperaceae	ELOB2
Elephantopus carolinianus	202	Devil's Grandmother	Asteraceae	ELCA3
Elephantopus tomentosus	101	Devil's Grandmother or Elephant's-foot	Asteraceae	ELTO2
Elymus virginicus	76	Virginia Wildrye	Poaceae	ELVI3
Epifagus virginiana	159	Beech Drops	Orobanchaceae	EPVI2
Eragrostis pilosa	176	Indian Lovegrass	Poaceae	ERPI2
Erigeron philadelphicus	160	Philadelphia Fleabane	Asteraceae	ERPH
Erigeron pulchellus	61	Robin's Plaintain	Asteraceae	ERPU
Erigeron quercifolius	195	Overleaf Fleabane	Asteraceae	ERQU
Erigeron strigosus	109	Lesser Daisy Fleabane	Asteraceae	ERST3
Erigeron vernus	88	Early Whitetop Fleabane	Asteraceae	ERVE

Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Eupatorium coelestinum	85	Mist Flower	Asteraceae	EUCO6
Eupatorium hyssopifolium	135	Hyssop-leaved Throughwort	Asteraceae	EUHY
Eupatorium rotundifolium	90	Round Leaved Boneset	Asteraceae	EURO4
Eupatorium rugosum	134	White Snakeroot	Asteraceae	EURU6
Euphorbia chamaesyce	131		Euphorbiaceae	EUCH7
Euthamia graminifolia	150	Flat-top Goldentop	Asteraceae	EUGR5
Fagus grandifolia	216	American Beech	Fagaceae	FAGR
Galium circaezans	113	Licorice Bedstraw	Rubiaceae	GACI2
Galium tinctorium	193	Stiff Marsh Bedstraw	Rubiaceae	GATI
Geranium dissectum	13	Cranesbill	Geraniaceae	GEDI
Geum canadense	71	White Avens	Rosaceae	GECA7
Geum virginianum	77	Cream Avens	Rosaceae	GEVI4
Glecoma hederacea	23	Ground Ivy	Lamiaceae	GLHE2
Gnaphalium purpureum	26	Cudweed	Asteraceae	GNPU2
Gratiola neglecta	217	Clammy Hedgehyssop	Scrophulariaceae	GRNE
Hedera helix	184	English Ivy	Araliaceae	HEHE
Hexastylis virginica	18	Heartleaf Wild Ginger	Aristolochiaceae	HEVI3
Hibiscus moscheutos	205	Crimsoneyed Rosemallow	Malvaceae	HIMO
Houstonia caerulea	244	Azure Bluet	Rubiaceae	HOCA4
Houstonia pusilla	238	Tiny Bluet	Rubiaceae	HOPU3
Hydrocotyle umbellata	211	Marsh Pennywort	Apiaceae	HYUM
Hypericum gentianoides	140	Orangegrass	Clusiaceae	HYGE
Hypericum mutilum	192	Dwarf St. Johnswort	Clusiaceae	HYMU
Hypericum punctatum	82	Spotted St. Johnswort	Clusiaceae	HYPU
Hypochoeris radicata	27	Cats Ear	Asteraceae	HYRA3
Hypoxis hirsuta	123	Star Grass	Iridaceae	HYHI2
Ilex opaca	42	American Holly	Aquifoliaceae	ILOP
Ipomoea purpurea	38	Common Morning Glory	Convolvulaceae	IPPU2
Iva frutescens	207	Jesuit's Bark	Asteraceae	IVFR
Juglans nigra	128	Black Walnut	Juglandaceae	JUNI
Juncus diffusissimus	191	Slimpod Rush	Juncaceae	JUDI2
Juncus effusus	68	Common Rush	Juncaceae	JUEF
Juncus marginatus	173	Grassleaf Rush	Juncaceae	JUMA4
Juncus roemerianus	259	Needlegrass Rush or Blackneedle Rush	Juncaceae	JURO
Juniperus virginiana	257	Eastern Redcedar	Cupressaceae	JUVI
Krigia virginica	31	Dwarf Dandelion	Asteraceae	KRVI
Lamium amplexicaule	22	Henbit Deadnettle	Lamiaceae	LAAM
Lechea racemulosa	199	Illinois Pinweed	Cistaceae	LERA
Lespedeza bicolor	121	Schrubby Lespedeza	Fabaceae	LEBI2
Lespedeza cuneata	84	Chinese Lespedeza	Fabaceae	LECU
Lespedeza procumbens	59	Trailing Lespedeza	Fabaceae	LEPR
Lespedeza repens	208	Creeping Lespedeza	Fabaceae	LERE2
Lespedeza violacea	203	Violet Lespedeza	Fabaceae	LEVI6

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Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Leucanthemum lacustre	51	Portuguese Daisy	Asteraceae	LELA10
Ligustrum sinense	46	Chinese Privet	Oleaceae	LISI
Lindernia dubia	194	False Pimpernel	Scrophulariaceae	LIDU
Liquidambar styraciflua	30	Sweetgum	Hamamelidaceae	LIST2
Liriodendron tulipifera	215	Tuliptree	Magnoliaceae	LITU
Listera australis	220	Southern Twayblade	Orchidaceae	LIAU3
Lobelia cardinalis	78	Cardinal flower	Campanulaceae	LOCA2
Lobelia inflata	89	Indian Tobacco	Campanulaceae	LOIN
Lobelia puberula	133	Downy Lobelia	Campanulaceae	LOPU
Ludwigia leptocarpa	171	Seedbox	Onagraceae	LULE4
Luzula acuminata	236	Hairy Woodrush	Juncaceae	LUAC
Luzula bulbosa	235	Bulbous Woodrush	Juncaceae	LUBU
Lycopodium obscurum	155	Ground Pine	Lycopodiaceae	LYOB
Lythrum lineare	198	Wand Lythrum	Lythraceae	LYLI2
Malus angustifolia	53	Crabapple	Rosaceae	MAAN3
Matelea gonocarpa	96	Milkvine	Asclepiadaceae	MAGO
Mazus japonicus	20	Japanese Mazus	Scrophulariaceae	MAJA
Mecardonia acuminata	136	Axilflower	Scrophulariaceae	MEAC
Melilotus alba	70	White Sweetclover	Fabaceae	MEAL12
Melothria pendula	245	Creeping Cucumber	Curcurbitaceae	MEPE3
Microstegium virmineum	178	Nepalese Browntop	Poaceae	MIVI
Monotropa uniflora	7	Indian Pipe	Monotropaceae	MOUN3
Muscari racemosum	9	Grape hyacinth	Liliaceae	MURA2
Myosotis arvensis	229	Field Forget-me-not	Boraganinaceae	MYAR
Myrica cerifera	119	Wax Myrtle	Myricaceae	MYCE
Nothoscordum bivalve	16	False Garlic	Liliaceae	NOBI2
Nuttallanthus canadensis	239	Canada Toadflax	Scrophulariaceae	NUCA
Oenothera biennis	204	Common Evening-primrose	Onagraceae	OEBI
Onoclea sensibilis	28	Sensitive Fern	Dryopteridaceae	ONSE
Osmunda regalis L. var spectabilis	102	Royal Fern	Osmundaceae	OSRES
Oxalis dillenii	25	Wood Sorrel	Oxalidaceae	OXDI2
Oxalis stricta	190	Common Yellow Oxalis	Oxalidaceae	OXST
Oxalis violacea	52	Violet Wood Sorrell	Oxalidaceae	OXVI
Oxydendrum arboreum	185	Sourwood	Ericaceae	OXAR
Panicum amarum	253	Bitter Panicgrass	Poaceae	PAAM2
Panicum anceps	196	Beaked Panicgrass	Poaceae	PAAN
Paspalum dilatatum	97	Dallisgrass	Poaceae	PADI3
Passiflora incarnata	120	Passion Flower	Passifloraceae	PAIN6
Photinia pyrifolia	17	Red Chokeberry	Rosaceae	PHPY4
Phragmites australis	256	Common Reed	Poaceae	PHAU7
Phytolacca americana	104	American Pokeweed	Phytolaccaceae	PHAM4
Pinus taeda	212	Loblolly Pine	Pinaceae	PITA
Pinus virginiana	210	Scrub Pine	Pinaceae	PIVI2

Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Plantago lanceolata	56	Narrowleaf Plantain	Plantaginaceae	PLLA
Plantago major	132	Common Plantain	Plantaginaceae	PLMA2
Pluchea purpurascens	126	Marsh Fleabane or Sweetscent	Asteraceae	PLPU2
Polygonum arifolium	174	Halbred-leaved Tearthumb	Polygonaceae	POAR6
Polygonum cespitosum	175	Smartweed or Oriental Ladysthumb	Polygonaceae	POCE4
Polygonum persicaria	103	Smartweed or Spotted Ladysthumb	Polygonaceae	POPE3
Polygonum punctatum	188	Dotted Smartweed	Polygonaceae	POPU5
Polygonum sagittatum	172	Arrowleaf Tearthumb	Polygonaceae	POSA5
Polystichum acrostichoides	44	Christmas Fern	Dryopteridaceae	POAC4
Pontederia cordata	92	Pickerelweed	Pontederiaceae	POCO14
Populus alba	108	White Poplar	Salicaceae	POAL7
Potentilla canadensis	246	Dwarf Cinquefoil	Rosaceae	POCA17
Prunus serotina	10	Black Cherry	Rosaceae	PRSE2
Pteridium aquilinum	156	Bracken Fern	Dennstaedtiaceae	PTAQC
Ptilimnium capillaceum	74	Herb William	Apiaceae	PTCA
Pueraria lobata	260	Kudzu	Fabaceae	PULO
Quercus alba	164	White Oak	Fagaceae	QUAL
Quercus ilicifolia	187	Bear Oak	Fagaceae	QUIL
Quercus michauxii	186	Swamp Chestnut Oak	Fagaceae	QUMI
Quercus velutina	165	Black Oak	Fagaceae	QUVE
Ranunculus abortivus	234	Littleleaf Buttercup	Ranunculaceae	RAAB
Ranunculus bulbosus	6	Bulbous Buttercup	Ranunculaceae	RABU
Ranunculus parviflorus	247	Smallflower Buttercup	Ranunculaceae	RAPA3
Ranunculus sardous	58	Hairy Buttercup	Ranunculaceae	RASA
Rhexia mariana	55	Maryland Meadowbeauty	Melastomataceae	RHMA
Rhus copallina	138	Winged Sumac	Anacardiaceae	RHCOL
Rhus radicans	81	Poison Ivy	Anacardiaceae	RHRA6
Rhynchospora corniculata	189	Shortbristle Horned Beaksedge	Cyperaceae	RHCO2
Robinia pseudoacacia	5	Black Locust	Fabaceae	ROPS
Rosa multiflora	40	Multiflora Rose	Rosaceae	ROMU
Rosa palustris	66	Swamp Rose	Rosaceae	ROPA
Rubus allegheniensis	251	Allegheny Blackberry	Rosaceae	RUAL
Rumex conglomeratus	62	Dock	Polygonaceae	RUCO2
Rumex crispus	39	Curly Dock	Polygonaceae	RUCR
Sabatia angularis	250	Rosepink	Gentianaceae	SAAN
Sabatia stellaris	145	Rose of Plymouth	Gentianaceae	SAST5
Salix nigra	240	Black Willow	Salicaceae	SANI
Sambucus nigra var. canadensis	49	Elderberry	Caprifoliaceae	SANIC4
Sassafras albidum	222	Sassafras	Lauraceae	SAAL5
Saururus cernuus	8	Lizards Tail	Saururaceae	SACE
Schoenoplectus americanus	115	Chairmakers Bulrush	Cyperaceae	SCAM6
Schoenoplectus pungens	233	Common Three Square	Cyperaceae	SCPUP5
Scirpus atrovirens	98	Green Bulrush	Cyperaceae	SCAT2

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Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Scirpus cyperinus	124	Stalked Bulrush or Woolgrass	Cyperaceae	SCCY
Scleranthus annuus	230	German Knotgrass	Caryophyllaceae	SCAN2
Scutellaria integrifolia	60	Hyssop Skullcap	Lamiaceae	SCIN2
Senecio aureus	231	Golden Ragwort	Asteraceae	SEAU2
Sesuvium maritimum	143	Slender Seapurslane	Aizoaceae	SEMA3
Setaria glauca	168	Pearl Millet	Poaceae	SEGL8
Sherardia arvensis	14	Blue Fieldmadder	Rubiaceae	SHAR2
Silene latifolia	79	Bladder Campion	Caryophyllaceae	SILA21
Sisyrinchium mucronatum	43	Common Blue-eyed Grass	Iridaceae	SIMU3
Smilax bona-nox	34	Catbrier	Smilacaceae	SMBO2
Solanum carolinense	87	Carolina Horsenettle	Solanaceae	SOCA3
Solidago pinetorum	100	Small's Goldenrod	Asteraceae	SOPI
Solidago speciosa var. erecta	227	Showy Goldenrod	Asteraceae	SOSPE
Sonchus asper	32	Spiny Sowthistle	Asteraceae	SOAS
Sorghum halepense	183	Johnsongrass	Poaceae	SOHA
Spartina alterniflora	258	Smooth Cordgrass	Poaceae	SPAL
Spartina cynosuroides	226	Big Cordgrass	Poaceae	SPCY
Spartina patens	151	Saltmeadow Cordgrass	Poaceae	SPPA
Strophostyles helvula	146	Trailing Fuzzybean	Fabaceae	STHE4
Taraxacum officinale	254	Dandelion	Asteraceae	TAOF
Teucrium canadense	57	American germander	Lamiaceae	TECA3
Thelypteris hexagonoptera	157	Broad Beech Fern	Thelypteridaceae	THHE
Tipularia discolor	105	Crippled Cranefly	Orchidaceae	TIDI
Trichostema dichotomum	125	Blue Curls	Lamiaceae	TRDI2
Trifolium arvense	110	Rabbitfoot Clover	Fabaceae	TRAR4
Trifolium campestre	248	Low Hop Clover	Fabaceae	TRCA5
Trifolium incarnatum	35	Crimson Clover	Fabaceae	TRIN3
Trifolium pratense	83	Red Clover	Fabaceae	TRPR2
Triodanis perfoliata	219	Clasping Venus' Looking-glass	Campanulaceae	TRPE4
Tripsacum dactyloides	201	Eastern Gamagrass	Poaceae	TRDA3
Typha angustifolia	65	Narrowleaf Cattail	Typhaceae	TYAN
Typha latifolia	64	Cattail	Typhaceae	TYLA
Ulmus americana	218	American Elm	Ulmaceae	ULAM
Vaccinium arboreum	2	Farkleberry	Ericaceae	VAAR
Vaccinium tenellum	1	Small Black Blueberry	Ericaceae	VATE3
Valerianella locusta	15	Lewiston Cornsalad	Valerianaceae	VALO
Valerianella radiata	24	Beaked Cornsalad	Valerianaceae	VARA
Verbascum blattaria	50	Moth Mullein	Scrophulariaceae	VEBL
Verbascum thapsus	29	Common Mullein	Scrophulariaceae	VETH
Verbena bonariensis	41	Purpletop Vervain	Verbenaceae	VEBO
Verbesina occidentalis	72	Yellow Crownbeard	Asteraceae	VEOC
Verbesina virginica	141	White Crownbeard	Asteraceae	VEVI3
Veronica peregrina	225	Neckweed	Scrophulariaceae	VEPE2

Scientific Name	Specimen No.	Common Name	Family	Symbol USDA
Veronica serpyllifolia	19	Thymeleaf Speedwell	Scrophulariaceae	VESE
Vicia angustifolia	243	Garden Vetch	Fabaceae	VIAN
Vicia hirsuta	47	Tiny Vetch	Fabaceae	VIHI
Vicia sativa	11	Garden Vetch	Fabaceae	VISA
Viola affinis	241	Sand Violet	Violaceae	VIAF2
Viola bicolor	237	Field Pansy	Violaceae	VIBI
Viola papilionacea	242	Common Blue Violet	Violaceae	VIPA5
Viola septemloba	252	Southern Coastal Violet	Violaceae	VISE4
Vitis vulpina	114	Frost Grape	Vitaceae	VIVU
Wisteria frutescens	36	Wisteria	Fabaceae	WIFR
Woodwardia areolata	170	Netted Chainfern	Blechnaceae	WOAR
Xanthium strumarium	153	Rough Cocklebur	Asteraceae	XAST

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Appendix 3 to Annex C to FE INRMP
Mammals Observed on FE

Scientific Name	Common Name
Marsupials	
Didelphis virginianus virginianus	Virginia opossum
Insectivores	
Blarina carolinensis carolinensis	Short-tailed shrew
Cryptotis parva	Least shrew
Myotis lucifugus	Little brown bat
Perymyotis subflavus	Tricolored bat
Myotis sodalis	Indiana bat
Myotis septentrionalis	Northern long-eared bat
Eptesicus fuscus	Big brown bat
Lasiurus borealis	Eastern red bat
Lasiurus cinereus	Hoary bat
Nycticeius humeralis	Evening bat
Lasionycteris noctivigans	Silver-haired bat
Myotis austroriparius	Southeastern myotis
Tadarida brasiliensis	Mexican free-tailed bat
Lasiurus intermedius	Northern yellow bat
Sorex longirostris longirostris	Southeastern shrew
Scalopus aquaticus	Eastern mole
Rodents	
Castor canadensis	Beaver
Glaucomys volans	Southern flying squirrel
Marmota monax	Groundhog
Microtus pennsylvanicus	Meadow vole
Mus musculus	House mouse
Ondatra zibethica macrodon	Muskrat
Oryzomys palustris palustris	Marsh rice rat
Peromyscus gossypinus	Cotton mouse
Peromyscus leucopus	White-footed mouse
Peromyscus nuttallli	Golden mouse
Sciurius carolinensis	Eastern gray squirrel
Lagomorphs	
Sylvilagus floridana mallurus	Eastern cottontail rabbit
Carnivores	
Lutra canadensis	Otter
Procyon lotor	Raccoon
Urocyon cinereoargenteus	Gray fox
Vulpes vulpes fulva	Red fox

Canis lutrans	Coyote
Ursus americanus	American black bear
Lynx rufus	Bobcat
Ungulates	
Odocoileus virginiana	White-tailed deer
Additional Species	
Neovison vison	American mink

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Appendix 4 to Annex C to FE INRMP
Birds Observed on FE

Scientific Name	Common Name
Order Anseriformes	
Aix sponsa	Wood duck
Anas acuta	Northern pintail
Anas americana	American widgeon
Anas clypeata	Northern shoveler
Anas crecca	Green-winged teal
Anas discolor	Blue-winged teal
Anas platyrhynchos	Mallard
Anas rubripes	American black duck
Anas strepera	gadwall
Aythya affinis	Lesser scaup
Aythya americana	Redhead
Aythya collaris	Ring-necked duck
Aythya marila	Greater scaup
Aythya valisineria	Canvasback
Botaurus lentiginosus	American bittern
Branta canadensis	Canada goose
Bubulcus ibis	Cattle egret
Bucephala albeola	Bufflehead
Bucephala clangula	Common goldeneye
Clangula hyemalis	oldsquaw
Cygnus columbianus	Tundra swan
Cygnus olor	Mute swan
Egretta thula	Snowy egret
Ixobrychus exilis	Least bittern
Lophodytes cucullatus	Hooded merganser
Mergus serrator	Red-breasted merganser
Nycticorax violaceus	Yellow-crowned night-heron
Oxyura jamaicensis	Ruddy duck

Scientific Name	Common Name
Order Pelecaniformes	
Gavia immer	Common loon
Phalacrocorax auritis	Double-crested cormorant
Podiceps grisegena	Red-necked grebe
Podiceps auritus	Horned grebe
Podilymbus podiceps	Pied-billed grebe
Order Charadriiformes	
Actitis macularia	Spotted sandpiper
Arenaria interpres	Ruddy turnstone
Calidris alba	Sanderling
Calidris alpina	Dunlin
Calidris fuscicollis	White-rumped sandpiper
Calidris himantopus	Stilt sandpiper
Calidris mauri	Western sandpiper
Calidris melanotos	Pectoral sandpiper
Calidris minutilla	Least sandpiper
Calidris pusilla	Semipalmated sandpiper
Charadrius semipalmatus	Semipalmated plover
Charadrius vociferous	Killdeer
Chlidonias niger	Black tern
Gallinago gallinago	Common snipe
Larus atricilla	Laughing gull
Larus delawarensis	Ring-billed gull
Larus fuscus	Lesser black-backed gull
Larus marinus	Great black-backed gull
Larus philadelphia	Bonaparte's gull
Limnodromus griseus	Short-billed dowitcher
Limnodromus scolopaceus	Long-billed dowitcher
Phalaropus tricolor	Wilson's phalarope
Porzana Carolina	Sora rail
Rallus longirostris	Clapper rail
Rallus limicola	Virginia rail
Scolopax minor	American woodcock
Sterna caspia	Caspian tern
Sterna forsteri	Forster's tern
Sterna hirundo	Common tern

Scientific Name	Common Name
Sterna maxima	Royal tern
Tringa flavipes	Lesser yellowlegs
Tringa melanoleuca	Greater yellowlegs
Tringa solitaria	Solitary sandpiper
Order Ciconiiformes	
Ardea herodias	Great blue heron
Butorides striatus	Green heron
Ardea alba	Great egret
Order Coraciiformes	
Ceryle alcyon	Belted kingfisher
Order Falconiformes	
Accipiter cooperii	Cooper's hawk
Accipiter striatus	Sharp-shinned hawk
Buteo jamaicensis	Red-tailed hawk
Buteo lineatus	Red-shouldered hawk
Circus cyaneus	Northern harrier
Falco columbarius	Merlin
Falco sparverius	American kestrel
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey
Order Galliformes	
Colinus virginianus	Northern bobwhite
Gallinula chloropus	Common moorhen
Meleagris gallopavo	Wild turkey
Order Apodiformes	
Archilochus colubris	Ruby-throated hummingbird
Chaetura pelagica	Chimney swift
Order Passeriformes	
Agelaius phoeniceus	Red-winged blackbird
Ammodramus leconteii	LeConte's sparrow
Baeolophus bicolor	Tufted titmouse
Bombycilla cedrorum	Cedar waxwing
Cardinalis cardinalis	Northern cardinal
Carduelis pinus	Pine siskin
Carpodacus mexicanus	House finch
Carpodacus purpureus	Purple finch

Scientific Name	Common Name
Catharus guttatus	Hermit thrush
Certhia Americana	Brown creeper
Cistothorus palustris	Marsh wren
Cistothorus platenis	Sedge wren
Coccyzus americanus	Yellow-billed cuckoo
Cyanocitta cristata	Blue jay
Dendroica caerulescens	Black-throated blue warbler
Dendroica coronata	Yellow-rumped warbler
Dendroica dominica	Yellow-throated warbler
Dendroica discolor	Prairie warbler
Dendroica magmolia	Magnolia warbler
Dendroica palmarum	Palm warbler
Dendroica petechia	Yellow warbler
Dendroica pinus	Pine warbler
Dendroica striata	Blackpoll warbler
Dumetella carolinensis	Gray catbird
Euphagus carolinus	Rusty blackbird
Geothlypis trichas	Common yellowthroat
Guiraca caerulea	Blue grosbeak
Hirundo rustica	Barn swallow
Icteria virens	Yellow-breasted chat
Icterus galbula	Baltimore oriole
Icterus spurius	Orchard oriole
Junco hyemalis	Dark-eyed junco
Melospiza Georgiana	Swamp sparrow
Melospiza melodia	Song sparrow
Molothrus ater	Brown-headed cowbird
Mniotilta varia	Black-and-white warbler
Order Passeriformes	
Myiarchus crinitus	Great crested flycatcher
Quiscalus quiscula	Common grackle
Parula americana	Northern parula
Passer domesticus	House sparrow
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Passerina cyanea	Indigo bunting

Scientific Name	Common Name
Pheucticus ludovicianus	Rose-breasted grosbeak
Pipilo erythrophthalmus	Eastern towhee
Piranga olivacea	Scarlet tanager
Piranga rubra	Summer tanager
Poecile carolinensis	Carolina chickadee
Polioptila caerulea	Blue-gray gnatcatcher
Pooecetes gramineus	Vesper sparrow
Progne subis	Purple martin
Protonotaria citrea	Prothonotary warbler
Regulus calendula	Ruby-crowned kinglet
Riparia riparia	Bank swallow
Sayornis phoebe	Eastern phoebe
Setophaga ruticilla	American redstart
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern waterthrush
Sialis sialis	Eastern bluebird
Sitta carolinensis	White-breasted nuthatch
Sitta eanadenis	Red-breasted nuthatch
Sitta pygmaia	Brown-headed nuthatch
Spizella passerina	Chipping sparrow
Spizella pusilla	Field sparrow
Stelgidopteryx serripennis	Northern rough-winged swallow
Sturnus vulgaris	European starling
Tachycineta bicolor	Tree swallow
Thryothorus ludovicianus	Carolina wren
Toxostoma rufum	Brown thrasher
Troglodytes aedon	House wren

Scientific Name	Common Name
Order Passeriformes	
Troglodytes troglodytes	Winter wren
Turdus migratorius	American robin
Tyrannus tyrannus	Eastern kingbird
Vireo griseus	White-eyed vireo
Vireo olivaceous	Red-eyed vireo
Vireo solitarius	Solitary vireo
Vermivora celata	Orange-crowned warbler
Wilsonia pusilla	Wilson's warbler
Order Piciformes	
Colaptes auratus	Northern flicker
Dryocopus pileatus	Pileated woodpecker
Melanerpes erythrocephaluss	Red-headed woodpecker
Picoides villosus	Hairy woodpecker
Picoides pubescens	Downy woodpecker
Melanerpes carolinus	Red-bellied woodpecker
Sphyrapicus varius	Yellow-bellied sapsucker
Order Strigiformes	
Bubo virginianus	Great horned owl
Strix varia	Barred owl
Megascops asio	Eastern screech owl
Order Cuculiformes	
Coccyzus americanus	Yellow-billed cuckoo
Order Caprimulgiformes	
Antrostomus carolinensis	Chuck Will's Widow

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Appendix 5 to Annex C to FE INRMP
Fish and Shellfish Observed on FE

Fish		Location	
Common	**Scientific Name**	**James River**	**Eustis Lake**
American eel	*Anguilla rostrata*	X	
Atlantic thread herring	*Iopisthonema oglinum*	X	
Atlantic croaker	*Micropogonias undulates*	X	
Atlantic silverside	*Menidia menidia*	X	
Bay anchovy	*Anchoa mitchilli*	X	
Black crappie	*Pomoxis nigromaculatus*		X
Blackcheek tonguefish	*Symphurus plagiusa*	X	
Bluefish	*Pomatomus saltatrix*	X	
Bluegill	*Lepomis machochives*		X
Bowfin	*Amia calva*		X
Brown bullhead	*Ameiurus nebulosus*		X
Channel catfish	*Ictalurus punctatus*		X
Common carp	*Cyprinus carpio*	X	X
Golden shiner	*Notemigonus crysoleucas*		X
Gizzard shad	*Dorosoma cepedianum*	X	X
Hogchokeer	*Reinectes maculates*	X	
Inshore lizqrdfish	*Synodus foetens*	X	
Largemouth bass	*Microjpterus solmoides*		X
Mosquitofish	*Gambusia affinis*		X
Northern kingfish	*Menticirrhus saxatillis*	X	
Pumpkinseed	*Lepomis gibbosus*		X
Red ear sunfish	*Lepommis microlophus*		X
Rough silverside	*Membras martinica*	X	
Spot	*Leiostomus xanthurus*	X	
Striped anchovy	*Anchoa hepsetus*	X	
Striped killifish	*Fundulus majalis*	X	
Striped bass	*Morone saxatillis*	X	
Weakfish	*Cynoscion regalsi*	X	
White catfish	*I. catus*		X
White crappie	*Pomoxis annularis*		X
White mullet	*Mugil curema*	X	
White perch	*Morone Americana*	X	X
Yellow Bullhead	*Ameriurus natalis*		X

Shellfish*		**Location**	
Common	**Scientific Name**	**James River**	**Eustis Lake**
Eastern floater mussel	*Anodonta cataracta cataracta*		**X**
Eastern elliptio mussel	*Elliptio complanata*		**X**
Crayfish (3 species)	*Cambarus bartonii bartonii*		**X**
	C. robustus		**X**
	Orconectes immunis		**X**
American oysters	*Crassostrea virginica*	**X**	**X**
Blue crabs	*Callinectes sapidus*	**X**	**X**

* Inventory data on invertebrate fauna is limited. Extensive inventories of insects and to a lesser extent arachnids have been prepared but both groups require additional examination. Other aquatic and terrestrial arthropods, molluscs, aquatic and terrestrial crustaceans, and annelids remain essentially insufficiently assessed.

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Appendix 6 to Annex C to FE INRMP
Reptiles and Amphibians Observed on FE

Scientific Name	Common Name	Known Occurrence	New Observation (name and date)
Amphibians			
Salamanders			
Ambystoma opacum	Marbled salamander	X	
Notophthalmus viridescens	Red-spotted newt	X	
Plethodon cinereus	Red-backed salamander (red & lead-phases)	X	
Frogs and Toads			
Acris spp	Cricket frog	X	
Gastrophryne carolinensis	Eastern narrow-mouthed toad	X	
Hyla chrysoscelis	Cope's gray treefrog	X	
Hyla cinerea	Green treefrog	X	
Pseudacris crucifer	Northern spring peeper	X	
Pseudacris feriarum	Upland chorus frog	X	
Lithobates catesbeianus	American bullfrog	X	
Lithobates clamitans	Green frog	X	
Lithobates palustris	Pickerel frog	X	
Lithobates sphenocephalus	Coastal Plains Leopard frog	X	
Hyla squirrella	Squirrel treefrog	X	
Anaxyrus fowleri	Fowler's toad	X	
Reptiles			
Turtles			
Chelydra serpentina	Snapping turtle	X	
Chrysemys picta picta	Eastern painted turtle	X	
Clemmys guttata	Spotted turtle	X	
Kinosternon subrubrum	Southeastern mud turtle	X	
Psudemys rubriventris	Northern red-bellied cooter	X	
Sternotherus odoratus	Eastern musk turtle (stinkpot)	X	
Trachemys scripta scripta	Yellow-bellied slider	X	
Trachemys scripta elegans	Red-eared slider	X	
Malaclemys terrapin terrapin	Northern diamond-back terrapin	X	

Terrapene carolina carolina	Woodland box turtle	X	
Snakes			
Carphophis amoenus amoenus	Eastern wormsnake	X	
Coluber constrictor constrictor	Northern black racer	X	
Diadophis punctatus	Ring-necked snake	X	
Pantherophis alleghaniensis	Eastern ratsnake	X	
Lampropeltis getula	Eastern kingsnake	X	
Nerodia sipedon	Northern watersnake	X	
Opheodrys aestivus	Rough greensnake	X	
Thamnophs sauritus	Eastern ribbon snake	X	
Thamnophs sirtalis	Eastern garter snake	X	
Storeria dekayi	Northern brownsnake	X	
Lizards			
Plestiodon fasciatus	Common five-lined skink	X	
Plestiodon laticeps	Broad-headed skink	X	
Scincella lateralis	Little brown skink	X	

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Appendix 7 to Annex C to FE INRMP
Insects, Other Arthropods & Other Invertebrates Observed on FE

1. General. Invertebrate fauna represent a highly significant group of organisms in relation to ecosystem management. Arthropods constitute the predominant group of invertebrates documented at JBLE-E. Inventories of other invertebrates particularly molluscs and annelids are extremely limited. Insects and several arachnid taxa represent the majority of the inventory. Not surprisingly, Coleoptera, Hymenoptera, Lepidoptera, and Diptera comprise the largest documented orders. Odonata are common as expected; however, this group did not receive as much attention and more data is needed. Megaloptera is expected but also requires more attention. Only one ephemeropteran was observed, and Plecoptera remains undocumnented. Trichoptera was reported only at the order level. Ephemeroptera, Plecoptera and Trichoptera may be limited due to the minimal availability of suitable freshwater habitats. The classes Protura, Collembola and Diplura remain undocumented. Araneae and Ixodida are well represented but additional inventory is needed. Decapoda, other crustaceans, Chilopoda, and Diplopoda as well as Opiliones are also limited and require considerable review. Insects, though well represented, warrant continuous examination due to their vast diversity and subsequent relationships in the installation ecosystem as well as establishment of invasive taxa of this class warrants continuous examination (including but not limited to forest pests and some other arthropods such as ticks) as well as native fauna that affect the ecosystem.

2. Data sources:

A. An Inventory of Insect and Medically Important Arthropod Taxa at Joint Base Langley-Eustis, Fort Eustis, Virginia (Christensen, February 2014).

B. Forest Insect Survey at Joint Base Langley-Eustis, Fort Eustis, Virginia, by A. Evans (Parsons, December 2015).

C. Tick & Tick-Borne Disease Threat Assessment (USA Public Health Command and the College of William & Mary, 2007-2018 which includes bird and mammalian host surveys).

D. 2017 Mosquito Species Inventory (Christensen, 2017).

E. Planning Level Surveys for Amphibians and Reptiles, Mammals, Birds, and Fish, As Well As Pest Insects and Invasive Plants at FE, Virginia in 2004-2005 (Versar, August 2006).

F. Data from previous INRMPs.

G. Annual records/observations.

H. Integrated pest management reports.

I. Historical collections and photographs.

3. Invertebrate inventories.

A. Consolidated Invertebrate Inventory Categories as of 2018 (Phylum Arthropoda is represented in A(1) – (5), Phylum Mollusca is represented in A(6), and Phylum Annelida is represented in A(7)).

(1) Class Insecta (Insects).

Orders (18)	Families	Genera	Species
Blattodea (Cockroaches & Termites)	3	4	2
Coleoptera (Beetles)	45	158	174
Dermaptera (Earwigs)	2	2	2
Diptera (True Flies)	19	23	43
Ephemeroptera (Mayflies)	1		
Hemiptera (True Bugs, Cicadas, Hoppers, Aphids & Allies)	18	22	23
Hymenoptera (Bees, Wasps, Hornets, Sawflies & Ants)	18	33	28
Lepidoptera (Butterflies, Moths & Skippers)	18	79	93
Mantodea (Mantids)	1	1	1
Mecoptera (Scorpionflies, Hangingflies & Allies)	1		
Megaloptera (Alderflies, Dobsonflies & Fishflies)	2	1	2
Microcoryphia (Bristletails)	1		
Neuroptera (Antlions, Owlflies, Lacewings & Mantidflies)	4	2	
Odonata (Dragonflies & Damselflies)	5	3	
Orthoptera (Grasshoppers, Katydids & Crickets)	5	7	2
Phasmida (Stick Insects)	1		
Psocodea (Barklice, Booklice & Parasitic Lice)	1	1	1
Trichoptera (Caddisflies)			
	145	335	371

(2) Class Arachnida (Arachnids).

Orders (6)	Families	Genera	Species
Aranae (Spiders)	13	16	15
Mesostigmata (Mites)	2	2	2
Trombidiformes (Mites)	2	3	
Ixodida (Ticks)	1	4	6
Opiliones (Harvestmen, Daddy longlegs)	1	1	
Pseudoscorpiones (Pseudoscorpions)			
	20	27	24

(3) Subphylum Crustacea/Class Malacostraca.

Orders	Families	Genera	Species
2	4	5	6

(4) Class Diplopoda (Millipedes).

Orders	Families	Genera	Species
2	3	1	1

(5) Class Chilopoda (Centipedes).

Orders	Families	Genera	Species
2	1	1	1

(6) Phylum: Mollusca/Class: Bivalvia (Molluscs).

Orders	Families	Genera	Species
1	1	2	2

(7) Phylum Annelida/Class: Clitellata (Segmented worms).

Orders	Families	Genera	Species
2	2	1	1

Class Insecta (Insects).

1. Blattodea (Cockroaches and termites).

Blattidae.
Eurycotis
Parcoblatta
Periplaneta americana

Ectobiidae.
Blattella germanica

Rhinotermidae? (Subterranean Termites).

2. Order Coleoptera (Beetles).

Aderidae (Ant-like Leaf Beetles).
Zonantes subfasciatus

Alleculidae? (Comb-clawed Beetles).

Anthribidae (Fungus Weevils).
Euparius marmoreus

Archeocrypticidae (Cryptic Fungus Beetles).

Buprestidae (Metallic Wood-boring Beetles).
Acmaeodera ornata
Acmaeodera tubulus
Agrilus celti
Agrilus ruficollis
Brachys aeruginosus
Brachys floricola
Buprestis apricans
Buprestis lineata?
Buprestis maculipennis
Buprestis rufipes
Chrysobothris femorata
Chrysobothris orono
Dicerca juncea (new state record when observed 2015)
Dicerca lepida
Dicerca lurida
Dicerca obscura
Pachyschelus laevigatus
Paragrilus tenuis
Spectralia gracilipes
Taphrocerus howardi

Cantharidae (Soldier Beetles).
Chauliognathus pensylvanicus
Discodon planicolle

Carabidae (Ground Beetles).
Acupalpus
Acupalpus pauperculus
Amphasia interstitialis
Anisodactylus nigerrimus
Bradycellus badipennis
Calosoma
Calosoma scrutator
Cicindela sexguttata
Cymindis platicollis
Stenolophus ochropezus

Cerambycidae (Long-horned Beetles).

Acanthocinus nodosus
Acanthocinus obsoletus
Aegomorphus morrisii
Anelaphus parallelus
Anelaphus villosus
Arhopalus rusticus?
Asemum
Asemum striatum
Astylopsis arcuata
Astylopsis sexguttata
Ataxia crypta
Cyrtophorus verrucosus
Eburia quadrigeminata
Elaphidion mucronatum
Elytrimitatrix undata
Enaphalodes atomarius
Enaphalodes rufulus
Eburia quadrigeminata
Euderces pini
Eupogonius tomentosus
Gaurotes cyanipennis
Graphisurus fasciatus
Leptostylus asperatus?
Mallodon dasystomus
Molorchus bimaculatus
Monochamus caroliniensis
Monochamus titillator?
Neandra brunnea
Neoalosterna capitata
Neoclytus acuminatus
Neoclytus scutellaris
Oberea reipunctata
Oberea tripunctata
Orthosoma brunneum
Parelaphidion incertum
Phymatodes amoenus
Prionus imbricornis
Prionus laticollis
Prionus pocularis
Psenocerus supernotatus
Rhagium inquisitor
Smodicum cucujiforme
Sphenostethus taslei
Strangalia famelica

Strangalia luteicornis
Styloleptus biustus
Tessaropa tenuipes
Typocerus acuticauda
Typocerus zebra
Xylotrechus colonus
Xylotrechus convergens
Xylotrechus sagittatus
Xylotrechus schaefferi

Chelonariidae (Turtle Beetles).
Chelonarium lecontei

Chrysomelidae (Leaf Beetles).
Altica chalybea
Donacia
Exema elliptica
Labidomera clivicollis

Cleridae (Checkered Beetles).
Enoclerus
Enoclerus nigripes
Phyllobaenus corticinus?
Thanasimus dubius

Coccinellidae (Lady Beetles).
Harmonia axyridis

Cucujidae (Flat Bark Beetles).
Cucujus clavipes

Curculionidae (Snout & Bark Beetles).
Ambrosiodmus
Ambrosiodmus obliquus
Carphoborus bicornus
Cnesinus strigicollis
Cnestus mutilatus
Curculio
Cyclorhipidion bodoanum
Dendroctonus terebrans
Dryophthorus americanus
Dryoxylon onoharaensis
Euplatypus compositus
Euwallacea validus
Gnathotrichus materiarius

Hylastes porculus
Hylastes salebrosus
Hylastes tenuis
Hylesinus aculeatus
Hylesinus fasciatus
Hylobius pales
Hylocurus langstoni
Hylurgops pinifex
Hypothenemus
Ips grandicollis
Monarthrum fasciatum
Myoplatypus flavicornis
Naupactus cervinus
Orthotomicus caelatus
Otiorhynchus sulcatus
Oxoplatypus quadridentatus
Pachylobius picivorus
Pissodes
Pityophthorus
Pseudopityophthorus minutissimus
Pseudothysanoes lecontei
Stenoscelis brevis
Thysanoes
Xyleborinus saxesenii
Xyleborus
Xyleborus celsus
Xyleborus pubescens
Xylosandrus crassiusculus
Xylosandrus germanus

Disteniidae.

Dytiscidae.
Dytiscus

Elateridae (Click Beetles).
Alaus myops
Alaus oculatus
Ampedus nigricollis
Lacon
Lacon discoideus
Orthostethus infuscatus

Endomychidae (Handsome Fungus Beetles).
Rhanidea unicolor

Erotylidae? (Pleasing Fungus Beetles).

Eucinetidae? (Plate-thigh Beetles).

Eucnemidae (False Click Beetles).

Geotrupidae (Earth-Boring Scarab Beetles).
Bolbocerosoma farctum

Histeridae (Clown Beetles).
Platysoma leconti

Hybosoridae (Scavenger Scarab Beetles).
Hybosorus illigeri

Hydrophilidae (Water Scavenger Beetles).

Laemophloeidae (Lined Flat Bark Beetles).
Charaphloeus convexulus

Lampyridae (Fireflies).
Ellychnia corrusca

Latridiidae (Minute Brown Scavenger Beetles).
Corticaria

Melandryidae (False Darkling Beetles).

