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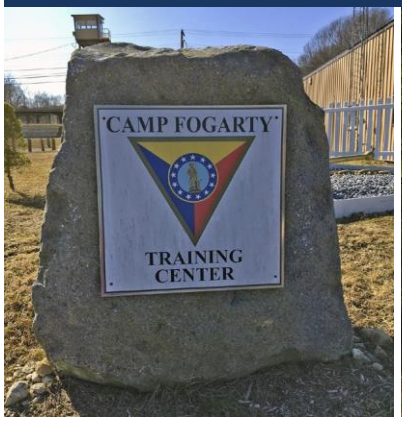

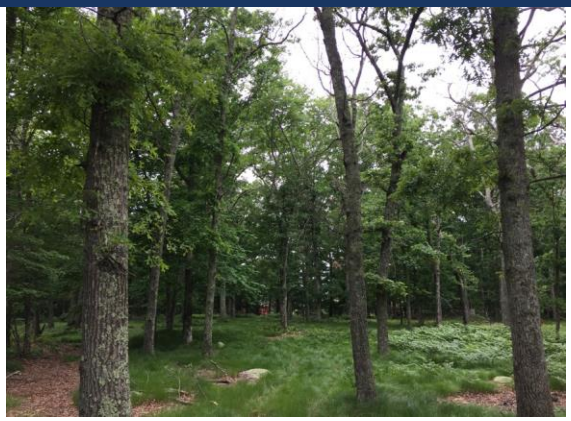


Integrated Natural Resources Management Plan (INRMP)

Camp Fogarty Training Site
Kent County, Rhode Island

April 2019

Rhode Island Army
National Guard

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FINAL

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP)

CAMP FOGARTY

TRAINING SITE

KENT COUNTY, RHODE ISLAND

RHODE ISLAND ARMY NATIONAL GUARD

APRIL 2019

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UPDATED
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
CAMP FOGARTY TRAINING SITE
KENT COUNTY, RHODE ISLAND

SIGNATURE PAGE

This Integrated Natural Resources Management Plan (INRMP) is an update of the 2007 Camp Fogarty Training Site (CFTS) INRMP that has been reviewed for operation and effect and recommended for update and continued implementation. It meets the requirements for INRMPs as specified in the Sikes Act, as amended (16 United States Code §670a *et seq.*). It has set appropriate and adequate guidelines for conserving and protecting the natural resources of CFTS.

Approving Officials:

WILLIAM M. MYER
COL, GS
I&E, Army National Guard

Date: 25 Apr 2019

CHRISTOPHER P. CALLAHAN
Major General
Rhode Island National Guard
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Date: 15 MAY 19

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Executive Summary

The Integrated Natural Resources Management Plan (INRMP) is the primary guidance document and tool for managing natural resources at Rhode Island Army National Guard's (RIARNG's) Camp Fogarty Training Site (CFTS). CFTS includes approximately 370 acres of federally owned land in Kent County, Rhode Island that is licensed by the United States (US) Army to the RIARNG. CFTS must provide a variety of environmental conditions and habitats in which to train soldiers. The management of CFTS must be conducted in a way that provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations, and provides for no net loss in the capability of military installation lands to support the military mission of the installation. Installation commanders can use INRMPs to manage natural resources more effectively to ensure that installation lands remain available and in good condition to support the installation's military mission over the long term.

This updated INRMP is intended to be consistent with the Sikes Act Improvement Act (SAIA) of 1997, 16 US Code §670a *et seq.*, as amended, Department of Defense Instruction 4715.03, *Natural Resources Conservation Program*, Army Regulation 200-1 *Environmental Protection and Enhancement*, Army National Guard Installations and Environment Directorate, Memorandum dated 9 April 2012, *Guidance for the Creation, Implementation, Review, Revision and Update of INRMPs*, Department of the Army (DA), Memorandum dated 25 May 2006, *Guidance for Implementation of the SAIA*, and Department of Defense (DoD) Office of the Deputy Under Secretary of Defense Memorandum dated 1 November 2004. This INRMP integrates all aspects of natural resources management with the rest of CFTS's mission, and therefore becomes the primary tool for managing CFTS's ecosystems and habitats while ensuring the successful accomplishment of the military mission at the highest possible levels of efficiency.

This INRMP is an update and reorganization of the 2007 CFTS INRMP and is the result of a review for operation and effect done by US Fish and Wildlife Service (USFWS), Rhode Island Department of Environmental Management (RIDEM), and RIARNG. The review for operation and effect determined that only an update is required since there are no military mission changes, no program or management philosophy changes, and no input received from USFWS or RIDEM that resulted in changes to the way natural resources are managed at CFTS. Based on the desire to update the INRMP, RIARNG updated and reorganized the plan in accordance with the DoD INRMP template guidance and incorporated updated natural resources data.

Goals and objectives provide the framework for the natural resources management programs. Goals provide a general guiding direction for each technical area and logical objectives that facilitate achieving those goals are described for any priority issues within each technical area.

> GOAL 1: Program Management: Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and DA regulations and policies.
>
> GOAL 2: Soil: Manage soil to minimize sediment loss and erosion.
>
> GOAL 3: Water Resources: Maintain water resources so they remain resilient, functional, and with no net loss of acreage.

GOAL 4: Vegetation: Manage vegetation to support the military mission, optimize protection of existing habitats, maintain native species, and enhance wildlife habitat.

GOAL 5: Fire: Manage wildland fires at CFTS in a manner that minimizes safety risks, enhances natural resources, and results in no net loss of training ability.

GOAL 6: Fish and Wildlife: Maintain fish and wildlife populations while minimizing potential impacts to the military mission.

GOAL 7: Threatened and Endangered Species: Manage rare species using an ecosystem approach, while maintaining the military mission at CFTS.

GOAL 8: Invasive Species: Minimize impacts of invasive and pest species, including plant and animal species, utilizing an Integrated Pest Management approach.

These goals are supported in the INRMP by objectives and projects, as well as management strategies and specific actions to achieve these goals. Goals and objectives are listed in **Section 4.0** of the INRMP, and projects and activities are summarized in **Table A-1** and **Table A-2**. These goals will ensure the success of the military mission and conservation of natural resources. The general philosophies and methodologies used throughout the CFTS natural resources management program are focused on conducting doctrinally required military training while maintaining ecosystem viability and sustainability.

This INRMP provides a description of the installation and the military mission, information regarding the environment at CFTS, and specific natural resource management programs designed for successful and sustainable military training. The implementation of this INRMP at CFTS will ensure the successful accomplishment of RIARNG's military missions while promoting adaptive management that sustains ecosystem and biological integrity and provides for multiple uses of natural resources.

TABLE OF CONTENTS

SECTION **PAGE**

FIGURES

TABLES

APPENDICES

ABBREVIATIONS AND ACRONYMS

ABS	Applied Bio-Systems, Inc.
amsl	above mean sea level
AR	Army Regulation
ARNG	Army National Guard
ARNG I&E	ARNG Installations and Environment Directorate
BCC	Birds of Conservation Concern
BMP	Best Management Practice
CFMO	Construction and Facilities Management Officer
CFR	Code of Federal Regulations
CFTS	Camp Fogarty Training Site
CSMS	Combined Support Maintenance Shop
CWA	Clean Water Act
DA	Department of the Army
DoD	Department of Defense
DoDI	DoD Instruction
DUSD	Deputy Under Secretary of Defense
EA	Environmental Assessment
EAB	Emerald Ash Borer
EIS	Environmental Impact Statement
EMS	Environmental Management System
EO	Executive Order
EQR	Environmental Quality Report
ESA	Endangered Species Act
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FNSI	Finding of No Significant Impact
FSP	Forest Stewardship Plan
FY	Fiscal Year
GIS	Geographic Information Systems
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
ITAM	Integrated Training Area Management
IWFMP	Integrated Wildland Fire Management Plan
LRAM	Land Rehabilitation and Maintenance
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NCBC	Naval Construction Battalion Center
NEPA	National Environmental Policy Act of 1969
NGB	National Guard Bureau
NLEB	Northern Long-Eared Bat
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PAO	Public Affairs Officer
PFO1	Palustrine Forested Wetland
PLS	Planning Level Survey
POTO	Plans, Operations, and Training Officer
POW	Palustrine Open Water
PSS1	Palustrine Deciduous Scrub Shrub Wetland
R.I.G.L.	Rhode Island General Laws
R4SB	Intermittent Streambed

REC	Record of Environmental Consideration
RIARNG	Rhode Island Army National Guard
RICR	Rhode Island Code of Regulations
RIESAPA	Rhode Island Endangered Species of Animals and Plants Act
RINHS	Rhode Island Natural History Survey
RIPDES	Rhode Island Pollutant Discharge Elimination System
RTLA	Range and Training Land Analysis
RTLP	Range and Training Land Program
SAIA	Sikes Act Improvement Act
SGCN	Species of Greatest Conservation Need
SMZ	Special Management Zone
SOP	Standard Operating Procedure
sp.	species
SPCP	Spill Prevention and Contingency Plan
SR	State Route
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
STEP	Status Tool for the Environmental Program
SWAP	State Wildlife Action Plan
TAG	The Adjutant General
TRI	Training Requirements Integration
TSM	Training Site Manager
UD	Udorthents-Urban Land Complex
Ur	Urban land
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
WQC	Water Quality Certification

1.0 INRMP OVERVIEW AND POLICIES

1.1 Purpose

The purpose of the Integrated Natural Resources Management Plan (INRMP) is to provide a foundation or "road map" for Rhode Island Army National Guard (RIARNG) actions in order to promote the conservation and management of the natural resources at Camp Fogarty Training Site (CFTS). The INRMP is the installation commander's adaptive plan and primary guidance document for managing natural resources on CFTS in support of the military mission. CFTS includes approximately 370 acres of land owned and operated by the RIARNG in Kent County, Rhode Island (see **Figure 1-1** and **Section 2.1** for details). CFTS must provide a variety of environmental conditions and habitats in which to train soldiers. The management of CFTS must be conducted in a way that provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations, and provides for no net loss in the capability of military installation lands to support the military mission of the installation. Installation commanders can use INRMPs to manage natural resources more effectively to ensure that installation lands remain available and in good condition to support the installation's military mission over the long term.