Meloidae (Blister Beetles).
Epicauta funebris
Lytta aenea
Meloe

Monotomidae (Root-eating Beetles).
Rhizophagus

Nitidulidae (Sap-feeding Beetles).
Aethina tumida

Oedemeridae (False Blister Beetles).

Passalidae (Bess Beetles).
Odontotaenius disjunctus

Ptilodactylidae (Toe-winged Beetles).
Ptilodactyla

Ptinidae (Death-watch and Spider Beetles).
Ptinus bimaculatus

Rhysodidae (Wrinkled Bark Beetles).
Omoglymmius americanus

Scarabaeidae (Scarab Beetles).
Ataenius
Canthon
Cotinus nitida
Deltochilum gibbosum
Dyscinetus morator
Dynaste tityus
Gnorimella maculosa
Hoplia trivialis
Pelidnota punctata
Phanaeus vindex
Phileurus truncatus
Phyllophaga
Plectris aliena?
Popillia japonica
Trigonopeltastes delta
Valgus
Valgus canaliculatus?
Valgus seticollis
Xyloryctes jamaicensis

Scirtidae (Marsh Beetles).
Cyphon (genus changed to *Contacyphon*?)

Silphidae (Carrion Beetles).
Necrodes surinamensis
Necrophila americana
Nicrophorus tomentosus
Oiceoptoma inaequale
Oiceoptoma noveboracense

Sylvanidae (Silvanid Flat Bark Beetles).
Silvanus

Staphylinidae (Rove Beetles).
Arpedium

Asclera ruficollis
Creophilus maxillosus
Hesperus apicialis?
Platydracus exulans?
Sepedophilus

Tenebrionidae (Darkling Beetles).
Alobates pennsylvanica

Trogossitidae (Bark-gnawing Beetles).
Temnoscheila virescens
Tenebroides collaris
Tenebroides corticalis
Tenebroides

Zopheridae (Ironclad Beetles).
Microsicus parvulus

3. Dermatoptera (Earwigs).
Carcinophoridae? / Anisolabididae
Euborellia annulipes

Forficulidae
Forficula auricularia

4. Diptera (True flies).

Asilidae (Robber Flies).
Diogmites
Efferia
Promachus

Bibionidae (March Flies).

Bombyliidae (Bee Flies).
Xenox tigrinus

Calliphoridae (Blow Flies).
Lucilia

Ceratopogonidae (Biting Midges).
Culicoides

Chironomidae (Midges).

Culicidae (Mosquitoes).

Aedes
Aedes albopictus
Aedes (Ochlerotatus) c. canadensis
Aedes cinereus
Aedes hendersoni
Aedes j. japonicas
Aedes sollicitans
Aedes taeniorhynchus
Aedes triseriatus
Aedes trivittatus?
Aedes vexans
Anopheles
Anopheles quadrimaculatus
Anopheles bradleyi
Anopheles crucians
Anopheles punctipennis
Coquillettidia perturbans
Culex
Culex erraticus
Culex nigripalpus
Culex pipiens
Culex pipiens-quinquefasciatus
Culex restuans
Culex salinarius
Culex territans
Culiseta impatien
Culiseta inornata
Orthopodomyia
Orthopodomyia signifera
Psorophora
Psorophora ciliata
Psorophora columbiae
Psorophora ferox
Psorphora mathesoni?
Uranotaenia sapphirine

Drosophilidae (Vinegar Flies).

Drosophila suzukii

Muscidae (House Flies & Kin).

Musca domestica

Mydidae (Mydas Flies).

Oestridae (Bot Flies).
Cephenemyia phobifer

Rhagionidae (Snipe Flies).
Chrysopilus thoracicus

Sarcophagidae (Flesh Flies).

Syrphidae (Syrphid Flies).
Mallota
Meromacrus

Tabanidae (Horse, Yellow and Deer Flies).
Chrysops
Chrysops dimmocki
Diachlorus ferrugatus
Tabanus
Tabanus atratus?
Tabanus fusciocostatus
Tabanus lineola
Tabanus nigrovittatus
Tabanus stygius
Tabanus sulcifrons

Tachinidae (Parasitic Flies).

Tipulidae (Large Crane Flies).

Therevidae (Stiletto Flies).

5. Ephemeroptera (Mayflies).
Baetidae.

6. Hemiptera (True bugs, cicadas, hoppers, aphids and allies).
Aphididae (Aphids).
Cinara strobi
Grylloprociphilus imbricator
Longistigma caryae

Aleyrodidae (Whiteflies).
Pealius azalea

Aradidae (Flat Bugs).
Aradus

Belostomatidae (Giant Water Bugs).
Abedus

Cercopidae (Froghoppers).
Prosapia bicincta

Cicadidae (Cicadas).
Neotibicen auletes
Neotibicen canicularis (originally reported as Tibicen canicularis)
Neotibicen tibicen

Cimicidae (Bed Bugs).
Cimex adjunctus
Cimex lectularius

Coreidae (Leaf-footed Bugs).
Acanthocephala declivis
Leptoglossus
Leptoglossus fulvicornis
Leptoglossus phyllopus

Gerridae (Water Striders).

Lygaeidae (Seed Bugs).
Oncopeltus fasciatus

Notonectidae (Backswimmers).
Notonecta

Pentatomidae (Stink Bugs).
Euthyrhynchus floridanus
Halyomorpha halys

Plataspidae (a single recently introduced species).
Megacopta cribraria

Reduviidae (Assassin Bugs).
Apiomerus crassipes
Arilus cristatus
Melanolestes? picipes?
Pselliopus cinctus

Rhopalidae (Scentless Plant Bugs).
Boisea trivitatta

Tingidae (Lace Bugs).
Stephanitis pyrioides

7. Hymenoptera (Bees, wasps, hornets, ants and sawflies).

Ampulicidae (Cockroach Wasps).
Ampulex canaliculata

Apidae (Cuckoo, Carpenter, Digger, Bumble, and Honey Bees).
Apis mellifera
Bombus pensylvanicus
Xylocopa virginica

Aulacidae.
Pristaulacus stigmaterus

Chrysididae (Cuckoo Wasps).

Crabronidae.
Trypoxylon politum

Evaniidae (Ensign Wasps).
Evania appendigaster
Hyptia thoracica
Formicidae (Ants).
Camponotus pennsylvanicus
Crematogaster
Formica exsectoides
Solenopsis invicta (one colony documented but was eliminated in 2015)

Ichneumonidae (Ichneumon Wasps).
Megarhyssa macrurus

Mutillidae (Velvet Ants).
Dasymutilla occidentalis
Sphaeropthalma

Orussidae (Parasitic Wood Wasps).
Orussus
Orussus sayi

Pompilidae (Spider Wasps).
Entypus

Rhopalosomatidae (Rhopalosomatid Wasps).
Rhopalosoma nearcticum

Sapygidae (Sapygid Wasps).
Sapyga centrata
Scoliidae (Scoliid Wasps).
Scolia nobilitata

Siricidae (Horntails).
Sirex nigricornis

Sphecidae (Thread-waisted Wasps).
Ammophila
Chalybion califormicum
Eremnophila aureonotata
Sceliphron caementarium?
Sphecius speciosus

Tenthridinidae (Common Sawflies).
Empria maculate
Thrinax dubitatus

Vespidae (Yellowjackets and Hornets, Paper Wasps; Potter, Mason & Pollen Wasps).
Dolichorespula maculata
Monobia quadridens
Polistes
Vespa crabro
Vespula
Vespula germanica
Vespula maculifrons

8. Lepidoptera (moths, butterflies and skippers).
Attevidae (Tropical Ermine Moths).
Atteva punctella
Atteva aurea

Crambidae (Crambid Snout Moths).
Desmia funeralis

Erebidae.
Caenurgina erechtea
Catocala ilia
Estigmene acrea?
Hyphantria cunnea
Pyrrharctia isabella

Geometridae (Geometrid Moths).
Ematurga amitaria
Erannis tiliaria

Hesperiidae (Skippers).
Achalarus lyciades
Amblyyscirtes vitalis
Anatrytone logan
Ancyloxypha numitor
Atalopedes campestris
Epargyreus clarus
Erynnis horatius
Euphyes dion
Euphyes vestris
Hylephila phyleus
Lerema accius
Nastra lherminier
Panoquina panoquin
Poanes viator
Poanes yehl
Poanes zabulon
Polites origenes
Polites themistocles
Pompeius verna
Pyrgus communis
Thorybes pylades
Wallengrenia egeremet
Wallengrenia otho

Lasiocampidae (Tent Caterpillar and Lappet Moths).
Malacosoma americana
Malacosoma disstria

Lycaenidae (Blues, Coppers, Hairstreaks, Harvesters).
Atlides halesus
Calycopis cecrops
Celastrina ladon
Cupido comyntas
Feniseca tarquinius
Satyrium calanus
Satyrium favonius
Satyrium kingi
Satyrium liparops
Strymon melinus

Megalopygidae (Flannel Moths).
Megalopyge opercularis

Noctuidae (Owlet Moths).
Autographa
Trichoplusia ni

Notodontidae (Prominent Moths).
Nadata gibbosa

Nymphalidae (Brush-footed Butterflies).
Asterocampa celtis
Cercyonis pegala
Chlosyne nycteis
Cyllopsis gemma
Danaus plexippus
Enodia anthedon
Euptoieta claudia
Hermeuptychia sosybius
Junonia coenia
Libytheana carinenta
Limenitis archippus
Limenitis arthemis astyanax
Megistro cymele
Nymphalis antiopa
Phyciodes tharos
Polygonia comma
Polygonia innterrogationis
Satyrodes appalachia
Speyeria cybele
Vanessa atalanta
Vanessa virginiensis

Papilionidae (Swallowtails & Parnassians).
Eurytides marcellus
Papilio glaucus
Papilio palamedes
Papilio polyxenes
Papilio troilus

Pieridae (Whites, Sulphurs, Yellows [butterflies]).
Abaeis nicippe
Colias eurytheme
Phoebis sennae
Pieris rapae

Pyristia lisa

Psychidae (Bagworm Moths).

Saturniidae (Giant Silkworm and Royal Moths).
Actias luna
Antheraea imperialis
Antheraea polyphemus
Anisota virginiensis
Callosamia
Dryocampa rubicunda
Eacles imperialis
Hyalophora cecropia

Sphingidae (Sphinx Moths).
Darapsa myron
Eumorpha pandorus
Manduca sexta

Torticidae (Tortricid Moths).
Acleris subnivana

Yponomeutidae (Ermine Moths).?

Zygaenidae (Leaf Skeletonizer Moths).
Harrisina americana
Hemaris diffinis
Pyromorpha dimidiate

9. Mantodea (Mantids).
Mantidae
Tenodera sinensis

10. Mecoptera (Scorpionflies, Hangingflies and Allies).
Bittacidae (Hangingflies).

11. Megaloptera (Alderflies, dobsonflies, and fishflies).

Corydalidae (Dobsonflies and Fishflies).
Chauliodes pectinicornis
Chauliodes rastricornis

Sialidae (Alderflies).

12. Microcoryphia (Bristletails).
    Meinertellidae

13. Neuroptera (Antlions, Owlflies, Lacewings, Mantidflies and Allies).
    Ascalaphidae (Owlflies).

    Chrysopidae (Green Lacewings).
    Chrysopa

    Hemerobiidae (Brown Lacewings).

    Mantispidae (Mantidflies).

    Myrmeleontidae (Antlions).

14. Odonata (Dragonflies and damselflies).
    Aeshnidae (Darners).

    Calopterygidae (Broad-winged Damselflies).
    Calopteryx

    Coenagrionidae (Narrow-winged Damselflies).

    Gomphidae (Clubtails).

    Libellulidae (Skimmers).
    Erythemis
    Libellula

15. Orthoptera (Grasshoppers, katydids and crickets).
    Acrididae (Short-horned Grasshoppers).
    Dissosteira
    Leptysma marginicollis

    Gryllidae (True Crickets).

    Gryllotalpidae (Mole Crickets).
    Neocurtilla hexadactyla

    Rhaphidophoridae (Camel Crickets).
    Ceuthophilus

    Tettigonidae (Katydids).
    Atlanticus
    Microcentrum

Neoconocephalus

16. Phasmida (Stick Insects).
    Phasmatidae

17. Psocodea (Barklice, Booklice, and Parasitic Lice).
    Trichodectidae
    Trichodectes canis

18. Trichoptera (Caddisflies).

Class Arachnida.

1. Order Araneae.

Agelenidae (Funnel Weavers).
Agelenopsis

Araneidae (Orb Weavers).
Argiope aurantia
Araneus marmoreus
Gasteracantha cancriformis
Larinioides cornutus
Lariniodes sclopetarius? (Found in box shipped from Pennsylvania)
Neoscona domiciliorum

Ctenidae (Wandering Spiders).

Filistatidae (Crevice Weavers).
Kukulcania
Kukulcania hibernalis

Gnaphosidae (Ground Spiders).

Lycosidae (Wolf Spiders).
Hogna?
Rabidosa

Philodromidae (Running Crab Spiders).
Philodromus vulgaris

Pholcidae (Cellar Spiders).

Pisauridae (Nursery Web & Fishing Spiders).
Dolomedes tenebrosus
Dolomedes triton

Tetragnathidae (Long-jawed Orb Weavers).
Leucauge venusta

Theridiidae (Cobweb Spiders).
Latrodectus mactans
Steatoda grossa

Thomisidae (Crab Spiders).

Salticidae (Jumping Spiders).
Lyssomanes viridis
Phidippus audax
Platycryptus

2. Order Pseudoscorpiones.

3. Order Opiliones.
Sclerosomatidae.
Leiobunum?

4. Order Ixodida (Ticks).
Ixodidae (Hard Ticks).
Amblyomma americanum
Amblyomma maculatum
Dermacentor variabilis
Haemaphysalis leporispalustris
Ixodes affinis
Ixodes scapularis

5. Order Mesostigmata
Dermanyssidae.
Steatonyssus ceratognathus

Macronyssidae.
Ornithonyssus sylviarum

6. Order: Trombidiformes.
Tetranychidae (Spider Mites).
Bryobia praetiosa? (Clover mite?)

Erythraeidae.
Balaustium? (Sidewalk mite?)

Trombidiidae (true velvet mites).
Trombidium (Chigger mite)

Phoretic mites observed on cerambycid beetles but taxonomy undetermined.

Class Chilopoda (Centipedes).

Order Scutigeromorpha (House Centipedes).

Scutigeridae
Scutigera coleoptrata

Class Diplopoda (Millipedes).

1. Order: Polydesmida
Xystodesmidae?

2. Order Spirobolida
Spirobolidae.
Narceus americanus

Class Malacostraca.

1. Order Decapoda
Ocypodidae (Fiddler Crabs and Ghost Crabs).
Uca pugnax (Atlantic Marsh Fiddler Crab).

Portunidae (Swimming Crabs).
Callinectes sapidus (Atlantic Blue Crab).

Grapsidae (Marsh Crabs, Shore Crabs, and Talon Crabs).
Sesarma reticulatum

Cambaridae.
Cambarus bartonii bartonii
Cambarus robustus
Orconectes immunis

2. Order Isopoda (Isopods).

Class Bivalvia
Order: Unionoida
Unionidae
Anodonta cataracta
Elliptio complanata

Phylum: Annelida
Class: Clitellata
Order: Haplotaxida
Lumbricidae
Earthworms

Subclass: Hirudinea
Leeches

Phylum: Platyhelminthes (Flatworms)
Class: Rhabditophora (All parasitic flatworms & most free-living species).
Order: Tricladida (Free-living flatworms)
Geoplanidae (Land planarians or land flatworms)
Bipalium kewense

Appendix 8 to Annex C to FE INRMP
Species of Greatest Conservation Need (GCN) documented on Fort Eustis based on the VA State Wildlife Action Plan (SWAP)

Key:
GCN- Greatest Conservation Need

GCN SWAP Rankings:

A- Managers within the state of Virginia have identified "on the ground' species or habitat management strategies expected to benefit the species; at least some of which can be implemented with existing resources and are expected to have a reasonable chance of improving the species' conservation status.
B- Managers within the state of Virginia have only identified research needs for the species or mangers have only identified "on the ground" conservation actions that cannot be implemented due to lack of personnel, funding, or other circumstance.
C- Managers within the state of Virginia have failed to identify "on the ground" actions or research needs that could benefit this species or its habitat or all identified conservation opportunities for a species have been exhausted.

Species Rankings:

Mammal Species of Special Status

Common Name	Scientific Name	Status
Indiana Bat	*Myotis sodalis*	Federally Endangered
Little Brown Bat	*Myotis lucifugus*	State Endangered
NorthernLong-eared Bat	*Myotis septentrionalis*	Federally Threatened
Tricolored Bat	*Perimyotis subflavus*	State Endangered
Cotton Mouse	*Peromyscus gossypinus gossypinus*	GCN: A
Eastern Red Bat	*Lasiurus borealis*	GCN: A
Hoary Bat	*Lasiurus cinereus*	GCN: A
Silver-haired Bat	*Lasionycteris noctivagans*	GCN: A
Southeastern Myotis	*Myotis austroriparius*	GCN: A

Fish Species of Special Status

Common Name	Scientific Name	Status
Atlantic Sturgeon*	*Acipenser oxyrinchus*	Federally Endangered
Alewife*	*Alosa pseudoharengus*	GCN: A
Blueback Herring*	*Alosa aestivalis*	GCN: A
American Eel	*Anguilla rostrata*	GCN: A

* Species have been identified as having the potential of occurring on the installation, but have not been observed.

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Reptile Species of Special Status

Common Name	Scientific Name	Status
Northern Diamond-back Terrapin	Malaclemys terrapin terrapin	GCN: A
Spotted Turtle	Clemmys guttata	GCN: A
Yellow-bellied Slider	Trachemys scripta scripta	GCN: B
Woodland Box Turtle	Terrapene carolina carolina	GCN: A

Bird Species of Special Status

Common Name	Scientific Name	Status
American Black Duck	*Anas rubripes*	GCN: A
American Woodcock	*Scolopax minor*	GCN: A
Belted Kingfisher	*Megaceryle alcyon*	GCN: B
Black-and-white Warbler	*Mniotilta varia*	GCN: A
Brown Thrasher	*Toxostoma rufum*	GCN: A
Chimney Swift	*Chaetura pelagica*	GCN: B
Clapper Rail	*Rallus longirostris*	GCN: A
Common Tern	*Sterna hirundo*	GCN: A
Dunlin	*Calidris alpina hudsonia*	GCN: A
Eastern Towhee	*Pipilo erythrophthalmus*	GCN: A
Field Sparrow	*Spizella pusilla*	GCN: A
Foster's Tern	*Sterna forsteri*	GCN: A
Gray Catbird	*Dumetella carolinensis*	GCN: A
Greater Scaup	*Aythya marila*	GCN: A
Green Heron	*Butorides virescens*	GCN: B
Least Bittern	*Ixobrychus exilis*	GCN: A
Marsh Wren	*Cistothorus palustris*	GCN: A
Northern Flicker	*Colaptes auratus*	GCN: B
Northern Harrier	*Circus cyaneus*	GCN: A
Northern Pintail	*Anas acuta*	GCN: A
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	GCN: C
Royal Tern	*Thalasseus maxima*	GCN: A
Rusty Blackbird	*Euphagus carolinus*	GCN: B
Sanderling	*Caldris alba*	GCN: A
Short-billed Dowitcher	*Limnodromus griseus*	GCN: A
Snowy Egret	*Egretta thula*	GCN: A
Virginia Rail	*Rallus limicola*	GCN: A
Yellow-billed Cuckoo	*Coccyzus americanus*	GCN: A
Yellow-breasted Chat	*Icteria virens*	GCN: A
Yellow-crowned Night-heron	*Nyctanassa violacea*	GCN: A

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Annex D to FE IMRMP
Bald Eagle Management Plan

BALD EAGLE MANAGEMENT PLAN

1. (Haliaeetus leucocephalus)

Joint Base Langley Eustis
Ft Eustis, VA

Original plan prepared by

U.S. Fish and Wildlife Service Gloucester, VA
June 2008

Updated and revised by

Conservation Branch, Environmental Element Civil Engineer Division
733d Mission Support Group August 2017

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

EXECUTIVE SUMMARY

An Endangered Species Management Plan (ESMP) was prepared in 1999 for the bald eagle (*Haliaeetus leucocephalus*) population at Fort Eustis. At that time, there were two active eagle nests on the installation, one of which consistently produced young. Both nests were protected from direct disturbance by the establishment of Eagle Management Areas (EMA). With the delisting of the bald eagle from the Federal Endangered Species Act on August 8, 2007, Fort Eustis renamed its ESMP to the Eagle Management Plan.

Since 1999, significant changes have occurred in the eagles utilizing Fort Eustis. Both original nests have fallen from their tree, but additional nests have filled the voids in multiple areas of the installation. The installation contains sufficient habitat to support the current fourteen nests and additional nesting pairs in the future.

There are currently fourteen EMAs on the installation. The installation's goal is to incorporate EMAs into the base planning and operations processes, including the Master Plan, ITAM and Real Estate plans, Flight Information Publication, and other installation information communication mechanisms and standing operating procedures. The EMA restrictions, as well as protection afforded to some nests due to impact area restrictions and their inherent isolation should ensure continued use and fecundity by the resident eagle pairs. Also, protection of foraging and roosting habitat on the post, as outlined in this plan revision, should maintain these important riparian areas as important eagle habitat.

This document provides a description of the current status of the eagles on Ft Eustis and the means to conserve them through incorporating sound natural resource management into installation operations. This document provides compliance measures and guidance under the Federal Bald and Golden Eagle Protection Act and Federal Migratory Bird Treaty Act.

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BACKGROUND

The U.S. Fish and Wildlife Service (USFWS) is the Federal agency responsible for the protection of migratory birds under the Migratory Bird Treaty Act (MBTA) of 1918 and of eagles (which are also migratory birds) under the Bald and Golden Eagle Protection Act (BGEPA) of 1940. USFWS coordinates with the state agency responsible for threatened and endangered (T&E) species, the Virginia Department of Game and Inland Fisheries (VDGIF) for non- insect animals and the Virginia Department of Agriculture and Consumer Services (VDACS) for plants and insects in accordance with their respective cooperative agreements with the USFWS. In 1999, an Endangered Species Management Plan (ESMP) was prepared for bald eagles utilizing Fort Eustis (Terwilliger 1999). All protection measures put forth in that plan were accurately followed. However, since the implementation of that plan, the status of the Fort Eustis eagle population has changed, as well as both federal and state protection status of the bald eagle. This document seeks to describe the current condition and fecundity of this population and provide up-to-date management guidelines. Failure to comply with these regulations could result in a violation of the MBTA or BGEPA.

Current Species Status

The bald eagle was listed as endangered throughout the United States in 1978 (43 FR 6233). It was subsequently down listed to threatened in 1995 (50 CFR Part 17) when the Chesapeake Bay bald eagle recovery population met its population and productivity objectives (USFWS 1990, 1995). The bald eagle was removed from the Federal ESA on August 8, 2007; however, it remains protected under BGEPA and MBTA. The BGEPA and MBTA continue to protect bald eagles from a variety of harmful actions and impacts. There are mechanisms through USFWS permitting to authorize removal of eagle nests and disturbance of eagles, but no mechanism for the destruction of eagles at the time of this document preparation. Under the Eagle Act, “disturb” includes activities that agitate or bother an eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Any unpermitted intentional activities that disturb eagles or alter or remove an eagle nest are grounds for prosecution under Federal law.

In May, 2007, USFWS developed National Bald Eagle Management Guidelines (available at: http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf) and the Service Virginia Field Office (VAFO) and the Virginia Department of Game and Inland Fisheries (VGDIF) have developed guidelines that more specifically address the bald eagles in Virginia. The Guidelines are recommendations based on several decades of behavioral observations, science, and conservation measures to avoid or minimize adverse impacts to bald eagles, but the Guidelines themselves are not law.

Adherence to the Guidelines will help avoid violations of the law. Although it is not

possible to absolve individuals and entities from liability under the BGEPA, the Service exercises enforcement discretion to focus on those individuals or entities that take migratory birds without regard for the consequences of their actions and the law, especially when conservation measures, such as these Guidelines, are available, but have not been implemented.

Habitat Requirements and Limiting Factors

The primary limiting factor to the Chesapeake Bay bald eagle population is the destruction of and disturbance to shoreline and riparian forested habitats. These areas are used for nesting as well as roosting and foraging. Limiting factors on the installation include disturbance to the nesting pairs from training activities, specifically aircraft operations and human foot traffic, and possibly hunting activities. Therefore, disturbance to the eagles and their habitat and modification of shoreline and riparian forests represent the most limiting factors on the post.

Management Objectives

Much of Fort Eustis is small islands surrounded by tidal marshes and rivers. All nests are located in isolated areas such as impact areas and training complexes that by their governing management will protect eagle nesting, foraging and roosting habitat from destruction of habitat and most disturbances. Although isolated, all nests are provided a 660-foot buffer to further protect against potential disturbances. Nests that have been inactive for five consecutive years will be declared abandoned and will no longer receive protection (except that the nest tree must be protected as long as a remnant of the nest remains in the tree).

The goal of bald eagle management is for the protection of both the eagles and the capability of the military to accomplish its mission. To accomplish this, mitigation measures must be implemented for both. The goal of bald eagle management on Joint Base Langley- Eustis, Fort Eustis is to protect the Bald Eagles and their requirement habitat to allow continued fecundity of the species while minimizing the impacts to military mission success by eliminating or reducing the encroachment of the Bald Eagles that could degrade the training mission and result in mission failure.

To maintain the effective readiness state of the military, Bald Eagle management on Fort Eustis would also include the removal of existing nest FE1201 (formerly NN0601) and prevent this and any other nesting pair from nesting within 1 mile of Felker Army Airfield. A USFWS Bald Eagle Harassment and Nest Take Permit has been obtained from USFWS to accomplish this readiness state of the military requirement.

Conservation Goals

The primary conservation goal is to maintain all of the existing nesting pairs of eagles and to maintain the nesting, foraging, and roosting habitat for existing use through sound natural resource conservation that is integrated into installation operations.

Actions Needed

The major steps needed to meet the management objectives and achieve the conservation goals are to maintain an EMA of 660 feet around each eagle nest site and to restrict air access within 660 feet of the nests and 500 foot over flight.

Actions Recommended

1. Post land and water access (DOD owned) points and routes and enforce the restricted areas.

2. Where possible, Fort Eustis will preserve a 660-foot riparian buffer of trees along the James River shoreline to provide and protect additional habitat. If not possible, coordination with USFWS may be required.

3. Incorporate bald eagle management into installation operations and documents including the master plan, military training, ITAM, and Real Estate plans, as well as other base information communication mechanisms. Publish EMA status and restrictions in operations and training documents, and other training/flight plan Standard Operating Procedures (SOPs), and distribute to all personnel in a position to affect the EMAs.

4. Conduct annual surveys to monitor nesting, roosting, and foraging sites and to determine status and locations of eagle use.

5. Minimize the effects of contaminants, pesticides, and other chemicals that may affect eagles.

6. Include the EMP within the Integrated Natural Resources Management Plan (INRMP).

7. If emergency situations arise and these restrictions cannot be followed, USFWS shall be contacted to find an immediate solution to the situation. This contacts are listed in Exhibit B.

8. Remove nests that fall within 1 mile radius of Felker Army Airfield.

Total Estimated Cost of Conservation Actions

Cost will be in staff time for coordination and administration of these communication mechanisms and is estimated to be 1/6 man-year, or $15,000/year (Table 1). Use of helicopters for eagle surveys could be integrated into training operations. Other Army installations already have this integration of military training and natural resources requirements in effect.

1.0 INTRODUCTION

(AFI 32-7064)

The purposes of this EMP are to:

• Present information on the bald eagle on Fort Eustis

• Present the threats the species faces on the installation

• Define conservation goals and management objectives

• Outline a plan for management of the eagle and its habitat that will achieve the conservation goals

• Enable the implementation of the best combination of options, consistent with meeting the bald eagle management goals, while minimizing adverse impacts to training readiness

2.0 SPECIES INFORMATION

(Cline 1996; Terwilliger 1991; USFWS 1990, 1995; VDGIF 1994, 2003)

2.1 Description

The bald eagle is a large bird of prey. Its Latin name, literally translated, means a white-headed sea eagle. Adult bald eagles have white heads and tails, brownish-black bodies, and yellow bills, eyes, and feet. Immature birds are variable in plumage but generally have dark-brown bodies, tails, and heads, all irregularly blotched with cream or white. The bill of an immature eagle is brownish, its eyes are pale yellow-gray, and its feet are bright yellow-gold. An eagle's tail and head become white at age four or five. Its voice is a squealing cackle. The bald eagle measures 33-43 inches in total length, with 21-inch wings and a 10-inch tail. Females are usually larger than males.

2.2 Distribution

In Virginia, the bald eagle is a somewhat common resident of the Coastal Plain and is an uncommon resident in the Piedmont and Mountain regions. In 2007, there were 486 bald eagle nests documented in Virginia and almost 10,000 in the coterminous U.S. as of 2010, there were more than 900 nests in Virginia with more than 680 breeding pairs that produced approximately 880 offspring. The eagle has become a fairly common summer and winter visitor, with birds coming from other areas of the U.S., including subadult birds from the Chesapeake Bay region. The bald eagle is usually found near water but during migration may occur in almost any area in Virginia. The Chesapeake Bay region is an important summering and wintering area for bald eagles from other nesting populations along the East Coast from Florida to eastern Canada. In addition to these migrant eagles, most of Virginia's breeding and nonbreeding eagles remain in the region throughout the year. The combination of resident and migrant eagles found in Virginia's Coast Plan makes it the most important eagle concentration area in the coterminous U.S. (Figure 1).

2.3 Fort Eustis Nest Sites

There are 14 active bald eagle nests on Fort Eustis as of August 2017. The first recorded eagle nest at Fort Eustis was documented in 1987 (NN8701) and became inactive in 2003. It was located along the James River shoreline near Marshy Point and was situated in a large loblolly pine in an area of scattered large pines and hardwoods. Nest NN8701 fell from the tree in 2002, but the pair built a new nest (NN0201) on the westerly adjacent island. Nest NN0201 fell from the tree in 2009. A new nest was found again in 2011 in the original nest tree of NN8701, now NN1001 and remains active. The area has been secured from disturbance and an Eagle Management Area (EMA) has been established.

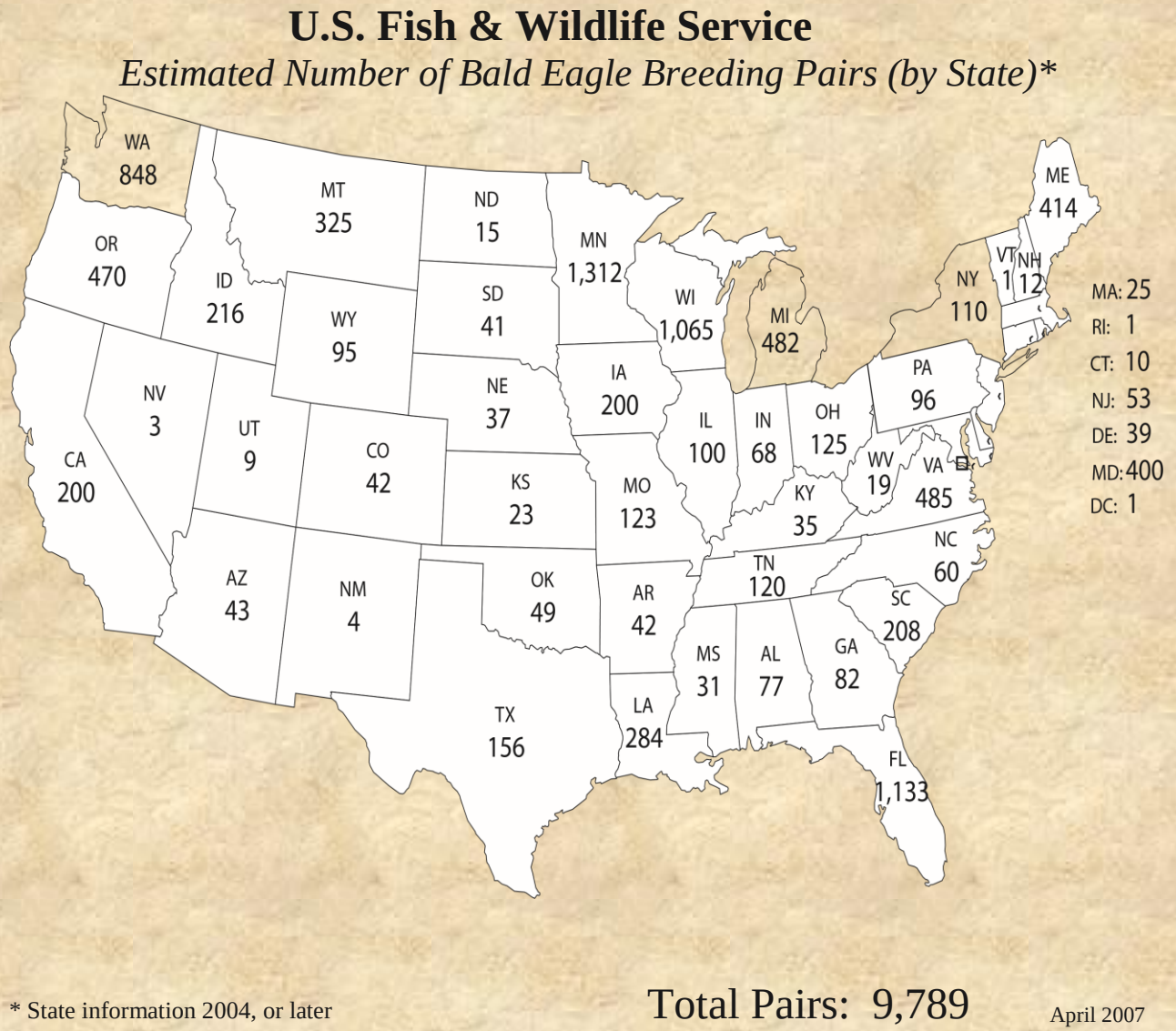

Figure 1. Bald Eagle Pairs in the Conterminous U.S. (USFWS 2007)

The second recorded nest, first discovered in 1996, was reported active in 1998 along Jail Creek near the southern tip of Mulberry Island. The nest was located on the northeastern portion of Jail Island. Jail Island is composed of 4 land masses separated by only a few feet of tidal marsh. An EMA was immediately established around it. No young were produced in that nest. After 1998 it remained inactive for 4 years and fell from the tree in 2002.

A third nest was located in 2003 (NN0301) on the northwestern portion of Jail Island, but was not active. A newer nest was constructed in 2004 (NN0401) south of nest NN0301, but fell in 2009. Nest NN0301 became active again in 2009 and remains active. In 2017, a new nest (FE1705) was found north of nest NN0301 on the same island. It is believed that due to the close proximity of the nests that both nests belong to the same breeding pair.

A fourth nest was discovered in Training Area 17C, near Blows Creek (NN0601) in 2006. The finding of this nest marked the realization that communication between VDGIF, USFWS and Fort Eustis was strained. This nest is considered a Bird Airstrike Hazard for Felker Army Airfield and was removed under permit at least once every year from 2010-1016. Due to continued harassment, the pair move off the installation. A Migratory Bird Permit authorizing harassment of eagles with the intent to disrupt nesting activities and removal of all active and inactive bald eagles nests within 1 mile radius of Felker Army Airfield was obtained in 2013. Nest NN0601 has been removed as few as once per year to as many as 5 times per year over a span of seven years.

In 2008, two new nests were found in the impact area of the installation. The first nest (NN0801), is located on a small island west of Curtis point. The second nest (NN0802) was found along the Warwick River. In 2017, new nests were found in close proximity to NN0801 and NN0802, FE1703 and FE1702 respectively. Due to the close proximity of the new nest with the older nests, it is believed the same nesting pairs maintain the old and the new nests, respectively.

A seventh nest (NN0503) was also found in 2009 northwest of Third Port on a portion of land owned by DOD, but is not utilized by military units. Although this nest remains active, a land survey in 2014 determined that DOD does not own the land in which nest NN0503 resides and therefore does not fall within installation purview and protection measures. This nest clearly demonstrates the lack of communication between and among Federal and State agencies. Attempts were made by Fort Eustis natural resources staff to repair and improve communications between VDGIF and USFWS regarding the monitoring and protection of eagle nests on FE, but an unwillingness of both agencies to repair communications severed all remaining ties between the agencies regarding the protection of the bald eagles on Fort Eustis. A renewed interest in the Fort Eustis boundary layer and potential erroneous delineation of the boundary is being investigated at the time of this document review.

An eighth nest was found along the James River in 2014 (FE1402) and it resides on a small island isolated from other islands by considerable distances. The location identifying codes of new nests discovered have changed from the NN (Newport News) to FE (Fort Eustis), but the 4 digit codes following the location code follows the national code system of year and number of nest in a location.

Two additional nests were found in 2015. Nest FE1501 was found along the Warwick River in the impact area. This nest was vacant in 2015 and 2016, but was active in 2017. A second nest found in 2015 (FE1502) along the James River.

In 2017, 6 new nests were found on Fort Eustis. Three of the six nests (FE1702, FE1703, and FE1705) were built by existing pairs of breeding eagles and are in close proximity to existing older nests. Nest FE1701 was found an island along the Warwick River just south of The Pines Golf Course. This nest marks the northern most active bald eagle nest on the Warwick River. Nest FE1704 is located on the southwestern most island of Jail Island. Nest FE1706 was found on an island along James River between nests FE1502 and NN1001.

As of 2017, a total of 23 nest sites have been utilized by breeding eagle pairs. Of these, eight nest sites have had nests fall from trees and while a few had new nests rebuilt, most (six) sites have not had nest rebuilt. Based on the current number of nests and proximity of some nests, it is believed that Fort Eustis is home to ten (10) breeding pairs of Bald Eagles.

Fort Eustis has successfully mitigated potential disturbances to all nests by measures that include the establishment of EMAs, changing of flight patterns of aircraft utilizing FE airspace and working with the public whose activities had the potential to disturb nesting eagles. A potential disturbance for nest NN1001 is the over flight by aircraft, because the nest is within the airfield approach and training zones. A former threat to the nest near Marshy Point was falling steel shot from a nearby duck blind. However, in the summer of 2003, the blind was abandoned and dismantled after coordination with the USFWS and consultation with the blind owner. In general, FE bald eagle nests are relatively secure at their locations due to the surrounding marshy and forested shoreline, the impact area zone restrictions, and the limited access for training and other human activities. If current air access and training restrictions are maintained, as put forth in the 1999 ESMP, and hunting activities restricted within the management zones, the nests should be secure. Of the fourteen active nests, eleven are located in an impact area. Fort Eustis natural resource staff conducts ground and aerial surveys throughout the year. Appropriate protection measures have been implemented around all active eagle nest sites (Figure 2).

2.4 Habitat/Ecosystem

2.4.1 Nesting Habitat

(Abbott 1978a; Andrew and Mosher 1982; Cline 1985, 1996; Cline and Clark 1981; Fraser et al. 1985, 1991; Jaffee 1980; Therres et al. 1993; USFWS 1987; Watts et al. 1994; Wood et al. 1989)

Bald eagles in Virginia and throughout the Chesapeake Bay region nest in live trees, usually in the tallest trees in a woodlot, close to water, and away from development or intensive human activity. The average height of a nest tree is 90 feet, with the nest located in a main crotch about 12 feet from the top of the tree. The average diameter of the tree is 22 inches. A majority of nests (70%) are located in loblolly pines, often left as seed trees during previous timber cuts. Other tree species used for nesting include tulip poplar, American beech, white and red oak, and Virginia pine. The nest itself is built of large sticks, but other vegetation such as corn stalks, fresh twigs

and leaves, and clumps of grass are often added to the top of the nest. The average size of the bowl-shaped nest is 3 feet deep and 5 feet across at the top. Some pairs will use the same nest each year, while others alternate year to year between 2 or 3 nests in their breeding territory. Territory size varies but typically encompasses 1.6 square miles. Bald eagle nests are most often located in open, mature forest stands usually at least 20 acres in size within 0.5 mile of both wetlands and open water. A majority of the time, there is a break in the forest within 330 feet of the nest, such as agricultural fields, nonforested wetlands, timber cuts, or bodies of water. Nests are often found near agricultural fields, but eagles tend to nest farther away from other types of human development and activity. This includes roads, residential and urban development, shoreline development, and industrial sites.