This updated INRMP is intended to be consistent with the Sikes Act Improvement Act (SAIA) of 1997, 16 United States Code (USC) §670 *et seq.*, as amended, Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, Army Regulation (AR) 200-1 *Environmental Protection and Enhancement*, Army National Guard (ARNG) Installations and Environment Directorate (ARNG I&E), Memorandum dated 9 April 2012, *Guidance for the Creation, Implementation, Review, Revision and Update of INRMPs*, Department of the Army (DA), Memorandum dated 25 May 2006, *Guidance for Implementation of the SAIA*, and Department of Defense (DoD) Office of the Deputy Under Secretary of Defense (DUSD) Memorandum dated 1 November 2004. This INRMP integrates all aspects of natural resources management with the rest of CFTS's mission, and therefore becomes the primary tool for managing CFTS's ecosystems and habitats while ensuring the successful accomplishment of the military mission at the highest possible levels of efficiency. The INRMP is the guide for the management and stewardship of all natural resources present at CFTS. A multiple-use approach will be implemented to allow for the presence of mission-oriented activities, as well as to protect environmental quality through the efficient management of natural resources.

This INRMP is an update and reorganization of the 2007 CFTS INRMP and is the result of a review for operation and effect done by the United States Fish and Wildlife Service (USFWS), Rhode Island Department of Environmental Management (RIDEM), and RIARNG. The review for operation and effect determined that only an update is required since there are no military mission changes, no program or management philosophy changes, and no input received from USFWS or RIDEM that resulted in changes to the way natural resources are managed at CFTS. Both RIARNG's Environmental Office and military trainers were included in the review. The projects identified in **Section 5.0** include recurring or ongoing projects as well as some newly identified projects needed for the implementation of the existing program.

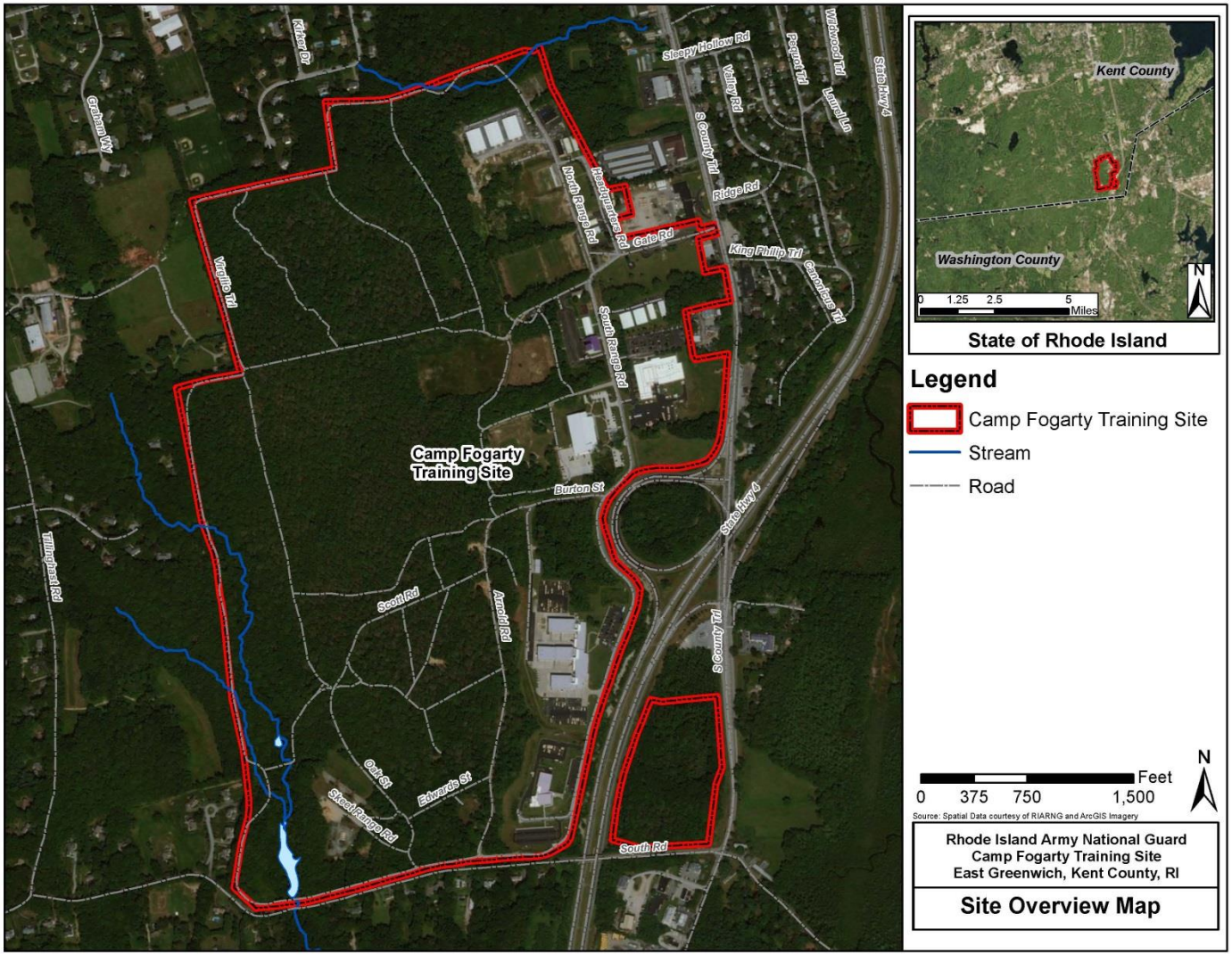

Figure 1-1: CFTS Site Overview

RIARNG updated and reorganized this INRMP in accordance with the DoD INRMP template guidance and incorporated updated natural resources data. These templates were used to ensure the plan content would meet ARNG I&E requirements and to provide an easy-to-follow and logical organization for the INRMP. The INRMP has been updated and reorganized as follows.

- To determine what projects and programs have been implemented, an INRMP Implementation Analysis was developed and included in **Section 3.7** (see **Table 3-1**).
- Natural resources data and species lists have been updated to include new data and to include changes in the status of rare species (see **Section 2.0** and **Appendix B**).
- An assessment of historical and projected climate change was added in **Section 3.5**.
- The Rhode Island State Wildlife Action Plan (SWAP) has been incorporated (see **Section 3.6**).
- Management goals and objectives have been reorganized and consolidated by resource area in **Section 4.0**.
- The list of implementation projects has been updated from the 2007 INRMP. See **Table 3-1** for a summary of 2007 project implementation and **Table A-1** and **Table A-2** for projects and activities, respectively, to be carried out under this INRMP.
- A Forest Stewardship Plan (FSP) was developed for CFTS and is included in **Appendix C**.
- Species lists of flora and fauna recorded at CFTS have been created and included in **Appendix B**.

1.2 Authority and Legal Requirements

The **SAIA** requires federal military installations and state-owned National Guard facilities with significant natural resources to develop a long-range INRMP and implement cooperative agreements with other agencies. CFTS is a federally owned installation that is licensed by the United States (US) Army to the RIARNG.

The **DoDI 4715.03**, *Natural Resources Conservation Program*, dated 18 March 2011, establishes policies and assigns responsibilities for complying with applicable federal, state, and local laws and regulations, executive orders (EOs), presidential memorandums, and DoD policies for the integrated management of natural resources on facilities managed or controlled by DoD. This instruction also implements new natural resources conservation metrics and provides procedures for developing, implementing, and evaluating effective natural resources management programs.

AR 200-1, *Environmental Protection and Enhancement*, dated 13 December 2007, addresses the environmental responsibilities of all Army organizations and agencies, and provides a framework for the Army Environmental Management System (EMS). This regulation provides guidance on when to develop and implement an INRMP and discusses associated coordination requirements.

The **DoD DUSD Memorandum**, *Supplemental Guidance concerning INRMP Reviews*, dated 1 November 2004, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by USFWS, the state conservation agency, and a military proponent for operation and effect on

a regular basis, but not less often than every five years. Minor updates and continued implementation of an existing INRMP do not require an opportunity for public comment. Major revisions to an INRMP do require an opportunity for public review. The degree of endangered species consultation when updating or revising an INRMP depends upon the management strategies identified in the INRMP and the amount of past consultation. Most updates and revisions will not require formal consultation. Endangered Species Act (ESA) Section 7 consultation is required for INRMPs that contain management strategies that may affect federally listed species or critical habitat. The need for such consultation should become apparent during the review for operation and effect and be implemented if necessary as part of a revision.

DA Memorandum, *Guidance for Implementation of the SAIA*, dated 25 May 2006, establishes guidance for implementing existing DoD SAIA guidance on Army lands.

ARNG I&E Memorandum, *Guidance for the Creation, Implementation, Review, Revision and Update of INRMPs*, dated 9 April 2012, is intended to supplement the SAIA and AR 200-1 and supersede all previous ARNG INRMP guidance. The memorandum provides guidance for state ARNG Environmental Programs on when an INRMP is required, coordination requirements for new and revised INRMPs, INRMP format, integration of component plans (e.g., Integrated Wildland Fire Management Plan [IWFMP]), integration with other programs, critical habitat designations, INRMP implementation and funding, annual reviews and reviews for operation and effect, reporting and tracking, plan updates and revisions, when public review is necessary, and National Environmental Policy Act of 1969 (NEPA) requirements.

In accordance with **NEPA** (42 USC §4321 *et seq*.), an Environmental Assessment (EA) of the 2001 CFTS INRMP was completed. The EA presented the *Proposed Action Alternative* (total implementation of the INRMP; the preferred alternative) and the *No Action Alternative*, summarized the affected environment, and assessed the environmental consequences of INRMP implementation. The EA concluded that implementation of the INRMP under the preferred alternative was expected to result in neither significant adverse impacts to the quality of the existing natural and human environments, nor a net loss in training lands, therefore allowing CFTS to achieve its primary mission of maintaining military readiness while balancing the sustainability of desired military training area conditions and ecosystem viability. A Finding of No Significant Impact (FNSI) was signed by the National Guard Bureau (NGB), and the 2001 CFTS INRMP was implemented. In 2007, RIARNG updated the original 2001 CFTS INRMP. At that time, it was determined no significant changes would occur as a result of the INRMP update and that the 2001 EA and FNSI were still valid.

Similarly, this INRMP is an update and reorganization of the 2007 CFTS INRMP. The review for operation and effect determined that only an update is required since there are no military mission changes, no program or management philosophy changes, and no input received from USFWS or RIDEM that resulted in changes to the way natural resources are managed at CFTS. An Environmental Checklist and a Record of Environmental Consideration (REC) will be prepared and included in **Appendix H**. The Environmental Checklist will describe the Proposed Action (update and continued implementation of the 2007 CFTS INRMP), identify potential impacts to various environmental media, and, if appropriate, identify that the updated INRMP is addressed in the 2001 CFTS INRMP EA and determine that a REC is the appropriate level of NEPA documentation. The REC that accompanies the Environmental Checklist would cite the EA for the 2001 CFTS INRMP.

In addition to these laws, regulations, and directives, a number of others apply to natural resources management at CFTS and are summarized in **Appendix I**.

1.3 Responsibilities

1.3.1 ARNG Headquarters

ARNG I&E is responsible for review and approval of this INRMP. ARNG I&E is also involved in programming, funding, and implementation review of projects set forth in the INRMP.

1.3.2 RIARNG

The Adjutant General (TAG) provides command guidance in the overall stewardship of the Environmental Management Program to meet training readiness within natural resource requirements, and achieve mission accomplishment. The office of TAG is located at RIARNG's headquarters, which will be transferred to CFTS in 2019.

The **Garrison Commander** is responsible for the overall operations of the Garrison Training Center as well as the comprehensive planning necessary to achieve and maintain excellence in training, real property, and base operations support on CFTS. The Garrison Commander coordinates the activities of all CFTS tenants and using organizations and ensures compliance of existing local, state, and federal laws, codes, and regulations, as applicable.

The **Construction and Facilities Management Officer (CFMO)** directs natural resources management at CFTS. The CFMO addresses environmental awareness and natural resource requirements in the CFTS Standard Operating Procedure (SOP) to ensure that all units using CFTS are briefed on their responsibilities in conducting training.

The **Plans, Operations, and Training Officer (POTO)** has the primary responsibility of scheduling military training and safety of all personnel while training exercises are being conducted. The POTO and the **Training Site Manager (TSM)** determine the training load of CFTS based upon the force structure determined by TAG. CFTS Operations staff are familiar with all aspects of the training center, including training scheduling and conflicts, locations of training facilities, impairments, or problems with human-made structures or natural functions and needs for improvement or maintenance of the training land. Secondary to scheduling is maintaining a high-quality training environment, which is also a primary goal of this INRMP. The TSM, with oversight from the POTO, identifies construction and maintenance priorities, determines Integrated Training Area Management (ITAM) projects, and submits an annual ITAM work plan.

The **RIARNG Environmental Office** is assigned day-to-day responsibility for development and implementation of the revised INRMP. The RIARNG Environmental Office is responsible for directing the management of natural resources at CFTS, identifying compliance requirements, and providing guidance to the TSM and other training site personnel. Specifically, CFTS provides technical assistance to the TSM and the training site personnel to develop projects, secure required permits, conduct field studies, provide environmental awareness materials, identify and map natural and cultural resources, direct the NEPA process, and manage the development and revision of the INRMP. CFTS staff is responsible for providing input to the plan and implementing specific elements of the plan.

The **Public Affairs Officer (PAO)** serves as a liaison between RIARNG and the public. The PAO represents RIARNG in public meetings, prepares media presentations, and offers photography services for natural resources projects and community educational events.

The **Staff Judge Advocate** is the legal advisor to TAG and RIARNG staff on laws and regulations that affect training land use, environmental compliance, and policy.

1.3.3 Cooperating Agencies

USFWS provides technical assistance to RIARNG and is a cooperator during preparation of this INRMP. Specifically, the USFWS is the principal advisor to RIARNG on issues regarding federally protected rare, threatened, and endangered species.

RIDEM provides guidance to RIARNG on species and habitats of special state concern and is a cooperator during the preparation of this INRMP. They also provide information for the management of fish and wildlife**,** water quality protection, and recreation.

1.4 Conditions for Implementation and Revision

1.4.1 Implementation and Annual Reviews

In accordance with DoD and Army policy, RIARNG will review the INRMP annually in cooperation with USFWS and RIDEM. On an annual basis, RIARNG will coordinate with the local USFWS field office and RIDEM to review the previous year's INRMP implementation and discuss implementation of upcoming programs and projects. Coordination will be done through a meeting or by letter or email. A memorandum of record detailing each annual review will be prepared by RIARNG, and these annual review documents will be appended in **Appendix D**.

During this annual review, the need for updates or revisions will be discussed. If minor updates are needed, the requesting party will initiate the updates. Upon agreement of all three parties, these will be added to the INRMP. If it is determined that major changes are needed, all three parties will provide input and an INRMP revision and associated NEPA review will be initiated with RIARNG acting as the lead coordinating agency. The annual meeting will be used to help expedite the more formal review for operation and effect and if all parties agree and document their mutual agreement, it can fulfill the requirement to review the INRMP for operation and effect.

If not already determined in previous annual meetings, by the fourth year annual review a determination will be jointly made to continue implementation of the existing INRMP with updates or to proceed with a revision. If the parties feel that the annual reviews have not been sufficient to evaluate operation and effect and they cannot determine if the INRMP implementation should continue or be revised, a formal review for operation and effect will be initiated. The determination on how to proceed with INRMP implementation or revision will be made after the parties have had time to complete this review.

As part of the annual review, RIARNG will specifically:

- Invite feedback from USFWS and RIDEM on the effectiveness of the INRMP

- Inform USFWS and RIDEM of which INRMP projects and activities are required to meet current natural resources compliance needs
- Document specific INRMP action accomplishments from the previous year and discuss upcoming projects and activities
- Verify that all must-fund projects and activities are budgeted and on schedule, all trained natural resources positions are either filled or in the process of being filled, INRMP goals and objectives are still valid, no significant changes to natural resources or the mission have occurred, and no net loss to CFTS's training capability has occurred in accordance with DA and ARNG Policy.

Information for the annual reviews comes from RIARNG environmental staff, CFTS military leadership, cooperating agencies, project files, and ARNG I&E as applicable. Natural resources data and program and project information are available to cooperating agencies. They may request to see project folders or to have a site visit to view natural resources projects in progress at any time.

1.4.2 INRMP Review for Operation and Effect

Not less than every five years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented to meet the requirements of the SAIA and Army Policy and contributing to the conservation and rehabilitation of natural resources at CFTS. The review will be conducted by the three cooperating parties to include the commander responsible for the INRMP, the Regional Director of USFWS, and the Director of RIDEM. These agencies all have technical representatives who actually perform the review.

The review for operation and effect will either conclude that the INRMP is meeting the intent of the SAIA and it can be updated and implementation can continue; or that it is not effective in meeting the intent of the SAIA to conserve natural resources while providing for no net loss in training capability and it must be revised. The conclusion of the review will be documented in a jointly executed memorandum, meeting minutes, or in some other way that reflects mutual agreement.

If only minor updates are needed, they will be done in a manner agreed to by all parties. The updated INRMP will be reviewed by the local USFWS office, USFWS Regional Director, and RIDEM Director. Once concurrence letters or signatures are received from USFWS's Regional Director and RIDEM's Director, the INRMP will continue to be implemented. A new NEPA review is not necessary for an update and continued implementation of an existing INRMP that has previously undergone NEPA review. In this case, an Environmental Checklist and REC citing the previous NEPA-compliant document is needed.

If a review of operation and effect concludes that an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and RIDEM concur with the revised INRMP. RIARNG will endeavor to complete such revisions within 18 months depending upon funding availability. Revisions to the INRMP will go through a more detailed review process similar to development of the initial INRMP to ensure that RIARNG's military mission and USFWS and RIDEM concerns are adequately addressed, and that the plan meets the intention of the SAIA and Army Policy. Revisions will usually require a new NEPA-compliant analysis. An EA will be done as part of the revision process if determined by ARNG I&E to be necessary.

1.5 Management Philosophy

This INRMP update for CFTS has been developed in cooperation with USFWS and RIDEM. Developed using an interdisciplinary approach, information has been gathered from various RIARNG directorates, CFTS staff, as well as other federal, state, and local agencies and special interest groups with an interest in the management of CFTS natural resources. Agencies and organizations consulted during the development of this INRMP update, as well as initial agency coordination and response letters, have been included in **Appendix E**.