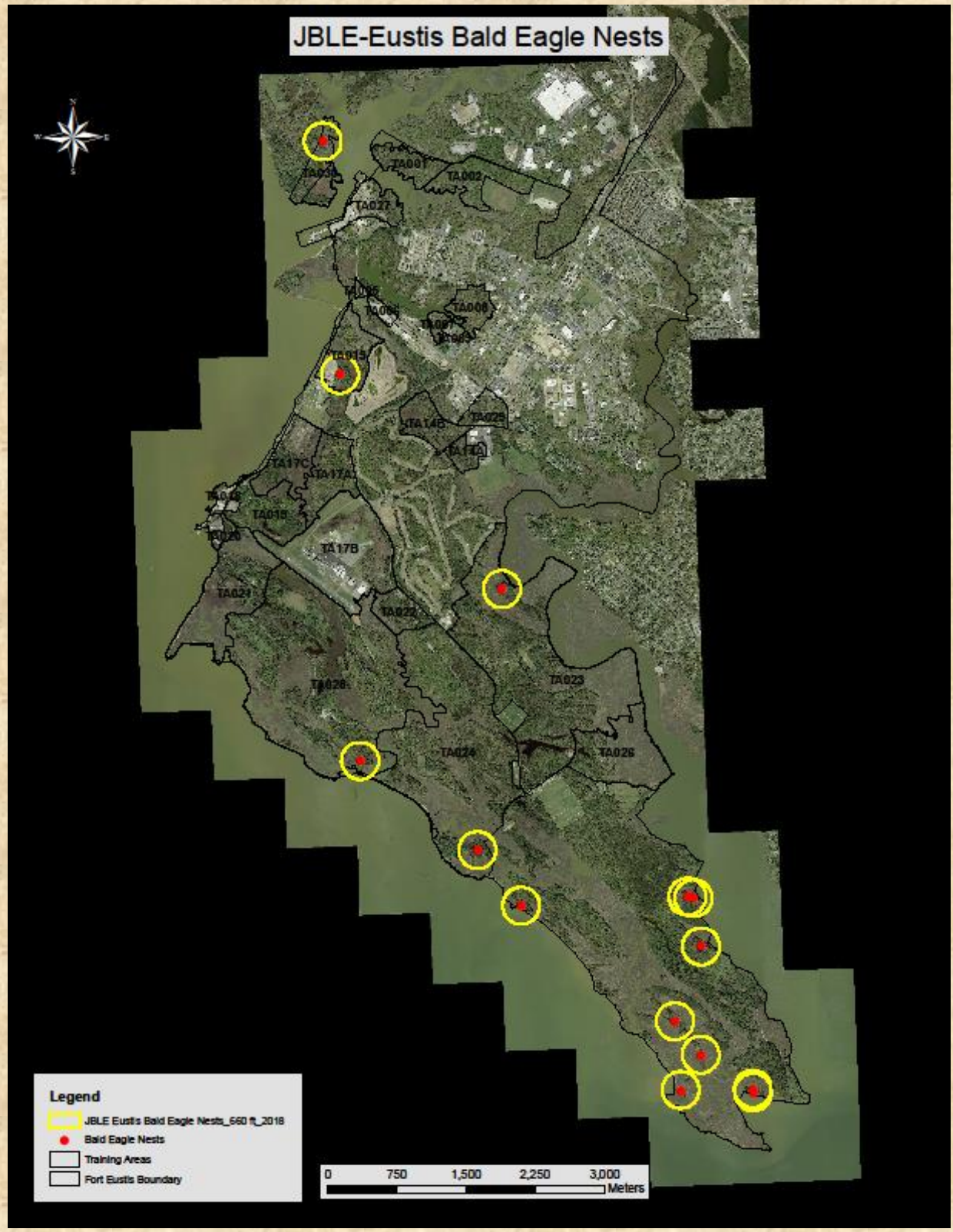

Figure 2. Location of Eagle Nests on Ft Eustis.

2.4.2 Foraging Habitat

(Buehler et al. 1991c; Clark 1992; Cline 1985, 1996; McGarigal et al. 1991; Mersmann et al. 1992; Stalmaster and Newman 1978)

Fish make up the majority of the diet of bald eagles in Virginia, although as opportunistic feeders, they also will prey on birds, reptiles, and small mammals. Bald eagles most frequently hunt from shoreline perches along bays, rivers, and marshes. Large trees with open canopies are used for hunting perches, just as they are for roost perches. Large, undeveloped, forested sections of shoreline are most often used for foraging. The longer the section of undeveloped shoreline and the deeper the woodlot, the more likely the area will be used for perching. The most frequently used sections of shoreline are also located near roost sites.

Foraging habitat on Fort Eustis is broadly distributed and corresponds to the forested riparian areas along the James and Warwick Rivers. Fort Eustis has not been identified by VDGIF to be a high-use foraging/roosting area in Virginia, as it is not known to harbor significant numbers of eagles throughout the year, beyond the nesting pairs.

2.4.3 Roosting Habitat

(Andrew and Mosher 1982, Buehler et al. 1991b, Cline 1996, Milsap et al. 1983, Stalmaster and Newman 1978, Steenhof 1978)

Bald eagle communal roosts, areas where eagles congregate to perch at night, are also located in forested areas close to water and away from human activity. These roosts provide protection from the wind and from disturbance. Eagles prefer to roost in large trees with open canopies that allow easy access for perching. Roost trees are similar in size to the live nest trees, although dead trees are often used for roosting. Most roosts are located in an area of dead or scattered live trees in a small forest opening surrounded by large, live trees. Flooded bottomland hardwood forests with isolated areas of large dead trees and small cutover areas where pockets of large trees were left standing are often used. Roosting habitat on Fort Eustis corresponds to foraging habitat, as birds utilize the forested riparian areas on the installation.

In one northern Chesapeake Bay study, communal roosts were 1-2.5 acres in size and located in woodlots with a minimum size of about 272 acres but averaging about 3,800 acres. Just as with nest sites, communal roosts are located within 0.5 mile of water and are located away from developed areas containing buildings, boat landings, and roads.

2.5 Life History/Ecology

(Cline 1996, Fraser et al. 1991, Terwilliger 1991, USFWS 1990)

Bald eagles do not begin to breed until 4-5 years of age, the same time that they develop their adult plumage of white head and tail feathers. In Virginia, nest building and repair usually begins in November and December. The 1- to 3-egg clutch is laid between late January and late March, though eggs can be laid as late as the end of April if an earlier nesting attempt fails. Eggs

hatch between early March and early May after 35 days of incubation. The young eagles remain in the nest until about 11-12 weeks of age, when they take their first flight. Sometimes the nestlings will fall out or be blown out of the nest before they are ready to fly. If this happens, the adults will continue to drop food to the young as long as they are on the ground. The last of the young leave the nest by late July. For about 2 months after their first flight, the young may frequently return to the nest to receive food from the parents.

2.6 Nesting Activity and Disturbance

(Cline 1996, Haines 1986, Milsap et al. 1983, Stalmaster and Newman 1978, Steenhof 1978)

Breeding bald eagles are most sensitive to disturbance when they are nest building or laying and incubating eggs. This is the time they will most readily abandon a nest if disturbed by human activity. Bald eagles are most sensitive to non-routine human activity visible from the nest. A breeding pair of eagles may tolerate routine traffic along a farm road or a farmer cultivating the fields near the nest. If this activity changes, however, such as someone stopping a car or tractor and approaching the nest, the eagle may quickly fly from the nest. An incubating adult may flush from the nest if a person wanders too close to the nest tree, or if other activities such as military training or timber cutting are within sight of the eagles on the nest. Eggs exposed too long to the cold may fail to hatch and the adults will abandon the nest. Very small 1- to 4-week- old nestlings are also vulnerable to the cold if the adults are kept away from the nest and cannot provide warmth to the young. During the latter part of the season, when nestlings are 7-weeks or older, human activity too close to the nest may cause the young to prematurely jump from the nest. Such nestlings may not survive an extended period unprotected on the ground.

2.7 Roosting Activity and Disturbance

(Buehler et al. 1991b, Cline 1996, Milsap et al. 1983, Wallin and Byrd 1984)

Eagles congregate in roosts in both summer and winter, but usually different roosts are used in different seasons. In Virginia, the largest numbers of eagles use winter roosts between November and January, but use can occur from September through April. Use of summer roosts peaks between June and August, but use can occur from April through October. Eagles usually enter the roost from an hour before to just after sunset; eagles leave the roost from just before to about an hour after sunrise. During inclement weather, however, eagles may remain perched in the roost throughout the day.

As with nesting bald eagles, eagles at a roost are more likely to be disturbed by visible human activity. An eagle that is flushed out of a roost by human activity may be forced to perch in an area more exposed to the weather and farther from foraging areas. This will cause eagles to expend more energy, and if the disturbance continues to occur, force them to abandon the roost entirely. Since eagles may be present in the roost at any time during the day, especially in bad weather, disturbance can occur at any time.

The number of eagles using a stretch of shoreline for foraging varies by season and the use of adjacent roosts. In Virginia, large stretches of the Potomac, Rappahannock, and James Rivers

have been identified as important foraging areas. Certain areas may be used year-round, while others are used primarily in the summer or winter. Eagles can be found hunting from perch trees at any time during daylight hours and can be flushed from their perch if disturbed by human activity.

Eagles rarely use shoreline areas within 330 feet of buildings or within 1,650 feet of human activity. An eagle that is flushed from a hunting perch will often fly down the shoreline, across the water, or inland away from the shore, thereby expending valuable energy and possibly resulting in reduced hunting success. Repeated disturbance may cause the eagles to abandon the area.

2.8 Conservation Measures

(Cline 1996; USFWS 1990, 1995; VDGIF 2003; Watts et al. 1994)

In 1940, Congress passed the Bald Eagle Protection Act in an attempt to protect bald eagles from extinction. Several changes have been made in this Act to strengthen the law against "taking" bald or golden eagles or disturbing their nests. The current Act, amended in 1962 to include the golden eagle (16 U.S.C. 668-668d), prohibits anyone from "taking" any bald eagle, dead or alive, or any nest, egg, or parts of these birds. The Act defines "taking" as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." It is also illegal to possess, sell, purchase, or transport any bald or golden eagle, dead or alive, or any part, nest, or egg of an eagle. A violation of the Bald and Golden Eagle Protection Act can result in fines of $5,000 to $10,000 and/or imprisonment for 1 to 2 years. The bald eagle is also protected under the Migratory Bird Treaty Act (16 U.S.C. 701-718h), with restrictions and penalties similar to the Bald and Golden Eagle Protection Act.

The VDGIF is the state regulatory agency with management responsibility for bald eagles. The VDGIF implements the Virginia Endangered Species Act (VA ESA). The Commonwealth of Virginia listed the bald eagle as a threatened species under the VA ESA until January 2013. The National Bald Eagle Guidelines under BGEPA protect eagle nest habitat out to 660 feet from the nest tree.

As of 2010, more than 900 nest sites are occupied in Virginia and many important roost sites and foraging areas have been identified. These use-areas must be protected from both the destruction of habitat and disturbance from human activities. Habitat alterations such as construction, land clearing, heavy land or air training use, and timber cutting can destroy existing bald eagle habitat and make it unsuitable for bald eagle use indefinitely. Human activities such as recreational boating, other shoreline activities, off-road vehicles, farming, and hunting can all cause disturbance to bald eagles if they are too close to the use area while eagles are present. Continued disturbance, or even a single disturbance during the most sensitive portions of the breeding season, can cause the eagles to abandon an area temporarily or permanently.

Maintaining a screen of vegetation between eagles and human activity, and limiting human activities during certain times of day and times of the year, can help to reduce disturbance. Potential bald eagle habitat, such as historic nest sites not currently used or maturing forested shoreline areas, also need to be identified and protected. In areas of potential habitat, management to limit

human disturbance is not as critical as habitat protection and enhancement. Management of these areas includes land conservation to preserve their natural character, and management to enhance the areas for eagle use. Habitat enhancement may include timber- harvesting techniques, such as selective thinning, shelterwood, or seed tree cuts, to encourage the growth of certain tree species most often used by bald eagles for nesting, roosting, and foraging. Roosting and foraging habitat can be created by forestry practices that encourage the growth of mature, open-canopy trees, particularly loblolly pines. Isolated, flooded bottomland forest, such as beaver impoundments, can provide the large dead trees that are often used for roosting.

Allowing the small, forested islands along the James River to remain in their vegetated state will provide good eagle and other wildlife habitat. Preserving a 660-ft. riparian buffer of trees along the James River shoreline, wherever possible, will help to provide and protect foraging habitat. The primary management of the shoreline buffer zone should be to maintain a buffer of trees between human activity and eagles perched along the shore, and to promote the growth of large, open-canopy trees.

3.0 CONSERVATION GOALS

(AR 200-3:11-5)

The installation goal is to maintain the existing nesting pairs of bald eagles as well as eagle use of the forested riparian areas and shoreline for foraging and roosting by integrating sound natural resource conservation into base operations while mitigating mission impacts on eagles and eagle impacts on the mission.

3.1 Considerations and Findings

1. Aerial surveys of Fort Eustis are conducted by natural resource staff twice annually; early February for occupancy data and late May for fecundity data. Although aerial surveys have been conducted each year since 1987 by VDGIF, limited communication by VDGIF and USFWS has led to the cessation of communications between Fort Eustis and VDGIF and USFWS. Although Fort Eustis monitors the eagles within its boundary multiple times each year, other agencies refuse to correct their incorrect data or share information.

2. Upon discovery of active nests, Fort Eustis implements EMAs to protect the nest and surrounding habitat to prevent disturbance of the nest sites.

3. Eleven nests are located in the impact area. Limitations associated with an impact area and vast tidal marshes provide isolation for the eagles from most human disturbance associated with Fort Eustis.

4. Nest NN1001 is located near the tip of land that extends into the James River at Morrison's creek in Training Area 28. Training area 28 is predominantly a driving based training area with limited ft. traffic beyond mock village areas. Within the villages and on the road network, explosive charges are detonated to simulate Improvised Explosive Devices (IEDs). During a 16 day period each month, an estimated 1,300 explosive charges may be

detonated within Training Area 28. These charges maintain a minimum of 1,200 foot from the nest. This distance is the nearest human disturbance which is a road. The Army Support Activity supports the EMAs and avoids intentional entry into the land spur that contains the nest.

5. Bald Eagle nest FE1201, formerly NN0601, was located in Training Area 17C which has been closed to training since 2011 due to timber hazards. This nest was in the direct departure/approach path for rotary wing aircraft utilizing the compass rose and helipad. Approximately 200 flights occur each day utilizing these areas. The nest was located approximately 3,000 ft from the helipad and due to conflicting aircraft flight paths and restricted flights operations over adjacent areas, the flight path that the eagle nest conflicts with cannot be moved. Because of the Bird Airstrike Hazard associated with this nest, the nest has been legally removed under permit each year; 2010-2016.

6. A Migratory Bird Permit authorizing harassment of eagles with the intent to disrupt nesting activities and removal of all active and inactive bald eagles nests within 1 mile radius of Felker Army Airfield was obtained in 2013. Nest NN0601 has been removed as few as once per year to as many as 5 times per year over a span of seven years. Although activities were heightened in that area to deter the eagles from utilizing the area, the eagle pair continue to attempt nesting in that area.

7. Limited management hunting occurs in the impact area during the hunting seasons. However, hunting regulations are in place that restrict all hunting activities in EMAs. Fort Eustis will communicate all current restrictions to participating hunters and outdoor recreationists who might impact the eagles through land or water access.

8. A forest inventory/vegetation survey was conducted in 1996 that delineated Fort Eustis into vegetation compartments (Terwilliger Consulting 1997). The survey was updated again in 2008. It is not anticipated that any forest activity would occur in the future to disturb nests. If plans change, Fort Eustis will consult with appropriate agencies.

9. An additional disturbance factor addressed in the previous ESMP was air traffic. The continued goal within all current EMAs is to maintain a 660-feet horizontal distance and 500 foot altitude (above ground level) overflight minimum disturbance level. Fixed-wing aircraft may fly below 500 feet, but rotary-wing aircraft should be restricted due to the possibility of downwash blowing a nest out of a tree.

3.2 Goals

1. Fort Eustis will maintain all existing nests by establishing a 660-foot EMA around each nest and managing foraging, roosting, and nesting habitat by implementing the following protection effort:

- Maintaining the natural features that attracted the eagles to the sites
- Preventing human disturbance at and around the nest sites

- Maintaining a visual barrier of vegetation between the eagles and adjacent human use areas

- Continue harassment of eagles and removal of nest per authorization by permit within 1 mile radius of Felker Army Airfield to minimize and remove Bird Air Strike Hazards (BASH) risks with bald eagles.

Restrictions for these areas are detailed in action steps as follows:

- Human activity in the EMAs, including training, hunting, and other foot traffic, is prohibited within the secondary zone (660-foot buffer) during the nesting/breeding season of December 15 through July 15. No chemicals toxic to eagles should be used in the EMAs, and an aircraft overflight restriction of 500 foot above ground level altitude should be enforced.

- Major land use changes should be avoided within 660 feet of the nest sites and should be coordinated with USFWS/VDGIF to ensure compliance with the BGEPA and MBTA before any clearing or construction activities occur. In view of the current wetland, safety, and logistic restrictions, no major land use changes are anticipated within the EMAs for any nest. Selective timber harvest could be conducted as long as it meets the guidelines established in Section 4.3, which entails harvesting outside the breeding season and leaving visual buffers and appropriate stocking to provide for additional replacement of eagle nest/roost trees.

2. The forested islands along the James and Warwick Rivers marsh and shoreline, which are inaccessible by land, will be left in their natural state as potential nesting/foraging/ roosting areas. Where possible, Fort Eustis will preserve a 660-foot riparian buffer of trees along the James and Warwick Rivers shoreline to provide and protect additional habitat. Morrison's Creek is probably the most heavily used area by the eagles there, although they have been observed foraging both north and south of the creek along the James River.

3. The National Environmental Policy Act (NEPA) requires full review and disclosure of activities that may impact the integrity of wetlands, the Clean Water Act protects the shoreline area, and the BGEPA prohibits take of eagles. Existing activities, as they comply with the action steps, are not considered to be detrimental to the eagles.

4. Enhancement of the eagle habitat in compartments along the shoreline and riparian areas by selective harvest outside of the breeding season could be considered if this is the primary objective of the silviculture treatment. Such a selective timber harvest should:

- Be coordinated with VDGIF and USFWS

- Be conducted between July 16 and December 14, outside of the breeding season

- Leave an adequate visual buffer between the eagles and surrounding activity areas

and prohibit timbering within 330 feet of the nests

- Provide for buffers along riparian forests and shorelines

- Result in large, open-canopy pines and selected hardwoods for nesting, roosting, and perching

Land use activities, such as timber harvest, in Compartments 3, 16, 17, 18, and the smaller, forested islands towards the James River which are within 660 feet of the nests need to be carefully planned and supervised to avoid any disturbance to eagles. See Forest Inventory and Vegetation Assessment for detailed prescriptions. Silviculture treatment, specifically selective thinning, is recommended for the densely stocked stands of younger pine. The final selective harvests, scheduled for when the pines reach maturity, should result in stands which leave thinned pockets of large pine and a much heavier stocking rate and basal area than seed tree harvests.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

(AR 200-3:11-5)

4.1 Training Management Units

Nest NN1001 EMA is in Training Area 28 (Figure 2). A 660-foot buffer has been marked to restrict access. This nest resides within the outer limit of the Range 1 SDZ (Figure 2). Range 1 however, is a small arms pistol range with maximum munitions catchment. Combined with the fact that this range is a qualifying range for small weapons (with a clear disincentive for inaccuracy), it is not believed to adversely affect the eagles in the area.

Nest NN0503 EMA is located in Training Area 30. This training area is not utilized and only serves as a security buffer for Third Port. This nest's isolation should protect the nest from future disturbances. In a similar area, nest FE1701 is located on an island in Training Area 23. The island is accessible by boat only and thus it should be protected from future disturbance. However, waterfowl hunting occurs within close proximity of the nest and this activity will be prohibited during the nesting season.

The Army Support Activity Range Control schedules and maintains the training areas and ranges, publishes Range Bulletins, and maintains a Bulletin Board. The ITAM directory states that Training Area 28 is restricted and munitions are not allowed within 660 feet of an eagle nest. The range safety briefing process now contains a reference to wildlife which is being modified to include specific eagle information. All training and range activities must avoid the EMAs. No human access should be allowed in these areas. Adequate buffers and audio and visual screening of training activities must be maintained.

Eleven nests are located within the impact area. The impact area is a restricted area and contain the range surface danger zones. These nests fall within the SDZ's of Ranges 2-6 and the US Army Aviation Applied Technology Directorate (AATD) range. Due to the existing

restrictions and limited use of the areas, no further restrictions are anticipated. A 660-foot buffer has been marked around each nest to prevent unintentional encroachment by ASA maintenance staff and Environmental staff. Further, the Range Safety Officer supervises each round fired from a tower and requires a safety briefing given to every person using the ranges. This briefing describes the eagles, the requirement to cease all firing if any wildlife is in the area, and states the penalty for harming an eagle.

Although the ranges meet the standard DOD construction design for safety and environmental impacts, Fort Eustis should stay abreast of and pursue any modifications that might improve the ranges from an environmental impact standpoint. The Range and Training Areas Directory, ITAM, restricts activity within the EMAs, as does the Range and Training Safety Briefing Manual. Training activities should continue to be prohibited within the EMAs and restricted from concentrating near the buffers.

The use of chemical agents, smoke and other contaminants should be restricted by safety and health requirements. Similar and appropriate distance buffers should be maintained around the nests for potentially harmful chemical agents as well. Use of any such agents should be restricted within the EMAs.

Restrictions for the EMAs should be permanently posted in the Bulletin and on the Bulletin Board and incorporated into any other training documents that involve the EMA. The EMA restrictions should be published in ASA 350-1, Fort Eustis Training Areas. Specifically, the restricted areas could be listed in the General Guidelines and limitations section, B) (2) (14) under the areas off limits at Fort Eustis.

Air access restrictions should be published in the Flight Information Publication and all other appropriate means of communication for personnel (existing and new) who are in a position to enter EMA air space. EMA air restrictions should also be posted in the flight center and other areas of visibility for flight personnel.

4.2 Hunting (Outdoor Recreation) Management Units

Nest NN1001 is located within Hunting Areas 28 and nest FE1701 is located within Training Area 23. All hunting activities should be prohibited within the EMA's as marked by the 660' buffer boundaries. All remaining nests are located in the impact areas where recreational hunting is prohibited or on a secluded parcel of land that is inaccessible to hunters. Special management hunts in the impact areas should be prohibited within the EMAs. Outdoor recreation documents should state these restrictions as SOPs and they should be posted at access sites as well as the recreation offices or public contact points.

4.3 Forestry Management Units

(Terwilliger Consulting Inc., Timber Inventory and Forest Management Plan 2007)

Silvicultural recommendations for compartments include selective thinning to encourage large, open-canopy trees. Any silvicultural activities within compartments with eagle nests need

to be carefully planned, timed, and supervised to avoid any disturbance to eagles that may be present in the area. Silviculture should allow appropriate buffers from the eagle nests. A minimum 660- feet-radius buffer must be maintained around the nest site during the thinning. Thinning can only occur during the non-breeding season, after the young have fledged and before nest building. For specific compartment recommendations, see Terwilliger Consulting Inc., Timber Inventory and Forest Management Plan 2007. Most of the smaller forested islands along the James River are excellent potential habitat for nesting eagles. These maritime pine islands contain snag perch trees and panoramic views, which are both important features to eagles.

These islands have potential for alternate nest sites and should be left in their natural state and managed as such. They contain large, open-canopy trees that provide the open crowns favored by eagles as replacement nesting trees. This is consistent with the recommendations in the Timber Inventory & Forest Management Plan (2007).

4.4 Administrative Management

Communication of the status of eagles, their habitat, and the restrictions within the EMAs is a necessary and important part of management. An effective communication protocol should be established which informs all appropriate divisions and staff of the location and restrictions of the EMAs. It is recommended that this information be disseminated on an annual schedule and incorporated into all appropriate installation documents and plans such as the Master Plan, the Training Development Plan, and the Integrated Natural Resources Management Plan. This annual report should communicate any change in nest location or status as well as annual productivity results to appropriate installation personnel, i.e., planning, law enforcement, training, public relations, etc., via an annual letter along with new restrictions. If no change in nest location or status exists, the above appropriate installation staff should be notified with an annual reminder of nest status and restrictions. This information should be communicated in a positive manner, encouraging the continuation of the stewardship Fort Eustis has provided for its bald eagles over nearly 30 years.

The EMA restrictions should be published in ASA 350-1, Fort Eustis Training Areas. Specifically, the restricted areas could be listed in the General Guidelines and limitations section, B) (2) (14) under the areas off limits at Fort Eustis. Especially important is the publication of the EMA air access restrictions in the FIP. It should be immediately submitted as an amendment and then permanently published at the end of the fiscal year (FY) as the schedule requires. In this way, it will be established permanently in the record and available for all pilots and staff to review from year to year, regardless of personnel replacement and program or operational changes.

Sensitivity training should be incorporated into existing training procedures. It is critical that each directorate incorporates staff training in order to prevent any possible violations or mishaps. Education and awareness training should prevent this if implemented each year in order to get new or replacement personnel involved. CEIE, Integrated Training Area Management (ITAM) and Flight Facility personnel should be specifically targeted.

Additional administrative actions will require an annual review for compliance with the prescribed action implementation and to allocate appropriate resources for this compliance.

4.5 Minimization of Bald Eagle Management Impacts on the Installation's Mission

With the exception of FE1701, no eagle nest coincides with the approach zone to the airfield. All rotary wing aircraft fly patterns and approaches that avoid the impact areas to avoid live fire exercise and flight conflicts. Published flight patterns near nest NN1001 has been modified to avoid over flights of the nest. No flight patterns exist north of Skiff's creek thereby avoiding conflicts with nest NN0503. Nest FE1701 is in the direst flight pattern of rotary wing aircraft approaching the airfield from the Warwick River. However, the distance from the airfield routinely places aircraft above the 500 feet minimum overflight level. Over flights less than 500 feet are prohibited by rotary-wing aircraft in the EMAs unless approved by USFWS or VDGIF.

Nest NN1001, does not directly limit training currently conducted in Training Area 28, but does limit potential future training in otherwise potential land use areas. Potential land use conflicts due to expansion of the training mission and loss of training land could create conflicts with this nest in the long term future. As of 2017, no Bald eagle nest limits the training mission of the installation. The frequency of military training within the boundaries of the training areas should preclude eagles from building a nest within the currently defined training areas that would interfere with Installation's mission.

Nest FE1501 is within 4 feet of an unimproved road in the impact area. Although the impact area is not open for public access and military training, the road in question is a fire and emergency access road and is the only access to the lower half of the impact area and Mulberry Island. This road is utilized at least a dozen times per month by Civil Engineering Division (CED) staff. CED staff continues to utilize this road, but only in a traversing manner. Vehicles shall refrain from stopping within the 660' buffer of the nest and all human foot traffic shall be prohibited within the buffer as well.

Additional potential habitat on the installation is located along the James River shoreline within the marshy, maritime, pine-dominated islands of Mulberry Island. Small patches of large pine exist in these isolated pockets and offer potential alternate eagle nesting sites throughout Mulberry Island and the extensive James River shoreline.

4.6 Management of Nesting Habitat

Fort Eustis shall:

1. Maintain the EMAs, which represent protection zones of a minimum of 660 feet radius around the nests and incorporate them into the base planning and operations processes, including the Instalaltion Development Plan, ITAM and Real Estate plans, Flight Information Publication, and other post information communication mechanisms and SOPs. Management will restrict human access within the EMAs

year-round within 660 feet of the nest. If emergency or mission operations require access, CEIE staff shall be contacted immediately. They will contact VDGIF/USFWS to work out a timely and reasonable solution.

Any land use changes such as land clearing, clearcut timbering, construction of buildings, roads, or trails, and other disruptive activities that are within the sight of eagles on a nest should also be prohibited within the EMAs. The use of pesticides and other chemicals or contaminants, including those used in training activities, should be restricted within these areas. Restrict air access within 660 feet of the nests. A protocol should be developed for emergency situations with USFWS and VDGIF, but it is recommended that helicopter over flights less than 500 feet above ground level be prohibited in the EMAs throughout the year. Restrictions may be lifted if a nest is inactive/unoccupied that year, but will be enacted if/when activity resumes at a nest.

2. Restrict major land use changes and activities up to 660 feet around the nest trees and incorporate into the base planning process, including the Installation Development Plan, ITAM, and Real Estate plans. Because most of the land within the 660-feet areas of the nests are either restricted training, range surface danger zone, or wetlands, major habitat changes that could disturb nesting eagles, including the development and construction of commercial, industrial, and large residential units, are not anticipated and do not therefore pose a threat to the eagles.

   During the breeding season, management within the EMAs should restrict major activities that could disturb the nesting eagles, such as timber cutting, land clearing, building, road or trail construction, day and night training, and other disruptive activities that are within the sight of the nests. Selective harvesting and other less impacting activities should be conducted outside of the breeding season.

3. Maintain the forested islands along the James River in their natural state and a 660-foot management zone, when possible, along other shorelines and riparian areas to provide foraging and roosting sites.

   a. Maintain buffers to protect existing foraging and roosting sites.

   b. Restrict clearcutting, land clearing and major construction within these areas. These land use changes are not likely or planned due to the wetland, safety, and logistic restrictions. If timber harvest is conducted in or around these areas, the use of selective timber harvest could maintain or encourage the growth of large, open-canopy trees for roosting and perching if eagle management is the primary objective. Harvesting should be conducted outside of the major use (summer or winter roost) season, and an adequate buffer for screening should be maintained.

   c. Restrict water-oriented activity and recreational boat use along shorelines within the installation's control in areas of high foraging use, as identified and communicated by VDGIF during their official surveys. At present, no such areas

have been identified. Morrison's Creek needs to be protected from access at the mouth by Swash Hole, due to the eagles' foraging use. Jail Creek should also be protected from water access near its mouth at the James River.

d. The James River shoreline extending from Mulberry Point to the upper Skiffes Creek as part of the Fort Eustis military installation, is used extensively for military watercraft exercises and operation. Military operations and eagle use has occurred in this area for many years without detrimental effects to eagle foraging or nesting. Thus, in the event VDGIF identifies this or part of this area of Fort Eustis as an area of high foraging use, it is understood that military operations will continue as usual. Fort Eustis will continue to avoid eagles when present.

4. Prohibit air access within the EMAs to a minimum 500-foot above ground level overflight altitude of the nests. Publish air restrictions in the Flight Information Publication and all other appropriate means of communication for personnel (existing and new) who are in a position to enter the EMA air space.

   a. Especially important is to maintain the EMA air restrictions in the FIP. In this way, it is established permanently in the record and available for all pilots and staff to review from year to year, regardless of personnel replacement and program or operational changes.

   b. Continue to post EMA air restrictions in the flight center and other areas of visibility for flight personnel.

5. Continue annual surveys to monitor roosting and foraging sites and determine status and locations of eagle use. This arrangement should not impact helicopter training.

   a. Coordinate helicopter surveys with training to integrate them into the schedule of training activities.

   b. Conduct a winter eagle location/shoreline use survey during the first 2 weeks of January each year (1/1-1/15).

   c. Conduct a summer survey during the first week of August every year (8/1-8/10) to determine foraging/roosting use of the installation.

   d. Conduct winter and spring nest survey (February and May) to determine nest activity and production.

6. Publish EMA status and restrictions in the training documents and other training/flight plans and procedures.

   a. Communicate status of nest location, annual productivity, and roosting/foraging use results to appropriate installation personnel (e.g., planning, law enforcement, training, and public relations personnel) via an annual letter. This letter should

include any new restrictions.

b. Integrate this EMP into the 10-year Range Development Plan (AR 210-21), the Integrated Natural Resources Management Plan, Installation Development Plan, and the ITAM program.

c. Incorporate sensitivity training into existing training procedures to ensure awareness of EMP and its restrictions.

7. Minimize the effects of contaminants, pesticides and other chemicals used at Fort Eustis on the eagle.

a. Follow pesticide labels and appropriate use and disposal techniques as outlined in the pesticide handbook.

b. Restrict the use of contaminants, chemical agents and smoke within the EMAs.

4.7 Management of Foraging/Roosting Habitat

Maintain a 660-foot management zone, when possible, along James River shorelines and riparian areas as potential high-use areas by eagles. At present, no such sites have been identified and designated by VDGIF/USFWS. However, the western portion of Morrison's Creek and the southern Jail Creek area need to be protected for the foraging use of the established territories. The small, forested islands along the James and Warwick Rivers provide good roosting and foraging habitat and are recommended to be left in their natural state.

a. Restrict clearcutting, land clearing and construction within the riparian zone and maintain buffers to protect existing foraging and roosting sites.

b. Use selective timber harvest whenever possible on the post to maintain or encourage the growth of large, open-canopy trees for roosting and perching if eagle management is the primary objective, and only if harvesting is completed outside of the breeding season, and if an adequate buffer for screening is maintained.

c. Restrict water-oriented activity and recreational boat use along shorelines within the installation's control for areas of high foraging use, as identified and communicated by VDGIF during their official surveys. Specifically, Morrison's and Jail Creeks should be posted as off limits by water access. Foraging/roosting areas on Ft Eustis are abundant and widespread along Mulberry Island and the James and Warwick River shorelines. Buffers should be maintained around shorelines and forested riparian areas. Land use changes and disturbances should be avoided within these areas. Management of these areas should include the maintenance of a visual buffer from surrounding activities and provide adequate screening from both audio and visual activities. The James and Warwick River shorelines, as well as Morrison's and Jail Creeks, provide the necessary perching/roosting and foraging sites on the installation. Silviculture treatments to encourage large, open-canopy trees would

better attract and screen eagles in those areas.

5.0 TIME, COSTS, AND PERSONNEL

(AR 200-3: 11-5, 11-13)

The majority of costs will be in staff time for coordination and administration of these communication mechanisms and is estimated to be 1/6 man-year or $15,000 (Table 1).

Table 1. Estimate of Required Resources by Activity by Year

Fiscal Year	Activities	Personnel	Est. Annual Cost
2018	• EMA management and monitoring • Plan integration into SOP • Approval and signing of approved updated EMP • Coordination • Environmental training	1/6 man-year	$15,000
2019	• EMA management and monitoring • Plan integration into SOP • Coordination • Harvest supervision • Training	1/6 man-year	$15,000
2020	• EMA management and monitoring • Plan integration into SOP • Coordination • Training	1/6 man-year	$15,000
2021	• EMA management and monitoring • Plan integration into SOP • Coordination • Training	1/6 man-year	$15,000
2022	• EMA management and monitoring • Plan integration into SOP • Coordination • Training	1/6 man-year	$15,000

6.0 CHECKLIST

SCHEDULE	CHECKLIST ACTIVITY TO BE COMPLETED	ORGANIZATION RESPONSIBLE	DATE	SIGNED
Year-round	Establish and maintain EMAs with a minimum of 660 feet radius around all nests. Restrict human access in these EMAs year-round. All activity is prohibited within the EMA. Any essential and emergency activities within the EMAs must be	CED		
Year-round	Avoid major land use changes within 660 feet radius around the nest trees. Selective silviculture harvest, following the guidelines presented, appears to be the only activity anticipated within these areas and must be	CED		
Each document FY revision	Incorporate EMA restrictions into the Post planning process, including the Master Plan, ITAM, and Real Estate plans, FIPs, and operation documents. Communicate them to the appropriate divisions or staff through public	CED, ASA		
Prior to 11/15	Maintain posted signs designating the EMA boundaries along the Donnebrook Pond spillway west along the spur road/railroad bed across the forested peninsula. Post Morrison's Creek at the entrance at Swash Hole, for EMAs 1 and 3, and Jail Creek Road and Creek entrance for EMA 4 to notify anyone entering these areas of the	CED		
Year-round	Prohibit land use changes in the EMAs, such as land clearing, clearcut timbering, and construction of buildings, roads, or trails and consult with EE, which will in turn consult with VDGIF/USFWS for activities out to 660 feet around the nests	CED		
Year-round	Restrict the use of pesticides and other chemical agents or contaminants within the EMAs, including those used in range and training activities or gypsy moth control. Develop an integrated pest management SOP to reflect these	CED		
11/15 through 7/15	Prohibit training and other human activities (both day and night) within the EMAs. Develop and update training SOPs to reflect these restrictions. The EMA restrictions should be published in Fort Eustis training areas publications. Specifically, the restricted areas could be listed in the General Guidelines and limitations section, B) (2) (14)	ASA		

SCHEDULE	CHECKLIST ACTIVITY TO BE COMPLETED	ORGANIZATION RESPONSIBLE	DATE	SIGNED
Year-round	Restrict traffic within and along the EMAs to routine road traffic and maintenance. Post signs along the spillway and at the Donnebrook Spur Road at the southwest corner of Donnebrook Pond to prohibit the stopping of vehicles within EMAs 1 and 3. Maintain the barriers to prohibit access onto roads/trail/railroad bed within the EMAs throughout the year. Access for emergency or necessary maintenance/safety work should be coordinated first	CED		
Year specified in compartment prescriptions	Conduct selective thinning or selective harvest and other silvicultural enhancements for the primary purpose of enhancing eagle habitat. Specifically design harvests to produce large, open-canopy trees for nesting with adequate visual and auditory vegetation buffer between adjacent land uses and disturbances. Maintain a minimum buffer of 330 feet from nest undisturbed from harvest. See Forest Inventory and Vegetation Assessment, 1997, for	CED		
Year-round	Maintain forested islands along James River in their natural state and maintain a 660-ft. management zone along other shorelines and riparian buffers to protect foraging and roosting sites.	CED		
Summer/winter	Restrict water-oriented activity and recreational boat use within 660 feet of any high-use shorelines within the installation's control as identified and communicated by VDGIF on their surveys. Specifically, the mouth of Morrison's and Jail Creeks should be posted to prohibit entry into the	CED		
Year-round	Publish air restrictions in the FIP and all other appropriate means of communication for personnel (existing and new) who are in a position to enter the EMA air space. In this way, it will be established permanently in the record and available for all pilots and staff to review from year to year, regardless of personnel replacement and program or	CED		
Year-round	Restrict air access within the EMA throughout the year. A protocol should be developed for emergency situations with VDGIF/USFWS.	CED		
Year-round	Post EMA air restrictions in the flight center and other areas of visibility for flight personnel.	CED		
FY planning cycle	Plan and schedule annual surveys to monitor nesting, roosting, and foraging sites and to determine status and locations of eagle use.	CED		
1/1- 1/15	Conduct a winter eagle use/shoreline survey.	CED		

8/1- 8/10	Conduct a summer survey to determine eagle foraging/roosting use of the installation.	CED		

SCHEDULE	CHECKLIST ACTIVITY TO BE COMPLETED	ORGANIZATION RESPONSIBLE	DATE	SIGNED
No later than 4/1 and 6/1	Communicate nesting and productivity survey data results to appropriate installation personnel, i.e., planning, law enforcement, training, public relations, etc., via an annual letter. Develop new restrictions in conjunction with VDGIF and USFWS for their approval if use patterns change. If no change in nest location or status is identified,	CED		
During next revision of each plan	Integrate this EMP into the post planning process, including the Installation Development Plan, ITAM, Real Estate, and Range Development Plans (AR210-21), the Integrated Natural Resources Management	CED, ASA		
Each planning cycle	Incorporate sensitivity training into existing environmental or natural resources awareness and other personnel training programs AR200-3, 11-10).	CED, ASA		
Budget cycle	Investigate the effects of contaminants, pesticides, and other chemical agents used at	CED		
Year-round	Follow pesticide labels and appropriate use and disposal techniques as outlined in the pesticide handbook and Integrated Pest	CED		
11/15- 7/15	Restrict the use of training chemical agents, smoke, and contaminants within the EMAs.	ASA		
Upon plan approval	Include the EMP in the Integrated Natural Resources Management Plan.	CED		
Each FY	Prepare EMP compliance reports according to AR 200-3, 11- 6g (2) (a-d) and review the	CED		
As needed	Consult with USFWS/VDGIF for any emergency situation where these guidelines cannot be followed for an immediate solution	CED		

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EXHIBIT A –Glossary

Active Nest - A nest where an adult was seen in incubating or brooding position, a chick or egg was seen or found in the nest, or the nest was newly constructed or repaired.
Breeding Season (nesting season) - The time period that bald eagles are most likely to be establishing breeding territories and pair bonds, nest building, egg-laying, incubating, raising young in the nest, and fledging young from the nest. This occurs from December 15-July 15 in Virginia.
Breeding or Occupied Territory - An area containing one or more nests within the range of one adult pair of bald eagles.
Eagle Management Area (EMA)/Zones - The area and zones outlined in this plan, which are established to protect the eagles and their habitat (660 feet out from the nest).
Inactive Nest - A nest that has been inactive for at least ten consecutive breeding season days.
Successful Nest (productive nest) - A nest where one or more young survived to fledging age, or were observed alive on last survey flight unless information is available that the young failed to fledge.
Unsuccessful Nest (unproductive nest) - A nest that was determined to be active but from which no young fledged

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Joint Base Langley-Eustis, Virginia 23665-2291

EXHIBIT B- Eagle Manageent Plan Participantsw

Fort Eustis Eagle Management Plan (EMP) Manager:
James Dolan, Conservation Branch, CEIE, 733 Civil Engineer Division

Cooperating Agencies

Virginia Department of Game and Inland Fisheries
US Fish & Wildlife Service

Cooperative Agreements
VDGIF entered into a cooperative Agreement with USFWS to establish joint responsibility for the management of federally endangered species in Virginia.
Ft Eustis consults with the USFWS and VDGIF for the Conservation and Management of Fish and Wildlife Resources on Ft Eustis through the Integrated Natural Resource Management Plan. This Plan is updated every five years and is in the process of being updated.

Coordination and Consultation
USFWS and VDGIF staff has been kept informed throughout the development of this plan and have been integral in the development of specific management and population recommendations. In addition, both agencies have reviewed the draft plan and concur that unintentional take, as defined under BGEPA and MBTA is unlikely. As long as the guidelines and steps outlined in this plan are followed, no significant adverse effects are likely.