1.5.1 Support of the Military Mission

The overall policies and philosophy of land management at CFTS support the SAIA, DoDI 4715.03, and AR 200-1, which are based on the concept that natural resources management is an integral component of the military training environment. Management of natural resources using an ecosystem approach ensures the sustainable use of training lands while considering both the effects on the surrounding environment and public concern. RIARNG shall maintain sustainable natural resources as a critical training asset upon which to accomplish CFTS's mission. To accomplish this, RIARNG will:

- Ensure no net loss in the capability of installation lands to support existing and projected military training and operations at CFTS
- Maintain quality training lands through proactive management; range and training land monitoring; and damage minimization, mitigation, and rehabilitation

1.5.2 Environmental Management System

The ARNG I&E and RIARNG consider CFTS to be part of the combined RIARNG operations in Rhode Island. The EMS is part of the overall RIARNG management system and includes organizational structure, planning, responsibilities, practices, procedures, and processes, and resource allocation for developing, implementing, achieving, reviewing, and maintaining environmental commitments. The EMS model used by RIARNG, as described in AR 200-1, leads to continual improvement based upon a cycle of "plan, do, check, act" (also known as adaptive management):

Developing and implementing an EMS is required at all ARNG installations.

In 2000, EO 13148, *Greening the Government through Leadership in Environmental Management,* established a 5-year EMS implementation goal for federal facilities.

- Planning, including identifying environmental aspects and establishing goals [plan]
- Implementing, including training and operational controls [do]
- Checking, including monitoring and corrective action [check]
- Reviewing, including progress reviews and acting to make needed changes to the EMS [act]

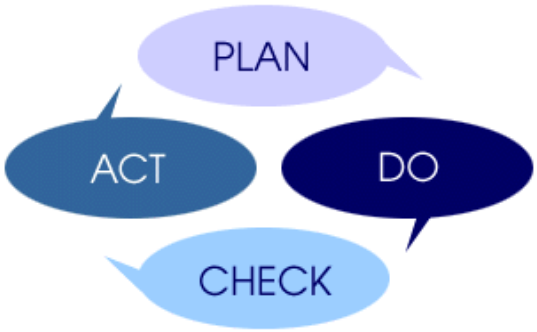

Figure 1-2: EMS Process from US Environmental Protection Agency

The EMS is continually updated through this cycle by fine-tuning its management of operations that may harm the environment. This continual improvement cycle is a fundamental attribute of the EMS that allows the system to adapt to the dynamic nature of the organization's operations.

This INRMP directly supports RIARNG's EMS. RIARNG personnel will perform annual reviews of the INRMP in conjunction with USFWS, RIDEM and other agencies in order to support the concept of EMS. Annual reviews are discussed in **Section 1.4.1** and monitoring of implementation is discussed in **Section 5.5**.

1.5.3 Ecosystem Management

Natural resources at CFTS will be managed with an ecosystem management approach as directed by AR 200-1 and DoDI 4715.03. Ecosystem management may be defined as management to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities. The goal of ecosystem management on military lands is to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. As described in DoDI 4715.03, ecosystem management will incorporate the following elements as described in **Table 1-1**.

Table 1-1: Elements of Ecosystem Management

Elements	
1	Avoid single-species management and implement an ecosystem-based multiple species management approach, insofar as that is consistent with the requirements of the ESA
2	Use an adaptive management approach to manage natural resources in response to conditions such as climate change
3	Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP
4	Use the best available scientific information in decision-making and adaptive management techniques in natural resource management
5	Foster long-term sustainability of ecosystem services

Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or planet. The DoD's challenge is to manage for biodiversity in a way that supports the military mission. The INRMP is identified by DoD as the primary vehicle for conserving biodiversity on military installations. Specific management practices identified in this INRMP have been developed to enhance and maintain biological diversity within the ecosystems at CFTS. The outcome of biodiversity conservation on DoD land includes the items listed in **Table 1-2**.

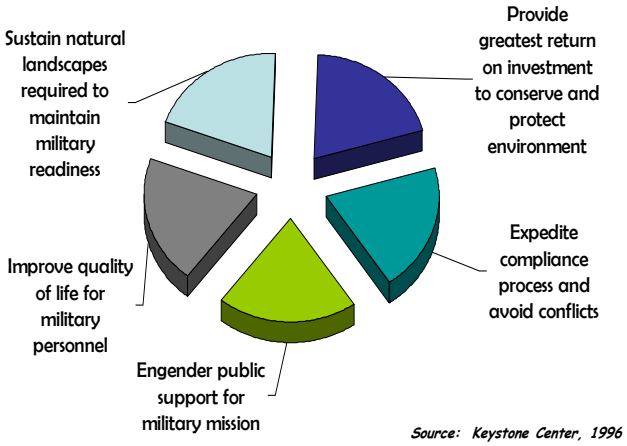

Figure 1-3: Why Conserve Biodiversity on Military Lands?

Table 1-2: Outcomes of Biodiversity Conservation

Outcomes	
1	Maintain or restore remaining native ecosystem types across their natural range of variation
2	Maintain or reestablish viable populations of native species on an installation, when practical
3	Maintain ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles, to the extent practicable
4	Manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics (i.e., incorporate a monitoring component to management plans)

1.5.4 Sustainable Range Program

The Sustainable Range Program (SRP) is the Army's overall approach for improving the way in which it designs, manages, and uses its ranges to ensure long-term sustainability. Requirements for the SRP are set forth in AR 350-19, *Army Sustainable Range Program*, dated 30 August 2005. The SRP is defined by its two core programs, the Range and Training Land Program (RTLP) and the ITAM Program, which focus on the doctrinal capability of the Army's ranges and training land. To ensure the accessibility and availability of Army ranges and training land, the SRP core programs are integrated with the facilities management, environmental management, munitions management, and safety program functions supporting the doctrinal capability.

1.5.4.1 Range and Training Land Program

The RTLP provides a range operations and modernization capability for the central management and programming of live-fire training ranges and maneuver training lands, including the design and construction activities associated with them. The RTLP planning process integrates mission support,

environmental stewardship, and economic feasibility and defines procedures for determining range projects and training land requirements to support live-fire and maneuver training. The RTLP defines the quality assurance and inspection milestones for range development projects and the SOPs to safely operate military training, recreational, or approved civilian ranges under Army control and supports the Commanders' Mission Essential Task List and Army training strategies. RTLP also establishes the procedures and means by which the Army range infrastructure is managed and maintained on a daily basis in support of the training mission.

1.5.4.2 Integrated Training Area Management Program

The ITAM program provides for the management and maintenance of training lands by integrating mission requirements derived from the RTLP with environmental requirements and environmental management practices. The objectives of RIARNG's ITAM program are to:

- Achieve optimal sustained use of lands for realistic training by providing a sustainable core capability that balances usage, condition, and level of maintenance
- Implement a management process that integrates RIARNG training and other mission requirements for land use with sound natural resources management
- Advocate proactive conservation and land management practices by aligning RIARNG land management priorities with RIARNG training and readiness priorities

ITAM consists of four proactive subprograms designed to facilitate these processes.

1) **Range and Training Land Analysis** (RTLA) is the ecological monitoring component that serves to characterize and monitor installation natural resources.
2) **Training Requirements Integration** (TRI) uses information generated and assimilated from RTLA to assist with military exercise scheduling and logistics to minimize harmful practices or activities within training areas.
3) **Land Rehabilitation and Maintenance** (LRAM) provides mitigation measures and land rehabilitation where needed or desired.
4) **Sustainable Range Awareness** (SRA) activities serve to promote awareness of environmentally sensitive issues and instill a stewardship ethic among unit commanders, soldiers, and neighboring communities.

The ITAM Program at CFTS is administered by the TSM with review and approval by the POTO. CFTS is a Category IV installation, which is the lowest priority for ITAM funding. The ITAM Program at CFTS was formally initiated in Fiscal Year (FY) 2018 with the development of an ITAM Work Plan. The requirements of the ITAM Program for CFTS are detailed in this Plan. Project information relevant to INRMP implementation from the ITAM Work Plan has been incorporated into this INRMP. Together, ITAM and natural resources management as outlined in this INRMP ensure sustainable use of training lands.

1.5.5 Goals and Objectives

Goals and objectives provide the framework for the natural resources management programs. Goals provide a general guiding direction for each technical area, and logical objectives that facilitate achieving those goals are described for any priority issues within each technical area. The objectives then drive the development of activities and projects to achieve those objectives. Goals and objectives are described in **Section 4.0** under each technical area. Projects and activities, and the objectives they support, are described in **Table A-1** and **Table A-2**. Below are the goals identified in **Section 4.0**:

GOAL 1: Program Management: Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and DA regulations and policies.

GOAL 2: Soil: Manage soil to minimize sediment loss and erosion.

GOAL 3: Water Resources: Maintain water resources so they remain resilient, functional, and with no net loss of acreage.

GOAL 4: Vegetation: Manage vegetation to support the military mission, optimize protection of existing habitats, maintain native species, and enhance wildlife habitat.

GOAL 5: Fire: Manage wildland fires at CFTS in a manner that minimizes safety risks, enhances natural resources, and results in no net loss of training ability.

GOAL 6: Fish and Wildlife: Maintain fish and wildlife populations while minimizing potential impacts to the military mission.

GOAL 7: Threatened and Endangered Species: Manage rare species using an ecosystem approach, while maintaining the military mission at CFTS.

GOAL 8: Invasive Species: Minimize impacts of invasive and pest species, including plant and animal species, utilizing an Integrated Pest Management (IPM) approach.