ACRONYMS/ABBREVIATIONS

ASA	Army Support Activity
BGEPA	Bald and Golden Eagle Protection Act CED Civil Engineering Division
CFR	Code of Federal Regulations
CEIE	Environmental Element, Civil Engineer Division
DA	Department of the Army
DOD	Department of Defense
EMA	Eagle Management Area
EMP	Eagle Management Plan
EE	Environmental and Natural Resources Division
ESA	Endangered Species Act of l973
ESMG	Endangered Species Management Guidelines
ESMP	Endangered Species Management Plan
FIP	Flight Information Publication
FR	Federal Register
FSS	Force Support Squadron
FY	Fiscal Year
GIS	Geographic Information System
INRMP	Integrated Natural Resources Management Plan
ITAM	Integrated Training Area Management
MAJCOM	Major Command
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
SJA	Staff Judge Advocate
SOP	Standard Operating Procedures
SDZ	Surface Danger Zone
T&E	Threatened and Endangered
USFWS	U.S. Fish and Wildlife Service
VDACS	Virginia Department of Agriculture and Consumer Services
VDGIF	Virginia Department of Game and Inland Fisheries
VNHP	Virginia Natural Heritage Program

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Annex E to FE INRMP

Forest Inventory

Forest inventories are required every 10 years per AFI 32-7064. The most recent (and current) inventory is the 2007 Timber Inventory & Forest Management Plan. It was reviewed and approved in previous versions of the INRMP.

Funding for a new inventory was approved by AFCEC to be executed through the USACE Omaha District in FY 2017. However, the project was not executed by this district. AFCEC attempted execute this project through the Norfolk District in FY 2018 but the action could not be executed in that FY either. Funding was addressed to AFCEC for FY 2020 in HERT205337. Completion would be expected in late FY 2020 or CY 2021.

The existing inventory (Timber Inventory and Forest Management Plan [2007]) is available at the following web site:

http://www.jble.af.mil/Units/Army/Eustis-Enviromental/

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Annex F to FE INRMP

US Army Corps of Engineers Norfolk District Wetlands Delineation Letter

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

Reply to Attention of

December 18, 2014

PRELIMINARY JURISDICTIONAL DETERMINATION

Southern Virginia Regulatory Section
NAO-2008-02602 (James River)

Joint Base Langley-Eustis
Mr. Mark J. Sciacchitano
Director, Civil Engineering Division
1407 Washington Blvd
Fort Eustis, Virginia 23604

Dear Mr. Sciacchitano:

This letter is in regard to your request for a preliminary jurisdictional determination for waters of the U.S. (including wetlands) at Joint Base Langley-Eustis, Fort Eustis, Virginia. The drawing entitled "Fort Eustis- Completed Wetland Delineation as of 18 December 2014" dated December 18, 2014 and the Esri File Geodatabase named "Wetlands.gdb" by the Corps of Engineers Norfolk District provides the locations of waters and/or wetlands on the property listed above. The basis for this delineation includes application of the Corps' 1987 Wetland Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region and the positive indicators of wetland hydrology, hydric soils, and hydrophytic vegetation and the presence of an ordinary high water mark.

The referenced map differentiates between wetlands and waters of the U.S. delineated in the field and the areas delineated using Geographic Information System (GIS) analysis. The field delineated wetlands was compiled from field surveys performed during the period of October 2004 through May 2014 by the Norfolk District Regulatory Branch. Wetlands and waters of the U.S. were delineated in the field by using the Corps' 1987 Wetland Delineation Manual and the Regional Supplement and the boundaries were surveyed with a hand-held GPS unit.

The GIS analysis included use of 1-meter bare earth LiDAR DEM collected in 2012 (provided by Fort Eustis GeoBase), aerial imagery from VGIN Virginia Base Mapping Program (flight years 2011, 2009, and 2006), and the USGS 1:24,000 Topographic Quad maps. A Mean High Water (MHW) elevation of 1.06' above NAVD88 was calculated and used for the GIS delineation. Tide data was based on a published bench mark sheet for Station 8638017 MARAD (Fort Eustis) Virginia. The GIS based delineation of wetlands and waters of the U.S. within the forested areas may not be all inclusive. Therefore, additional field based delineations using the Corps' 1987 Wetland

Delineation Manual and the Regional Supplement may be required to determine the full extent of wetlands and waters of the U.S. in the forested areas.

Discharges of dredged or fill material, including those associated with mechanized landclearing, into waters and/or wetlands on this site may require a Department of the Army permit and authorization by state and local authorities including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC) and/or a permit from your local wetlands board. This letter is a confirmation of the Corps preliminary jurisdiction for the waters and/or wetlands on the subject property and does not authorize any work in these areas. Please obtain all required permits before starting work in the delineated waters/wetland areas.

This is a preliminary jurisdictional determination and is therefore not a legally binding determination regarding whether Corps jurisdiction applies to the waters or wetlands in question. Accordingly, you may either consent to jurisdiction as set out in this preliminary jurisdictional determination and the attachments hereto if you agree with the determination, or you may request and obtain an approved jurisdictional determination. This preliminary jurisdictional determination and associated wetland delineation map may be submitted with a permit application.

The "Preliminary Jurisdictional Determination Form" is enclosed. Please review the document, sign, and return a copy to the Corps Regulatory Office (Melissa Nash, 803 Front St. Norfolk, VA 23510) within 30 days of receipt and keep a copy for your records. This delineation of waters and/or wetlands is valid for a period of five years from the date of this letter unless new information warrants revision prior to the expiration date. Please contact this office prior to the December 18, 2019 expiration of this verification, so we may plan to review areas as needed to extend the delineation.

If you have any questions and/or concerns about this permit authorization, please contact me via telephone at (757) 201-7489 or via email at melissa.a.nash@usace.army.mil.

Sincerely,

Melissa A. Nash

Melissa A. Nash
Project Manager
Southern Virginia Regulatory Section

Enclosure:
Preliminary Jurisdictional Determination Form

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION:

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): December 18, 2014

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
Joint Base Langley-Eustis
Mr. Mark J. Sciacchitano
Director, Civil Engineering Division
1407 Washington Blvd

C. DISTRICT OFFICE: Norfolk District (CENAO-REG)

FILE NAME: Joint Base Langley-Eustis, Fort Eustis

FILE NUMBER: NAO-2008-02602

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: **VIRGINIA** County/parish/borough: City: Newport News

Center coordinates of site (lat/long in degree decimal format):

Latitude: 37.10471 ° N Longitude: -76.51973 ° W

Universal Transverse Mercator:

Name of nearest waterbody: James River

Identify (estimate) amount of waters in the review area:

Non-wetland waters: linear feet; width (ft); and/or acres.

Cowardin Class: see below

Stream Flow:

Wetlands: 3,611 acres

Cowardin Class: PFO, PSS, PEM, POW, PUB, E2EM, E2SS

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: James River

Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: December 18, 2014
☒ Field Determination. Date(s): October 2004-May 2014

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

3. This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA:

Data reviewed for preliminary JD (check all that apply) - checked items should be included in case file and, where checked and requested, appropriately reference sources below.

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: The drawing entitled "Fort Eustis- Completed Wetland Delineation as of 18 December 2014" dated December 18, 2014 and the Esri File Geodatabase named "Wetlands.gdb" by the Corps of Engineers Norfolk District.

☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

☐ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report.

☒ Data sheets prepared by the Corps: From October 2004-April 2014

☐ Corps navigable waters' study:

☐ U.S. Geological Survey Hydrologic Atlas:

☐ USGS NHD data.

☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name: Mulberry Island &Yorktown Q

☒ USDA Natural Resources Conservation Service Soil Survey.

Citation: SSURGO Soils Newport News

☒ National wetlands inventory map(s). Cite name: Mulberry Island and Yorktown Quads

☐ State/Local wetland inventory map(s):

☒ FEMA/FIRM maps: Mulberry Island and Yorktown Quads

☐ 100-year Floodplain Elevation: (National Geodetic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): 1990 Color IR; VGIN 2011, 2009 &2006

or ☒ Other (Name & Date): LiDar DEM 2012

☒ Previous determination(s): September 30, 2008; September 26, 2013

File no. and date of response letter:

☒ Other information (please specify): Tide data was based on published bench mark sheet for Station 8638017 MARAD (Fort Eustis) Virginia

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Melissa A Nash

Signature
Regulatory Project Manager
(REQUIRED)

December 18, 2014

Date

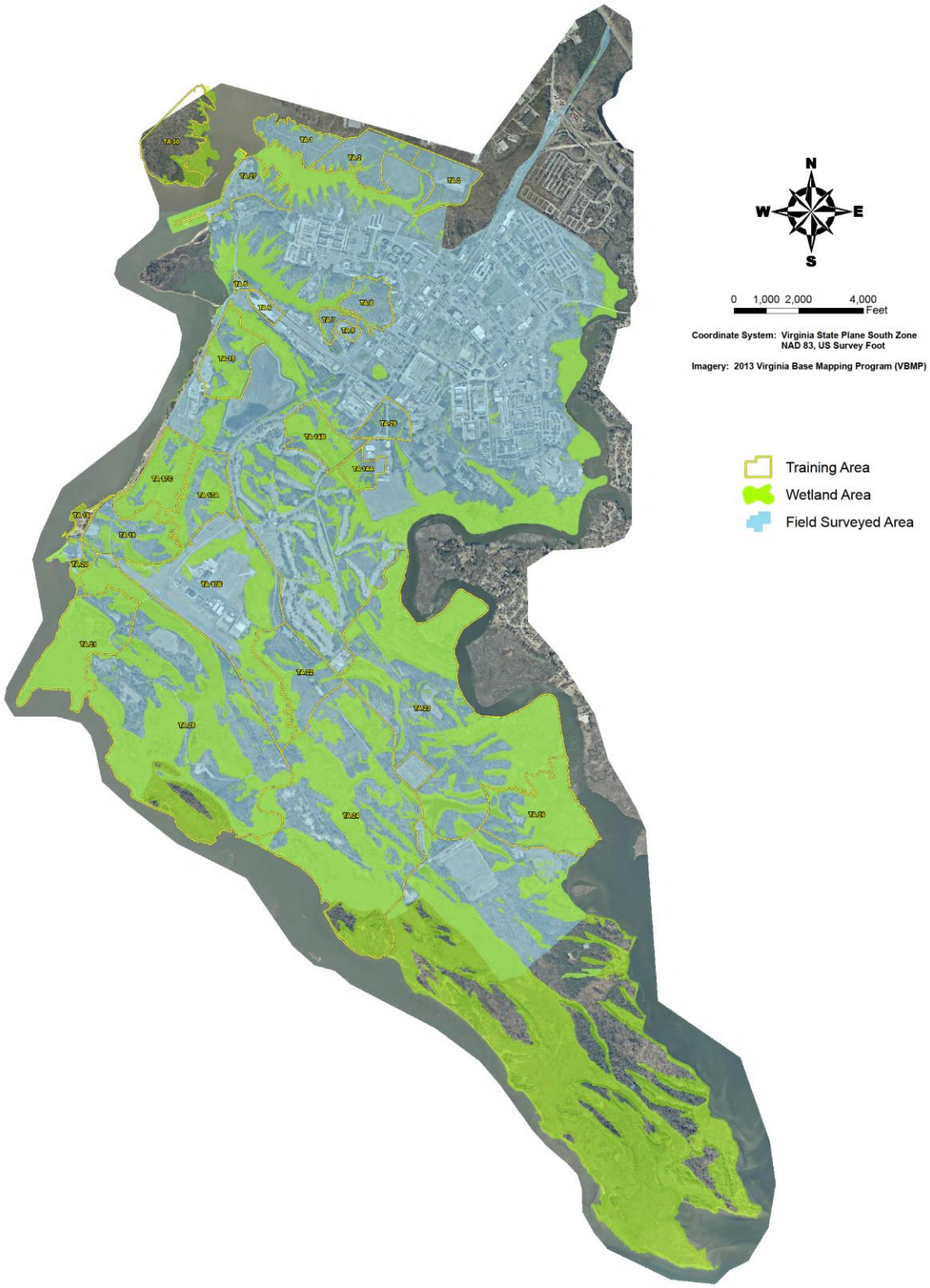
Signature of person requesting
Preliminary JD
(REQUIRED, unless obtaining the signature is impracticable)

6 Jan 15

Date

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Fort Eustis - Completed Wetland Delineation as of 18 December 2014



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HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Annex G to FE INRMP
Annual INRMP Review Summary Approval Delegation of Authority

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 633D AIR BASE WING
JOINT BASE LANGLEY-EUSTIS VA

OFFICE OF THE COMMANDER

MEMORANDUM FOR 633 MSG/CC AND 733 MSG/CC

SUBJECT: Delegation of Authority for Revised Integrated Natural Resources Management Plans (INRMP) and Certification of Annual INRMP Review Summaries

1. Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, dated 18 Nov 14, Section 2.7.1 authorizes the Installation Commander to re-delegate signature authority for revised INRMPs to a lower level provided that the signatory has control over all aspects and management objectives addressed within the subject INRMP.

2. AFI 32-7064, Section 2.7.2 authorizes the Installation Commander to delegate the certification of the annual INRMP review authority to no lower than the Civil Engineer Squadron Commander.

3. In accordance with AFI 32-7064, the authority re-delegated to the Installation Commander to approve revised INRMPs and certification of the annual INRMP review, is hereby re-delegated to the 633d Civil Engineer Squadron Commander for JBLE-Langley and 733d Civil Engineer Division Director for JBLE-Eustis.

CAROLINE M. MILLER, Colonel, USAF
Commander

cc:
633 ABW/IG
633 CES/CC
733 MSG/CED

Global Power For America

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Annex H to FE INRMP
JBLE Environmental Policy Statement

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 633D AIR BASE WING
JOINT BASE LANGLEY-EUSTIS VA

OFFICE OF THE COMMANDER
125 Mabry Avenue
Joint Base Langley-Eustis VA 23665-2522

MEMORANDUM FOR ALL JOINT BASE LANGLEY-EUSTIS PERSONNEL

SUBJECT: Environmental Policy Statement

1. Our ability as Joint Base Langley-Eustis (JBLE) to conduct our mission requires daily operations in the land, sea and air environments. Protecting each is an integral and mandatory part of accomplishing our mission.

2. We are committed to sustaining JBLE through a C.L.E.A.N. approach:

- **C**omply……..We will comply with all environmental regulations and all other requirements while reducing compliance costs and liabilities.
- **L**imit impact……..We will prevent pollution and minimize waste while cleaning up past sites of environmental concern and making efforts to achieve Chesapeake Bay conservation.
- **E**xecute plans……We will identify and attain energy, environment, safety and occupational health objectives and targets through planning that is Specific, Measurable, Achievable, Realistic, and Timely (SMART).
- **A**chieve improvements……..We will continuously improve our programs and processes through the use of effective management and planning.
- **N**otify……We will communicate our environmental commitments and performance to all levels of our organization and local community.

3. It is the responsibility of all military personnel, civilian employees and support contractors to perform their duties in a manner that prevents pollution, protects the environment and conserves natural resources.

4. We will ensure the continual improvement of our environmental systems and the overall accomplishment of our core mission by following these commitments. Please address any questions or concerns to Mike Patton of the Environmental Flight at 764-1046.

TYLER.SEAN.K.1127541155 Digitally signed by TYLER.SEAN.K.1127541155 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=TYLER.SEAN.K.1127541155 Date: 2017.08.24 07:51:27 -04'00'

SEAN K. TYLER, Colonel, USAF
Commander

Global Power For America

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<u>Annex I to FE INRMP</u>
Invasive Species Management Plan

1. INTRODUCTION

1.1. Facility Description and History of Fort Eustis

1.1.1. Fort Eustis is located in the Hampton Roads area of Southeast Virginia on the southwest side of the Virginia Peninsula, which is bordered by the James River and York River. The installation is contiguous to the city of Newport News and is located on the eastern shoreline of the James River approximately 30 miles upstream of its confluence with the Chesapeake Bay. It is bordered on the northeast by the City of Newport News, on the west and south by the James River, and on the east by the Warwick River, which separates Fort Eustis from the City of Newport News.

1.1.2. The U.S. Army purchased 8,300 acres of land in 1918 to support U.S. involvement in World War I. Fort Eustis was originally a temporary artillery and balloon training facility. It became a permanent base in 1923 and was used as an artillery training facility. During World War II, the base was used for coastal artillery and anti-aircraft training, and as a prisoner of war internment facility. In 1947, the base was placed under the control of the U.S. Army Transportation Corps and was established as a training post.

1.1.3. Under Base Realignment and Closure 2005, Fort Eustis was designated for realignment whereby some existing tenant activities were relocated to Fort Lee including most of the U.S. Army Transportation School while retaining rail and watercraft training components). Several activities from Fort Monroe were relocated to Fort Eustis including Headquarters, Training and Doctrine Command and the former Northeast Regional Headquarters of Installation Management Command. On October 1, 2010 Fort Eustis was aligned with Langley Air Force Base as Joint Base Langley Eustis, Fort Eustis. By this action, installation management was performed in accordance with U.S. Air Force policies.

1.1.4. The primary mission of Fort Eustis is to train personnel and units in transportation skills such as railroad, terminal service, harbor craft operations, land navigation, common soldier skills and small unit tactics. The installation also supports other military organizations external to the installation including Navy, ROTC and reserve component units. Training facilities include a variety of classrooms, 38 miles of railroad track, and ship and aircraft cargo loading facilities. In addition to the training facilities on the base, there are approximately 2,000 privatized family housing units, a medical clinic, a dental clinic, a commissary, various recreation facilities, warehouses, storage areas, Felker Army Airfield, Third Port and light industrial facilities that support base operations.

1.2. Information on Invasive species at Fort Eustis.

1.2.1. Definition of invasive species. Executive Order 13112 defines the term as "a species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Generally, this definition refers to those species that are not native to Virginia or the Eastern United States. Some native vegetation can pose challenges for land/habitat sustainability such as sweet gum (*Liquidambar styraciflua*) or loblolly pine (*Pinus taeda*). Such species are not considered as invasive and are managed in accordance with the Integrated Natural Resources Management Plan and the Timber Inventory and Forest Management Plan.

1.2.2. Determination of invasive vegetation on Fort Eustis. Identification of invasive vegetation was accomplished through a series of data collection projects over a period of time. By incorporating institutional knowledge of likely invasive plant species by installation staff, the U.S. Army Environmental Center conducted a Pest Management Program Assistance Visit with technical support from BASF in September 2005. The purpose was to perform an initial survey and note recommended control techniques. This information was further incorporated in a limited report entitled "Planning Level Surveys for Amphibians and Reptiles, Mammals, Birds, and Fish as Well as Pest Insects and Invasive Plants at Fort Eustis, Virginia in 2004-2005" (Versar, 2006). Additionally, a Timber Inventory and Forest Management Plan was completed in 2007 which included information on invasive vegetation in installation forest compartments. Collectively, these surveys/reports were incorporated into the Fort Eustis Invasive Species Management Plan that was prepared by the U.S. Fish and Wildlife Service in July 2008. This plan constituted the original plan used by the installation. From 2009-2011, several invasive species control test plots (Fort Eustis Invasive Species Control Test Plots, final report, November 2009) and actual treatment projects were performed. The results were incorporated into this updated plan.

1.2.3. Vertebrate invasive organisms. The original plan focused solely on vegetation. This updated version also discusses several known and potential vertebrate species at Fort Eustis. Primarily this includes coyotes (*Canis latrans*), nutria (*Myocastor coypus*), mute swans (*Cygnus olor*), rock dove (*Columba livia*), European starlings (*Sturnus vulgaris*) and English house sparrows (*Passer domesticus*). Coyotes were documented on the installation in 2008 though their existence was suspected prior to this time frame. The starlings, house sparrows and rock doves are common at Fort Eustis as expected in nearly anywhere in North America.

1.2.4. Vertebrate invasive organisms with potential to become established on FE. Mute swans (*Cygnus olor*) have been observed in the local areas adjacent to Fort Eustis but have not yet been documented on the installation. Nutria (*Myocastor coypus*) are known to occur in portions of eastern Virginia. Natural resources staff

with augmented support from USDA-WS conducted annual surveys and surveillance with dogs and hair platforms from 2014-2016. No funding was provided for 2017 (HERT185339). Funding for 2018 is uncertain. As of 2016, no individuals have been documented. However, one adult may have been observed at the intersection of Wilson Avenue and Pershing Avenue in 2015.

1.2.5. Invertebrate invasive organisms documented on FE. As discussed above, the original plan focused on invasive vegetation. However, in addition to the known/potential vertebrate species, several invertebrate species have been documented:

- Japanese beetles (*Popillia japonica*)
- Kudzu bug (*Megacopta cribraria*)
- Asian tiger mosquito (*Aedes albopictus*)
- Brown marmorated stink bug (*Halyomorpha halys*).
- Imported fire ants (*Solenopsis invicta*) – one colony neutralized in October 2013
- European hornet (*Vespa crabro*)
- Chinese mantis (*Tenodera sinensis*)

1.2.6 Invertebrate invasive organisms with potential for establishment on FE. The following invertebrate organisms could become established on FE in the near future. Survey work and surveillance are key to managing these pests:

- Red swamp crayfish (*Procambarus clarkii*)
- Rusty crayfish (*Orconectes rusticus*)
- Asian long-horned beetle (*Anoplophora glabripennis*)
- European gypsy moth (*Lymantria dispar*)
- Sirex woodwasp (*Sirex noctilio*)
- Spotted lanternfly (*Lycorma delicatula*)
- Redbay ambrosia beetle (*Xyleborus glabratus*)
- Beech scale (*Cryptococcus fagisuga*).

1.2.7 Participation in the Cooperative Agricultural Pest Survey (CAPS). JBLE-E began participating with Virginia Polytechnic Institute and State University performance of the CAPS program in 2005 with continued involvement annually since then (with data collection through 2017 and survey work continuing into 2018). These efforts focus on wood-boring invasive beetle taxa (cerambycids, buprestids & curculionids) that may enter through port facilities with primary target pests including *Agrilus biguttatus*, *Anoplophora glabripennis*, *Anoplophora malasiaca*, *Callidiellum rufipenne*, *Hesperophanes campestris*, *Ips typographus*, *Monochamus alternatus*, and *Ips typographus*. None of these taxa were found during the survey work from 2005 - 2017. Lindgren funnel traps are used near the installation's port facility (3d Port).

2. Responsibilities.

2.1. 733 Civil Engineer Division, Environmental Element.

2.1.1. Has overall management oversight for invasive species program management.

2.1.2. Prepares and revises the Invasive Species Management Plan.

2.1.3. Incorporates invasive species management as part of the INRMP including the Invasive Species Management Plan as an annex.

2.1.4. Develops maps and GIS data files of invasive species.

2.1.5. Prepares scopes of work for and oversees contracts related to control of invasive species.

2.1.6. Provides limited invasive vegetation chemical control.

2.1.7. Manages recreational trappers involved in removal of coyotes.

2.1.8. Performs or contracts monitoring for nutria.

2.1.9. Approves herbicides used to control invasive vegetation, maintains records related to herbicide treatment and ensures appropriate VPDES permitting requirements are met in accordance with the Integrated Pest Management Plan.

2.1.10. Records sightings of invasive vertebrate organisms.

2.2. Army Support Activity (ASA).

2.2.1. Provides information concerning specific impacts of invasive species on military training and related missions. Provides this information to Natural Resources & Integrated Pest Management Branch, Environmental Element for inclusion in revisions to the Integrated Natural Resources Management Plan (INRMP), Integrated Pest Management Plan (IPMP) and Invasive Species Management Plan.

2.2.2. Coordinates with CED for invasive species control in training areas.

3. Habitat Types at Fort Eustis

3.1. Wetland Habitat.

3.1.1. Wetlands cover approximately 3,600 acres on Fort Eustis. Approximately, 2,022 acres constitute wetlands delineation by the U.S. Army Corps of Engineers, Norfolk District with the remaining being estimated by National Wetland Inventory data. The plants that comprise the majority of the tidal wetlands include black needlerush (*Juncus roemerianus*) and saltmarsh cordgrass (*Spartina*

alterniflora). On slightly higher elevations, tidal wetland vegetation consists of big cordgrass (*Spartina cynosuroides*), saltmeadow hay (*Spartina patens*), and narrowleaf cattail (*Typha angustifolia*) and groundsel bush (*Baccharis halimifolia*). Fresh tidal wetlands consist primarily of pickerelweed (*Pontederia cordata*), and arrow arum (*Pentandra virginica*) (USATCFE, 2004).

3.1.2. Fort Eustis contains approximately 80 acres of ephemeral/vernal pools. Ephemeral/vernal pools are seasonal, freshwater wetlands that hold water for a portion of the year, usually in a contained basin with no water outlet, and support the breeding activity of amphibian and macroinvertebrates, but do not contain fish populations (USATCFE, 2004).

3.2. Terrestrial Habitat.

3.2.1. Commercial forests cover 2,784 acres on Fort Eustis. Woodlands are dominated by loblolly pine (*Pinus taeda*). Other coniferous species present in the canopy include Virginia Pine (*Pinus virginiana*) and shortleaf pine (*Pinus echinata*). Common hardwood species include red maple (*Acer rubrum*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), yellow poplar (*Liriodendron tulipifera*), mockernut hickory (*Carya tomentosa*), American elm (*Ulmus americana*), black cherry (*Prunus serotina*), American sycamore (*Platanus occidentalis*), white ash (*Fraxinus americanus*), and sweetgum (*Liquidambar styraciflua*). American beech (*Fagus grandiflora*) is also common on rich slopes adjacent to creeks (USATCFE, 2004).

3.2.2. Bald cypress (*Taxodium distichum*) and black gum (*Nyssa sylvatica*) are present on wetter soils. Understory tree species include paw-paw (*Asimina triloba*), blueberry (*Vaccinium* spp.), American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), and wax myrtle (*Myrica cerifera*) (USATCFE, 2004).

3.3. Aquatic Habitat. Aquatic habitats on Fort Eustis include the lower James River and Warwick Rivers, Eustis and Brown Lakes, Skiffes Creek, Bailey Creek, and numerous unnamed creeks and ponds. The shallow coves of Eustis Lake are characterized primarily as lacustrine wetland communities dominated by emergent species; however, there are a few coves dominated by stands of bald cypress. An upland community of mixed hardwood-pine forests surrounds the lake. Brown's Lake has little emergent vegetation and is surrounded by shrubs. Uplands on the western and northern sides are vegetated with mixed hardwood-pines. The drainage from Brown's Lake flows into the Warwick River (USATCFE, 2004).

4. BACKGROUND ON INVASIVE ANIMAL AND PLANT SPECIES.

4.1. Basis for Invasive Species Control. Management of invasive plant species is paramount to long-term sustainment of natural resources which is necessary to meet continued military mission requirements. Executive Order (Invasive Species), DODI 4715.03 (Natural Resources Conservation Program) and U.S. Air Force Instruction 32-7064 (Integrated Natural Resources Management) provide guidance and directives that Fort Eustis follows towards managing invasive species.

4.1.1. Executive Order 13112 established the National Invasive Species Council, co-chaired by the Secretaries of Agriculture, Commerce, and Interior. The National Invasive Species Management Plan recognizes that human activities are the primary means of invasive species introductions. It is a blueprint for federal action to prevent the introduction of invasive species, provide for their control, and minimize their economic, environmental, and human health impacts (National Invasive Species Council, 2001). Indeed, Executive Order 13112 directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

4.1.2. Executive Order 13112 identifies actions that may affect the status of invasive species. Subject to availability of appropriations and to the extent practicable and permitted by law, each federal agency shall use relevant programs and authorities to:

4.1.2.1. Prevent the introduction of invasive species:

4.1.2.2. Detect and control such species in a cost-effective manner;

4.1.2.3. Monitor invasive species populations;

4.1.2.4. Provide for restoration of native habitats that have been invaded;

4.1.2.5. Conduct Research on invasive species to prevent introduction and for scientifically sound control; and

4.1.2.6. Promote public education on invasive species.

4.1.3. Primary management objectives recommended in Executive Order 13112 are to eradicate small infestations and contain expansive infestations of invasive plants. Early eradication of small infestations will save significant time and money and will be more successful than attempts to eradicate larger infestations later.

4.1.4. An advisory list published by Virginia Department of Conservation and Recreation to inform land managers of potential risk associated with certain plants species known to exhibit invasive behavior is some situations is available on their website at http://www.dcr.state.va.us/dnh/invinfo.htm. The Virginia Native Plant Society and Virginia Department of Conservation and Recreation have combined their resources in an Invasive Alien Plant Project presented at http://www.wnps.org/invasive.html. This project had the following goals:

4.1.4.1. *Identify* alien plant species that have potential to become invasive in Virginia.

4.1.4.2. *Document* the threat posed by specific invasive plant species.

4.1.4.3. *Educate* the public about the issue of invasive plant species.

4.1.4.4. *Coordinate* with other agencies and organizations to identify mutual concerns and develop reasonable solutions to the problem of invasive plant species.

4.1.4.5. *Develop* and use sound practices for control of invasive species in natural areas.

4.1.5. This plan is intended to be an annex of the Fort Eustis Integrated Natural Resources Management Plan (INRMP) and is intended to follow integrated management techniques. Funding requests for invasive species management is programmed through Automated Civil Engineer System (ACES). Funding is used to manage those organisms which have the higher levels of impact on military missions. Variations in the priorities may occur annually based on ecological or human activity factors or may be based on the extent of efficacy of techniques. Funds may be used to implement contracts, obtain pesticides (primarily herbicides), generate planning maps and purchase related equipment.

4.2. How Invasive Plants Threaten and Degrade Native Habitats

4.2.1. Invasive plants constitute the majority of invasive species impacts on Fort Eustis. Some invasive vertebrate organisms do exist on Fort Eustis, and some have potential to occur. These issues are discussed separately in this plan. Invasive plants are defined as plants that reproduce rapidly, spread over large areas of the landscape and have few, if any, natural controls, such as herbivores and diseases, to keep them in check. Many invasive plants share some important characteristics that allow them to grow out of control. These include: (1) spreading aggressively by runners or rhizomes; (2) producing large numbers of seeds that survive to germinate; and (3) dispersing seeds away from the parent plant through various means such as wind, water, wildlife and people.

4.2.2. If left unchecked, invasive plants can take over natural areas and degrade natural resources. Invasive plants disrupt food webs and compete for limited natural resources. Invasive plants will also displace native plants, including rare species, reducing food and shelter for native wildlife, eliminating host plants of native insects and competing for native plant pollinators. Some invasive species spread so rapidly that they displace most other plants, changing a forest, meadow, or wetland into a landscape dominated by one species. Such “monocultures” (stands of a single plant species) have little ecological value and greatly reduce the natural biological diversity of an area.

4.2.3. Of the 4,000 alien plant species introduced to the United States that have escaped cultivation, approximately 400 are serious invaders. Half this total was introduced for horticultural uses. Others arrived accidentally in seed mixes, packaging materials, ships ballast, and by other means. Invasive plants now infest more than 100 million acres. The Virginia Department of Conservation's Division of Natural Heritage and the Virginia Native Plant Society have identified 115

invasive alien plant species that threaten or potentially threaten natural areas, parks, and other protected lands in Virginia.

4.2.4. Once thought to be a problem only on farms or in lawns, invasive plants are now recognized as a threat to natural areas, parks, forests, and other sites in a more or less natural state. Land managers, weed scientists, foresters, ecologists, and other conservationists are joining together to face this challenge in ways that help conserve native species and natural communities and protect environmental quality.

4.2.5. The goal of this invasive species management plan will be to assess which invasive plant species are having negative impacts on military training, other mission requirements and/or natural areas of the base and which species should be targeted for management. The plan will also discuss why these species should be managed and discuss methods for control.

4.3. INVASIVE PLANT SPECIES FOUND AT FORT EUSTIS.

4.3.1. Invasive Plant Species Surveys at Fort Eustis.

4.3.1.1. As discussed previously, several surveys have been conducted that led to the development of the original plan and this subsequent updated version. This included the survey from 2003 to 2005 at Fort Eustis have identified 47 species that Virginia Department of Conservation and Recreation considers invasive (Versar, 2006). Table 1 lists the species identified on the base over this three year survey of the base. Also included in the table is their invasiveness rank (as defined by Virginia Department of Conservation and Recreation).

Table 1. Invasive species identified at Fort Eustis.

Scientific Name	Common Name	Invasiveness
Ailanthus altissima	Tree-of-Heaven	High
Alliaria petiolata	Garlic mustard	High
Celastrus orbiculata	Oriental bittersweet	High
Centaurea biebersteinii	Spotted knapweed	High
Cirsium arvense	Canada thistle	High
Elaegnus umbellata	Autumn olive	High
Lespedeza cuneata	Chinese lespedeza	High
Ligustrum sinense	Chinese privet	High
Lonicera japonica	Japanese honeysuckle	High
Lonicera morrowii	Morrow's honeysuckle	High
Microstegium vimineum	Japanese stilt grass	High
Phragmites australis	Common reed	High
Polygonum cuspidatum	Japanese knotweed	High
Polygonum perfoliatum	Mile-a-minute	High
Ranunculus ficaria	Lesser celandine	High

Rosa multiflora	Multiflora rose	High
Rubus phoenicolasius	Wineberry	High
Acer platanoides	Norway maple	Moderate
Allium vineale	Field garlic	Moderate
Artemisia vulgaris	Mugwort	Moderate
Cirsium vulgare	Bull thistle	Moderate
Convolvulus arvensis	Field bindweed	Moderate
Dipsacus sylvestris	Common teasel	Moderate
Festuca pratensis	Meadow fescue	Moderate
Glechoma hederacea	Gill-over-the-ground	Moderate
Hedera helix	English ivy	Moderate
Humulus japonicus	Japanese hops	Moderate
Lonicera tartarica	Tartarian honeysuckle	Moderate
Paulownia tomentosa	Princess tree	Moderate
Phleum pratense	Timothy	Moderate
Poa trivialis	Rough bluegrass	Moderate
Setaria faberi	Faber's foxtail grass	Moderate
Stellaria media	Common chickweed	Moderate
Veronica hederifolia	Ivy-leaved speedwell	Moderate
Xanthium strumarium	Cocklebur	Moderate
Commelina communis	Asiatic dayflower	Low
Coronilla varia	Crown vetch	Low
Dactylis glomerata	Orchard grass	Low
Elaeagnus angustifolia	Russian olive	Low
Elaeagnus pungens	Thorny olive	Low
Eragrostis curvula	Weeping lovegrass	Low
Lotus corniculata	Birdsfoot trefoil	Low
Melilotus officinalis	Yellow sweet clover	Low
Morus alba	White mulberry	Low
Vinca minor	Periwinkle	Low
Wisteria floribunda	Japanese wisteria	Low

4.3.2. Additional Invasive Plant Species observed at Fort Eustis by the USFWS. There are several other non-native invasive species that have been found on the base by the USFWS that do not appear on the list in Versar (2006). The additional species observed by USFWS are listed below in Table 2. The table also provides the relative invasiveness as rated by the Virginia Department of Conservation and Recreation.

Table 2. Additional invasive species known to occur based on visual observation by USFWS.

Scientific Name	**Common Name**	**Invasiveness**
Albizia julibrissin	Mimosa	Low
Cystisus scoparius	Scotch broom	Not rated by DCR
Perilla frutescens	Beefsteak Plant	Low
Phyllostachys aurea	Golden bamboo	Not rated by DCR

Pueraria lobata	Kudzu	High
Sorghum halepense	Johnsongrass	High

4.3.3. Additional Invasive Plant Species observed at Fort Eustis by the Conservation Branch.

Table 3. Additional invasive plant species based on visual observation by Conservation staff

Scientific Name	**Common Name**	**Invasiveness**
Melia azedarach	Chinaberry	
Festuca arundinacea	Tall fescue	
Lespedeza bicolor	Shrubby bushclover	

4.3.4. Additional Invasive Plant Species likely to also occur at Fort Eustis. There are several non-native species that are likely to occur at Fort Eustis based on known occurrence in the surrounding area that do not occur on the list in Versar (2006). These additional invasive plant species are listed below in Table 3. The table also provides the relative invasiveness as rated by the Virginia Department of Conservation and Recreation.

Table 4. Invasive species likely to occur on the base based on presence in nearby areas.

Scientific Name	**Common Name**	**Invasiveness**
Broussonetia papyrifera	Paper mulberry	Not rated by DCR
Euonymus alatus	Burning bush	High
Euonymus fortunei	Wintercreeper	Moderate
Nandina domestica	Nandina	Not rated by DCR
Pyrus calleryana	Callery pear (Bradford pear)	Not rated by DCR

4.4. INVASIVE PLANT SPECIES THAT NEED TO BE MANAGED. The lists above provide a comprehensive list of all of the invasive species present or likely to be present at Fort Eustis. However, not all of these plant species are interfering with base activities or having a negative impact on native habitats. The species described below includes invasive species that are disrupting base activities, are impacting native habitats, or have the potential to disrupt these functions in the future if not controlled. These are the species that should be managed at Fort Eustis. Information on the identifying characteristics, habitat and range, impacts on ecosystems, origin and management provided in this section was taken from Kaufman and Kaufman (2007), and Miller (2003). Information is also provided on why the base needs to manage these species. The species are listed in order of invasiveness or potential invasiveness on the base with the most invasive species listed first. For each species there are areas of the base where the species is more invasive and would be a higher priority to control. Priorities for control within a species should be defined based on areas where the species is aggressively spreading into new areas, areas where the species is abundant and displacing native species, and populations adjacent to sensitive or rare plant communities.

4.4.1. Common Reed (*Phragmites australis*)

4.4.1.1. Identifying Characteristics. *Phragmites australis* is a tall, up to 20 feet, wetland grass with leaves sticking out from the stems similar to a corn plant. Leaves are 50 to 100 inches long and 0.4 to 1.75 inches wide. In summer, it produces fluffy plumes of flowers held above the stems. Distinguishing native and exotic *Phragmites australis* can be challenging, but several differences can be seen in the field. Stems of the natives are generally more scattered, while exotic *Phragmites australis* forms dome-shaped, dense masses. Natives have more grey-green leaves while exotics have more yellow green leaves. Peel the leaf back from the stem, and the native will tend to have smooth, shiny stems and a reddish color in spring and summer, whereas the exotic will have finely ribbed and dull stems with a tan color in spring and summer.

4.4.1.2. Habitat and Range. *Phragmites australi*s grows in wet areas such as marshes, floodplains, drainage ditches, lake edges, and dredge spoil areas. It tolerates brackish water. At Fort Eustis, *Phragmites australis* grows in large, monotypic stands in freshwater wetlands and in brackish wetlands where salinity is low enough. *Phragmites* also grows along the upper edge of brackish wetlands. One of the largest stands of *Phragmites* on the base is in the dredge spoil basin. *Phragmites australis* currently occupies over 200 acres of the base, and is likely spreading every year.

4.4.1.3. What it Does in the Ecosystem. *Phragmites australis* invasions begin in wet areas, and stands become so aggressive and thick that they eventually shade out native aquatic and marsh plants. The dense stands are often too thick for wildlife. *Phragmites* also provides no value as a food source for wildlife. Wildlife diversity, particularly birds, decreases significantly once *Phragmites australis* becomes established.

4.4.1.4. How it came to North America. Archeological records show that *Phragmites australis* has been present on some sites for almost 3,000 years, but its rapid spread began after European colonization, and became even faster in the last century. It spreads mainly through the transport of root fragments from one wetland to another. It is unclear how this species was introduced to the base.

4.4.1.5. Why this species needs to be managed on the base. *Phragmites australis* is one of the highest priorities for control at Fort Eustis. It is currently the most widespread invasive species found on the base, and is likely having the greatest impact on native plant communities of any other invasive plant species found on the base. It has invaded many acres of wetlands on the installation, which are a high priority ecosystem to protect. In 2011, an estimated 600-1,000 acres existed on the installation. The

presence of *Phragmites australis* in these wetlands significantly reduces flora and fauna biodiversity. Furthermore, this species poses as a significant wildland fire hazard in certain areas of the installation. In some locations such as in Training Area 28, it hinders visibility along certain road networks. Of particular concern is that it could also pose as an impact on force protection especially near installation borders and shorelines because the dense stands could be used by trespassers and other unauthorized individuals. Priority is given to areas of *Phragmites australis* that are currently spreading and to the identification and eradication of new infestations. Given the large area currently occupied by *Phragmites australis*, regular monitoring is needed to establish which areas should be prioritized first for control. Occurs installation-wide adversely affecting training and non-training areas.

4.4.1.6. Management. Once an invasion takes root, extermination becomes very difficult. Small stands can be controlled through repeated cutting or by cutting and dripping glyphosate formulated for use near water into the cut stems in late summer. Controls for large stands include burning, flooding, disking, and aerial spraying of herbicides. In tidal areas where the elevation has been raised by the placement of dredge spoil or fill material, the areas can be excavated down to low marsh elevation and planted with smooth cordgrass (*Spartina alterniflora*). This lower elevation and frequent tidal inundation is usually sufficient to keep *Phragmites australis* out of the site. Recent control effort using a imazapyr-based herbicide (i.e., Habitat®) have proven very successful for the control of *Phragmites australis*. In 2004, approximately 120 acres of area containing *Phragmites australis* was treated with Rodeo (of which glyphosate is the active ingredient). Unfortunately, subsequent seasonal treatments were not possible, and the *Phragmites australis* returned. In October 2011, a major treatment effort using imazapyr went into effect with approximately 300 acres being treated via aerial and ground spray means. This occurred at the time that this plan was being revised. Monitoring was planned for spring/summer 2012 to evaluate efficacy. Even with sufficient efficacy, additional areas will require treatment. *Phragmites australis* also colonizes disturbed areas that contain sufficiently moist soil to include open wet forested areas. Historically, the operational dredge spoil facility located near BLDG 2015 has been colonized, and it has since spread into adjacent wetlands and beyond. A similar situation exists at a former dredge spoil site across from Eustis Lake along Taylor Avenue.