1.5.6 Integration with Other Plans

By its nature, an INRMP is multidisciplinary and provides the summary for natural resources at a specific installation. As a result, information from an INRMP is incorporated into other plans and other plans help identify management priorities and potential impacts to natural resources. The INRMP is integrated with a number of RIARNG plans including:

- AR 350-4, ITAM Work Plan (under development) – plan identifies the RIARNG ITAM mission, land stewardship goals, land management focus, and proposed ITAM projects.
- Integrated Cultural Resources Management Plan (ICRMP) for Sites and Training Installations of the RIARNG – plan for management of cultural resources, including consultation and other legal requirements, known cultural resources, processes, and responsibilities at RIARNG facilities (RIARNG, 2019).

- Integrated Pest Management Plan (IPMP; under revision) – plan for management of pest species, including nuisance wildlife and invasive species, to minimize impact to mission, natural resources, and the environment (RIARNG, 2018).

- Spill Prevention and Contingency Plan (SPCP) – plan that describes practices, procedures, structures, and equipment for the prevention of and response to spills of petroleum, oil, and lubricant products, hazardous material, and hazardous waste at CFTS (RIARNG, n.d.).

- Forest Stewardship Plan for CFTS – plan establishes management strategies focused on providing a variety of habitat and stand conditions for the purpose of military training and other resource uses, and enhancing the quality of wildlife habitat and water quality (see **Appendix C**).

- Statewide Operational Noise Management Plan – plan provides a strategy for noise management at RIARNG facilities, including complaint management and noise abatement procedures, when necessary (RIARNG, 2014).

- Environmental Stewardship Plan for Lead Management on RIARNG Ranges at CFTS – plan identifies potential environmental concerns resulting from lead at the firing ranges and identifies best management practices (BMPs) for minimizing the release of lead into the environment (RIARNG, 2017).

- Operational Energy Plan for Training Facilities at CFTS – plan identifies goals and methods to reduce energy use and its environmental impacts, and maximize energy efficiency, including through increased use of renewable energy sources (RIARNG, 2017).

- Range Complex Master Plan for the State of Rhode Island – plan establishes the range and maneuver land requirements for the State of Rhode Island to support the installation training missions (RIARNG, 2012).

- CFTS Trail System Final BMPs Manual – manual provides information on soil erosion and sediment control within the installation, assists RIARNG personnel in maintaining the existing trail system, and provides practical training exercises in a variety of engineering techniques (RIARNG, 2007).

- Various Planning Level Surveys (PLSs) – PLSs have been completed for numerous species; these surveys, to varying degrees, identify species present at CFTS and provide basic management recommendations.

    - Botanical Inventory and Invasive Plant Species Mapping (Leeson, 2004; Leeson, 2008)

    - Odonata (Dragonflies and Damselflies), Asilidae (Robber Flies), and Water Shrew Surveys of Camp Fogarty (Brown & Puryear, 2005)

    - Rare, Threatened, and Endangered Species Surveys (ABS, 2000)

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2.0 INSTALLATION INFORMATION

2.1 General Description

The approximately 370-acre CFTS is located in central Rhode Island (see **Figure 2-1**). The installation lies completely within Kent County and is approximately 15 miles southwest of Providence, Rhode Island. The main gate is located on South County Trail (State Route [SR] 2) approximately 0.5 mile south of Frenchtown Road and 0.4 mile north of Colonel Rodman Highway (SR 4). CFTS is located within the municipality of East Greenwich, Rhode Island.

CFTS land is federally owned and licensed by the US Army to the RIARNG. The RIARNG operates and manages the installation in its entirety to support military training for light infantry exercises. CFTS is divided into a Cantonment Area, Impact Area, 5 firing ranges, and 14 tactical training areas (see **Figure 2-2**), which are described in **Section 2.1.5**.

CFTS is the primary training facility for the RIARNG. The RIARNG also actively uses two other installations (see **Figure 2-1**). Camp Varnum Training Site is a 33-acre installation located in Narragansett, Rhode Island, at the mouth of Narragansett Bay. This site is mostly developed, but does contain approximately 8 acres of deciduous forest and wetland resources. The RIARNG also actively uses Wallum Lake Training Site, which is a 134-acre site located in northeastern Providence County near the Massachusetts and Connecticut borders. This site consists of forest, wetland, and surface water features, and does not contain any developed areas. Camp Varnum and Wallum Lake Training Sites do not require, and do not have, individual INRMPs. Due to the similarity in natural resources present at these training sites and CFTS, the same general management practices described in this INRMP for CFTS would also be implemented at those sites.

2.1.1 Regional Land Use

The CFTS is located in East Greenwich, Kent County, Rhode Island. Kent County supports a rural community that is rapidly expanding its residential base. CFTS is bordered to the south by residential development along South Road; to the west by residential and agricultural uses; to the north by undeveloped woodland, residential, and commercial uses; and to the east by commercial developments abutting SR 2 and SR 4. A portion of CFTS in the southeast corner of the installation (aka, the Island) is fragmented by SR 4.

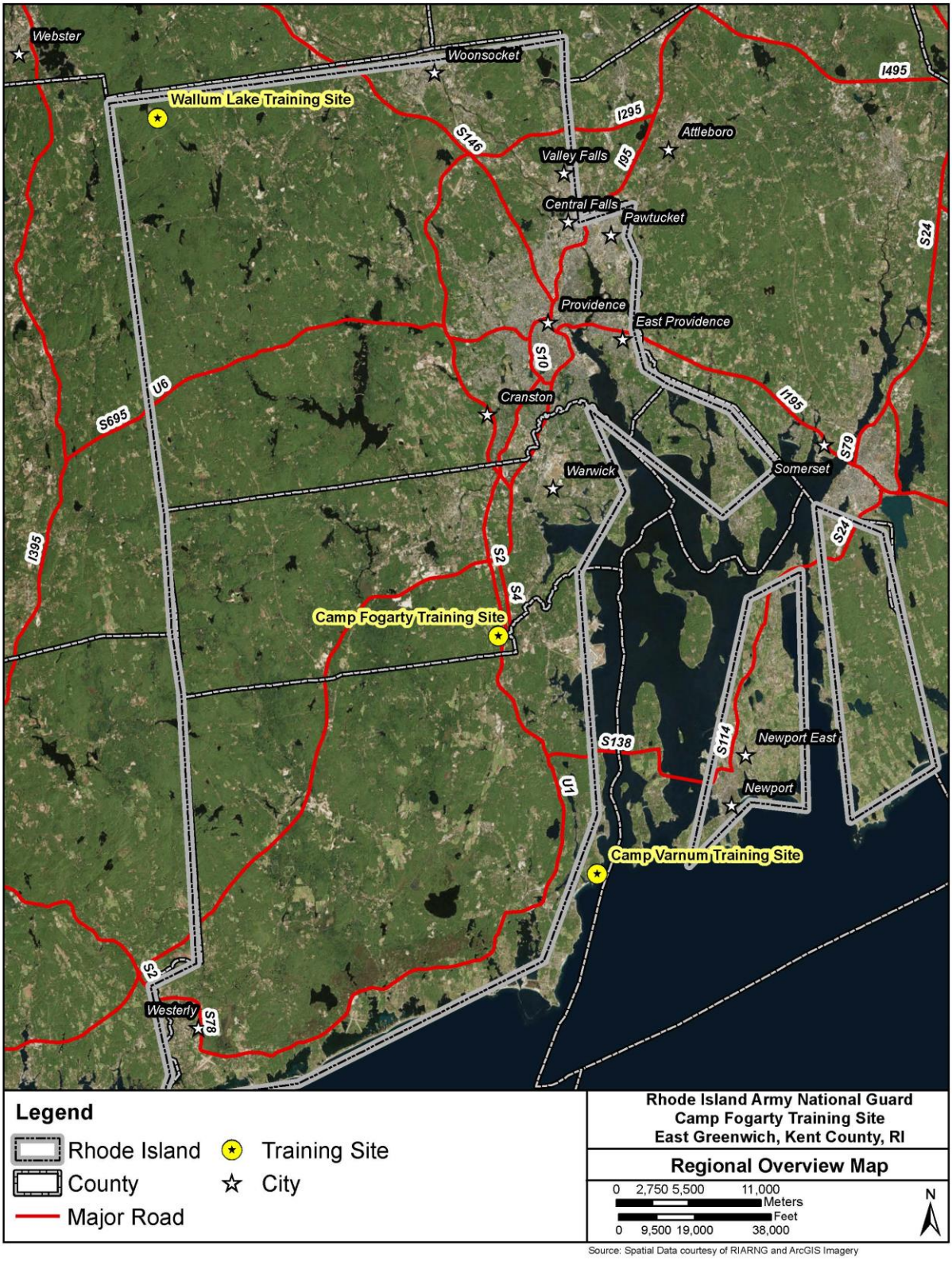

Figure 2-1: Regional Overview of RIARNG Training Sites

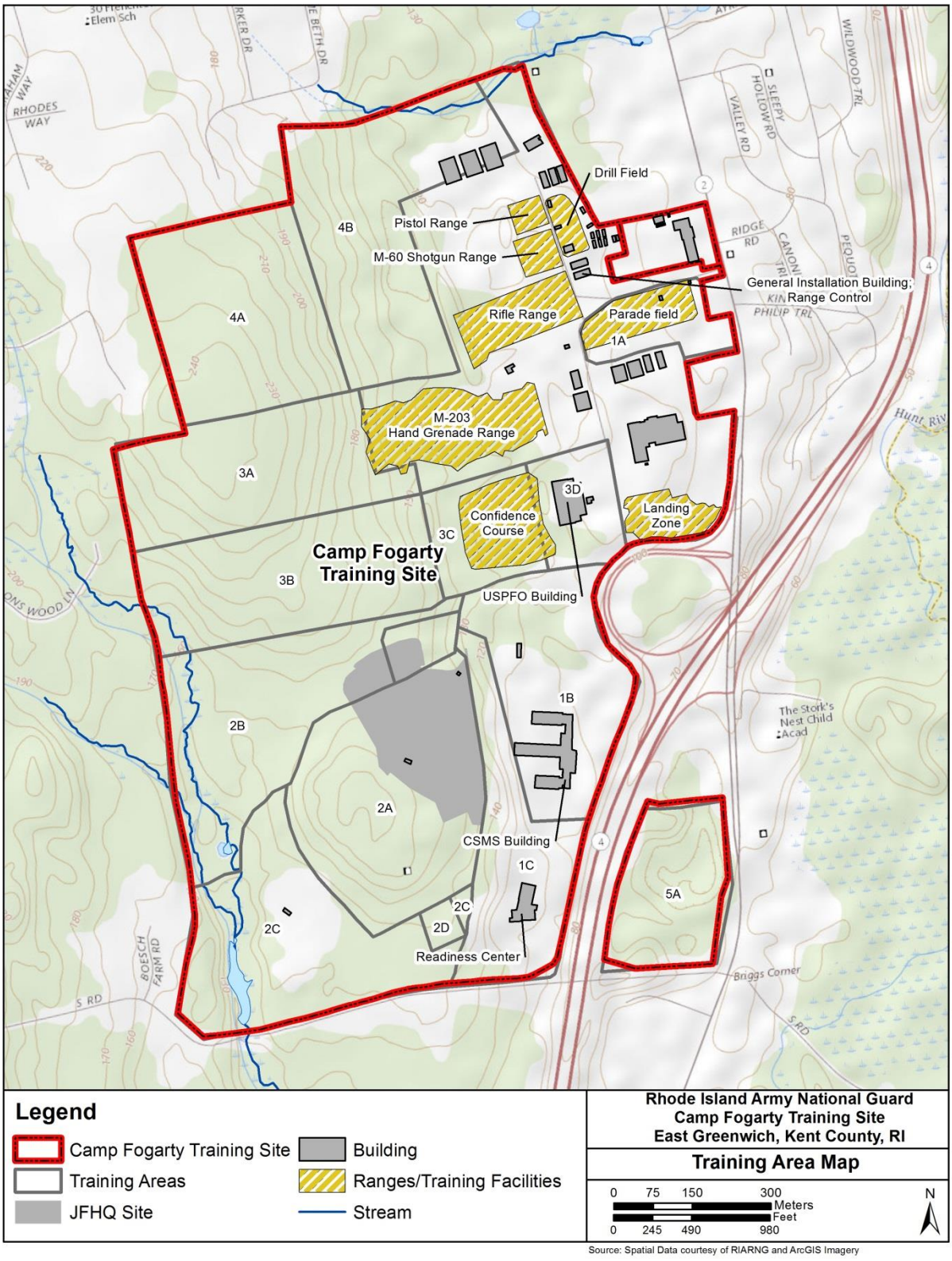

Figure 2-2: Buildings and Training Facilities at CFTS

Deciduous and mixed forests and residential land use comprise the largest land uses in the area. CFTS is surrounded by an expanding residential development which characterizes the Kent County area. **Table 2-1** provides the classification of land uses within a 5-mile radius of CFTS.

Table 2-1: Land Uses Within 5-mile Radius of CFTS

Land Use	Acreage	Percent of Total
Airports (and associated facilities)	616	1.08%
Beaches	58	0.10%
Brushland (shrub and brush areas, reforestation)	527	0.93%
Cemeteries	222	0.39%
Commercial (sale of products and services)	1,367	2.40%
Commercial/Industrial Mixed	12	0.02%
Commercial/Residential Mixed	2	0.00%
Cropland (tillable)	1,395	2.45%
Deciduous Forest (>80% hardwood)	18,454	32.42%
Developed Recreation (all recreation)	1,193	2.10%
High Density Residential (<1/8 acre lots)	740	1.30%
Idle Agriculture (abandoned fields and orchards)	101	0.18%
Industrial (manufacturing, design, assembly, etc.)	1,132	1.99%
Institutional (schools, hospitals, churches, etc.)	497	0.87%
Low Density Residential (>2 acre lots)	514	0.90%
Medium Density Residential (1 to 1/4 acre lots)	5,375	9.44%
Medium High Density Residential (1/4 to 1/8 acre lots)	3,997	7.02%
Medium Low Density Residential (1 to 2 acre lots)	1,501	2.64%
Mines, Quarries and Gravel Pits	688	1.21%
Mixed Barren Areas	6	0.01%
Mixed Forest	8,582	15.08%
Orchards, Groves, Nurseries	252	0.44%
Other Transportation (terminals, docks, etc.)	228	0.40%
Pasture (agricultural not suitable for tillage)	930	1.63%
Power Lines (100' or more width)	261	0.46%
Railroads (and associated facilities)	145	0.25%
Roads (divided highways >200' plus related facilities)	748	1.31%
Rock Outcrops	<1	0.00%
Sandy Areas (not beaches)	11	0.02%
Softwood Forest (>80% softwood)	4,338	7.62%
Transitional Areas (urban open)	339	0.60%
Vacant Land	679	1.19%
Waste Disposal (landfills, junkyards, etc.)	144	0.25%
Water	1,073	1.89%
Water and Sewage Treatment	17	0.03%
Wetland	771	1.36%
TOTAL	**56,916**	**100%**
Source: (RIGIS, 2014)		

2.1.2 Installation History

The history of the CFTS dates back to the mid-1940s when the site was established under the ownership of the US Navy. In 1942, the Navy acquired property to support the expanding Camp Endicott, the former Naval Construction Battalion Center (NCBC) Davisville, located 5 miles east on the shore of Narragansett Bay. As additional space was required, the Navy acquired property to train recruits in the use of rifles, pistols, machine guns, mortars, and grenades. The site was named Sun Valley Reservation, and at its peak it contained over 580 buildings and structures. Remaining portions of the site contained weapons ranges and bivouac training areas. In December 1945, the activities at NCBC Davisville were officially de-established and transferred to the west coast with the exception of the 370-acre Sun Valley Reservation, which continued to operate as a training facility. On 23 September 1967, the name of the reservation was officially changed to Camp Fogarty to honor the late Congressman John E. Fogarty. The facility was owned and operated by the Navy until 1993, when as part of the Base Realignment and Closure Act, the Navy transferred Camp Fogarty to the RIARNG. At that time, most of the 580 buildings and structures were removed from the site. A more detailed description of the history of CFTS is provided in the ICRMP (RIARNG, 2019).

2.1.3 Installation Land Use / Cover

CFTS is divided into 14 areas for use in individual and tactical training, including firing ranges, rappel training area, confidence course, trail network, and bivouac areas. The majority of existing and future infrastructure resides in the approximately 125-acre Cantonment Area. The Cantonment Area, located on the eastern portion of CFTS, includes developed land comprised of active military buildings, roadways, and ranges. This area of the facility is serviced by electric, natural gas, and water service combined with street and stormwater drainage systems. The facility is serviced by individual sewage disposal systems – no sanitary sewers are present. The western portion of the property is predominantly deciduous forest.

On CFTS, the dominant land cover is deciduous and mixed upland forests (70.0 percent) which serves as the principal tactical training area. Developed areas within the Cantonment Area comprise the next largest land use / cover at CFTS (25.7 percent). **Table 2-2** provides a breakdown of the land use / cover within CFTS for land uses that comprise at least 1 percent of the installation.

Table 2-2: Land Use / Cover within CFTS

Land Use	Acres	Percent of Total
Openland/Brushland	9.7	2.5
Deciduous Forest	252.7	66.1
Institutional (developed)	98.2	25.7
Mixed Forest	14.8	3.9
Water	1.3	0.4
Wetlands	4.8	1.3
Source: (RIGIS, 2014)		

2.1.4 Military Mission

The **Federal Mission** is to maintain manned, equipped, and trained operational forces that are prepared to respond to any contingency in support of the President's National Security Plan. The Rhode Island National Guard is an operational force provider for the full-spectrum of contingencies to include nation-building, peacekeeping, humanitarian, natural disaster, national emergency, limited conflicts, and full-scale war. The ARNG is a partner with the Active Army and the Army Reserves in fulfilling the country's military needs. During times of national emergency, National Guard members may be called into active federal service by the President of the US.

The **State Mission** is to provide manned, equipped and trained units and personnel that are prepared to respond to state and local authorities as directed by the Governor to assist in maintaining peace, order and public safety during crisis situations to include natural or man-made disasters, high-profile events, and state emergency defense operations. This dual federal-state mission is unique within the US military and sets the National Guard apart from any other regular or reserve component.

The **CFTS mission** is to provide the best firing ranges and training facilities possible to support military units as well as civilian organizations. Its goal is to maximize training opportunities with minimum restrictions, consistent with sound safety and environmental considerations.

2.1.5 Training Operations and Infrastructure

CFTS specializes in supporting military training for light infantry exercises and presently serves as a logistical support base during federal and state emergencies, such as hurricanes and disaster relief. The installation is structured to command, operate, manage, and administer services of the facilities and assign use of resources to ensure training and logistical support is provided to RIARNG units. In addition to the RIARNG, it also provides training support to units from other states, other reserve components, certain elements of active components, federal government organizations, state and local agencies, and civic groups. These include, but are not limited to, the following: US Army, Navy, and Marines; Rhode Island State Police; Rhode Island Department of Corrections; Federal Bureau of Investigation; US Postal Police; and Rhode Island Emergency Management Agency. CFTS has also been used for search and rescue dog training.

The Rhode Island US Property and Fiscal Office (USPFO), Combined Support Maintenance Shop (CSMS), CFTS Armory and the East Greenwich Readiness Center are the largest tenants on the installation. Additionally, a new Joint Force Headquarters building for RIARNG is currently under construction, and is anticipated to be completed in 2019.