4.4.1.6.1. Management of this species must include the following techniques:

4.4.1.6.1.1. Perform aerial and ground spraying preferably with imazapyr-based herbicide seasonally on all existing

viable stands. This should occur between June and October based on herbicide label specifications.

4.4.1.6.1.2. Seek resources for the conversion of the marsh noted above (across from Eustis Lake along Taylor Avenue between Harrison Road and Lee Blvd) to a lower marsh with replanting of native aquatic vegetation.

4.4.1.6.1.3. All construction sites or disturbed areas will be managed by replanting with native vegetation. An example would be the former leaf pile located along Wilson Avenue.

4.4.1.6.1.4. Manage the non-tidal wetland north of Felker Army Airfield (along Condon Road and Mulberry Island Road) as an emergent wetland. To accomplish this, a prescription burn should be performed following an aerial herbicide treatment. Follow-up routine monitoring with spot treatments will be performed. Replanting with native aquatic emergent vegetation would be implemented based on viability of the seed bank.

4.4.1.6.1.5. Once the operational dredge spoil facility has completed its lifecycle, it must be monitored for re-growth of *Phragmites australis* and controlled accordingly. This site may be a significant propagation area from which expansion could occur again in the future.

4.4.1.6.1.6. Spot treat *Phragmites australis* that tends to arise within the artificially created emergent wetland along Harrison Road. This wetland was constructed to protect Harrison Road from erosion. Invasion by *Phragmites australis* will eliminate its added value as a recreational fishing and picnic area, mar aesthetics/obscure views of the James River and impact force protection.

4.4.1.6.1.7. Prescription burns will be implemented if feasible but generally will not be used as a sole means of control. Typically a prescription burn will be used for large stands within a year of herbicide treatment.

4.4.1.6.1.8. Perform routine monitoring of treated areas.

4.4.2. Japanese Stilt Grass (*Microstegium vimineum*).

4.4.2.1. Identifying characteristics. At maturity, the clumps of stilt grass are more stem than leaves. The slender stems rise to 3.5 feet, but often bend over. They bear lime green leaves with a distinct, off-center, shiny (minute silvery hairs) midrib. Alternate, well-spaced leaves are lance

shaped, pointed fore and aft, 1 to 4 inches long and 0.5 inches wide. In late summer, thin flower stalks appear at the leaf axils or ends of the stems. Flower heads consist of 1 to 3 thin spikes with flowers or seeds clustered along the spike, somewhat resembling crab-grass like heads. By late fall, after the plants have shed hundreds of yellow to reddish, elliptical seeds, their leaves darken and the plants die. Stilt grass resembles some other grasses, but can be easily distinguished by the silver stripe along the leaf and the leaf shape.

4.4.2.2. Habitat and Range. Stilt grass prefers soils that are acidic to neutral, and have high organic content, particularly floodplain forests and streambanks. It will also grow in fields, brushy areas, along roads, and under utility lines. It can also grow, however, in slightly alkaline soils and in fairly heavy shade. On Fort Eustis, this species grows all over the base, and seems to prefer moist soils along streams and in non-tidal wetlands. This species is perhaps the most wide-spread invasive plant on the base. It is abundant where there is man-made or natural disturbance. There is a fairly large infestation of this species along the road leading out to Landfill 15. It is likely to occur along the edges of roads in other areas of the base.

4.4.2.3. What is does in the Ecosystem. By itself, stilt grass does not readily take over established natural plant communities, but given a start by some land disturbance (grazing, burning, mowing, or logging), it can quickly monopolize the ground level plant community within five years. Large patches of stilt grass, spreading by seeds, can outcompete native plants and rob the lower ones of sunlight. It will root at the stem nodes that touch the ground, but because it is an annual, only produces new plants by seed each year. Few animals browse stilt grass. Deer will not eat stilt grass, but unchecked populations of deer that reduce natural vegetation and cause soil disturbance can encourage the spread of the seed.

4.4.2.4. How it came to North America. The tradition of packing oriental porcelain in dry Japanese stilt grass (also called packing grass) probably accounts for its appearance in Tennessee around 1919 and elsewhere later on. It is unclear how and when this species was introduced to the base.

4.4.2.5. Why this species needs to be managed on the base. Japanese stilt grass should be a priority for the base to control. While this species is currently very widespread and would be nearly impossible to eradicate from the base, there are steps that can be taken to reduce its impact on native habitats. Control should be focused in areas where it is abundant, actively spreading and has become the dominant species. Because it is an annual, it is easily controlled with a glyphosate herbicide applied in September. It would also be beneficial to control this species along roadways. Because their small seeds are easily transported by water, the ditches along roadways act as pathways for the species to spread to new areas downstream. Occurs installation-wide.

4.4.2.6. Management The shallow-rooted grass is relatively easily pulled by hand when the ground is moist and the plants are tall enough to grab firmly at the base. This is impractical for large infestations. Large infestations require many hours of work and plants have to be pulled for several years to exhaust the seed bank. Mowing and weed whacking late in the season (September) before seeds set can also be useful as this will prevent seed buildup. However, mowing this species too early in the summer can give the plants time to produce new flower spikelets at the axils before winter. Systemic herbicides with glyphosate as a 2-percent solution in water (8 ounces per 3-gallon mix) with a surfactant in late summer before seed set kills stilt grass but also its competitors. Herbicides containing imazameth will kill stilt grass but not most competing natives like asters, legumes, and sedges. Repeat treatments for several years to control abundant germinating seeds will be necessary to provide necessary control. Whenever there is soil disturbance, there should be monitoring of the area to identify any new infestations, as the seeds are easily transported on equipment.

4.4.3. Japanese honeysuckle (*Lonicera japonica*)

4.4.3.1. Identifying characteristics...The sweetly scented, tubular, white to pink flowers that fade to yellow make Japanese honeysuckle most recognizable in late spring. Flowering can continue throughout the summer and into fall. The twining vines ramble across the ground and over trees and shrubs. Most leaves are simple, oval and opposite. Leaves are 1.5 to 3.5 inches long. Some lowermost leaves are lobed like oak leaves. It spreads by seeds, underground rhizomes, and aboveground runners. The black fruit matures in fall. Leaves remain on the vines year-round. Japanese honeysuckle is easily distinguished from native vining honeysuckles by its black fruits (natives have red to orange fruits) and because the upper pairs of leaves is distinctly separate as opposed to the fused leaves of the native honeysuckle.

4.4.3.2. Habitat and Range...Japanese honeysuckle frequents road-sides, field and road edges, floodplains, and disturbed woods and forest openings. At Fort Eustis, Japanese honeysuckle is fairly widespread across the base. It is most common along the edge of woods and roads and in open areas.

4.4.3.3. What is does in the Ecosystem...Japanese honeysuckle overgrows small trees and shrubs and can girdle trees as vines thicken with age, killings hosts and eventually changing forest structure. It forms a dense ground cover in sunny areas, outcompeting native vegetation through above- and below-ground competition. Deer and rabbits eat the leaves, while birds eat the fruit. Because Japanese honeysuckle tends to form a monoculture, the variety of food and shelter available for animals declines. Japanese honeysuckle can persist for many years on the forest floor until a

disturbance occurs (i.e., logging/blowdown), at which time the plant will suddenly grow very vigorously.

4.4.3.4. How it came to North America. Japanese honeysuckle first came to Long Island, New York in 1806 as an ornamental landscape vine. It spread throughout the country through the nursery trade. It was later promoted and planted for wildlife habitat and erosion control. It is still recommended for planting by some groups as wildlife food, particularly for winter forage for deer. It is unclear how or when this species was introduced to the base.

4.4.3.5. Why this species needs to be managed on the base. This species should be a priority for the base to control. This species can have significant effects on native plants species, particularly smaller understory species. This species is very easy to visually identify in the winter when other species are dormant since it keeps its leaves throughout the winter in Virginia. Most other common vines (with the exception of English ivy) are deciduous and lose their leaves in the winter. The winter is when large honeysuckle vines should be identified for control. Control should focus in areas of the base where the species is abundant and displacing native species, and on large vines that are flowering and producing abundant fruit and seed for dispersal. This will be primarily in open areas and along forest and road edges of the base. Control should focus on treatment of large infestations in open areas with herbicide and on the cutting and herbicide treatment of honeysuckle vines that are climbing into the canopy to reach sunlight. The control of these honeysuckle vines will also benefit the host tree, as the climbing vine can girdle and kill the host tree. Reducing the abundance of flowering and fruiting vines will help reduce the spread and abundance of this species on the base. Because this species is evergreen in Virginia, treatment with herbicides can be performed in the fall/winter when desirable native species are dormant. Occurs installation-wide adversely affecting training and non-training areas.

4.4.3.6. Management. In loose soil, plants can be pulled up by hand, but root fragments will resprout. Because Japanese honeysuckle holds it leaves throughout the year in Virginia, it can be sprayed with herbicide, such as glyphosate as a 2-percent solution (8 ounces per 3-gallon mix), after most other plants are dormant. The use of Garlon 3A or Garlon 4 as a 3- to 5-percent solution is also effective. Retreatment may be necessary as plants often resprout after initial spraying. In mature forests, honeysuckle can be significantly reduced by cutting vines off of trees to prevent them from climbing to the light necessary for stronger photosynthesis. For large vines, cutting and immediately treating the freshly cut stems with a glyphosate herbicide or Garlon 3A as a 20-percent solution (2.5 quarts per 3-gallon sprayer) in water with a surfactant is also effective. Prescribed burning in spring will reduce dense ground mats and sever climbing vines for more effective herbicide treatments to re-sprouting vines.

4.4.4. Tree of Heaven (*Ailanthus altissima*).

4.4.4.1. Identifying characteristics. This fast growing deciduous tree attains a height of 80 feet or more. The 11 to 41 leaflets on a straight stem are actually part of a single 1 to 4 foot long compound leaf that appears very late in the spring. Each leaflet is lance shaped with a long pointed tip and has just 1 to 5 teeth at the base of the leaflet. Crushed foliage has an unpleasant odor often described as burnt peanut butter. The leaves are alternately arranged. The stout twigs are covered with fine hairs when young and have a yellowish pith. On older trees the bark is relatively smooth and either light brown or striped gray-brown. In early summer, trees produce yellowish flowers held in a large cluster above the leaves at the ends of the branches. Male and female are on separate trees. A single large female tree can produce more than 300,000 papery-winged, wind-dispersed, tan seeds in late summer to fall.

4.4.4.2. Habitat and Range. Tree of heaven tolerates a wide range of soils, from coastal sandy soils to rocky mountain soils, but it is not very shade tolerant. It thrives in disturbed areas and tolerates air pollution and acidic soils. It can be found along road embankments, field edges, urban pavement cracks, railroad beds, mine spoils, and in disturbed forests. At Fort Eustis, tree of heaven can be found along forest edges, particularly along roadways. It is most common along the southern part of the base. There is a large stand of tree of heaven in Training Areas 23 and 24.

4.4.4.3. What is does in the Ecosystem. Once established, tree of heaven sends up many root sprouts, rapidly forming a dense colony. Chemicals released from the roots and from leaf litter hinder the growth of other plants. The aggressive root system can damage sewer pipes and foundations. These colonies will quickly inhibit the growth and establishment of native species.

4.4.4.4. How it came to North America. Tree of heaven is native to China where it was called tree of heaven because it grew out of the rocks on mountains where other trees would not grow. Tree of heaven first reached Philadelphia in 1748, introduced by a gardener. Nurseries, particularly on the east coast, sold tree of heaven because it was pest free, grew quickly, and was easy to grow in any soil. Chinese immigrants brought seeds to the west coast in the 1850s during the Gold Rush, probably because of traditional medicinal uses. It is unclear how this species was introduced to the base.

4.4.4.5. Why this species needs to be managed on the base. While this species appears to be widespread across the base, it does not appear to be incredibly abundant, however this is expected to change given sufficient time without any control measures. This species is a high priority for the base to control because of its ability to spread quickly and colonize new

areas, thus having a significant impact on native plant communities and military missions especially training. It has the ability to interfere with military training activities as there is currently a large infestation of this species in Training Areas 23 and 24 where it can lead to impenetrable areas. This restricts movement of personnel during land navigation, small unit tactics, bivouac and other training activities. It is most common along forest edges and in forest openings. Because this species produces abundant seed (one tree can produce up to 300,000 seeds per year), initially, priority should be focused on the identification of infested areas and the elimination of trees that are producing seed, particularly older trees. This will help slow the spread of this species. Once prevented from producing seed, control should focus on smaller trees that surround these larger trees. With persistence, this species can be managed effectively. Occurs installation-wide but has a major impact on training areas.

4.4.4.6. Management. Cutting trees only encourages a huge number of root sprouts, in addition to the resprouting at the trunk. Small trees can be pulled by hand or with a weed wrench, but fragments of root can result in more root sprouts. The “hack and squirt” method works well for larger trees, notching the trunks with an axe and squirting a systemic herbicide into the cut or cutting trees and applying herbicide to the cut stump in summer using Garlon 3A, Pathway, Pathfinder, or Arsenal AC in dilutions specified on the label. On saplings, applying Garlon 4 as a 20-percent solution in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3-gallon mix) with a penetrant to young bark as a basal spray in late winter/early spring is also effective. Spraying the foliage of the trees in summer with Arsenal AC as a 1-percent solution (4-ounces per 3-gallon mix), Krenite S as a 30-percent solution (3 quarts per 3-gallon mix), or Garlon 4 as a 2-percent solution (8 ounces per 3-gallon mix) and a surfactant is also effective. Several fungal pathogens are under investigation as possible control agents.

4.4.5. Kudzu (*Pueraria montana*).

4.4.5.1. Identifying characteristics. This fast growing deciduous vine scrambles over trees, buildings, and power lines. Kudzu leaves are made up of three leaflets, each of which can be unlobed or have 2 to 3 lobes with the leaflet up to four inches wide. Leaves have hairy margins and grow alternately along the stem. Individual flowers, about 0.5 inches long are purple, highly fragrant, and born in long hanging clusters in midsummer. Brown, hairy flat seed pods follow quickly with 2 to 10 hard seeds. Kudzu has massive taproots up to 6 feet in length.

4.4.5.2. Habitat and Range. Kudzu adapts to a variety of soils, but thrives in areas with mild winters and hot, humid summers with annual average rainfall above 40 inches. At Fort Eustis, kudzu appears to be fairly localized in distribution and is not widespread. However, the potential for

this species to spread is high. One stand existed in Training Area 2 and an estimated 11 acres existed north and south of the second access gates. The stand in Training Area 2 was treated in 2009 and monitoring suggests it has been eradicated from that location. The stand near the second access gate was treated in September-October 2011. This stand was being monitored at the time this plan was revised. Continued monitoring throughout the installation is necessary to prevent re-establishment.

4.4.5.3. What is does in the Ecosystem Kudzu's massive area of leaves collects nitrogen and sunlight from the air. It is almost entirely an open field and forest edge invader, but it now affects up to 7 million acres of land by some estimates. While frost kills most of the vines each fall, shoots resprout every spring from the roots and vines can grow up to 1 foot a day and send out anchor roots as they grow. In the 6 month frostless periods in the summer, one root can send out 30 vines and a vine can grow over 100 feet and grow over the tops of trees and power lines. Roots can penetrate 10 feet into the ground and weigh over 100 pounds. Few kudzu seeds are viable and those that are may take several years to germinate, so kudzu spreads mostly vegetatively.

4.4.5.4. How it came to North America. The Japanese government's garden of native plants at the 1876 Centennial Exposition in Philadelphia, Pennsylvania, included kudzu. Americans began using it in the Southeast to shade porches with its broad leaves and sweet smelling blossoms. In the 1920s, one Chipley, Florida, nursery sold kudzu through the mail to be planted for forage. In the 1930s, as small farmers in the South abandoned unprofitable red clay soils, government work crews planted thousands of acres of kudzu for erosion control. In the 1940s, the government helped spread kudzu by paying farmers $8 an acre to plant kudzu in old fields. The U.S. Department of Agriculture removed kudzu from its list of approved cover crops in 1953. It is unclear how this species was introduced to the base.

4.4.5.5. Why this species needs to be managed on the base. Most infestations at the base were fairly limited in size though it had spread several acres moving south along the Warwick River prior to treatment in 2011. However, without continued vigilance, the potential for re-establishment is significant and can quickly and overwhelm many acres of the base. It will be much more cost effective to control the species now while distribution if relatively limited and treatment has been implemented. Establishment in training areas create huge stands greatly limiting visibility and movement during training activities. Additionally, growth will overwhelm trees creating hazards when the tree is weakened or dies. This remains an additional concern for training areas but also exists as such in non-training areas. Furthermore, expansive growth mars aesthetics throughout the year. For these reasons, kudzu should be a priority for the base for monitoring and manage should its presence be identified. Based

on existing information as to its infestation and subsequent treatments in 2009 and 2011, eradication from the installation may have been achieved. Originally occurred near the second access gate and Training Area 2.

4.4.5.6. Management. The key to control is root destruction. Agriculturalists have found that goats will control kudzu and even kill it if an area is grazed for at least 3 years. Pigs are more effective since they eat the roots as well as the vines. Use of livestock remain as options; however, logistical aspects require further consideration before implementation. Monthly close to the ground mowing for at least two years to deplete carbohydrate storage can eliminate some stands. Systemic herbicides such as Garlon 4 or a glyphosate herbicide as a 2-percent solution in water (8 ounces per 3-gallon mix) with a surfactant can be applied late in the season to cut vine stumps and any resprouts. Applying Garlon 4 as a 20-percent solution in commercially available basal oil, diesel fuel or kerosene (2.5 quarts per 3-gallon mix) with a penetrant to large vines as a basal spray in the spring (January to April) will control vines less than 2 inches in diameter.

4.4.6. Chinese lespedeza (*Lespedeza cuneata*).

4.4.6.1. Identifying characteristics. This perennial legume forms a bushy clump from 1 to 5.5 feet tall with as many as 20 stems. Each stem is covered with leaves divided into 3 leaflets. Leaves are arranged alternately along the stem. Chinese lespedeza can be distinguished from all other lespedezas by the wedge-shaped base of the leaflets. Leaflets are only 0.5 to 1 inch long and are covered by dense hairs giving them a gray-green appearance. Chinese lespedeza flowers from midsummer to fall, with two flower types. The showier flowers are small creamy white flowers with purple throats nestled in clusters of 2 to 4 among the leaves along the upper parts of the branches. These flowers are insect-pollinated. The other flowers do not have petals and are self-pollinated. They are mixed in with the insect pollinated flowers. Bicolor lespedeza and Thunberg's bushclover are woodier and larger than Chinese lespedeza and the flowers are arranged in an elongated cluster.

4.4.6.2. Habitat and Range. Chinese lespedeza grows in meadows and prairies, along roadsides and in pastures. It tolerates poor soil conditions and prefers sunny sites. Stands can be damaged by late spring freezes. At Fort Eustis, this plant is widespread, however, it is most abundant in open areas that are infrequently mowed. This species is particularly abundant on the capped landfills (Landfills 7 and 15) that are infrequently mowed. This species does persist in wooded areas and along forest edges but is not dominant or aggressive under these lower light conditions.

4.4.6.3. What is does in the Ecosystem. Plants develop into large stands through spreading root systems. A single plant can persist for more than 20

years. Because it spreads vigorously, it displaces native plants and hinders their colonization. Given time, this species can come to completely dominate open areas if left unchecked. It is competitive during droughts because a deep taproot allows it to persist. The tannins and other chemicals inhibit the growth of other plants and make older lespedeza plants unpalatable to grazers. In meadows, it does provide cover for ground nesting birds. Bobwhite quail will eat the seeds, however, very few other bird species will eat the seeds.

4.4.6.4. How it came to North America. Native to Asia and Australia, Chinese lespedeza was brought first to Arlington, Virginia, in 1899. It spread to the southeastern United States, planted as forage for livestock and for erosion control. Wildlife managers often recommended it for meadow plantings to encourage quail. It is still widely planted for quail despite is listing as an invasive species in many states. It is unclear how this species was introduced to the base.

4.4.6.5. Why this species needs to be managed on the base. In open areas of the base, this species has the potential to form a monoculture. When first identified on a site, it only takes a couple of years for this species to become dominant and outcompete nearly all other species. The presence of this species significantly impacts native plant communities. The presence of this species in training areas could significantly interfere with military training since once established this species forms thick mats that are difficult to walk through. This species is also a prolific seed producer, which allows the species to spread very quickly in open areas. For these reasons, Chinese lespedeza should be a priority for the base to manage.

4.4.6.6. Management. Because of the extensive root system and because seeds remain viable in the soil for many years, eradicating Chinese lespedeza takes persistence. Hand pulling is ineffective because of the extensive root system. Mowing just before plants begin to flower for several years in a row can reduce the vigor of plants and keep them from spreading. Applying Garlon 4 to the leaves as a 2-percent solution (8 ounces per 3-gallon mix) during mid to late summer can be very effective. Mowing 1 to 3 months before herbicide applications can assist with control. A glyphosate herbicide as a 2-percent solution (8 ounces per 3-gallon mix) can also be used, however, impacts to non-target species will be greater than with Garlon 4. Transline applied as a 0.2-percent solution (1 ounce per 3-gallon mix) can be used to reduce impacts to non-target plant species.

4.4.7. Johnson grass (*Sorghum halepense*).

4.4.7.1. Identifying characteristics. Mature Johnson grass grabs the soil with half inch thick roots, grows to 8 feet tall, and reproduces by rhizomes and copious seed. Rhizomes are white to pinkish when young, beige when

mature, and have frequent nodes. Leaf blades are flat with a white rib, up to 2 feet long and 1 inch wide with rough but not toothed margins, bright green, sometimes with purple shoots. The seed heads are purplish and hairy, can be 2 feet long, beginning compact then opening with pairs or trios of spikes at the node of the panicle, one of each pair being non-seed bearing. Rhizomes distinguish it from corn. The white leaf vein distinguishes it from eastern gamagrass and switchgrass. Big bluestem and indiangrass have narrower leaves and usually no distinct midvein.

4.4.7.2. Habitat and Range. This Mediterranean native prefers habitat in old fields, croplands, pastures, forest edges, power line clearings, fertile bottomlands, and streambanks. Agronomists consider it one of the worst weeds in the world with 53 countries reporting it as a major problem. At Fort Eustis, Johnson grass invades open fields that are infrequently mowed, particularly after having been disturbed. This species is particularly abundant on the capped landfills (Landfills 7 and 15) that are infrequently mowed.

4.4.7.3. What is does in the Ecosystem. Johnson grass plants can produce over 80,000 seeds in one season and 200 feet of rhizomes. The seed remains viable for over 20 years. Johnson grass on untended land often forms pure stands that outcompete native grasses for space, water, and nutrients, thus reducing both animal and plant diversity. Because of the large amount of biomass it produces, it becomes a fire hazard during dry periods.

4.4.7.4. How it came to North America. By the mid-1800s, botanists had identified Johnson grass in North America using 8 different botanical names and dozens of common names. In 1874 an Alabama botanist called it Johnson grass because it had been grown for 40 years on the farm of Colonel Johnson. The grass had previously been called Means grass because Gov. John Means of South Carolina had imported it from Turkey as “guinea grass” and he and his brother William both grew it. The grass apparently overran William’s farm and he moved to Louisiana. The governor said he could not move because “the big grass has inspired such a terror that no one will even look at (my place).” Johnson grass has since spread in contaminated feed and seed shipments. It is unclear how this species was introduced to the base.

4.4.7.5. Why this species needs to be managed on the base. In open areas of the base, this species has the potential to form a monoculture. When first identified on a site, it only takes a few years for this species to become dominant and outcompete nearly all other species. The presence of this species significantly impacts native plant communities. The presence of this species in training areas could significantly interfere with military training since once established this species forms thick tall stands that are difficult to walk through. This species is also a prolific seed producer,

which allows the species to spread very quickly in open areas. For these reasons, Johnson grass should be a priority for the base to manage. Occurs installation-wide.

4.4.7.6. Management. In pastures, heavy grazing, especially by hogs and goats, can eventually kill of Johnson grass. The key is to prevent seeding and deny nutrients to the roots. Cultivating fields colonized by Johnson grass often spreads the invasion by chopping the rhizomes into pieces and replanting them. Tilling or plowing in late fall exposes roots to freezing and can be followed by herbicides or grazing in spring. For a limited area, hand pulling should be done only when the ground is wet and soft so that roots do not break and resprout. Application of a glyphosate herbicide as a 2-percent solution (8 ounces per 3 gallon mix) to the foliage during the summer before seed set can be effective, however, only if continued for 3-4 years.

4.4.8. English Ivy (*Hedera helix*).

4.4.8.1. Identifying characteristics. This evergreen climbing vine has dark waxy leaves placed alternately along the stem. Leaves can take several forms but are generally 3-lobed with a heart-shaped base. Plants can remain immature indefinitely, but sunlight triggers maturity such as when vines climb into trees. Mature plants branch out and have unlobed, rhomboid-shaped leaves. Sunlight triggers the flowering of clusters of small, greenish-white flowers that in late summer form blackish fleshy fruits around one to several stone like seeds. Ivy spreads by runners and also by bird-dispersed seeds.

4.4.8.2. Habitat and Range. Native to Europe, western Asia, and northern Africa, English ivy prefers shady or semi-shady, moist areas but is drought tolerant. It thrives in disturbed forests. At Fort Eustis, this species is not widespread. However, given time and left unchecked, this species has the potential to become a larger problem at the base. The few areas this species is known to exist may be remnants of old home sites. The one area where English ivy is known to currently exist is in Training Area 3.

4.4.8.3. What is does in the Ecosystem. English ivy grows along the ground and climbs on any plant or object in its path. The dense blanket blocks light and germination of other plants beneath it, reducing local plant diversity. It will grow several stories up the sides of buildings or into the canopy of a forest, adding weight to the trees. This added weight can make them more susceptible to blowdown, particularly in this area where tropical storms and hurricanes are common. Covering tree trunks, ivy can loosen bark and hold moisture against the tree trunk, encouraging fungus and decay. Few birds will eat the berries as they are considered mildly toxic.

4.4.8.4. How it came to North America. European colonists introduced English ivy early in their settlement of North America, mainly as a decorative plant. The earliest record of English ivy in North America is from 1727. In cultivation, it is fast growing and requires little maintenance. It is unclear how this species was introduced to the base, although it may exist from old home sites.

4.4.8.5. Why this species needs to be managed on the base. This species is currently spreading across the base. It is more cost effective to control this species while relatively limited in distribution. This species is currently growing in Training Area 3, thus it has the potential to eventually interfere with military training activities in this area. For these reasons, this species should be a priority for the base to manage. Initial control efforts should focus on cutting vines that are growing up trees, as these are the portions of the vines that flower and produce prolific seed for dispersal. This should immediately be followed with herbicide treatment of the cut stump. Occurs installation-wide and may eventually kill trees that become hazards in training and non-training areas.

4.4.8.6. Management. Vines can be pulled up by hand or dug up. Vines on the ground can also be smothered by covering them with plastic or a thick layer of newspaper and mulch during the summer. Climbing vines can be contained by cutting stems near the ground, but do not attempt to remove from high branches. Since ivy can reproduce from cuttings or vines in contact with the soil, do not leave cut vines on the ground. Application of either Garlon 3A or Garlon 4 to leaves with a surfactant in late summer to early fall (July to October) as a 3- to 5-percent solution (12 to 20 ounces per 3-gallon mix) can be effective. Application of a glyphosate herbicide as a 2-percent solution (8-ounces per 3-gallon mix) is also effective. Use of a string trimmer to reduce growth layers and injure leaves to improve herbicide uptake will enhance effectiveness. These herbicides can also be applied to the cut stems. Applying Garlon 4 as a 20-percent solution in commercially available basal oil, diesel fuel or kerosene (2.5 quarts per 3-gallon mix) with a penetrant to large vines as a basal spray can be effective, however, care should be taken to avoid spraying the bark of the host tree.

4.4.9. Chinese privet (*Ligustrum sinense*).

4.4.9.1. Identifying characteristics. While several species of privet may occur on the base, the most common species in the area is Chinese privet. Chinese privet is an evergreen shrub that grows up to 15 feet tall. The glossy, leathery leaves are arranged opposite along the stem and are ovate to elliptic with rounded tips. Leaves are 0.8 to 1.6 inches long and 0.4 to 1.2 inches wide. In early summer, small plumes of tiny white flowers with a fused base breaking up into 4 petals appear at the ends of the twigs. By fall, clusters of dark blue-black berries have matured.

4.4.9.2. Habitat and Range. Chinese privet grows along woodland edges, in floodplains, old fields, riparian forests, and upland forests. Privet is tolerant of some shade and of occasional drought. In shade, privet will readily sprout and grow but will not flower until a disturbance opens up the canopy. At Fort Eustis, Chinese privet is widespread, growing along forest edges and open areas. Because of its fast growth, privet will quickly outcompete native plants in open areas and forest edges.

4.4.9.3. What is does in the Ecosystem. Privet forms dense stands that outcompete native plants for space, light, and water. Few insects feed on it because chemicals in the leaves inhibit digestion. Deer will feed on privet. Birds will eat the fruit and disperse the seeds to forest gaps and into fields. The ingestion by birds is the main form of dispersal and has allowed this species to quickly colonize new areas.

4.4.9.4. How it came to North America. Chinese privet was introduced into the United States in 1952 for use in gardens. Other privet species were introduced much earlier. It quickly spread from gardens into natural areas by birds who ingest the fruit. It is unclear how this species was introduced to the base.

4.4.9.5. Why this species needs to be managed on the base. This species can become very abundant in open areas and along forest and road edges and can have negative effects on native plant communities. This species could also interfere with military training if large infestations were established. For these reasons, Chinese privet should be managed by the base. Because this species is evergreen, and has small leaves, it is fairly easily to identify along roads and forest edges in the winter when other species are dormant. Initial control efforts should focus on the identification and removal of large shrubs that are producing abundant flowers and fruit for dispersal. This initial control effort should reduce the spread of this species. Priority should also be given to areas with large numbers of plants, as these can interfere with the growth of native plant communities. Occurs installation-wide and is a significant issue in training areas.

4.4.9.6. Management. Young plants can be hand pulled or pulled with the aid of an uprooting tool like a weed wrench or mattock. Shrubs can also be cut multiple times until they die. To control with herbicides, thoroughly wet all leaves with a glyphosate herbicide as a 3-percent solution (12 ounces per 3-gallon mix) or Arsenal AC as a 1-percent solution (4 ounces per 3-gallon mix) with a surfactant in late summer to early winter (August to December). For large plants, cut stems should immediately be treated with Garlon 3A or a glyphosate herbicide as a 20-percent solution in water (2.5 quarts per 3-gallon mix) with a surfactant. Large plants can also be treated with Garlon 4 as a 20-percent solution in a commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallon mix) with a

penetrant to young bark as a basal spray. Additionally, some success was observed using Pathfinder II herbicide that has the active ingredient Triclopyr Butoxyethylester (13.6 %). This should be used for woody vegetation with less than 6 inches basal diameter.

4.4.10. Thorny olive (*Elaeagnus pungens*).

4.4.10.1. Identifying characteristics. This may not be the only *Elaeagnus* sp. found on the base, however this is likely the most common. Autumn olive (*E. umbellata*) and Russian olive (*E. angustifolia*) are also reportedly present on the base (Versar, 2006). Thorny olive tends to grow as a dense shrub with long shoots coming out of the top while the other two tend to grow as small trees to 30 feet. Leaves on the thorny olive are alternate, oval to elliptic and thick, 0.4 to 4 inches long and 0.2 to 2 inches wide. Blade surfaces are silver and scaly in spring becoming dark green or brownish green above and densely silver and scaly with scattered brown scales beneath. Numerous silvery white flowers in clusters are produced in the fall that are tubular with four lobes. Red juicy fruits that are 0.3 to 0.6 inches are produced in late fall.

4.4.10.2. Habitat and Range. This species is usually found as scattered plants in forest openings, open forests, and along forest edges. This species thrives in sandy floodplains, but is intolerant of shade. At Fort Eustis, this species is fairly widespread along forest edges and in open areas or young forests. There are some parts of the base where this species is relatively abundant.

4.4.10.3. What is does in the Ecosystem. The roots of thorny olive form an association with bacteria to fix nitrogen, which may change the composition of the plant community. Shrubs can grow so densely that they outcompete other species. This species does provide both cover and winter food for wildlife, however the diversity of plants is reduced where this species is abundant.

4.4.10.4. How it came to North America. This species was introduced as an ornamental from China and Japan in 1830. This species was frequently planted for hedgerows and on highway right-of-ways and is still used for landscaping. Wildlife managers extensively promoted the use of this species as cover and food for wildlife and agricultural extension agents promoted their use to farmers as fast growing windbreaks. It is unclear how this species was introduced to the base.

4.4.10.5. Why this species needs to be managed on the base. This species can become abundant in open areas and along forest and road edges and can have negative effects on native plant communities. This species could also interfere with military training if large infestations were established. For these reasons, thorny olive should be managed by the base. Because

this species is evergreen, and has distinguishing leaf color and growth form, it is fairly easily to identify along roads and forest edges in the winter when other species are dormant. Initial control efforts should focus on the identification and removal of large shrubs that are producing abundant flowers and fruit for dispersal. This initial control effort should reduce the spread of this species. Priority should also be given to areas with large numbers of plants, as these can interfere with the growth of native plant communities.

4.4.10.6. Management. Young seedlings can be pulled by hand, especially when the soil is moist. To control with herbicides, the leaves of seedlings and small saplings should be thoroughly wetted with Arsenal AC or Vanquish as a 1-percent solution in water (4 ounces per 3-gallon mix) with a surfactant between April and October. To control larger plants, apply Arsenal AC as a 10-percent solution (1 quart per 3-gallon mix) or a glyphosate herbicide as a 20-percent solution (2.5 quarts per 3-gallon mix) to stumps immediately after cutting. This treatment is most effective in late summer. Large plants can also be treated with Garlon 4 as a 20-percent solution in a commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallon mix) with a penetrant to young bark as a basal spray (January to February or May to October).

4.4.11. Princess tree (*Paulownia tomentosa*).

4.4.11.1. Identifying characteristics. This tree can be recognized by its large, heart-shaped, velvety leaves and the pale, violet spring flowers that blossom in 8 to 12 inch long, upright clusters. Flowers are 1.5 to 2 inches long and tubelike. Leaves are in opposite pairs on the stems and 5 to 12 inches long. Flowers produce a 4-segment capsule that shelters thousands of small, winged seeds. Capsules stay attached during the winter and smaller rounded flower buds are also visible in winter. New branches and stems are greenish to brown, flattened where stems and branches join. Bark is thin with shallow creases. Second-year branches are pithy to hollow inside. Trees grow very rapidly, reaching 50 feet tall and 2 feet in diameter.

4.4.11.2. Habitat and Range. Because of its copious seed production and ability to spread seed by wind, Princess tree quickly colonizes sites following disturbance (clearcuts, burns, and storm blowdowns). Princess tree will also grow along forest edges and open areas where sunlight is sufficient. At Fort Eustis, the species is widespread but not abundant, but because of its prolific seed production has the potential to become more abundant and widespread. The species seems to grow along the edge of woods and roads where there is sufficient sunlight.

4.4.11.3. What is does in the Ecosystem. Princess tree can grow more than 15 feet a year and send up new shoots from root sprouts. A single tree can

produce up to 20 million seed a year that are easily spread by wind and water. The seeds germinate and grow quickly. Because of their fast growth and prolific seed production, this species can quickly outcompete native species for light and moisture.

4.4.11.4. How it came to North America. The Dutch East India Company brought princess tree to Europe in the 1830s from its native China and Japan. It was brought to North American shortly thereafter. It has been widely planted in North America as an ornamental and grown in scattered plantations for speculative high value wood exports to Japan. It is also sold in the nursery trade as an extremely fast growing shade tree. It is unclear how this species was introduced to the base.

4.4.11.5. Why this species needs to be managed on the base. While this species appears to be widespread across the base, it does not appear to be incredibly abundant. This situation could change given sufficient time without any control measures. This species is very easy to visually identify in the spring with its showy pale-violet flower clusters and in the winter with its large branches and terminal nut-like clusters. It is most common along forest edges and in forest openings. Because this species produces abundant seed (up to 20 million per year) and is very fast growing, this species should be a priority for the base to manage. Initially, priority should be focused on the identification of infested areas and the elimination of trees that are producing seed, particularly older trees. This will help slow the spread of this species. Once these large seed trees are eliminated, management should focus on the smaller trees. With persistence, this species can be managed effectively.

4.4.11.6. Management. Hand pulling of young plants should be done when soil is wet so the entire root system can be removed. Trees can be cut or mowed and then repeatedly mowed until the tree dies. To control with herbicides, the leaves of small trees can be sprayed with Arsenal AC as a 1-percent solution (4 ounces per 3-gallon mix) or with a glyphosate herbicide, Garlon 3A or Garlon 4 as a 2-percent solution (8 ounces per 3-gallon mix) in late summer (July to October). Arsenal AC or a glyphosate herbicide can also be applied to stumps immediately after cutting anytime except March and April. This can also be applied as stem injections. Apply at concentrations as specified on the label.

4.4.12. Mimosa tree (*Albizia julibrissin*).

4.4.12.1. Identifying characteristics. Mimosas are small trees that grow 20 to 40 feet tall. They are often multistemmed with vase-shaped branching. The bark is smooth and tan colored. Trees leaf out late in spring. Their feathery double compound leaves are arranged alternately along the stem, and each leaf is about 20 inches long. Most distinct are the fragrant, pink, powder-puff looking flowers at the ends of the branches that bloom in early

summer and are 1.5 inches across. Clusters of tan to brown 6 inch long flat pods form in late summer each containing several oval, flattened seeds.

4.4.12.2. Habitat and Range. Mimosa grows in open areas, forest edges and river floodplains in a wide range of soil types. It is also tolerant of drought, wind and salt spray. At Fort Eustis, this species is widespread but not particularly abundant. However, because of its ability to produce prolific seed, there is high potential for this species to spread. It occurs mostly along forest edges along roads. This species prefers open sunny conditions, but will persist in shade.

4.4.12.3. What is does in the Ecosystem. Because of its prolific seed production, mimosa can produce dense stands that can reduce light and water available to native plants. Trees fix nitrogen and their leaf litter is high in nitrogen resulting in higher soil nitrogen levels, potentially changing the plant community. The flowers from this species do provide nectar for hummingbirds and many insects.

4.4.12.4. How it came to North America. Mimosa was introduced from Asia in the late 1700s to Charleston, South Carolina. Thomas Jefferson brought this species to Virginia in the late 1700s to grow at Monticello. It was widely introduced as an ornamental plant around the same time because of its unusual, attractive and fragrant flowers and interesting fern-like foliage. It is unclear how this species was introduced to the base.

4.4.12.5. Why this species needs to be managed on the base. While this species appears to be widespread across the base, it does not appear to be incredibly abundant. This situation could change given sufficient time without any control measures. This species is very easy to visually identify in the spring with its pink powder-puff looking flowers. It is most common along forest edges and in forest openings. Because this species produces abundant seed that is viable for many years and is fast growing, this species should be a priority for the base to manage. Initially, priority should be focused on the identification of infested areas and the elimination of trees that are producing seed, particularly older trees. This will help slow the spread of this species. Once these large seed trees are eliminated, management should focus on the smaller trees. This species can be managed effectively.

4.4.12.6. Management. Seedlings can be hand pulled. Trees resprout readily after being cut, and they sucker from roots. Seeds can remain viable for up to 50 years. Trees can be cut while flowering to eliminate seed production, but resprouts will have to be cut or stumps treated with herbicide. For large trees, mimosa can be controlled with stem injections of Arsenal AC or Garlon 3A in dilutions as specified on the label (anytime except March and April). For felled trees, these herbicides should be applied to the stem and cut stump immediately after cutting. For smaller

trees, the application of Garlon 4 as a 20-percent solution in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3-gallon mix) with a penetrant to young bark as a basal spray can be effective. For stump resprouts and seedlings, thoroughly wet all leaves with either Garlon 3A, Garlon 4, or a glyphosate herbicide between July and October as a 2-percent solution (8 ounces per 3-gallon mix) or with Transline between July and September as a 0.2 to 0.4 percent solution (1 to 2 ounces per 3-gallon mix).

4.4.13. Golden bamboo (*Phyllostachys aurea*).

4.4.14. Identifying characteristics. Golden bamboo grows in dense evergreen thickets with hollow stems up to 30 feet high and 1 to 6 inches in diameter. Golden bamboo is distinguished by its inflated and often contorted internodes near the base of the stem. The green-gold stems and twigs bear leaves 0.25 to 0.75 inches wide and 3 to 10 inches long, generally growing alternate or in fanlike clusters pointing upward. The plant spreads by shallow underground stems (rhizomes) that send up new stems from alternate nodes. This particular species of bamboo may flower only once in 7 to 12 years.