Training activities on CFTS support individual and collective training in the operational and virtual training domains in an integrated environment within the current constraints and limitations of the installation. The primary focus of these training activities includes:

- Individual training – basic Soldiering, marksmanship, Warrior tasks, and battle drills.
- Collective training – integrates and synchronizes individual skills learned and capitalizes on multi-echelon opportunities.

2.1.5.1 Training Site Facilities

As noted in **Section 2.1.3**, CFTS is divided into 14 areas for use in individual and tactical training. The Cantonment Area is the improved portion of the training site where the majority of existing and future infrastructure resides (see **Figure 2-2**). Infrastructure in the Cantonment Area includes, but is not limited to, an organizational maintenance bay, USPFO, CSMS, CFTS Armory, training institute (classroom only), range control and range maintenance facility, parachute rigging building, cold storage building, classroom facilities, officers and enlisted annual training barracks, fitness center and gymnasium, and fleet parking areas (improved and unimproved).

Training facilities include a land navigation course, confidence course, 10-25 meter range (restricted to short-range training, non-lethal, shotgun, and close combat mission capability kit ammunition), M203/320 Grenade Launcher Range (practice and non-lethal rounds only), and a Hand Grenade Qualification Course. CFTS also houses six simulators for training in the virtual environment. All simulators are located within the Cantonment Area.

The western and southern portions of the site comprise the tactical training areas, totaling approximately 250 acres. The area is accessed by a network of improved trails which lead to bivouac sites and internal training areas used on occasion throughout the year. Dismounted and mounted squad to platoon maneuver training occur within these portions of CFTS. Mounted maneuver training is restricted to the trail network that runs throughout the training areas.

An approximately 10-acre Impact Area is the primary impact area for the M203/320 Grenade Launcher Range and contains small arms projectiles, as well as suspected unexploded ordnances from historic weapons training. This Impact Area is considered a high hazard impact area and is off limits to all personnel. No active land management (i.e., clearing, etc.) occurs in this area.

Finally, CFTS has a designated helicopter landing zone located between the Camp Fogarty Armory and SR 4 on the southeast corner of the training site. The area is used multiple times per year, and is maintained as managed field.

2.1.5.2 Training Site Use

The RIARNG, local Active and Reserve units, local police, and DoD agencies are the primary site users of CFTS. **Figure 2-3** illustrates annual site utilization by type of site user (DoD and non-DoD entities) between FY 2013 and FY 2017. Average annual usage during this time period was 30,348 individuals trained, while annual usage levels ranged from 25,565 to 32,842 individuals trained in FY 2016 and FY 2014, respectively. On average, DoD entities comprise approximately 79 percent of site users. Based on past usage data, overall training site usage has remained relatively stable over the past 5 years and no steady increase or decrease in training site use has occurred.

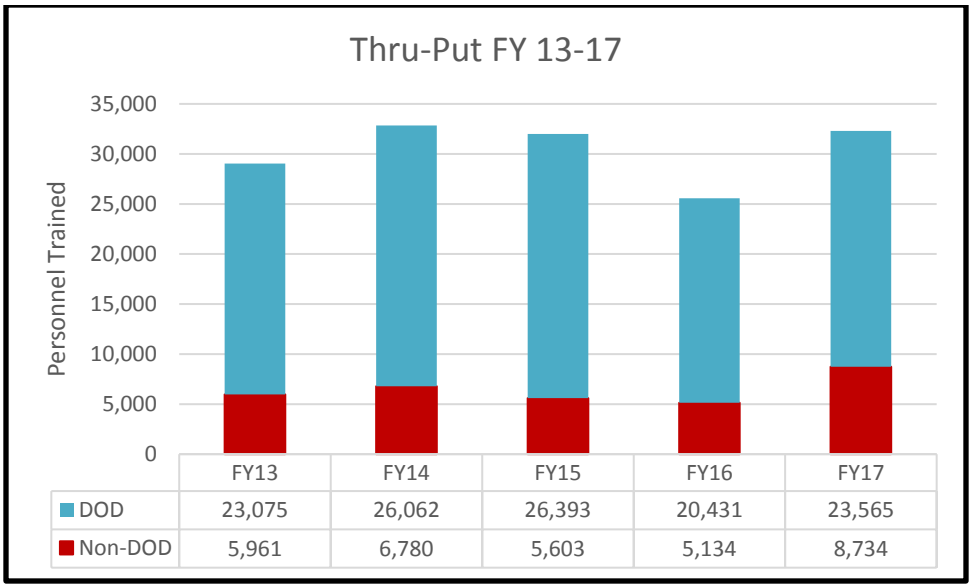

Figure 2-3: Number of Personnel Trained by Site User from FY 2013 to FY 2017

2.1.6 Effects of the Military Mission and Natural Resources Management on Natural Resources at CFTS

A wide variety of projects and activities impact CFTS natural resources, which include soil, ground and surface water features, air, vegetation, wildlife, and habitat. These impacts, however, are generally temporary in nature and not considered to be significant. Day-to-day operations, construction and maintenance work, grounds-keeping, events, and other activities need to be considered individually and collectively for their effects on the environment. The effects of the proposed INRMP were assessed and documented within the 2001 INRMP EA.

2.1.7 Constraints and Opportunities

Natural resources and natural resource management at CFTS that could constrain training and development include wetlands, streams, and special management zones (SMZs), topography, highly erodible soils, and cultural resources sites. While there are some constraints to activities on CFTS, not all of them are applicable for a given situation. For example, a constraint for new building construction may not be a constraint at all – may even be a benefit – for infantry training.

There are no major topographic or soil erosion concerns that limit the military mission on CFTS with the exception of a large berm in the Island. However, this portion of CFTS is not currently used for training purposes, and future training in this area is not currently anticipated.

Constraints due to military training that can impact natural resources management include:

- Restricted access to Impact Area (permanent)
- Restricted access in active range fans (temporary)

No significant new development or military missions are currently planned, thus no opportunity map is provided.

2.2 Physical Environment

2.2.1 Climate

The climate of Rhode Island is humid-temperate, with an average annual precipitation of 42 to 44 inches. The majority of rainfall occurs between the months of April and September. The climate in Rhode Island is greatly influenced by the effects of Narragansett Bay and the Atlantic Ocean. The area exhibits a mesic temperature regime with average monthly temperatures ranging from approximately 25 degrees Fahrenheit (°F) in the winter to 70°F in the summer with an average annual temperature of 50°F. The last frost date in the spring is between 17 April and 26 May and the first frost date is between 19 September and 19 October. Typically, the first snowfall occurs in December, although earlier storms have been documented. Coastal portions of the State of Rhode Island exhibit a slightly milder, maritime climate influenced by the Atlantic Ocean and Narragansett Bay, which is 3 miles east of the CFTS. The nearest weather stations with long-term precipitation records are at the University of Rhode Island and T.F. Green International Airport, both located less than 15 miles from the CFTS.

A Climate Change Assessment for Rhode Island, as it relates to CFTS, is included in **Section 3.5**.

2.2.2 Topography

Topography at CFTS is depicted in **Figure 2-4**, and varies from nearly level to moderately sloping. Slopes range from 0 to 3 percent along the eastern and southern portion of the installation to 8 to 15 percent within the southwest corner of the installation and in the Island. Overall, the eastern half of the installation (around the Cantonment Area) is generally flat, while the majority of the western half of the installation has slopes between 0 and 8 percent (see **Section 2.2.4**). Topography generally slopes upward to the west. Elevations on the site range from 250 feet above mean sea level (amsl) at the highest point on site in Training Area 4A (northwestern portion), to 100 feet amsl at the eastern boundary along SR 2 and SR 4. A narrow drainageway along the southwestern property boundary flows in a southerly direction to South Road and is a tributary to the Hunt River. Topography in the northeastern portion of the base has been altered by grading activities associated with the Cantonment Area. The Island has been extensively modified by past mining activities associated with highway construction; cuts in the area range to over 30 feet below the original grade.

2.2.3 Geology

The geology of CFTS can be classified into two media: (1) unconsolidated overburden materials comprised of late Wisconsin and Holcene deposits; and (2) underlying consolidated bedrock. Bedrock at the site is composed of carboniferous sedimentary and metasedimentary rock materials approximately 300 million years old (Quinn, 1971). The site sits on the contact between the sedimentary and metasedimentary units of the Narragansett Basin and fine-grained granite units. Rock formations underlying the site are fossiliferous sandstone, conglomerate, shale, schist, and phyllite of the Rhode Island Formation, and locally underlying the southeast portion of the site is the Pondville Conglomerate (Hermes, Gromet, & Murray, 1994). The dark color of rock formations in the area reflect their carboniferous origin. Other rock types on the site include porphyritic granite gneiss. The western section of the base is dominated by granitic bedrock in the Scituate igneous suite dominated by alkali feldspar granite.