4.4.15. Habitat and Range. Golden bamboo prefers open sunlight and warm climates, though it tolerates winter temperatures to 0°F (-18°C). It also grows in partially wooded areas. The optimum soils are light and moist or southeastern clays that hold moisture. At Fort Eustis, there are several large clumps of bamboo. There is one clump along the edge of a wooded area along the James River, and several large clumps on the golf course. Their spread appears to be controlled by mowing, particularly at the golf course. There may also be other clumps of this species on the base.

4.4.16. What is does in the Ecosystem. In open areas and disturbed areas, golden bamboo spreads very rapidly by rhizomes. Because of the density, height and spreading leaves of bamboo stands, they effectively eliminate native vegetation by the dense shade they cast.

4.4.17. How it came to North America. Several hundred bamboo species have been brought to North America for ornamental planting, with 24 of these being in the *Phyllostachys* group. Bamboo was also widely planted for fishing poles. Golden bamboo, the most invasive, was introduced in Alabama in 1882 from Asia. It is unclear how the species was introduced to the base.

4.4.18. Why this species needs to be managed on the base. This species can become abundant in open areas and along forest edges and can have negative effects on native plant communities. This species could also interfere with military training if large infestations were established. For these reasons, bamboo should be managed by the base. There are several large patches of bamboo on the golf course that are interfering with golf course maintenance activities. For this reason, these areas may be the highest priority for control. The base should be thoroughly

surveyed for the presence of this species. The infestations that are identified should then be controlled.

4.4.19. Management. Small stands can be controlled and contained by mowing repeatedly to kill shoots sent up by rhizomes. For larger stands, most bamboos are easily controlled by combining cutting to the ground in June with a fall application of herbicides to any regrowth, and a repeat application two weeks later. Concentrated solutions applied to stems immediately after cutting will also prevent most regrowth. Arsenal AC as a 1-percent solution (4 ounces per 3-gallon mix), a glyphosate herbicide as a 2-percent solution 8 ounces per 3-gallon mix), or a combination of the two herbicides should work best.

5. MANAGEMENT OF INVASIVE PLANT SPECIES.

5.1. General Mechanisms of Invasive Plant Control. There are five basic steps for managing invasive plant species (Kaufman and Kaufman, 2007) which include:

5.1.1. Prevent the introduction of invasive species. Discourage the use of non-native invasive species in landscaping and erosion control, and maintain the quality of natural areas by limiting excessive disturbance and maintaining a cover of native species.

5.1.2. Learn to recognize invasive plants and monitor natural areas regularly to catch invasions early.

5.1.3. Prevent invasive plants from reproducing by seed and vegetatively.

5.1.4. Thoroughly clean all tools and equipment used in managing invasive plants to avoid spreading plants to new areas.

5.1.5. Share information with other landowners and land managers and work cooperatively to prevent and control invasive species.

5.1.6. The easiest course of action is to prevent invasions in the first place. When selecting plants for landscaping, learn what plants are invasive in the area and avoid planting them. If invasive plants are already planted on the base, consider removing them and replacing them with native species. Monitor the base for the appearance of new populations of an invasive species. It is always easier to remove something as soon as it appears then to wait until it is established and reproducing. Many invasive plants get their start on disturbed ground and in areas where native plant cover has been damaged. It is important to monitor these areas and to restore native plant communities. Monitoring is especially important after earth moving, logging, hurricanes and tornadoes, floods, and fires. These disturbances provide opportunity for many invasive plant species to become established.

5.1.7. In areas where invasive plants are abundant, develop a plan to address them. Map out which invasive plants occur in what areas and categorize the level of

infestation (light, moderate, and heavy). Based on this information, determine which areas have top priority for removal. This might be areas with rare plants or animals, heavily infested areas near high quality uninvaded habitat, areas with new, still small, invasions, or places like streambanks and road edges from which invaders are likely to spread.

5.1.8. Once priority areas are established, determine when and how each area will be controlled. Control techniques can be broken down into mechanical, chemical, and biological controls. Mechanical controls vary from hand pulling plants to mowing to cutting them down with chainsaws. Generally, mechanical controls are cheap but labor-intensive.

5.1.9. Hand pulling is often effective for controlling young plants or plants without extensive root systems. For larger plants, tools like a weed wrench, root talon, or mattock can be used to pull up or dig up plants. The disadvantage of pulling or digging plants is that it often causes soil disturbance, which can create new sites for invasive seeds to germinate. Seeding with native species may help limit this invasion.

5.1.10. In some situations, brush cutters or brush mowers can be used to mow down small shrubs, tree seedlings, grasses and taller herbaceous plants. In other cases, chainsaws, axes, loppers and other cutting tools can be used to cut down one tree or shrub at a time. Many plants are capable of sending out roots from cut plant parts or of maturing seeds even after the plant is cut down. Therefore, all plant parts should either be burned on site or removed off-site (being careful not to spread them to new locations).

5.1.11. Grazing by animals and burning are another means of controlling some invasive plants, and can be very effective in certain situations. Different grazing animals have different food preferences, and some like goats, will eat almost any woody plant whether native or not. Grazers may also disperse seeds if they eat fruit or seed heads. Burning can kill some species, but it may also stimulate seed germination or vigorous root sprouting.

5.1.12. Chemical control involves the use of herbicides. Although many prefer not to use herbicides, in some cases they are the only effective method of control for particular species. Many herbicides can be applied with less disturbance to soils and surrounding vegetation. Depending on the mode of action, some herbicides are effective against certain types of plants while not affecting other types.

5.1.13. Biological controls are often insects that attack plants, but they can also be fungi, bacteria and other animals. Many insects are deliberately sought out, bred, and released to control invasive plants. For biological control, the goal is to find insects that attack particular invasive species without posing harm to native species or economically important species. Generally, biological control agents do not eliminate a species, they simply keep it in check and prevent it from spreading.

5.2. Controlling Invasive Plants using Herbicides

5.2.1. Herbicides are grouped generally by how they kill or suppress the growth of a plant. Some herbicides act on certain types of plants such as grasses only or woody plants only. Other herbicides are known as non-selective or broad-spectrum herbicides that kill almost any plant. The two types of non-selective herbicides are those that kill on contact and those that are absorbed into the plant (systemic herbicide). Contact herbicides kill the foliage, but not necessarily the roots.

5.2.2. Most selective herbicides are also systemic herbicides. Herbicides work by inhibiting the production of certain amino acids, disrupt cell membranes, inhibit the synthesis of lipids, or have other effects on a plant's metabolism. Some systemic herbicides are applied to the soil before the seeds germinate and are called pre-emergent herbicides. They prevent seed germination or inhibit the formation of plant tissue. Post-emergent herbicides are applied to the growing plant. Most modern systemic herbicides have little effect on animal species because they target chemical pathways specific to plants.

5.2.3. The differences among brand name herbicides often relates to the active chemicals in different quantities and dissolved in different solvents (e.g., water, oil or alcohol). Many will also contain what are called surfactants or adjuvants. Surfactants are chemicals that help the chemical stick to the leaf or penetrate the leaves outer layer by reducing the surface tension of water. An adjuvant makes the herbicide more effective or safer for people to use. Although the active ingredient in the herbicide may be considered non-toxic to animals, the surfactant or adjuvant may not be so benign so caution should be used when handling any herbicide. Each herbicide will have a label saying on which plants it is effective and what quantities should be used.

5.3. Techniques for Herbicide Application.

5.3.1. Spraying.

5.3.1.1. Many herbicides are designed to be sprayed onto foliage. These are usually mixed with water and sometimes a surfactant. A dye is sometimes added to distinguish plants that have and have not been sprayed. The disadvantage of spraying is that surrounding plants are likely to be killed, but it works well where there is a solid stand of something you want to kill. Spraying is also safer and more effective when plants are low growing since holding a spray nozzle over your head is both tiring and dangerous to the person spraying. This can also result in more non-target plants being sprayed.

5.3.1.2. Most plants should be sprayed between midsummer and late fall before the leaves turn. In some cases you will want to spray in winter or early spring when other plants are dormant. Japanese honeysuckle is an

example of a species where fall or winter spraying can be very effective since this will minimize impacts to non-target species. Check the label, but generally, spraying is recommended when the temperature is above 55º F and below 80º F. Spray until the leaves are wet but not dripping. Do not spray on windy days as the herbicide may drift onto other plants. Early mornings provide cooler temperatures and less wind, however, heavy dew in the morning may affect herbicide contact with the leaves of plants.

5.3.1.3. Various types of spray equipment are available. Hand pump sprayers work well for small sites. Backpack sprayers hold more liquid, and some have motors to regulate the volume of spray. Larger spray equipment with tanks can be mounted on tractors, trucks, or off-road vehicles.

5.3.1.3.1. Hack and Squirt. The hack and squirt method involves cutting into the bark of a tree or large shrub and then squirting herbicide into the cut. This allows the herbicide to get directly into the plants circulatory system with little risk of contaminating surrounding desirable vegetation. Care should be taken not to girdle a tree when making the cuts as that can cause some species to send up root suckers or resprouts. One cut for every 4 inches in diameter of trunk should be effective. Squirt bottles can be used to squirt the herbicide into the cut. Generally, the best time of the year for hack and squirt is late in the growing season when plants are beginning to translocate nutrients down to the roots. Triclopyr and glyphosate are most commonly used for the hack and squirt method. Triclopyr can be used when temperatures are colder but can volatilize when temperatures are over 80º F.

5.3.1.3.2. Cut Stump. This method involves the cutting of trees and shrubs to the ground, and the painting or squirting of herbicide onto the cut tissue. Handheld spray bottles, sponge paintbrushes, and squirt bottles work well for this. Similar to the hack and squirt method, this method minimizes risk to surrounding vegetation. This method also works best on species unlikely to send up root suckers and can be done throughout most of the year if temperatures are favorable. Glyphosate and triclopyr are the herbicides most frequently used for this kind of treatment.

5.3.1.3.3. Basal Bark. For basal bark application, the herbicide is generally mixed with oil so that it will have time to penetrate the bark of the tree or shrub. Herbicide is sprayed or painted onto the bark at the base of the tree in a 6 to 15 inches wide band. Basal bark treatments are usually done in cooler weather since the herbicides volatilize at higher temperatures. The advantage of this method is that a large number of plants can be treated fairly quickly. After trees die, they can be cut down or left to fall on their own.

5.4. Restoration following removal of invasive plants.

5.4.1. Restoration is the most important final phase of an integrated invasive plant eradication program. This phase requires the establishment of fast-growing native plants that can outcompete and outlast any surviving non-native plants while stabilizing and protecting the soil. If the soil seed bank remains intact, native plant communities may naturally reinitiate succession after eradication of non-native plants. Light-seeded native species are usually present in the seed bank while heavier seeded plants will gradually be deposited on a site by birds and other animals. Large seeded species can be planted to speed up the natural successional process.

5.4.2. In recent years, native plant seed and seedlings have become available for sowing and planting. There are currently many nurseries that specialize in the production of seed and plants of native species. It may be beneficial to establish fast-growing tree species during the later control phase to hinder the reestablishment of shade intolerant non-native invasive plants. Reestablishing native grasses and forbs is equally important. Native plant seeds require appropriate storage and planting techniques and times to assure successful germination. Seedling native plants can also be collected and transported from other suitable sites, or purchased from a nursery specializing in native plants.

5.4.3. Even after natives are seeded and planted, sites will need regular monitoring to ensure that non-native species do not become reestablished. This monitoring will often be needed for many years as the seed from many non-native invasive plants remain viable for many years. Both the treatment and eradication of any non-native plants and the restoration of the site with native plants are critical to preventing and controlling invasions in the future.

6. MANAGEMENT OF VERTEBRATE INVASIVE SPECIES.

6.1. Coyote (*Canis latrans*).

6.1.1. Status of Populations on the installation. The existence of coyotes on the installation was confirmed in 2009 based on natural resources staff observations; though the existence was suspected prior to this time frame based on reports from recreational hunters. Since 2009, monitoring was implemented by using wildlife cameras, field observations by the Conservation Branch and limited trapping. Data is insufficient to estimate the population. However, several individuals were observed on pre-placed wildlife cameras as well as being personally seen by natural resources staff. Additionally, five individuals were trapped in 2010, and one each in 2017 and 2018. At the time of this revision, coyotes have been observed on the dredge spoil facility, Landfill 15, The Pines Golf Course and several training areas.

6.1.2. Why This Species Warrants Control. This highly adaptable and moderately large canine predator is capable of devastating a number of native wildlife species

on the installation especially because Fort Eustis is a partially isolated ecosystem. Natural barriers such as the James and Warwick Rivers in conjunction with development and fencing systems on the installation as well as external road networks, Newport News development and the Newport News Reservoir limit movement of deer, small mammals, reptiles and some avian species to some extent. Ground-nesting birds such as bobwhite quail (*Colinus virginianus*) and wild turkey (*Meleagris gallopavo*) are particularly at risk. Overall, this species would decrease the biodiversity and impact wild turkey hunting and to a lesser extent deer hunting. Additionally, coyotes may pose safety and health concerns for the installation community. Though not normally aggressive, coyotes could pose threats to small children and pets in housing areas or could seriously injure persons if cornered or harassed. At least two individuals have been observed in the cantonment area. More importantly, evidence exists of coyote depredation of deer fawns and are expected to impact wild turkeys. Turkey population appears to be lower within the 3 years. Additionally, bobwhite quail populations on the installation are extremely low and may also be impacted by coyote depredation. Coyotes are susceptible to the rabies virus and thus could pose an additional risk. Additionally, seven coyotes captured between 2010 and 2017 had high ixodid tick loads and several were infected with tick-borne pathogens.

6.1.3. Management Techniques.

6.1.3.1. Natural resources staff record known and suspected coyote sightings and signs as part of a monitoring program via visual encounters, surveys and wildlife cameras.

6.1.3.2. Recreational hunters and trappers may take unlimited coyotes during Virginia hunting and trapping seasons.

6.1.3.3. Natural resources staff shoot or trap coyotes in selected areas when feasible based on time/resource and access availability to training areas and golf course throughout the year.

6.1.3.4. When financial resources are available, U.S. Department of Agriculture-Wildlife Services (USAD-WS) is contracted to perform coyote removal (HERT185339-HERT225339).

6.2. Nutria (*Myocastor coypus*).

6.2.1. Status of Populations on the installation. At the date of this revision, nutria have not been documented on the installation; however, one suspected sighting occurred in 2014.

6.2.2. Why This Species Warrants Control. Nutria wreak havoc on native wetland vegetation through intense feeding, construction of large vegetation mats and burrowing into banks of streams and wetlands. In some cases they may overtake muskrat burrows and compete against muskrats for resources. Currently, large portions of Fort Eustis wetlands are damaged from invasive vegetation particularly

common reed as discussed in this plan. Further damage to native wetland vegetation by nutria pose even greater impacts on wetland habitats.

6.2.3. Management Techniques. Monitoring is the current technique for this species; however, it is a resource-intensive action. When feasible/available, natural resources staff develop cooperative monitoring projects with federal and state wildlife agencies and/or university research projects related to nutria. At a minimum, monitoring by natural resources staff is performed twice annually at pre-selected wetlands to observe for individuals, damaged vegetation, creation of vegetation mats and burrowing. When financial resources are available, U.S. Department of Agriculture-Wildlife Services (USAD-WS) is contracted to perform nutria surveillance (HERT195339-HERT235339).

6.3. Invasive Bird Species.

6.3.1. Rock dove (*Columba livia*), European starlings (*Sturnus vulgaris*) and English house sparrows (*Passer domesticus*).

6.3.1.1. Status of Populations on the Installation. Actual populations on the installation are unknown though all three avian species are well established on the installation as they are throughout most of North America.

6.3.1.2. Why these Species Warrant Control. All three species are invasive/non-native and are not subject to protection of the Migratory Bird Treaty Act. They out compete native bird species for resources. Equally important is that they tend to be communal nesters and roost in large numbers. In some cases these species may do so in or around structures on the installation. In such cases, this leads to unsanitary conditions to include large amounts of fecal matter potentially containing the fungus *Histoplasma capsulatum*.

6.3.1.3. Management Techniques. These species are normally controlled as pest species in accordance with the Fort Eustis Integrated Pest Management Plan. Pest control professionals within the Civil Engineer Division will implement control measures of these species in situations posing health concerns in structures. Pest control staff will first confirm through the Conservation Branch, Environmental Element that these are the species associated with situation before taking action. Building exteriors will be monitored for damage allows entrance by these species and repaired to exclude them. USDA-WS remove rock doves and starlings by trapping at Felker Army Airfield.

6.3.2. Mute swans (*Cygnus olor*).

6.3.2.1. Status of Populations on the Installation. This species has been observed in areas adjacent to the installation; however, no breeding populations have been documented on the installation at the time of this revision.

6.3.2.2. Why This Species Warrants Control. Mute swans actively compete with native waterfowl for necessary resources, may come into conflict with people based on observed aggressive behaviors and may damage submerged aquatic vegetation (SAV). SAV restoration projects have been implemented in areas of the Chesapeake Bay and consideration has been given to areas along Fort Eustis shoreline.

6.3.2.3. Management Techniques. Though mute swans are non-native birds, they are protected under the Migratory Bird Treaty Act based on the U.S. Court of Appeals for the District of Columbia Circuit Court that ruled on December 28, 2001 that these swans were of the waterbird family Anatidae and thus protected by the Migratory Bird Treaty Act. Consequently, any action taken to control this species on the installation will require permits from the U.S. Fish and Wildlife Service. No specific surveys are intended under this plan but actions will be determined if the species is sighted. Resources will be needed should they become documented. In this case, natural resources staff will first explore contracting with USDA-WS for removal.

6.4. Feral domestic animals. Feral domestic animals include cats, dogs, swine, goats and others. At Fort Eustis, the only confirmed feral domestic animal is domestic cats.

6.4.1. Status of Populations on the Installation. Feral domestic cats have existed on the installation for an undetermined period of time. The actual population is unknown since surveys for such would be difficult and time consuming.

6.4.2. Why This Species Warrants Control. Feral domestic cats impact native wildlife populations because they function as non-native, non-natural predators by decimating songbirds, ground-nesting birds (such as wild turkey, bobwhite quail and woodcock), reptiles, amphibians and small mammals. They also serve as hosts and reservoirs for tick-borne diseases and rabies. These diseases are pathogenic to humans that are serious issues for the health and welfare of military personnel and their families as well as civilian employees and contractors in both cantonment and training areas.

6.4.3. Management Techniques. Several preventive measures help reduce the risks of feral cats. This plan as an annex to the INRMP serves as installation policy against feeding for feral cats. It is a violation of installation policy to provide food or care for feral cats on Fort Eustis. It is also a violation to intentionally release domestic cats on the installation. Any act of releasing a

domestic cat shall be reported to the 733 Security Squadron. No domestic cats will be brought onto the installation except those military personnel or family members who are authorized to have such pets in Balfour Beatty Communities residences. When military families reside in these quarters, all pets will removed by the owners upon vacating the residences. Owners of domestic cats residing in BBC residences will comply with Veterinary Services policies. Cats must remain under the control of the owners at all times and not allowed to run loose. All cats shall be vaccinated against rabies in accordance with Veterinary Services policies. Any installation community member who observes a stray or feral cat will call a service order to the Civil Engineer Division (CED) at 878-HELP. The service order is forwarded to the CED pest control contractor. The contractor will utilize humane traps or other humane capture means and transfer the cats to the Peninsula Regional Animal Shelter in Newport News.

7. MANAGEMENT OF INVASIVE INVERTEBRATE SPECES

7.1 Identification of known invasive invertebrates. The current list of known invasive invertebrate species as of 2018 (as per INRMP Section 7.13.5):

- Japanese beetle (*Popillia japonica*)
- Kudzu bug (*Megacopta cribraria*)
- Asian tiger mosquito (*Aedes albopictus*)
- Brown marmorated stink bug (*Halyomorpha halys*)
- Red imported fire ant (*Solenopsis invicta*)
- European hornet (*Vespa crabro*)
- Chinese mantis (*Tenodera sinensis*)

7. 1.1 Kudzu bug and marmorated stink bug. Information on the extent of impact is needed for kudzu bug and brown marmorated stink bug. These species are known to be important agricultural pests and it remains uncertain as to their effects on natural habitats at FE.

7.1.2 Japanese beetle. This species is ubiquitous throughout the installation primarily from June through September (adults emerge between May and July depending on the soil temperature). Larvae feed on roots of various plants while in the soil and adults are host plant generalists feeding on foliage, flowers and fruits of various plants. Some noted impacts were on native marsh mallow in wetlands on the installation by adults where the plants achieved high beetle loads. Control is primarily via insecticide sprays if applications can occur with limited impacts on non-target organisms particularly insect/arthropod predators and pollinators. Use of milky spore powder (containing spores of *Bacillus popilliae*) against grubs shall be used when and where feasible. Surveys of grub habitat is needed to determine the presence and extent of grubs is needed prior to application of the powder. Consideration of biological control is also a possibility pending further research. The introduced parasitic tachanid fly *Istocheta aldrichi* and tiphiid wasp *Tiphia vernalis* represent two examples as well as the native scoliid wasp (*Scolia dubia*).

7.1.3 Asian tiger mosquito. This mosquito is a significant nuisance biter and potential disease vector. While it has been documented on FE, actual numbers were low as observed in the 2017 mosquito inventory. Additional, mosquito species surveys/inventories are needed to ascertain the extensiveness on the installation. These surveys/inventories are planned in 2018 and annually thereafter. Control measures in the form of breeding site source reduction is the best control course of action. Ground and aerial insecticide spray represent techniques used when other non-chemical techniques are deemed in effective.

7.1.4 Red imported fire ant. Establishment on the installation creates significant impacts to both wildlife (such as ground-nesting birds, small mammals and herpetofauna) and human health & safety. One colony was found in cantonment adjacent to the Shoppette (BLDG 704) in 2013 and was eliminated following pest control using appropriate ant bait. Surveillance is important to monitor for nests and is performed annually as part of the BOS contract.

7.1.5 European hornet and Chinese mantis. The European hornet and the Chinese mantis are documented on the installation. The European hornet is predatory on other insects and is known to girdle twigs by which to obtain sap while the Chinese mantis is a general predator that competes with native mantids and is known to feed on small vertebrate prey (including anurans, lizards and hummingbirds). Natural resources staff observed competition behaviors between European hornets and other insects for food sources. Though documented on FE, information as to the distribution on the installation is lacking as is the extent of their impacts on native fauna.

7.2 Invertebrate invasive organisms with potential for establishment on FE. The following invertebrate organisms could become established on FE in the near future. Survey work and surveillance are key to managing these pests:

- Red swamp crayfish (*Procambarus clarkii*)
- Rusty crayfish (*Orconectes rusticus*)
- Asian long-horned beetle (*Anoplophora glabripennis*)
- European gypsy moth (*Lymantria dispar*)
- Sirex woodwasp (*Sirex noctilio*)
- Spotted lanternfly (*Lycorma delicatula*)
- Redbay ambrosia beetle (*Xyleborus glabratus*)
- Beech scale (*Cryptococcus fagisuga*).

7.2.1 Red swamp crayfish and rusty crayfish. No information exists about these species at FE. Red swamp crayfish have been found within 5 miles of FE in York County. Information about the rusty crayfish in the local information is not available. These species shall be considered for the FY 21 macroinvertebrate survey (HERT215331).

7.2.2 Asian long-horned beetle. This species has been documented in Massachusetts, New York and Ohio, and is not yet a pest in Virginia. Certain hardwoods at risk include ash, birch, elm, horse chestnut/buckeye, golden raintree, london planetree/sycamore, katsura, maples (including boxelder, red, silver and sugar maple), mimosa, mountain ash, poplar, and willow. Currently, surveillance is the primary task.

7.2.3 European gypsy moth. This species is expected to occur locally though none have been documented to date. Surveillance is an annual task performed by the CED pest control staff.

7.2.4 Sirex woodwasp, spotted lanternfly, redbay ambrosia beetle, and beech scale.

7.2.4.1 Sirex woodwasp. A forest insect survey conducted in 2014-2015 did not find the sirex woodwasp nor was it observed during the Cooperative Agricultural Pest Survey (CAPS) performed at 3d Port between 2006-2017. Its is found in New York, Connecticut, Ohio, Pennsylvania, Michigan, and Vermont. Its distribution in Virginia is uncertain; however, loblolly pine which is important host plant, is common at FE. Surveillance is the primary task for this INRMP period.

7.2.4.2 Spotted lanternfly. This species is serious pest of grapes, peaches, hops, and a variety of other crops but its potential impacts on natural habitats is uncertain. This species is thought to damage tree of heaven, willow, maple and poplar. Tree of heaven is a serious invasive plant at FE so, there is no issue regarding that tree. More information about its biology is needed to determine if routine surveillance is needed. It has been documented in in Frederick County, Virginia, on January 2018.

7.2.4.3 Redbay ambrosia beetle. This very small beetle vectors the fungus *Raffaellea lauricola* that causes laurel wilt in redbay trees (*Persea borbonia*) and also sassafras (*Sassafras albidum*). Laurel wilt results in mortality of affected trees. Currently the beetle ranges from Florida to the southeastern portion of North Carolina. Currently tasks for 2018 is to identify locations of redbay trees on the installation and follow up with surveillance for the beetle.

7.2.4.4 Beech scale. This insect causes beech bark disease by vectoring the fungus *Nectria coccinea* var. *faginata* or *Nectria galligena*. It feeds on the sap of beech trees thereby creating cracks in the bark. The fungi colonize these areas causing bark cankers. This condition is capable of killing all size classes of American beech. By the 1980s, beech bark disease was widespread in Pennsylvania and West Virginia. Isolated infestations exist in the mountains of Virginia and North Carolina. The installation contains stands of beech primarily north of Taylor Avenue.

Surveillance is the egg masses and damaged trees is the initial course of action during this INRMP period.

7.3 Participation in the Cooperative Agricultural Pest Survey (CAPS). JBLE-E began participating with Virginia Polytechnic Institute and State University performance of the CAPS program in 2005 with continued involvement annually since then (with data collection through 2017 and survey work continuing into 2018). These efforts focus on wood-boring invasive beetle taxa (cerambycids, buprestids & curculionids) that may enter through port facilities with primary target pests including *Agrilus biguttatus*, *Anoplophora glabripennis*, *Anoplophora malasiaca*, *Callidiellum rufipenne*, *Hesperophanes campestris*, *Monochamus alternatus*, and *Ips typographus*. None of these taxa were found during the survey work from 2005 - 2017. Lindgren funnel traps are used near the installation's port facility (3d Port).

7.4 Invasive invertebrate management 2019-2023:

7.4.1 Continuation of participation in Cooperative Agricultural Pest Survey (CAPS). JBLE-E began participating with Virginia Polytechnic Institute and State University performance of the CAPS program in 2005 with continued involvement annually since then (with data collection through 2017). These efforts focus on wood-boring invasive beetle taxa (cerambycids, buprestids & curculionids) that may enter through port facilities. Virginia Polytechnic and State University entomologists continue conducting surveillance for invasive woodboring coleopterans that could enter through 3d Port at FE in 2018. This is assumed to continue through the remainder of the INRMP period. The following taxa are the focus for 2018:

- *Callidiellum rufipenne,*
- *Pityophthorus juglandis*
- *Monochamus alternatus*
- *Monochamus urussovii*
- *Agrilus auroguttatus*
- *Dendroctonus micans*
- *Pityogenes chalcographus*
- *Agrilus biguttatus*
- *Hylobius abietis*
- *Platypus quercivorus*
- *Agrilus planipennis*
- *Ips sexdentatus*
- *Tetropium castaneum*
- *Anoplophora chinensis*
- *Ips typographus*
- *Tetropium fuscum*
- *Anoplophora glabripennis*
- *Megaplatypus mutates*
- *Tomicus destruens*
- *Callidiellum villosulum*

- *Monochamus alternatus*
- *Trichoferus campestris*
- *Chlorophorus annularis*
- *Monochamus urussovii*
- *Trypodendron domesticum*
- *Chlorophorus strobilicola*
- *Orthotomicus erosus*

7.2.2. European gypsy moth (*Lymantria dispar*) and RIFA. Natural resources and pest control staff continue surveillance for these species as part of the Base Operating Services (BOS) contract.

7.2.3. Red swamp crayfish (*Procambarus clarkii*), rusty crayfish (*Orconectes rusticus*), Asian long-horned beetle (*Anoplophora glabripennis*), Sirex woodwasp (*Sirex noctilio*), spotted lanternfly (*Lycorma delicatula*), redbay ambrosia beetle (*Xyleborus glabratus)*, and beech scale (*Cryptococcus fagisuga*) shall be included in the FY 21 planning level survey (HERT215331).

7.2.4. Natural resources staff shall develop a draft forest insect pest surveillance plan by 2019. The following invasive taxa shall be included in the plan at a minimum:

- Asian long-horned beetle
- European gypsy moth
- Sirex woodwasp
- Spotted lanternfly
- Redbay ambrosia beetle
- Beech scale

7.2.5 Surveillance for Japanese beetle larvae shall be implemented at Felker Army Airfield in 2018.

7.2.6 Asian tiger mosquito shall be surveyed during the annual mosquito species inventory and Zika surveillance.

7.2.7 Red imported fire ant surveillance shall be conducted in locations identified in the BOS contract.

7.2.8 Kudzu bug, brown marmorated stink bug, European hornet and Chinese mantis are considered of less importance for this INRMP period but literature research shall be conducted to ascertain further insight regarding impacts.

8. REFERENCES

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b) Department of Defense Instruction 4715.03. Natural Resources Conservation Program.

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m) U.S. Department of Agriculture. 2005. Animal and Plant Health Inspection Service Fact Sheet: Nutria.

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Annex J to FE INRMP
Wildland Fire Management Plan

AFCEC initiated a contract to prepare a Wildland Fire Management Plan (WFMP) with initial site visits and plan preparation beginning in Jamuary 2018. A draft WFMP was prepared and and submitted for installation comments in April 2018. Installation comments were submitted to the AFCEC Wildland Fire Center on 5 June 2018. Most installation comments were rejected in July 2018. Installation staff nonconcurred with these rejections in August 2018. AFCEC is revising the draft and will meet with JBLE natural resources and Fire & Emergncy Services staff in early CY 2019. Resolution of comments is pending. Upon resolution of comments, a final document will be submitted to the 633 ABW/CC for approval. A completed WFMP will then be incorporated into the INRMP.

HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Annex K to FE INRMP
JBLE Bird/Wildlife Air Strike Hazard Plan (2016)

This plan is prepared by 1ST Fighter Wing with the most recent version dated 2016.

This document can be found at the following web site:

http://www.jble.af.mil/Units/Army/Eustis-Enviromental/

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HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

Annex L to FE INRMP
Annual Wetland Rehabilitation, Preservation and Losses Report

1. Calendar Year:

2. Acres of tidal wetlands

    2.1. Lost:

    2.2. Preserved:

    2.3. Rehabilitated:

3. Acres of non-tidal wetlands (include by wetland type [forested, scrub-shrub, emergent])

    3.1. Lost:

    3.2. Preserved:

    3.3. Rehabilitated:

4. Project and description and title of EIAP documentation for wetland rehabilitation, preservation or losses occurring in this CY.

5. Confirmed or proposed wetland rehabilitation, preservation or losses expected in the following CY and beyond.

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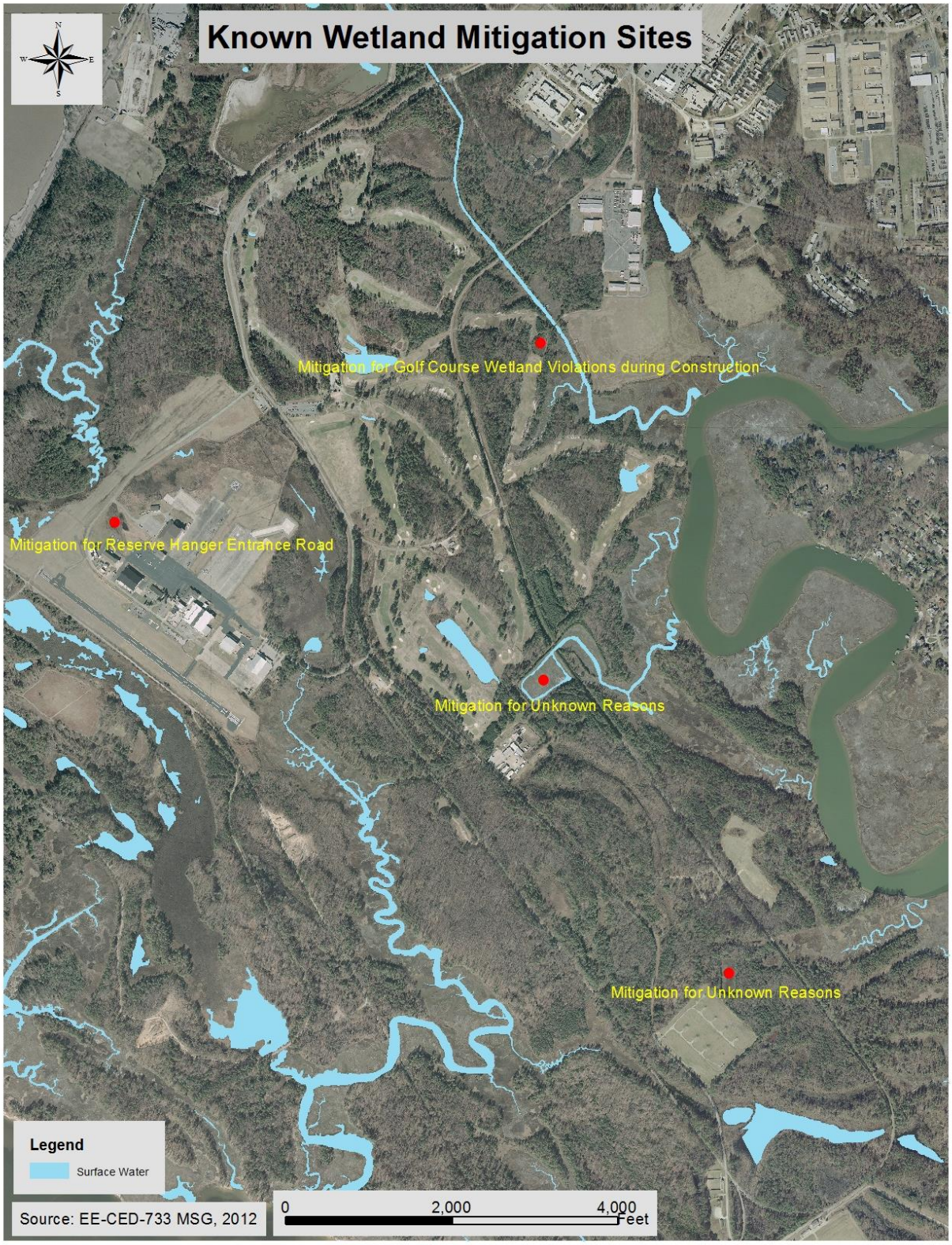
HEADQUARTERS 633D AIR BASE WING (ACC)
Joint Base Langley-Eustis, Virginia 23665-2291

<u>Annex M to FE INRMP</u>
Mitigation Wetland Sites



Annex N to FE INRMP
JBLE-I 32-102, Hunting, Fishing and Trapping Program

BY ORDER OF THE COMMANDER ***JOINT BASE LANGLEY-EUSTIS-EUSTIS***
INSTRUCTION 32-102
[8 July 2018]

Civil Engineering HUNTING, FISHING AND TRAPPING PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available for downloading or ordering on the e-Publishing website at www.e-Publishing.af.mil.

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 733 MSG-CED Certified by: 733 MSG/CC
(COL Ralph L. Clayton III)

Supersedes: Joint Base Langley-Eustis Instruction 32-102, 19 December 2016 Pages: 36

This publication implements the JBLE-Eustis Hunting, Fishing and Trapping Program. It provides guidance and procedures to all persons eligible to hunt, fish and trap on Joint Base Langley Eustis-Eustis (JBLE-Eustis). This publication may be supplemented at any level, but all supplements must be routed to the Office of Primary Responsibility (OPR) listed above for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the OPR listed above using the Air Force (AF) Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through the appropriate chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual 33-363, Management of Records, and disposed of IAW Air Force Records Information Management System, Records Disposition Schedule. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the AF.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include addition of chapter 3 to cover trapping activities, addition of chapter 5 to cover development and coordination of specific stakeholder duties and responsibilities, chapter 6 to cover violation penalties, revision of appendix C to cover the Release and Hold Harmless Agreement, and addition of appendix D to cover permit fees. Modifying, deleting or creating

new rules that govern the JBLE-Eustis Hunting, Fishing and Trapping Program must be approved by the installation commander prior to implementation and without such approval are null and void.

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Chapter 1

GENERAL INFORMATION

1.1. Purpose. This instruction prescribes policies and procedures for hunting, fishing and trapping on JBLE-Eustis.

1.2. Applicability. The requirements in this instruction apply to all persons on JBLE-Eustis.

1.3. Explanation of abbreviation and terms. Abbreviations and special terms used in this regulation are explained in the glossary.

1.4. Federal and State Laws. All persons participating in hunting, fishing or trapping on JBLE-Eustis will comply with Federal and State wildlife laws, as well as installation policies and will cooperate fully with representatives of law enforcement agencies.

1.5. Land Management. JBLE-Eustis lands are managed for military missions. Primary consideration is given to accomplishing military requirements, such as training and providing supporting infrastructure.

1.6. Integrated Natural Resources Management (INRMP). All hunting, fishing and trapping activities are subject to the Wing Commander's natural resource management policies and procedures as articulated in the JBLE-Eustis INRMP. This includes game and nongame wildlife. The INRMP is reviewed/updated annually with complete revision made every five years to accommodate issues or changes resulting from regulatory requirements, mission changes or means of improvement that affect wildlife populations and habitat conditions.

1.7. Access. All training areas, unpaved roads and firebreaks are off-limits except for military training or other activities permitted by this or other installation regulations.

1.8. Enforcement. Conservation law enforcement executed by the 733d Security Force Squadron (733 SFS) to protect against unauthorized habitat disturbance, illegal wildlife harvest or impacts, damage to installation property and facilities, vandalism, illegal removal of archeological resources and ensure public safety. Conservation law enforcement personnel are authorized to enforce Federal, State and local conservation and wildlife laws, and AF regulations and installation policies.

1.9. Violations.

1.9.1. Violators of Federal and State game laws are subject to prosecution before the U.S. Magistrate. Violators who are subject to the Uniform Code of Military Justice (UCMJ) are also subject to prosecution under the UCMJ for any violation of this regulation. Any actions taken by the magistrate or by commanders under the UCMJ will be in addition to the administrative suspension or revocation of hunting, fishing and trapping privileges.

1.9.2. 733 SFS has the authority to suspend and revoke hunting, fishing, and trapping privileges for violating this regulation, AF regulations, installation policies, and federal and state regulations regarding wildlife laws. JBLE-Eustis Conservation Law Enforcement Officers have the authority to temporarily suspend hunting, fishing and trapping privileges for up to 30 days pending investigations and action by the 733 SFS/CC. 733 SFS will officially notify, by letter, persons whose privileges have been suspended or revoked. Persons whose privileges have been revoked, may apply in writing to the 733d Mission Support Group (MSG) Commander office for reinstatement after one year from date of revocation.

1.10. Prohibited Activities. JBLE-Eustis prohibits the following activities. See subsequent sections on hunting, fishing and trapping for additional activity-specific prohibitions.

1.10.1. Possession or use of alcohol, illegal drugs or medication causing mental or physical impairment while hunting, fishing, trapping, or using the hunting and fishing facilities, including sign-out/in lines and wildlife check stations.

1.10.2. Any unsafe act or misuse of weapons so as to endanger life, limb, or property.

1.10.3. Recreational shooting or discharging of any firearm, except as outlined in Chapter 2 and IAW regulations (JBLE I 36-101) governing the Personally Owned Firearms range.

1.10.4. Introducing plants or releasing any animal, including game or nongame wildlife, snakes, birds, fish, insects, etc. or their parts, onto the installation, except as authorized by 733d Civil Engineering Division (CED).

1.10.5. Harassing, harming, pursuing, shooting, wounding, killing, trapping, capturing, collecting, removing plants or animals or attempting to engage in such activities.

1.10.6. Engaging wildlife species by activities or vocalizations that interfere with the species biological processes or increases metabolic energy requirements, except while actively engaged in hunting activities. For example, turkey “calling” when not actively hunting is an example of prohibited wildlife engagement.

1.10.7. Collecting or attempting to collect any wildlife carcass or parts, to include (but not limited to) shed antlers, skulls, feathers, claws, talons, beaks, furs, turtle shells, etc.

1.10.8. Utilizing video filming equipment and posting of material on social media or other internet forums from within sensitive areas or containing sensitive information.

1.10.9. Removing forest products (such as tree limbs, tree trunks, slash, downed timber, standing timber, pine straw, soils, etc.) without appropriate approval and coordination of CED. For example, cutting tree limbs to apply to a duck blind for camouflage is an example of prohibited forest product removal.

1.10.10. Engaging in or attempting to engage in habitat modifying activities including, but not limited to altering surface water, wetlands, forest or other habitats without appropriate

approval and coordination of CED. Examples of such modifications include, but are not limited to cutting trees, removing down timber, placement/discharge of vegetation debris or other materials into wetlands, excavating in wetlands, digging holes, installing signs, trimming of vegetation or tree limbs, painting of trees, use of pesticides, and utilization of bark penetrating devices on trees.

1.10.11. Utilizing metal detectors.

1.10.12. Locating or removing archeological resource artifacts.

1.10.13. Entering any training area or other areas, except designated public access areas, without coordination of Range Control and 733 SFS. Entry into any area by persons engaged in hunting, fishing or trapping activities must be signed in through CED or Hunter Check Station (HCS) facility during designated seasons.

1.10.14. Harassment of government employees or contractors involved in natural resources management, or uniformed soldiers training or conducting operations.

1.10.15. Disrupting operations or interfering with anyone using the hunting or fishing facilities.

1.10.16. Confronting other hunters, or any individuals utilizing the hunting or fishing facilities or JBLE-Eustis training areas, concerning their compliance with procedures or regulations, except to provide courtesy notice and for the avoidance of a safety hazard.

1.10.17. Intentionally interfering with the lawful pursuit of taking wildlife resources or disturbing any wildlife resources for the purpose of disrupting the lawful taking of wildlife.

1.10.18. Removing, altering, or defacing information on regulatory signs, instructions or maps.

1.10.19. Littering or disposing of refuse, except in approved receptacles.

1.10.20. Using motorcycles, dirt bikes, three or four wheeled all-terrain vehicles (ATV), utility terrain vehicles (UTV) such as “gators”, or other off- road vehicles are prohibited for hunting, fishing or trapping activities. Only privately-owned motor vehicles registered by Virginia Department of Motor Vehicles for highway use shall be used to transport hunters, fishermen and trappers to and from area. Operating motor vehicles on any terrain except existing improved or semi-improved roads is prohibited.

1.10.21. Digging and all forms of ground disturbing activities.

1.10.22. Utilization of wildlife cameras or remote camera/sensing equipment.

1.10.23. Harvesting and collecting of amphibian and reptile species.

1.10.24. Transporting reptiles and amphibians onto the installation.

1.10.25. Use of vinyl survey flagging and cat eye markers.

1.11. Unexploded Ordinance (UXO). Persons permitted access to the installation for hunting, fishing and trapping activities may encounter UXO (bullets, bombs, rockets, flares, etc.) in the areas that are open for public recreation. UXOs may be on the surface, partially buried or completely buried. All persons encountering a suspected UXO shall contact Range Control (878-4412) during regular duty hours, or 733 SFS (878-4555) after regular duty hours.

Chapter 2

HUNTING

2.1. Persons authorized to hunt, fish and trap on JBLE-Eustis shall comply with the provisions of this instruction and adhere to all Federal, State, and local laws and regulations, and AF and installation regulations governing hunting, fishing and trapping.

2.2. Active duty military personnel and their family members, regardless of duty station, federal employees, retired military personnel, retired federal employees, and non-affiliated civilians are authorized to hunt, fish and trap on JBLE-Eustis.

2.3. License Requirements.

2.3.1. All persons 12 years of age and over must have in their possession a valid JBLE-Eustis hunting, fishing and trapping permit while participating in such activities.

2.3.2. All persons must possess appropriate federal and state hunting, fishing and trapping permits to include, but not limited to Virginia Department of Game and Inland Fisheries small game, big game, archery, black powder, fishing and trapping licenses, federal Migratory Duck Stamp, Virginia Migratory Waterfowl Conservation Stamp, and Harvest Information Program (HIP) registration.

2.3.3. Hunters must have completed a Hunter Education Course and present certificate of completion at the time of purchasing a JBLE-Eustis permit.

2.3.4. All weapons shall be registered with 733 SFS.

2.3.5. All persons issued a JBLE-Eustis hunting, fishing or trapping permit must sign the Hunters Memorandum of Understanding (Appendix B), Release and Hold Harmless Agreement (Appendix C) and the general safety brief (Appendix E).

2.3.6. Permits may be purchased at the JBLE-Eustis Outdoor Recreation (ODR) Rental Office located at 828 Kells Drive, during normal operating hours.

2.3.7. Hunting permits are comprised of two parts:

2.3.7.1. Hunting Fee. A hunting permit fee of $15 is collected by Force Support Squadron (FSS) on behalf of CED. These fees are deposited into the AF Wildlife Account and are used for wildlife management activities.

2.3.7.2. Administrative Fee. An administrative fee of $30 is charged by FSS to offset the administrative costs of supplies and staffing. Total hunting permit cost is $45.

2.3.7.3. Permit fees shall be waived for patrons who are 100% service connected disabled. Patrons claiming 100% service connected disability must present appropriate Department of Veterans Affairs documentation.

2.3.8. Fishing permits consist of a $10 administrative fee to offset the FSS costs of regulatory documentation and map production.

2.3.9. Turkey lottery tickets. Turkey hunting is conducted using a lottery ticket system. Participants may purchase Turkey Hunt lottery tickets through FSS for $25 ($3 administrative fee and $22 deposited in the AF Wildlife Account).

2.3.10. Trapping permits are $50, purchased through FSS and deposited in the AF Wildlife Account.

2.3.11. Patrons purchasing a hunting, fishing or trapping permit shall review UXO awareness documents at the time of permit purchase; these permits, in turn, signify that patrons have been advised of this regulation and agree to abide by it.

2.4 Weapon Registration and Transport.

2.4.1. All weapons, to include firearms, muzzle loaders, bows and crossbows, must be registered with 733 SFS, utilizing AF Form 1314.

2.4.2. While in transit on JBLE-Eustis, personally owned firearms owners must have in their possession an AF Form 1314, Weapons Registration and Hunting Weapon Placard. The Hunting Weapon Placards must be displayed on the driver’s side windshield while in transit. Hunting Weapon Placards shall not be displayed when vehicle is parked and unoccupied.

2.4.3. Weapons shall be cased and inaccessible while in transit, with ammunition stored separately.

2.4.4. Weapons and ammunition shall be secured when left in unoccupied vehicle.

2.5. Hunting Days.

2.5.1. No hunting is authorized on Thanksgiving Day, Christmas Day or when the installation is closed by order of the Installation Commander. Hunting is authorized on Christmas Eve from 30 minutes before sunrise until noon.

2.5.2. Deer Season. Deer season occurs the first Saturday in October through the first Saturday in January.

2.5.2.1. Authorized hunting days will consist of Friday, Saturday, Sunday and Tuesday.

2.5.2.2. Monday will be an authorized hunting day, if it is a military training holiday or federal holiday, excluding Thanksgiving or Christmas.

2.5.2.3. Hunting is authorized from 30 minutes before sunrise to 30 minutes after sunset.

2.5.2.4. Deer hunting is authorized on the last Saturday and Sunday of September for the State approved youth deer weekend.

2.5.2.5. Urban Deer Management is authorized from the first Saturday in September through the last Saturday in March, 30 minutes before sunrise to 30 minutes after sunset, Monday through Saturday.

2.5.3. Waterfowl Season.

2.5.3.1. Waterfowl season occurring from the first Saturday in September through the last Sunday in September.

2.5.3.1.1 Authorized hunting days will consist of Saturday and Sunday.

2.5.3.1.2. Hunting is authorized from 30 minutes before sunrise to noon each day.

2.5.3.2. Waterfowl season occurring during deer season.

2.5.3.2.1. Authorized hunting days will consist of Friday, Saturday, Sunday and Tuesday.

2.5.3.2.2. Monday will be an authorized hunting day, if it is a military training holiday or federal holiday, excluding Thanksgiving or Christmas.

2.5.3.2.3. Hunting is authorized from 30 minutes before sunrise to sunset each day.

2.5.3.3. Waterfowl season occurring from the first Sunday in January through the last Sunday of January.

2.5.3.3.1. Authorized hunting days will consist of Friday, Saturday, Sunday and Tuesday.

2.5.3.3.2. Monday will be an authorized hunting day, if it is a military training holiday or federal holiday, excluding Thanksgiving or Christmas.

2.5.3.3.3. Hunting is authorized from 30 minutes before sunrise to noon on Friday, Sunday, Tuesday and Monday (IAW 2.5.3.3.2)..

2.5.3.3.4. Hunting is authorized from 30 minutes before sunrise to sunset on Saturday.

2.5.3.4. Waterfowl hunting is authorized on the first Saturday of February for State approved youth waterfowl day from 30 minutes before sunrise to sunset.

2.5.4. Small Game Season.

2.5.4.1. Small Game Season occurring from the first Sunday in November through the last Sunday in January.

2.5.4.1.1. Authorized hunting days will consist of Friday, Saturday, Sunday and Tuesday.

2.5.4.1.2. Monday will be an authorized hunting day, if it is a military training holiday or federal holiday, excluding Thanksgiving or Christmas.

2.5.4.1.3. Hunting is authorized from 30 minutes before sunrise to noon on Friday, Sunday, Tuesday and Monday (IAW 2.5.4.1.2.).

2.5.4.1.4. Hunting is authorized from 30 minutes before sunrise to sunset on Saturday.

2.5.4.2. Small Game Season occurring from the first Saturday in February through the last Saturday in February.

2.5.4.2.1. Authorized hunting days are Saturday only.

2.5.4.2.2. Hunting is authorized from 30 minutes before sunrise to 30 minutes after sunset.

2.5.5. Turkey hunting is authorized Friday through Monday, 30 min before sunrise until noon each day, from the first Saturday in April through the third Saturday in May.

2.5.6. In the event a reduction of hunting days is necessary, a one week notice will be posted at the HCS, on the JBLE-Eustis hunting web page and JBLE-Eustis mass hunter e-mail notification system.

2.6. General Hunting Regulations

2.6.1. Hunter Control

2.6.1.1. All hunters shall comply with any and all hunting regulations and directions provided within this document, posted at the HCS and at remote hunter check stations.

2.6.1.2. All deer and small game hunters must check in/out at the HCS or designated remote check in/out station, if a remote hunter check station is implemented, before entering designated hunting areas.

2.6.1.3. All waterfowl hunters utilizing interior waterfowl hunting locations must check in/out at the HCS or designated remote check in/out station, if a remote hunter check station is implemented, before entering designated hunting areas.

2.6.1.4. Waterfowl hunters utilizing the installation permitted exterior waterfowl blinds along the James and Warwick River are permitted to reserve and check in/out via telephone to the HCS the day of hunting. River blind patrons shall telephone the HCS when they arrive at their blind location, when they clear the blind location and when they are ashore at their original launch location.

2.6.1.5. HCS staff will ensure safe distances are maintained between different types of hunters to promote safety. HCS staff may close areas to certain types of hunting while other types of hunting are conducted.

2.6.1.6. When deer and waterfowl hunting occur during the same time periods, waterfowl hunting areas and surrounding deer stands will be reserved for waterfowl hunting until 0500 hours daily. During this time, all deer stands within the 368 meter safety buffer will remain closed. If waterfowl hunters reserve a waterfowl hunting area prior to 0500 hours, then all deer stands within the 368 meter safety buffer will remain closed until the waterfowl hunter has completed their waterfowl hunting activities. If no waterfowl hunters reserve a waterfowl hunting area prior to 0500 hours, then all deer stands within the 368 meter safety buffer may be reserved by deer hunters on a first come, first serve basis.

2.6.1.7. All hunting activities shall be conducted IAW the annual sunrise-sunset table in the annual Hunting and Trapping in Virginia regulations published by the Virginia Department of Game and Inland Fisheries.

2.6.1.8. All hunters shall park in designated parking locations as indicated on the annual JBLE-Eustis Hunting Map. Parking is prohibited at all non-designated areas.

2.6.2 Hunting dogs may be used to retrieve waterfowl and pursue rabbit and squirrel IAW established Virginia laws and regulations during applicable hunting seasons on the installation unless otherwise prohibited by installation policies. All dogs shall be under the direct control of the hunter/owner to preclude the dog from running loose on the installation.

2.6.2.1. Dogs are not permitted for hunting deer on JBLE-Eustis.

2.6.2.2. All dogs brought to JBLE-Eustis for the purpose of hunting must display a current rabies vaccination tag and contact information for the owner. Rabbit hunters may remove the rabies tag while actively hunting, but must maintain possession of the tags while hunting. Rabbit hunting dogs must be collared at all times with owners contact information.

2.6.2.3. Hunting dog training with live game animals or live birds is prohibited.

2.6.2.4. Retrievers authorized for hunting on JBLE-Eustis may be exercised or trained year around at Anzio Beach and within TA18 when available at the end of Harrison Road only.

2.6.3 Blaze Colored Requirements

2.6.3.1. Deer hunters must wear the legally required blaze orange /pink IAW Virginia Code during all deer hunting seasons and deer hunting activities as defined by state law for the general firearms deer season.

2.6.3.2. Waterfowl hunters must wear the legally required blaze orange/pink for deer hunting while traversing to and from waterfowl hunting locations within the boundaries of the installation during established state deer seasons.

2.6.3.3. Squirrel hunters must wear the legally required blaze orange/pink for deer hunting while hunting during the deer season on JBLE-Eustis.

2.6.3.4. Rabbit hunters must wear the legally required blaze orange/pink for deer hunting while hunting on JBLE-Eustis.

2.6.4. Use of electronic calls is prohibited, except while actively engaged in coyote hunting.

2.6.5. Hunters must report all harvests and unrecovered crippled animals IAW installation policies. Reporting policies shall be posted on the HCS communication board, on the JBLE-Eustis Hunting Program web page and included within the daily hunter briefing.

2.6.6. Scouting is authorized each Saturday during the month of September from 0700-1200 hrs. Persons desiring to scout must check in/out at the HCS.

2.6.7. The use of turkey call devices is prohibited at all times except during authorized turkey hunting activities.

2.6.8. No person shall take or pursue any wildlife species on the installation except as authorized by this regulation.

2.6.9. No person shall kill, cripple or otherwise harm any animal without making a reasonable effort to retrieve the animal. All hunters shall make a reasonable attempt to retrieve injured wildlife resulting from hunting.

2.6.10. Annual seasons and bags limits shall be posted at the HCS and on the JBLE-Eustis Hunting Program web page.

2.6.11. It is unlawful to damage or mutilate animal carcasses so as to obscure the sex, age or physical characteristics of any bird or animal.

2.6.12. It is unlawful to harvest any animal by baiting.

2.6.13. It is unlawful to attach any tree stand or platform to trees by nails, screws, bolts or wire, unless approved by CED.

2.6.14. It is unlawful to utilize any device that penetrates the bark of trees, to include but not limited to, screw in foot pegs and bow holders.

2.6.15. Every game animal wounded by hunting and reduced to possession by the hunter shall be killed immediately and become a part of the daily bag. No person will at any time, or by any means, possess or transport live game animals taken under authority of this regulation.

2.6.16. No person will use or direct the rays of a spotlight or other artificial light, including automotive headlights, for the purpose of spotting, locating, or taking animals within the boundaries of the installation.

2.6.17. Quail, Woodcock and Bobcat hunting is prohibited.

2.6.18. Raccoon and Fox may be harvested during the State defined seasons and as stipulated in this document.

2.6.19. Mourning Dove may be hunted IAW federal, state and installation migratory bird hunting regulations.

2.7. Game Species-Specific Regulations

2.7.1. Hunters shall report all harvests and unrecovered crippled animals. Reporting policies shall be posted on the HCS Communication Board, JBLE-Eustis Hunting Program web page, and included in the Daily Hunter Briefing.

2.7.2. Deer Hunting.

2.7.2.1. Deer limits are two (2) per day and six (6) total per season, 3 of which must be antlered; archery, muzzle loading and firearms seasons combined.

2.7.2.2. Deer hunters shall record biological data from deer harvests, as specified at the HCS. Procedures will be posted at the processing facility, on the HCS Communication Board, and included within the Daily Hunter Briefing.

2.7.2.3. Jaw bones shall be removed from each harvested deer. The entire jaw bone must be removed and tagged according to posted procedures on the day of harvest. Should a hunter desire to have a deer head mounted, they may have the jaw bone removed by the taxidermists and returned to CED within 5 business days. Failure to return the jaw bone within 5 business days will result in immediate suspension of hunting, fishing and trapping privileges until the jaw bone is returned or one year front date of harvest.

2.7.2.4. All deer hunting shall occur from an elevated platform no less than ten (10) feet in height, except at approved youth, senior, handicapped locations, or special circumstances approved by CED.

2.7.2.5. Deer hunters must utilize a four point safety harness while on the stand.

2.7.2.6. Hunters may retrieve harvested deer if the deer is within sight from the hunter's assigned stand. If the deer is not visible, hunters must call the HCS and obtain approval before retrieving the deer.

2.7.2.7. All deer must be tagged IAW Virginia State Code prior to moving the animal.

2.7.2.8. Deer shall not be field dressed in hunting areas. Hunters shall bring all harvested deer to the HCS for check-in and processing.

2.7.2.9. Shooting deer through or over fences, ditches and roads is prohibited.

2.7.2.10. Carrying a loaded weapon (including a shotgun with a shell in chamber or magazine, muzzle loading firearms with primer or cap in place or bow/crossbow with the arrow/bolt nocked/loaded on the ground) is prohibited.

2.7.2.11. Carrying a loaded weapon (as described in 2.7.2.9) while climbing a ladder or utilizing a personal tree stand is prohibited.

2.7.2.12. Archery and crossbow hunters shall pass an archery shooting ability test every 2 years before hunting with archery tackle. Archery hunters shall hit a 7-inch target five (5) out of six (6) times at unknown distances with broad heads from an elevated position no less than 10 feet in height. Unknown distances shall be no more than 35 yards, no more than 1 shot at each distance and no more than 2 shots in each distance range of 0-15 yards, 15-25 yards and 25-35 yards. Range finders are permitted and encouraged. Persons wishing to qualify with archery tackle must provide their own target, in good condition and capable of preventing pass through shots, during testing. Persons utilizing mechanical broad heads may use practice mechanical broad heads for testing. Persons utilizing fixed broad heads must utilize a fixed broad head for testing. Broad head use shall be IAW State Code.

2.7.2.13. Use of buck shot is prohibited.

2.7.2.14. Man-drive hunting or stalking is prohibited.

2.7.2.15. Hunters living off base must dispose of harvested deer carcasses off base. JBLE-Eustis will provide hunters living in base housing with a location to dispose of harvested deer carcasses.

2.7.2.16. Possession or use of any product that contains natural deer urine or other bodily fluid is prohibited.

2.7.3. Youth Deer Hunting.

2.7.3.1. Youth hunters 14 years old and under shall be directly supervised by an adult within a distance that affords direct control of the weapon by the adult.

2.7.3.2. Youth hunters 15-16 years olds may hunt alone within 25 yards and within direct line of sight of an adult. If hunters utilize personal climbing gear, the adult and youth cannot cohabit the same tree. Both hunters may possess and utilize firearms, except in designated youth seats.

2.7.3.3. Only one weapon is authorized on designated youth seats and only the youth is authorized to utilize the weapon.

2.7.4. Urban Deer Management.

2.7.4.1. Urban Deer Management necessity will be determined annually by CED.

2.7.4.2. Dates, days and times will be set prior to urban deer management requirements.

2.7.4.3. Only archery tackle is authorized during urban deer management activities.

2.7.5. Turkey Hunting.

2.7.5.1. Turkey hunting is conducted through a lottery.

2.7.5.2. Turkey hunters have two (2) half-day hunts, starting 30 minutes before sunrise until noon, to harvest one (1) bearded turkey.

2.7.5.3. Scouting is not permitted for turkey hunting.

2.7.5.4. Shot size larger than #2 is prohibited.

2.7.5.5. Specific turkey lottery information shall be posted at the HCS and on the JBLE-Eustis Hunting Program web page.

2.7.6. Small Game Hunting.

2.7.6.1. Small game hunting is permitted in designated hunting areas on a first come, first served basis, after the deer season ends.

2.7.6.2. Small game hunting is permitted during deer season if adequate hunting areas are available.

2.7.6.3. Rabbit hunting with dogs is permitted. If rabbit dogs leave the designated hunting areas, hunting will cease and owners will notify the HCS of the situation. The HCS shall approve retrieval of the dogs only after coordination with Range Control, 733 SFS and affected military units. Persons retrieving dogs shall secure their weapon IAW section 2.7.2.9.

2.7.7. Waterfowl Hunting.

2.7.7.1. Waterfowl hunting will be IAW Federal and State laws, and installation policies. Hunters shall comply with annual Migratory Game Bird Hunting in Virginia regulations.

2.7.7.2. Waterfowl hunters hunting interior locations must check in/out at the HCS.

2.7.7.3. Waterfowl hunters utilizing the installation permitted exterior waterfowl blinds along the James and Warwick River are permitted to reserve and check in/out via telephone to the HCS the day of hunting. River blind patrons shall telephone the HCS when they arrive at their blind location, when they clear the blind location and when they are ashore at their original launch location.

2.7.7.4. Waterfowl hunting is permitted at designated locations as indicated on the JBLE-Eustis Waterfowl Hunting Map posted at the HCS.

2.7.7.5. JBLE-Eustis waterfowl blinds and locations are granted on a first come, first serve basis. Lottery drawings may be conducted when deemed necessary for waterfowl hunt locations.

2.7.7.6. Temporary ground blinds may be erected for waterfowl hunting but must be removed upon conclusion of the hunt.

2.7.7.7. Waterfowl hunters utilizing interior blinds or locations may hunt anywhere within the boundary of the water feature or designated boundary IAW waterfowl hunting map.

2.7.7.8. When only waterfowl hunting is occurring in a designated hunting area, waterfowl hunters may utilize the marker system in tidal creeks and are permitted to hunt within 100 yards of posted markers.

2.7.7.9. Waterfowl hunters must use non-toxic shot.

2.7.7.10. Waterfowl decoys are not permitted to be left positioned overnight.

2.7.7.11. Exterior waterfowl blinds may be hunted regardless of training area occupancy.

2.7.7.11.1. If training areas are occupied by activities other than waterfowl hunting, waterfowl hunters must hunt from the blind.

2.7.7.11.2. If training areas are occupied by only waterfowl hunting, waterfowl hunters may hunt anywhere within the tidal creeks utilizing the prescribed floating blind marker system and hunting within 100 yards of a floating blind marker.

2.7.7.12. Waterfowl hunters may launch small watercraft from any of the approved small watercraft launch points as indicated on the JBLE-Eustis Waterfowl Hunting Map.

2.7.7.13. Waterfowl hunters may utilize kayaks or canoes to set/retrieve decoys and to retrieve harvested waterfowl at any interior waterfowl hunting location which the transition from soil to water does not exceed a 0.5:1 rise to run ratio. Some locations exceeding this ratio may be indicated on the waterfowl hunting map.

2.7.7.14. Waterfowl hunters operating boats, kayaks, canoes, etc. or wading in water features with depths greater than two (2) feet shall utilize an appropriate and functional personal floatation device.

2.7.7.15. Waterfowl hunters are required to document all harvested, un-retrieved and crippled waterfowl IAW installation policies.

2.7.7.16. Jump shooting waterfowl is prohibited.

2.7.8. Coyote Hunting

2.7.8.1. Electronic calls are authorized for coyote hunting.

2.7.8.2. Coyote hunting is authorized 30 minutes before sunrise to 30 minutes past sunset during other approved installation hunting seasons.

2.7.8.3. All coyote harvest shall be reported to CED.

2.8. Deer stands.

2.8.1. A system of marked trees/stands exist in each hunting area and are marked numerically. Hunters must sign for a single tree/stand to hunt from. A limited number of single and double metal stands exist. Hunters also have the option to utilize personal climbing tree stands.

2.8.2. Hunters are permitted to climb utilizing personal climbing tree stands within specific distances, not to exceed 50 yards, of the marked tree. Stand limitations and restrictions are detailed on the JBLE-Eustis Hunting Map.

2.8.3. Established “Youth Only” double metal stands are for youth hunters only and shall not be closed or utilized by anyone other than youth deer hunters.

2.8.4. Cohabitation of trees by hunters by any means except in double metal stands is prohibited.

2.8.5. Hunters are permitted to tandem hunt within the authorized specific distance of a marked stand. This activity is permitted only if the two hunters wish to hunt as a team, must notify HCS staff, HCS staff must approve and HCS staff shall notify appropriate law enforcement personnel of this activity occurring, to include who and where. HCS staff and any other person shall not request this activity of any person at any time for any reason.

2.8.6. Double metal stands will be reserved for senior hunters until 0500 hours daily. After 0500 hours, all double metal stands will be available on a first come, first serve basis.

2.8.7. Deer stands are filled on a first-come-first-served basis. Lottery drawings may be conducted when deemed necessary for deer stands.

2.9. Weapons and Ammunition

2.9.1. All weapons used on JBLE-Eustis must be registered with the 733 SFS, to include archery tackle.

2.9.2. Authorized Weapons and Ammunition for Deer Hunting.

2.9.2.1. Shotguns .410 gauge through 10 gauge bore firing slugs.

2.9.2.2. Muzzle loading rifles and muskets .45 caliber and larger, firing a single projectile.

2.9.2.3. Bows with arrows and crossbows with broad heads measuring no less than 7/8” in diameter. Broad heads may be fixed blade or mechanical.

2.9.3. Authorized Weapons and Ammunition for Migratory Game Bird Hunting.

2.9.3.1. Shotguns .410 gauge through 10 gauge bore. Shot sizes and type restrictions shall be IAW federal and state regulations. When hunting migratory game birds, auto loading and repeating shotguns capable of holding more than three shells must be plugged with a one-piece filler plug inserted inside the magazine in such a way the plug may not be removed without disassembly of the shotgun. Nontoxic shot is required for hunting migratory waterfowl.

2.9.4. Authorized Weapons and Ammunition for Small Game Hunting.

2.9.4.1. Shotguns .410 gauge through 10 gauge bore. Shot sizes larger than #4 are prohibited. When hunting migratory game birds, auto loading and repeating shotguns capable of holding more than three shells must be plugged with a one-piece filler plug inserted inside the magazine in such a way the plug may not be removed without disassembly of the shotgun.

2.9.4.2. Air rifles not exceeding .22 caliber and 1600 psi are authorized. Air rifle use is prohibited within 200 yards of any structure or paved road. Air rifle use is limited to designated locations, to include Hunting Area 24I, Hunting Area 28 (see hunting map for specifics), Hunting Area 24 west of the train tracks.

2.9.5. Authorized Weapons and Ammunition for Turkey and Coyote Hunting.

2.9.5.1. Shotguns .410 gauge through 10 gauge bore. Shot sizes larger than #2 are prohibited.

2.9.5.2. Bows with arrows and crossbows with broad heads measuring no less than 7/8” in diameter. Broad heads may be fixed blade or mechanical.

2.9.6. Unauthorized Weapons and Ammunition for Hunting or in Possession while Hunting:

2.9.6.1. All center-fire and rim-fire rifles.

2.9.6.2. Buckshot.

2.9.6.3. Lead shot shotgun shells while hunting migratory waterfowl.

2.9.6.4. Pistols and revolvers, to include muzzle loading pistols.

2.9.6.5. Fully automatic weapons.

2.10. Safety Regulations

2.10.1. Weapons must be unloaded, cased, secure and inaccessible while being transported.

2.10.2. Ammunition must be stored separately from the firearm while transported within a vehicle.

2.10.3. Night hunting is prohibited.

2.10.4. Archery hunters must be a minimum of 100 yards from any occupied building or residential housing and 50 yards from any paved road.

2.10.5. Muzzle loading and firearm hunters must be a minimum of 200 yards from an occupied building or residential housing and 100 yards from any paved road.

2.10.6. Open air fires are prohibited.

2.10.7. Hunters shall only enter those areas or stands for which they are assigned.

2.10.8. Entry into any “off limits” area is prohibited. “Off limits” areas are designated on the hunting map as “off limits”. All personnel are required to acknowledge these permanent “off limits” areas.

Chapter 3

TRAPPING

3.1. Trapping

3.1.1. Trapping is limited to 4 trappers per year on a first come first serve basis.

3.1.2. Trapping is limited to 15 December through 31 January.

3.1.3. Upland trapping is prohibited.

3.1.4. Snares are prohibited.

3.1.5. Leg hold traps are prohibited, unless attached to a drowning set and leg holds must be offset.

3.1.6. Dog proof traps are authorized in wetlands along waters edges.

3.1.7. Body gripping traps larger than #220 are prohibited.

3.1.8. Body gripping traps set along water edges, but not below high water mark, with a jaw spread greater than 5 inches must be approved by CED prior to deployment.

3.1.9. Trapping in wetlands and water is authorized with CED coordination. Persons interested in trapping shall contact CED (878-4152) for specifics.

3.1.10. Trapping area allotment will be handled case by case.

3.1.11. Trappers shall submit an annual catch report to CED by 15 March.

3.1.12. All trapping activities will be IAW Federal and State laws, and installation polices.

3.1.13. Trappers are limited to the capture of 4 otters per season. This limit includes the sum of all intentional and unintentional or bycatch captures.

Chapter 4

FISHING

4.1. Lawful Fishing. Fishing shall be by hook and line or rod and reel. A hand landing net may be used to land fish legally hooked in all waters.

4.2. Fishing Permit. Individuals age 16 and older shall possess a current State of Virginia Saltwater and/or Freshwater Fishing License and a JBLE-Eustis Fishing Permit. Fishing permits can be obtained at the JBLE-Eustis ODR Rental Office, 828 Kells Drive, during normal operating hours. Fishing permit cost is $5.

4.3. Persons engaged in night fishing from sunset to sunrise shall sign in with the 733 SFS, 648 Washington Boulevard, prior to night fishing and must sign out following the completion of night fishing.

4.4. Freshwater Fishing

4.4.1. Fish may be caught and released by hook and line only. Each line, to include casting or spinning equipment, shall contain no more than two hooks per line. This limit does not apply to artificial lures.

4.4.2. Personal floatation devices are required to be worn by persons 16 years of age and under when fishing from boats on Eustis Lake. Personal floatation devices must be accessible for persons 17 years of age and older. Floatation devices in covered compartments are not considered accessible.

4.4.3. The following is prohibited when fishing:

4.4.3.1. Using set lines, trot, and bank poles.

4.4.3.2. Fishing at times other than those legally authorized and published.

4.4.3.3. Using seines, fish traps, spears, explosives, and lights.

4.4.3.4. Using waders or float tubes.

4.4.3.5. Any activity that may disturb lake-bottom sediment not included above.

4.4.3.6. Utilizing gasoline powered motors.

4.4.3.7. Fishing in the pond adjacent to Magnolia Park and all Golf Course ponds.

4.4.3.8. Using reptiles and amphibians (of any life stage) as fishing bait.

4.4.3.9. Use of minnow traps are not authorized for personal use in Eustis Lake, Browns Lake, Magnolia Park pond, or any Golf Course pond.

4.4.3. Eustis Lake and Browns Lake are the only authorized locations for freshwater fishing and are catch and release only.

4.4.4. All poles or lines shall be attended at all times. Fishermen must remain within the general area of their fishing tackle.

4.5. Saltwater Fishing.

4.5.1. Federal and State regulations govern fishing in the James and Warwick Rivers and associated tributaries.

4.5.2. Virginia Saltwater Fishing License is required to fish in the James or Warwick Rivers from JBLE-Eustis shorelines.

4.5.3. Children 16 and under fishing from piers are required to wear personal flotation devices.

4.5.4. Saltwater fishing on JBLE-Eustis shall be IAW the annually published JBLE-Eustis ODR Fishing Map. The map is available for distribution and posted at the JBLE-Eustis ODR Rental Office, as well as the ODR web page.

4.5.5. Fishing within any area or along any shoreline is prohibited, except from Mulberry Point to the intersection of Harrison Road and Taylor Avenue.

4.5.6. Use of minnow traps are authorized for personal use in tidal tributaries, except in training areas or impact areas.

4.5.7. Daily creel limits are enforced IAW Federal and Virginia State Regulations.

4.5.8. Using reptiles and amphibians (of any life stage) as fishing bait is prohibited.

4.5.9. The following is prohibited when Saltwater Fishing.

4.5.9.1. Using set lines, trot, and bank poles.

4.5.9.2. Using seines, fish traps, spears, explosives, and lights.

4.5.9.3. Cleaning/filleting of fish in the picnic areas located on Harrison Road. Fish must remain whole from place of catch to residence.

4.5.10. All poles or lines shall be attended at all times. Fishermen must remain within the general area of their fishing tackle.

Chapter 5

DUTIES AND RESPONSIBILITIES

5.1. 733 MSG CED is the Program Manager providing management and oversight of the JBLE-Eustis Hunting, Fishing and Trapping Program. Effective management of the program consists of coordinated efforts of CED, FSS, 733 SFS, Staff Judge Advocate (SJA), Safety and the Army Support Agency (ASA).

5.1.1. 733 CED

5.1.1.1. Serves as Program Manager of the JBLE-Eustis Hunting, Fishing and Trapping Program.

5.1.1.2. Provides management oversight of all hunting, fishing and trapping activities conducted on JBLE-Eustis.

5.1.1.3. Develops, coordinates and staffs written installation policy documents for hunting, fishing and trapping activities to include but not limited to JBLE I 32-102, the JBLE-Eustis INRMP and Annual INRMP Review Summaries.

5.1.1.4. Prepares Environmental Impact Assessment Process (EIAP) documentation for applicable hunting, fishing and trapping activities.

5.1.1.5. Sets harvest limits and restrictions for species to be hunted or harvested.

5.1.1.6. Sets limits and restrictions on non-game wildlife harvests, collections, and use. This includes but is not limited to common snapping turtles, frogs, salamanders, etc.

5.1.1.7. Establishes hunting and non-hunting/off-limits areas and requests 633 Air Base Wing (ABW) Commander approval.

5.1.1.8. Establishes archery, air rifle, black powder, and shotgun use locations and boundaries.

5.1.1.9. Develops and produces hunting, fishing and trapping maps depicting all boundaries and limitations to hunting, fishing and trapping.

5.1.1.10. Develops and staffs hunting, fishing and trapping fees in coordination with FSS.

5.1.1.11. Approves all hunting, fishing and trapping program disseminated information published on the JBLE-Eustis Hunting Program web page and disseminated through the JBLE-Eustis e-mail information distribution system.

5.1.1.12. Develops and staffs land access policies and procedures.

5.1.1.13. Develops, staffs and executes special management programs for restricted and off-limits areas including the impact area, golf course, and cantonment areas.

5.1.1.14. Collects deer biological data directly from hunters.

5.1.1.15. Collects waterfowl harvest data from hunters and recreational hunter opinions through surveys.

5.1.1.16. Prepares annual harvest and hunter demographics report.

5.1.1.17. Conducts end of season AAR with input from FSS, ASA, SFS and the JBLE-Eustis Hunting Council.

5.1.2. 633 FSS

5.1.2.1. Executes recreational hunting and fishing program as articulated in JBLE I 32-102 and the JBLE-Eustis INRMP.

5.1.2.2. Maintains the JBLE-Eustis Hunting and Fishing Web site and the JBLE-Eustis e-mail information distribution system.

5.1.2.3. Distributes information pertaining to hunting and fishing to include maps, promotional and regulatory materials.

5.1.2.4. Ensures that all prerequisites are met prior to sale of permits.

5.1.2.5. Collects hunting, fishing and trapping fees and issues appropriate permits and forwards fees to the AF account for fish and wildlife management (57 5095) as per AFI 32-7064.

5.1.2.6. Reserves training areas through Range Facility Management Support System.

5.1.2.7. Develops and organizes JBLE-Eustis Hunter Education Courses and hunter information briefs.

5.1.2.8. Operates the JBLE-Eustis HCS.

5.1.2.9. Ensures hunter accountability for persons failing to sign in/out.

5.1.2.10. Staffs HCS with trained personnel.

5.1.2.11. Manages available hunting areas for conflict resolution.

5.1.2.12. Conducts hunter lotteries, when necessary.

5.1.2.13. Maintain stands, blinds and trails to include managing volunteer work force.

5.1.2.14. Maintains the JBLE-Eustis archery range and conducts archery qualification tests.

5.1.2.15. Organizes off-season shooting events.

5.1.2.16. Provides new stands and blinds as necessary.

5.1.2.17. Promotes soldier/airmen participation across JBLE.

5.1.2.18. Conducts annual review of the hunting program and provides comments and recommendations to CED.

5.1.2.19. Advises hunters of actions that may violate JBLE-Eustis Hunting Regulations.

5.1.3. 633 ABW Safety Office. Review all safety related aspects of the JBLE-Eustis Hunting, Fishing and Trapping Program.

5.1.4. 733 SFS

5.1.4.1. Enforces Federal, State and Local laws, rules and regulations and installation policies that govern hunting, fishing and trapping to protect wildlife and the environment.

5.1.4.2. Protects natural resources through a combination of enforcement, education, and conservation programs.

5.1.4.3. Conducts surveillance activities as part of investigatory actions.

5.1.4.4. Conducts vehicle check points.

5.1.4.5. Investigates complaints of illegal hunting activities and nuisance wildlife.

5.1.4.6. Prepares reports, issues citations/summons and information packages for administrative and prosecutory actions.

5.1.4.7. Issues suspension and revocation notices to hunters for illegal and unsafe activities.

5.1.5. ASA

5.1.5.1. Maximizes opportunities for hunting and fishing consistent with training and safety requirements..

5.1.5.2. Prepares and provides 2 week schedule, up to 1 week (locked-in).

5.1.6. 633 SJA

5.1.6.1. Provide legal sufficiency review of the hunting, fishing and trapping program.

Chapter 6

VIOLATION PENALTIES

6.1. Violations of Federal, State and local laws and installation policies can carry multiple penalties, if convicted, ranging from prison, loss of property, fines to loss of privileges.

6.2. General Categories.

6.2.1. Penalties for violations of Federal, State and Local laws are set by the appropriate governing bodies and are prescribed by appropriate judicial platforms.

6.2.2. Penalties for violations of installation policies are prescribed by federal statutes and determined by appropriate judicial platforms.

6.2.3. Penalties for violations of specific installation hunting regulations not covered by federal statutes will result in suspension or revocation of hunting, fishing and trapping privileges based on categorical classification of the offense.

6.2.3.1. Penalties for violations of administrative controls will result in loss of privileges for 1-4 weeks for first time offense, 2-8 weeks for second time offense and loss of privileges for remainder of the season for third time offense.

6.2.3.2. Penalties for violations of safety controls will result in loss of privileges for 2 weeks to the remainder of the season for first time offense and revocation of privileges for second time offense.

6.2.3.2. Situations with multiple violations of either category could result in revocation of privileges on first offense.

TYLER.SEAN.K.1127541155 Digitally signed by TYLER.SEAN.K.1127541155 Date: 2018.07.08 19:16:00 -04'00'

SEAN K. TYLER, Colonel, USAF
Commander, 633d Air Base Wing

Appendix A

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

6 References

AFMAN 33-363, *Management of Records*, 01 March 2008 (Incorporating Change 1, 28 January 2015)
AFI 32-7064, *Integrated Natural Resource Management*, 18 November 2014

7 Prescribed Forms

None

8 Adopted Forms

AF Form 847, Recommendation for Change of Publication

9 Abbreviations and Acronyms

ABW—Air Base Wing

AF—Air Force

AFI—Air Force Instruction **ASA—**

Army Support Activity **CED—**Civil

Engineering Division

DODI—Department of Defense Instruction

EIAP—Environmental Impact Analysis Process

FSS—Force Support Squadron

HCS—Hunter Check Station

INRMP—Integrated Natural Resources Management Plan

JBLE—Joint Base Langley-Eustis **JBLEI**—

Joint Base Langley-Eustis Instruction **MSG—**

Mission Support Group **ODR—**Outdoor

Recreation

OPR—Office of Primary Responsibility

PAO—Public Affairs Office

RFMSS—Range Facility Management Support System

SFS—Security Forces Squadron **SJA**—Staff

Judge Advocate **UCMJ**—Uniform Code of

Military Justice

UXO—Unexploded Ordinance

10 Terms

Animal: includes wildlife as defined below (such as deer, other mammals, birds, reptiles, amphibians), as well as insects and other invertebrate organism.

Artifact: An object of cultural significance.

Engaging: to become involved in

Exterior Waterfowl Blinds: Waterfowl blinds that are located within 100 yards of the outmost boundary of the installation along the James and Warwick River.

Inaccessible: Unable to be reached, not within reach of the driver under normal driving operations.

Interior Waterfowl Blinds or Areas: Waterfowl blinds or areas that are located more than 100 yards inward of the outmost boundary of the installation.

Night Hunting: Hunting between the hours of 30 minutes past sunset and 30 minutes before sunrise.

Pesticide: "Any substance or mixture of substances including biological control agents, that may prevent, destroy, repel, or mitigate pests and is specifically labeled for use by the EPA. Also, any substance or mixture of substances used as a plant regulator, defoliant, dessicant, disinfectant or biocide." as defined by DODI 4150.07, 28 May 2008. Pesticides include but are not limited to acaricides, algaecides, fungicides, herbicides, insecticides, nematocides and rodenticides.

Processing facility: A roofed structure located in the 3500 block south of The Pines Golf Course behind building 3516 where deer processing is authorized and deer biological data is collected.

Revocation: Permanent forfeiture of an individual's hunting and fishing privileges on the installation.

Secure: Placed so not to be moved or taken.

Senior: Person 65 years of age and over.

Suspension: Forfeiture of an individual's hunting and fishing privileges for a prescribed period of time.

Take: capture or gain possession of **Taking:**

to capture or gain possession of **Youth:**

Person 16 years of age and under.

Wildlife: animals that have not been domesticated or tamed and are usually living in a natural environment, including both game and nongame species.

Appendix B

MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING

I,_____, understand that hunting, fishing and trapping on JBLE-Eustis is a privilege and not an entitlement. I have had adequate opportunity to read JBLE Instruction 32-102 and agree to abide by its provision. I understand and agree to the above and to abide by all Federal and State Laws, AF and Installation regulations. I understand that any violation of Federal and State law(s), AF, Installation regulations or the JBLE I 32-102 will invalidate my hunting, fishing and trapping privileges and may lead to possible criminal or civil prosecution. I agree to allow inspection of my bag limit, vehicle, cooler, containers, and any/all equipment used in the execution of hunting, fishing and trapping by law enforcement personnel at any time. I understand that refusal to allow inspection will immediately cancel my hunting, fishing and trapping privileges and can also lead to further Federal and/or State prosecution.

_____ _____

Print Name Signature Date

_____

Outdoor Recreation Representative Date

Appendix C

RELEASE AND HOLD HARMLESS AGREEMENT

RELEASE AND HOLD HARMLESS AGREEMENT

I,_____, am voluntarily participating in hunting, fishing and/or trapping on JBLE-Eustis. I understand and acknowledge that hunting, fishing and trapping are inherently dangerous activities. I agree that I am assuming the risk of all personal injuries, death and property damage that may occur as a result of taking part in these activities. These include such injuries or damages as may be caused by:

(INITIAL BELOW TO ACKNOWLEDGE)

_____- Hazards incident to hunting, fishing and/or trapping on JBLE-Eustis and in military training areas; to include, but not limited to UXO, barbed wire, foxholes, etc.

_____- The negligent acts of other hunters, fishers and/or trappers.

_____- Any dangerous condition, known or unknown, that exists on JBLE-Eustis and in military training areas.

_____- Any other negligent act of JBLE-Eustis or 733 CED.

I, on behalf of myself, my personal representative, and my heirs voluntarily agree to release, waive and hold harmless the Unites States Air Force, Joint Base Langley Eustis-Eustis, and Civil Engineering Division, its agents, officers and employees for any and all claims arising from my participating in any hunting, fishing and/or trapping activity.

I certify on this_____(day) of_____(month),_____(year), that I/my child will follow all Federal and State laws, Air Force and JBLE-Eustis hunting, fishing and trapping regulation.

_____

Signature of Hunter/Fisher/Trapper

If participant is a minor child, in addition to initialing above, a parent or legal guardian must sign.

I,_____, parent/legal guardian of the above child, consent to his/her participation in hunting, fishing and/or trapping activities and will abide by the above indemnity agreement.

_____

Signature of Parent/Guardian

Appendix D

Permit Fees

Permit Fees

The following is a listing of fees payable for installation hunting, fishing and trapping permits.

Hunting: Annual permits are valid 1 September - 31 July

(1) 100% Service Connected Disabled	$0
(2) All Others	$45
(3) Turkey Lottery	$25

Fishing: Annual permits are valid for 1 year from date of purchase

(1) All	$10

Trapping: Annual permits are valid 1 September – 31 July

(1) All	$50

Appendix E

GENERAL FIREARMS SAFETY BRIEF

GENERAL FIREARMS SAFETY BRIEF

- All hunters must have a safety brief once a year at the time of purchasing a permit.

- When transporting weapons on JBLE-Eustis, all weapons must be unloaded, cased and inaccessible while being transported within a vehicle. Weapon placard must be displayed while in transit. Ammunition may not be stored within the same case as the weapon.

- Hunters must check in/out of the Hunter Check Station prior to and after each hunting activity.

- Firearms, muzzle loaders, bow and crossbows shall not be loaded while walking to and from hunting locations for any reason.

- Blaze orange or blaze pink vest and/or hat must be worn IAW State law and JBLE I 32-102, Hunting, Fishing and Trapping Program.

- If military training, government work or other non-hunting activity begins around you, make yourself seen and heard and return to the Hunt Check Station immediately.

- Parking passes must be displayed on the dashboard of your vehicle.

- Parking is authorized as identified on map located at the Hunt Check Station and will be strictly enforced.

- Shooting times shall be IAW the Virginia State Hunting and Trapping Digest for the appropriate game being hunted. Official hunting times are established using the Sunrise/Sunset Table located in the aforementioned digest and posted at the Hunt Check Station.

- Drugs and alcohol use while hunting, fishing and trapping is prohibited.

- Game harvest limits will be IAW State law and 733 CE annual instructions.

- Deer hunting must be conducted from assigned stand location. Designated locations allow climbing within 50 yards of your assigned marked tree.

- All deer hunting shall occur from an elevated platform no less than 10 feet in height, except at approved youth, senior, handicapped locations or special circumstances approved by CE.- Game harvests, cripples and unrecovered shall be reported to the Hunter Check Station and IAW with CE policies and procedures. This is applicable to all game species hunting to include, but not limited to, deer, waterfowl, turkey, etc.

- Jaw bones will be removed from all deer harvested on JBLE-Eustis. Instructions for jaw bone removal are posted at the Hunt Check Station. Biological data will be taken from each harvested deer. Hunters whom harvest an antlered deer that they desire to have mounted have 5 business days from harvest to have the taxidermist remove the jaw bone and return it to the Hunt Check Station. Failure to return the jaw bone within allotted time frame shall result in immediate suspension of hunting privileges.

- Deer hunters must utilize a four (4) point safety harness.

- Shotgun slugs are the only permitted shotgun ammunition for deer hunting.
- Waterfowl hunters operating boats, kayaks, canoes, etc or wading in water features with depths greater than four (2) feet shall utilize a proper and in working order personal floatation device.
- Night hunting is prohibited.

Emergency number is 757-878-4555 or 911. Game Check Station number is 757-878-2391.

Print Name Signature Date

Annex O to FE INRMP
Authorized Hunting and Fishing Areas

From: George, Ricky D CIV USAF 733 MSG (US)
To: "633 ABW/CCE"; "633 ABW/CCEA Correspondence"
Cc: Sciacchitano, Mark J CIV USAF 733 MSG (US); Mills, Robin D CIV USAF (US); Dolan, James Douglas (James) CIV USAF 733 MSG (US)
Subject: FW: eSSS: FE Recreational Hunting Area Delineation Approval (UNCLASSIFIED)
Date: Tuesday, January 31, 2017 8:27:00 AM
Attachments: FW eSSS FE Recreational Hunting Area Boundary Coordination.msg
FW eSSS FE Recreational Hunting Area Boundary Coordination (UNCLASSIFIED).msg
FW eSSS FE Recreational Hunting Area Boundary Coordination (633 ABW Safety).msg
FW eSSS FE Recreational Hunting Area Boundary Coordination.msg
FE Rec Hunt Area INRMP Comp Map_2016.jpg

CLASSIFICATION: UNCLASSIFIED

Good morning,

Per AFI 32-7064, chapter 7 (Fish and Wildlife Management), section 7.2 (hunting, fishing, trapping and outdoor recreation programs), sub-section 7.2.3 (Access and Participation), recreational hunting areas must be classified by access (open, restricted, off limits) and included in the installation Integrated Natural Resources Management Plan (INRMP). Request 633 ABW/CC approve the Fort Eustis recreational hunting area boundaries.

v/r
Rick

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Monday, December 12, 2016 11:33 AM
To: USAF JB L-E 733 MSG Mailbox 733 MSG CCE <usaf.jble.733-msg.mbx.733-msg-cce@mail.mil>
Cc: Dolan, James Douglas (James) CIV USAF 733 MSG (US) <james.d.dolan.civ@mail.mil>; Tarvin, Elizabeth E CIV USARMY (US) <elizabeth.e.tarvin.civ@mail.mil>; Mills, Robin D CIV USAF (US) <robin.d.mills.civ@mail.mil>; Benedetto, Tania L CIV USAF 733 MSG (US) <tania.l.benedetto.civ@mail.mil>
Subject: eSSS: FE Recreational Hunting Area Delineation Approval

To	Action	Signature (Surname), Grade, Date
1. 733 MSG/CED	Coord	M.Sciacchitano/12 Dec 16
2. 733 MSG/CSM	Coord	Herrington/CSM/16 Dec 16
3. 733 MSG/CCD	Coord	Stenglein/GS-14/4 Jan 17
4. 733 MSG/CC	Coord	Clayton/COL/30 Jan 17
5. 633 ABW/CCEA	Coord	JB 1 Feb 17
6. 633 ABW/CCC	Coord	Arnold/CMSgt/2 Feb 17
7. 633 ABW/CCS	Coord	
8. 633 ABW/CCE	Coord	
9. 633 ABW/XD	Coord	
10. 633 ABW/CV	Coord	Carr/Col/3 Feb 17
11. 633 ABW/CC	Appr	

Action Officer: Mr. James D. Dolan, 733 MSG/CEIE, (757) 878-4152

Suspense: 20 December 2016

1. PURPOSE: 633 ABW/CC approve the Fort Eustis recreational hunting area boundaries.

2. BACKGROUND: Per AFI 32-7064, chapter 7 (Fish and Wildlife Management), section 7.2 (hunting, fishing,

ARW/H 11 of 11

trapping and outdoor recreation programs), sub-section 7.2.3 (Access and Participation), recreational hunting areas must be classified by access (open, restricted, off limits) and included in the installation Integrated Natural Resources Management Plan (INRMP).

a) Fort Eustis operates a recreational hunting program.

b) The Fort Eustis recreational hunting program is operated by 633 ABW/FSS and supported by 733d MSG/CE to ensure effective implementation of the INRMP.

c) The INRMP is currently being reviewed and revised due to recent findings of federally endangered species on Fort Eustis.

d) An updated recreational hunting and non-hunting area delineation is required for the new INRMP.

e) The attached map accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

f) As per AFI 32-7064 definitions, Fort Eustis only has "Open" and "Off Limits" areas. "Off Limits" areas are areas where mission security and safety concerns due to high human use and/or presence will not allow recreational hunting. Examples of "Off Limits" areas include housing, schools, golf course, impact area, etc. All "Off Limits" areas fall under the authority of 733 MSG/CE for depredation and/or special management hunts for selective species under rigid safety protocols and oversight when deemed necessary.

g) As per AFI 32-7064 definitions, all "Open" areas are accessible by all persons authorized to purchase a Fort Eustis Hunting Permit.

3. See attached concurrences from 633 ABW/FSS, SJA, SE and ASA.

4. RECOMMENDATION: Concur for 633 ABW approval.

//signed//
MARK J. SCIACCHITANO
Director, 733 CED

5 Tabs:
Fort Eustis Recreational Hunting Area Boundary Map Concurrences from 633 ABW/FSS, SJA, SE and ASA; four (4) separate outlook attachments

CLASSIFICATION: UNCLASSIFIED

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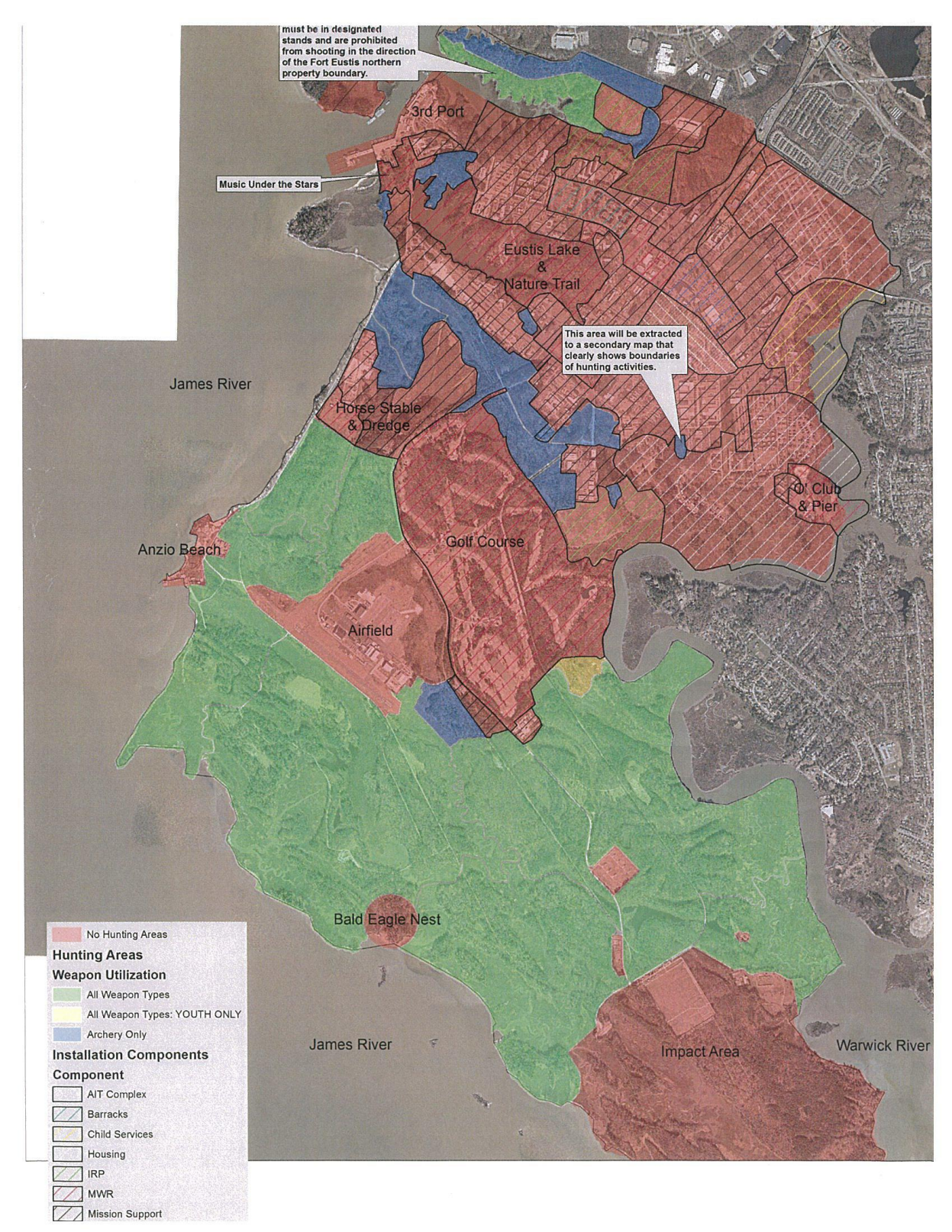
CLASSIFICATION: UNCLASSIFIED


must be in designated stands and are prohibited from shooting in the direction of the Fort Eustis northern property boundary.
3rd Port
Music Under the Stars
Eustis Lake & Nature Trail
This area will be extracted to a secondary map that clearly shows boundaries of hunting activities.
James River
Horse Stable & Dredge
Ol' Club & Pier
Golf Course
Anzio Beach
Airfield
Bald Eagle Nest
James River
Impact Area
Warwick River
No Hunting Areas
Hunting Areas
Weapon Utilization
All Weapon Types
All Weapon Types: YOUTH ONLY
Archery Only
Installation Components
Component
AIT Complex
Barracks
Child Services
Housing
IRP
MWR
Mission Support

George, Ricky D CIV USAF 733 MSG (US)

From: Calder, Donald W Jr CIV USAF 733 MSG (US)
Sent: Tuesday, September 27, 2016 8:06 AM
To: Dolan, James Douglas (James) CIV USAF 733 MSG (US)
Cc: Christensen, Timothy P CIV USAF (US)
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination
Attachments: Hunting Area INRMP Compliancy Map.pdf
Signed By: donald.calder@us.af.mil

Importance: High

WG/JA COORD

James - Here's the legal office response (Maj Velasco).

Don C.

-----Original Message-----
From: VELASCO, JODI M Maj USAF ACC AFLOA/JACE-FSC
[mailto:jodi.velasco@us.af.mil]
Sent: Wednesday, September 14, 2016 3:18 PM
To: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Cc: Bond, Susan E CIV USAF 633 ABW (US) <susan.e.bond6.civ@mail.mil>; Bond, Susan E CIV USAF 633 ABW (US) <susan.e.bond6.civ@mail.mil>
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Don

I reviewed the map and if it's consistent with the current (2016) recreational hunting area boundaries and weapon platforms that are identified in the INRMP, I have no objection.

I have cc'd Susan Bond for her read at the installation.

V/r

Maj Velasco

V/r

JODI VELASCO, Maj, USAF
ACC Environmental Liaison Officer
AFLOA/JACE-FSC
220 Sweeney Blvd., Bldg 669, Ste. 109
Langley AFB, VA 23665-2774
DSN: 574-3534
COMM: (757) 764-3534

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work-product or information protected under the attorney-client privilege, both of which are protected from disclosure under the Freedom of Information Act, 5 USC Sec. 552. Do not release outside of DoD channels without the consent of the originator's office. If you received this message in error, please notify the sender by reply e-mail and delete all copies of this message.

-----Original Message-----
From: Calder, Donald W Jr CIV USAF 733 MSG (US)
[mailto:donald.w.calder.civ@mail.mil]
Sent: Wednesday, September 14, 2016 12:34 PM
To: THERIAULT, LIZA M Lt Col USAF ACC 633 FSS/CC <liza.theriault@us.af.mil>; VELASCO, JODI M Maj USAF ACC AFLOA/JACE-FSC <jodi.velasco@us.af.mil>
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

LtCol Theriault & Maj Velasco,

Mark Sciacchitano sent this out on 26 August requesting your coordination. Did you ever receive it? Any problems providing coordination?

V/R,

Don C.
Donald W. Calder, Jr.
Chief, Environmental Element (733 CED/CEIE) Joint Base Langley-Eustis
757-878-7380
Donald.W.Calder.Civ@mail.mil

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Friday, August 26, 2016 11:45 AM
To: Theriault, Liza M Lt Col USAF (US) <liza.theriault@us.af.mil>; Ulmen, Justin G SMSgt USAF 633 ABW (US) <justin.g.ulmen.mil@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>; Velasco, Jodi M Maj USAF AFLOA (US) <jodi.velasco@us.af.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Subject: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Please provide coordination on the eSSS providing your review of the attached map that accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

Please return to Don Calder, Environmental Chief upon completion.

Thanks,

Mark Sciacchitano
Director, 733d Civil Engineer Division
JBLE-Eustis
1407 Washington Blvd
Fort Eustis, VA 23604
Comm: 757-878-3642
Mobile: 757-342-3576

To (Surname), Grade, Date	Action	Signature
1. 733 MSG/CEIE DWC/26Aug16	Coord	
2. 733 MSG/CEI	Coord	VRT/26Aug16
3. 733 MSG/CDD	Coord	RDM/26 Aug16
4. 733 MSG/CED	Coord	MJS/26 Aug 16
5. 633 ABW/FSS	Coord	
5. 633 ABW/SJA	Coord	
6. 633 ABW/SE	Coord	
7. ASA	Coord	

Action Officer: Mr. James D. Dolan, 733 MSG/CEIE, (757) 878-4152

Suspense: 2 September 2016

1. PURPOSE: To gain coordination form major stakeholders in order to have 633 ABW/CC approve the Fort Eustis recreational hunting area boundaries.

2. BACKGROUND: Per AFI 32-7064, chapter 7 (Fish and Wildlife Management), section 7.2 (hunting, fishing, trapping and outdoor recreation programs), sub-section 7.2.3 (Access and Participation), recreational hunting areas must be classified by access (open, restricted, off limits) and included in the installation Integrated Natural Resources Management Plan (INRMP).

a) Fort Eustis operates a recreational hunting program.

b) The Fort Eustis recreational hunting program is operated by 633 ABW/FSS and supported by 733d MSG/CE to ensure effective implementation of the INRMP.

c) The INRMP is currently being reviewed and revised due to recent

findings of federally endangered species on Fort Eustis.

d) An updated recreational hunting and non-hunting area delineation is required for the new INRMP.

e) The attached map accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

f) As per AFI 32-7064 definitions, Fort Eustis only has "Open" and "Off Limits" areas. "Off Limits" areas are areas where mission security and safety concerns due to high human use and/or presence will not allow recreational hunting. Examples of "Off Limits" areas include housing, schools, golf course, impact area, etc. All "Off Limits" areas fall under the authority of 733 MSG/CE for depredation and/or special management hunts for selective species under rigid safety protocols and oversight when deemed necessary.

g) As per AFI 32-7064 definitions, all "Open" areas are accessible by all persons authorized to purchase a Fort Eustis Hunting Permit.

4. RECOMMENDATION: Concur for 633 ABW approval.

//signed//
MARK J. SCIACCHITANO
Director, 733 CED

1 Tab:
Fort Eustis Recreational Hunting Area Boundary Map

George, Ricky D CIV USAF 733 MSG (US)

From: Calder, Donald W Jr CIV USAF 733 MSG (US)
Sent: Friday, October 14, 2016 9:35 AM
To: Christensen, Timothy P CIV USAF (US); Dolan, James Douglas (James) CIV USAF 733 MSG (US)
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination

Importance: High

633 FSS Coord

Tim & James,
Here's the belated coord from 633 FSS.

Don C

-----Original Message-----
From: THERIAULT, LIZA M Lt Col USAF ACC 633 FSS/CC [mailto:liza.theriault@us.af.mil]
Sent: Friday, October 14, 2016 8:19 AM
To: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Cc: Dolan, James Douglas (James) CIV USAF 733 MSG (US) <james.d.dolan.civ@mail.mil>; Fontes, Donna S NAF USAF (US) <donna.s.fontes.naf@mail.mil>; Cook, Carl E Jr NAF USAF 633 MSG (US) <carl.e.cook.naf@mail.mil>; Anderson, Gloria D NAF USAF ACC CC (US) <gloria.d.anderson.naf@mail.mil>
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Mr Calder,

So sorry for the delay...no issues from an FSS/Outdoor Rec perspective. I've coordinated below.

V/R,

Lmt
LIZA M. THERIAULT, Lt Col, USAF
Commander, 633d Force Support Squadron
Joint Base Langley-Eustis, VA
Comm: 757-764-2991 & DSN: 312-574-2991

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Friday, August 26, 2016 11:45 AM
To: Theriault, Liza M Lt Col USAF (US) <liza.theriault@us.af.mil>; Ulmen, Justin G SMSgt USAF 633 ABW (US) <justin.g.ulmen.mil@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>; Velasco, Jodi M Maj USAF AFLOA (US) <jodi.velasco@us.af.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Subject: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Please provide coordination on the eSSS providing your review of the attached map that accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

Please return to Don Calder, Environmental Chief upon completion.

Thanks,

Mark Sciacchitano
Director, 733d Civil Engineer Division
JBLE-Eustis
1407 Washington Blvd
Fort Eustis, VA 23604
Comm: 757-878-3642
Mobile: 757-342-3576

To (Surname), Grade, Date	Action	Signature
1. 733 MSG/CEIE DWC/26Aug16	Coord	
2. 733 MSG/CEI	Coord	VRT/26Aug16
3. 733 MSG/CDD	Coord	RDM/26 Aug16
4. 733 MSG/CED	Coord	MJS/26 Aug 16
5. 633 ABW/FSS	Coord	lmt/12 Oct 16
5. 633 ABW/SJA	Coord	
6. 633 ABW/SE	Coord	
7. ASA	Coord	

Action Officer: Mr. James D. Dolan, 733 MSG/CEIE, (757) 878-4152

Suspense: 2 September 2016

1. PURPOSE: To gain coordination form major stakeholders in order to have 633 ABW/CC approve the Fort Eustis recreational hunting area boundaries.

2. BACKGROUND: Per AFI 32-7064, chapter 7 (Fish and Wildlife Management), section 7.2 (hunting, fishing, trapping and outdoor recreation programs), sub-section 7.2.3 (Access and Participation), recreational hunting areas must be classified by access (open, restricted, off limits) and included in the installation Integrated Natural Resources Management Plan (INRMP).

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g) As per AFI 32-7064 definitions, all "Open" areas are accessible by all persons authorized to purchase a Fort Eustis Hunting Permit.

4. RECOMMENDATION: Concur for 633 ABW approval.

//signed//
MARK J. SCIACCHITANO
Director, 733 CED

1 Tab:
Fort Eustis Recreational Hunting Area Boundary Map

George, Ricky D CIV USAF 733 MSG (US)

From: Calder, Donald W Jr CIV USAF 733 MSG (US)
Sent: Tuesday, September 27, 2016 8:10 AM
To: Dolan, James Douglas (James) CIV USAF 733 MSG (US)
Cc: Christensen, Timothy P CIV USAF (US)
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination (633 ABW Safety)

James,
Here's the 3rd (and final) response I received - this one from Wing Safety.

WG/SE COORD

Let me know if we need to re-send to anyone else,

Don C.

-----Original Message-----
From: Ulmen, Justin G SMSgt USAF 633 ABW (US)
Sent: Monday, September 19, 2016 1:52 PM
To: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>
Subject: RE: eSSS: FE Recreational Hunting Area Boundary Coordination

My Apologies I must have missed this.

SE has no issues with this as proposed as we discussed this with Mr. Dolan.

Please let me know if you have any questions.

r/
SMSgt Ulmen

From: Calder, Donald W Jr CIV USAF 733 MSG (US)
Sent: Wednesday, September 14, 2016 4:37 PM
To: Ulmen, Justin G SMSgt USAF 633 ABW (US); Mckenna, James W LTC USARMY IMCOM ATLANTIC (US); Hinojosa, Richard L CIV USARMY ASA (US)
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination

LTC Mckenna, SMSgt Ulmen, and Mr. Hinojosa,

Mr. Sciacchitano sent this out to you on 26 August requesting coordination. Did you receive it? Do you have any problems providing coordination on the eSSS?

V/R,

Don C.
Donald W. Calder, Jr.
Chief, Environmental Element (733 CED/CEIE) Joint Base Langley-Eustis
757-878-7380

Donald.W.Calder.Civ@mail.mil

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Friday, August 26, 2016 11:45 AM
To: Theriault, Liza M Lt Col USAF (US) <liza.theriault@us.af.mil>; Ulmen, Justin G SMSgt USAF 633 ABW (US) <justin.g.ulmen.mil@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>; Velasco, Jodi M Maj USAF AFLOA (US) <jodi.velasco@us.af.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Subject: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Please provide coordination on the eSSS providing your review of the attached map that accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

Please return to Don Calder, Environmental Chief upon completion.

Thanks,

Mark Sciacchitano
Director, 733d Civil Engineer Division
JBLE-Eustis
1407 Washington Blvd
Fort Eustis, VA 23604
Comm: 757-878-3642
Mobile: 757-342-3576

To	Action	Signature (Surname), Grade, Date
1. 733 MSG/CEIE	Coord	DWC/26Aug16
2. 733 MSG/CEI	Coord	VRT/26Aug16
3. 733 MSG/CDD	Coord	RDM/26 Aug16
4. 733 MSG/CED	Coord	MJS/26 Aug 16
5. 633 ABW/FSS	Coord	
5. 633 ABW/SJA	Coord	
6. 633 ABW/SE	Coord	
7. ASA	Coord	

Action Officer: Mr. James D. Dolan, 733 MSG/CEIE, (757) 878-4152

Suspense: 2 September 2016

1. PURPOSE: To gain coordination form major stakeholders in order to have 633 ABW/CC approve the Fort Eustis recreational hunting area boundaries.

2. BACKGROUND: Per AFI 32-7064, chapter 7 (Fish and Wildlife Management), section 7.2 (hunting, fishing, trapping and outdoor recreation programs), sub-section 7.2.3 (Access and Participation), recreational hunting areas must be classified by access (open, restricted, off limits) and included in the installation Integrated Natural Resources Management Plan (INRMP).

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c) The INRMP is currently being reviewed and revised due to recent findings of federally endangered species on Fort Eustis.

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g) As per AFI 32-7064 definitions, all "Open" areas are accessible by all persons authorized to purchase a Fort Eustis Hunting Permit.

4. RECOMMENDATION: Concur for 633 ABW approval.

//signed//
MARK J. SCIACCHITANO
Director, 733 CED

1 Tab:
Fort Eustis Recreational Hunting Area Boundary Map

George, Ricky D CIV USAF 733 MSG (US)

From: Calder, Donald W Jr CIV USAF 733 MSG (US)
Sent: Tuesday, September 27, 2016 8:08 AM
To: Dolan, James Douglas (James) CIV USAF 733 MSG (US)
Cc: Christensen, Timothy P CIV USAF (US)
Subject: FW: eSSS: FE Recreational Hunting Area Boundary Coordination (UNCLASSIFIED)

James,
Here's the response from ASA (on behalf of LTC McKenna).

ASA COORD

Don C.

-----Original Message-----
From: Hinojosa, Richard L CIV USARMY ASA (US)
Sent: Wednesday, September 14, 2016 1:17 PM
To: Sciacchitano, Mark J CIV USAF 733 MSG (US) <mark.j.sciacchitano.civ@mail.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>
Subject: RE: eSSS: FE Recreational Hunting Area Boundary Coordination (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

ASA Eustis concurs with hunting area boundaries.

Rick Hinojosa
Deputy to the Commander
US Army Support Activity Fort Eustis
Joint Base Langley-Eustis
Fort Eustis, VA 23604
(757) 878-0940
DSN 826-0940

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Wednesday, September 14, 2016 11:57 AM
To: Ulmen, Justin G SMSgt USAF 633 ABW (US) <justin.g.ulmen.mil@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>; Velasco, Jodi M Maj USAF AFLOA (US) <jodi.velasco@us.af.mil>; Theriault, Liza M Lt Col USAF (US) <liza.theriault@us.af.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Subject: RE: eSSS: FE Recreational Hunting Area Boundary Coordination

I have not heard back from any of you on this. Can you please provide your concurrence and send back to me ASAP so it will be properly identified for both the hunting program and the INRMP.

Thanks!

Mark Sciacchitano

Director, 733d Civil Engineer Division
JBLE-Eustis
1407 Washington Blvd
Fort Eustis, VA 23604
Comm: 757-878-3642
Mobile: 757-342-3576

-----Original Message-----
From: Sciacchitano, Mark J CIV USAF 733 MSG (US)
Sent: Friday, August 26, 2016 11:44 AM
To: 'THERIAULT, LIZA M Lt Col USAF ACC 633 FSS/CC' <liza.theriault@us.af.mil>; Ulmen, Justin G SMSgt USAF 633 ABW (US) <justin.g.ulmen.mil@mail.mil>; Mckenna, James W LTC USARMY IMCOM ATLANTIC (US) <james.w.mckenna4.mil@mail.mil>; Hinojosa, Richard L CIV USARMY ASA (US) <richard.l.hinojosa.civ@mail.mil>; Velasco, Jodi M Maj USAF AFLOA (US) <jodi.velasco@us.af.mil>
Cc: Calder, Donald W Jr CIV USAF 733 MSG (US) <donald.w.calder.civ@mail.mil>
Subject: eSSS: FE Recreational Hunting Area Boundary Coordination
Importance: High

Please provide coordination on the eSSS providing your review of the attached map that accurately depicts the current (2016) recreational hunting area boundaries and weapon platforms authorized for each.

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Thanks,

Mark Sciacchitano
Director, 733d Civil Engineer Division
JBLE-Eustis
1407 Washington Blvd
Fort Eustis, VA 23604
Comm: 757-878-3642
Mobile: 757-342-3576

To	Action	Signature (Surname), Grade, Date
1. 733 MSG/CEIE	Coord	DWC/26Aug16
2. 733 MSG/CEI	Coord	VRT/26Aug16
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5. 633 ABW/SJA	Coord	
6. 633 ABW/SE	Coord	
7. ASA	Coord	

Action Officer: Mr. James D. Dolan, 733 MSG/CEIE, (757) 878-4152

Suspense: 2 September 2016

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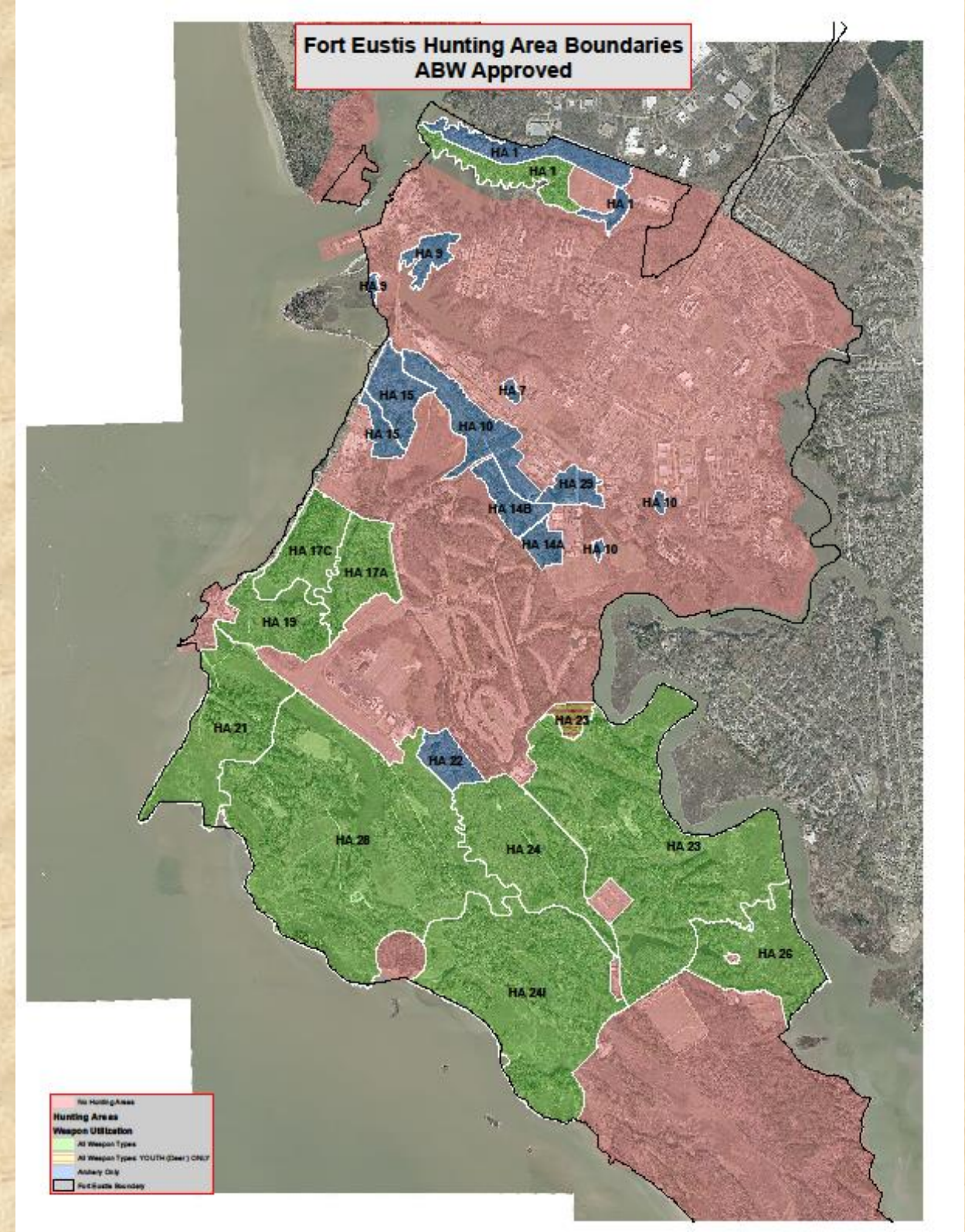
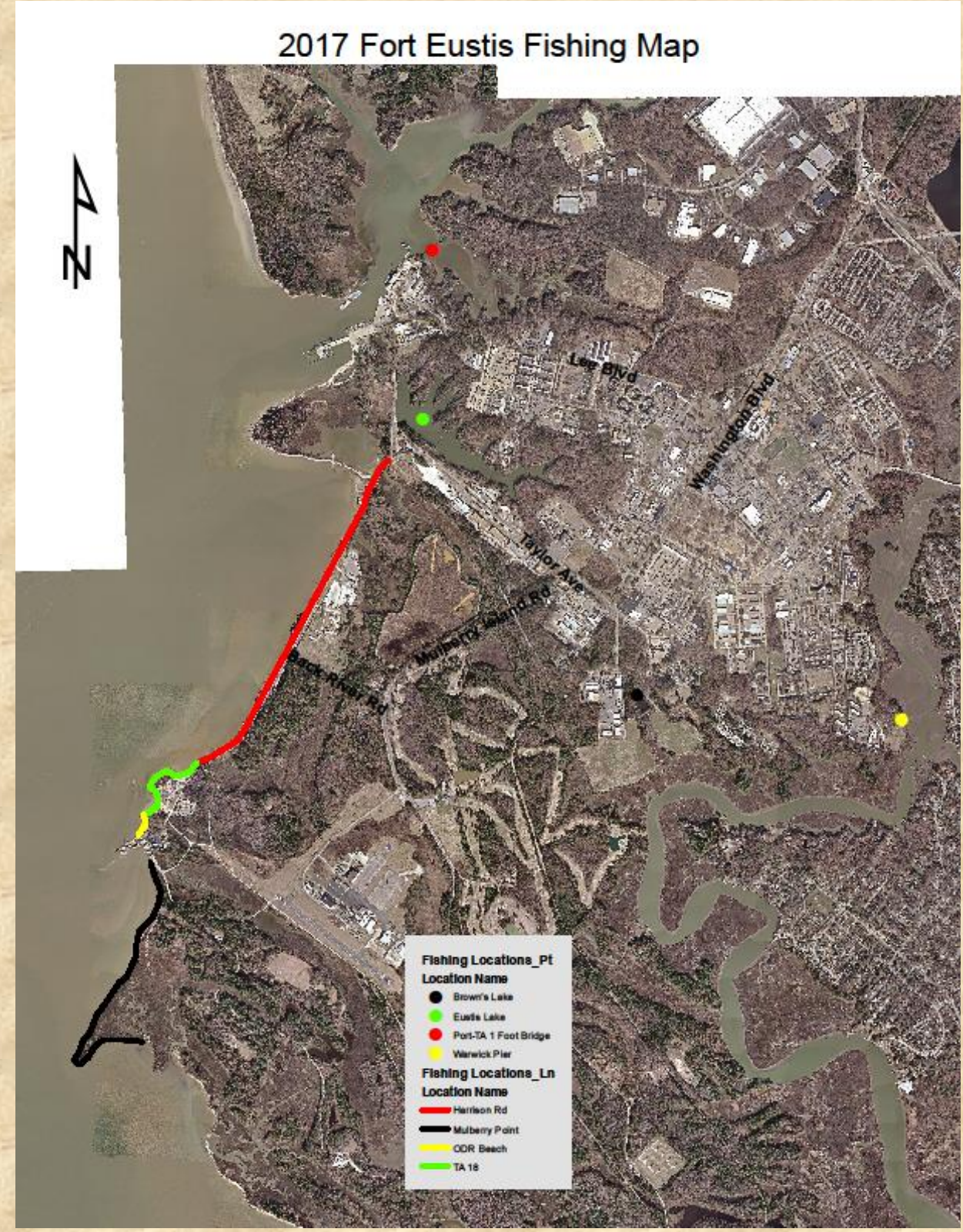
4. RECOMMENDATION: Concur for 633 ABW approval.

//signed//
MARK J. SCIACCHITANO
Director, 733 CED

1 Tab:
Fort Eustis Recreational Hunting Area Boundary Map

CLASSIFICATION: UNCLASSIFIED


Fort Eustis Hunting Area Boundaries
ABW Approved
HA 1
HA 1
HA 1
HA 9
HA 9
HA 15
HA 15
HA 7
HA 10
HA 29
HA 14B
HA 10
HA 14A
HA 10
HA 17C
HA 17A
HA 19
HA 21
HA 23
HA 22
HA 28
HA 24
HA 23
HA 26
HA 24I
Hunting Areas
Weapon Utilization
All Weapon Types
All Weapon Types YOUTH (Deer) ONLY
Archery Only
Fort Eustis Boundary


2017 Fort Eustis Fishing Map
N
Lee Blvd
Washington Blvd
Taylor Ave
Mulberry Island Rd
Back River Rd
Fishing Locations_Pt
Location Name
Brown's Lake
Eustis Lake
Port-TA 1 Foot Bridge
Warwick Pier
Fishing Locations_Ln
Location Name
Harrison Rd
Mulberry Point
ODR Beach
TA 18

INTENTIONALLY LEFT BLANK

<u>ANNEX P TO FE INRMP</u>
Chesapeake Bay Agreements

Double clike on the below document to open.

CHESAPEAKE WATERSHED AGREEMENT

2014

ANNEX Q TO FE INRMP

Memorandum of Understanding between the 633d Air Base Wing (633 ABW) and the 1st fighter wing (1 FW) Delineating Senior Airfield Authority (SAA) and Base Operating Support-Integrator (BOS-I) Roles, Responsibilities, Rrelationships, and Authorities

1 FW 633 ABW SAA_BOS-I MOU 28

<u>ANNEX R TO FE INRMP</u>
DISTRIBUTION

633 ABW/CC
633 ABW/CV
633 ABW/SE
633 FSS/DIR

1 FW/CC
1 OG/CC
1 OSS/CC
1 OSS/OSA

733 MSG/CC
733 MSG/CD
733 CED/DIR
733 SFS/CC
733 MSD/DIR
733 LRD/DIR

ASA

7 TRANS BDE
128 AV BDE