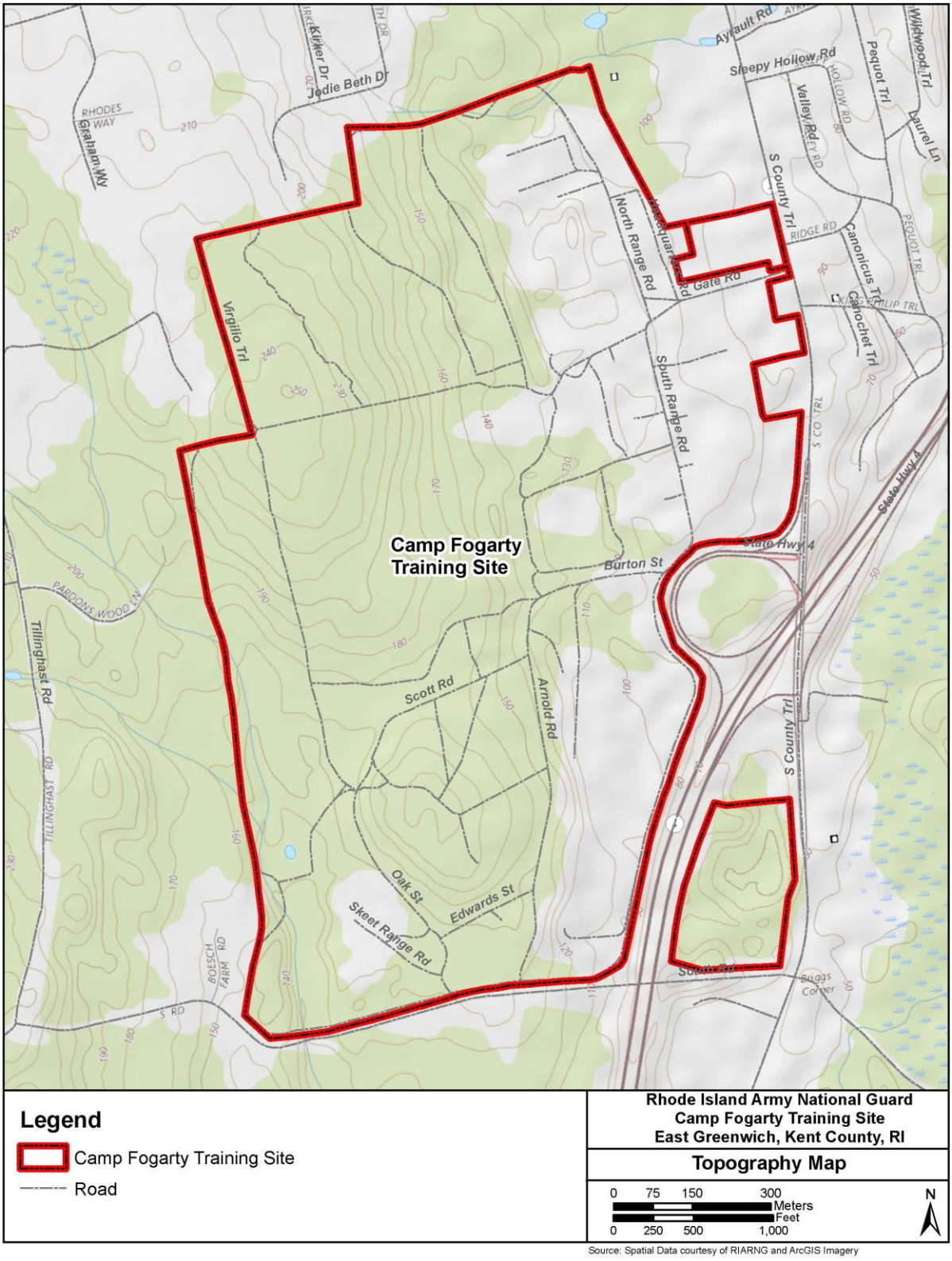

Figure 2-4: Topography at CFTS

Surficial overburden deposits overlying bedrock consist of Wisconsin Age glacial till which was deposited and modified approximately 16,000 years ago. Till is an unconsolidated assemblage of sand, silt, clay, and coarse fragments ranging from gravels to boulders, which were deposited by downwasting ice masses. The till forms a variably thick mantle over the consolidated bedrock. The depth of overburden is approximately 10 feet or less in thickness. Local till in the area is characterized by stony to very stony surface with an abundance of angular gravels, stones, and boulders.

There are no commercially valuable minerals or deposits at CFTS. Localized deposits mapped by Rector (1981) include small inclusions of stratified sands and gravels in the southern and southeastern portion of the site which have been, and continue to be, locally used on CFTS for borrow materials. Localized minerals listed with no specific location in the Town of East Greenwich include asbestos, clinozoisite, hornblende, monazite, orthoclase, quartz, basanite, and chalcedony (Miller, 1971). Till materials are not considered economically important because of their heterogeneous nature. As noted previously, the Island has been extensively modified by past mining activities associated with highway construction.

The State of Rhode Island is located in an inactive seismic area. No major fault lines occur on the site. There are no petroleum or natural gas deposits in the region.

2.2.4 Soils

According to the NRCS mapping illustrated in **Figure 2-5**, the majority of the northeastern portion of the site (i.e., around the Cantonment Area) is comprised of Udorthents-Urban Land Complex (UD). This complex consists of moderately well drained to excessively drained soils that have been disturbed by anthropogenic activities such as cutting, grading, or filling, and/or are covered by buildings and/or impervious surfaces. Since the initial INRMP was prepared in 2001, new construction on base, particularly in the southeastern portion of the installation, has led to the conversion of Bridgehampton and Bridgehampton-Charlton soils (among others) into additional UD and Urban land (Ur) soils.

Undisturbed soils in western portions of the base are comprised of well to moderately well drained Narragansett and Bridgehampton soils, which are characterized by a fine grained mantle of silt loam overlying sandy till. Non-wetland forested areas are mapped as Narragansett extremely stony and very stony silt loams (NcC and NbB). These well drained soils occur over 3 to 15 percent slopes of till uplands, have abundant stones and boulders on the surface, and are characterized by a thick mantle of windblown silt and very fine sandy loam which overlies a gravelly till substratum. Stones and boulders cover 10 to 35 percent of the ground surface.

Within wetlands, Ridgebury, Leicester, and Whitman extremely stony fine sandy loams (Rf) are found. This complex of poorly drained and very poorly drained soils formed in glacial till is found in depressions and drainageways in glacial till uplands. Ridgebury, Leicester, and Whitman soils are hydric soils. Soils are generally acidic, low in clay content (>10 percent), and have a high water holding capacity. **Table 2-3** provides a summary of soil types and land use factors.

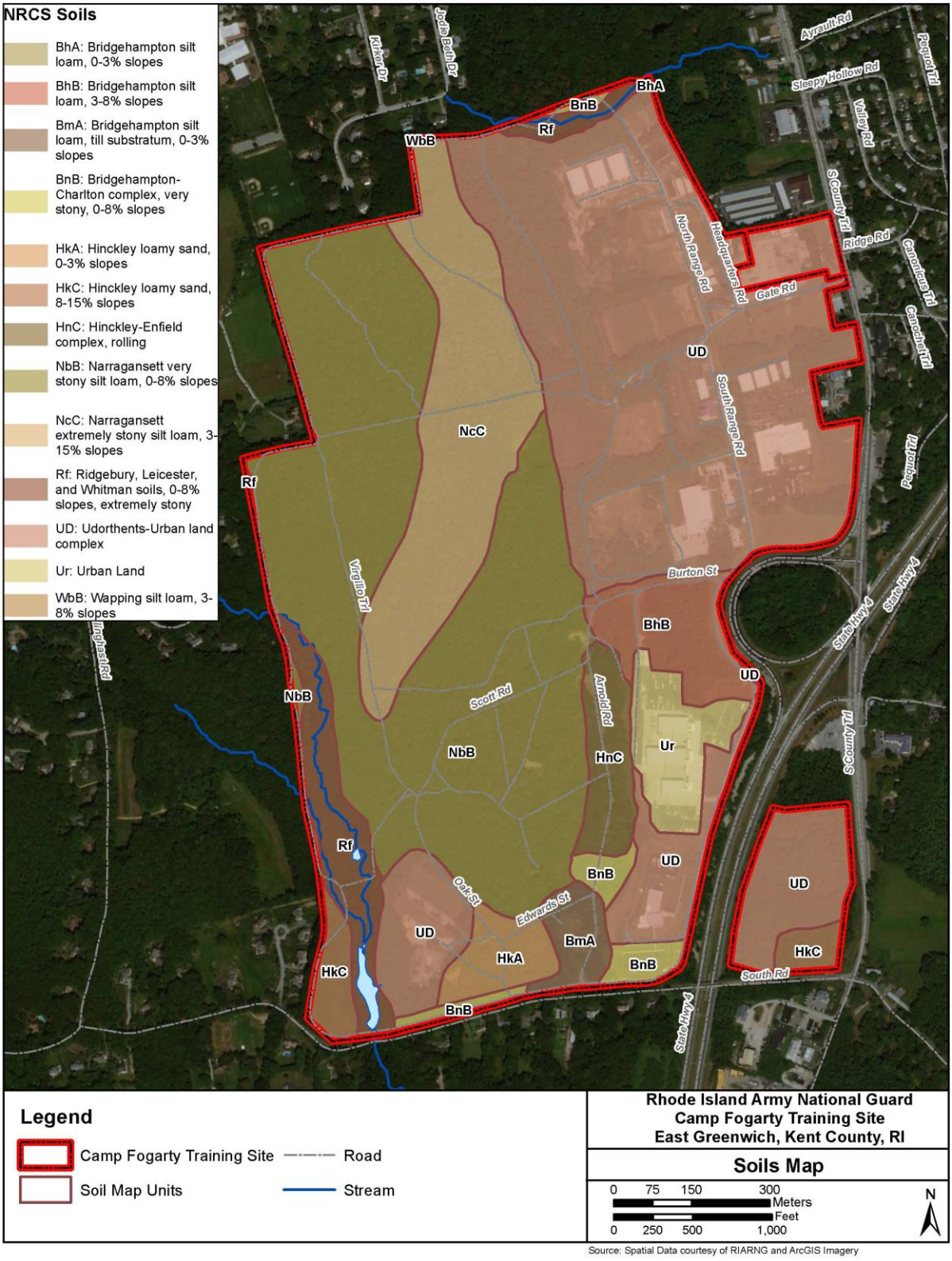

Figure 2-5: NRCS Soils Map of CFTS

Table 2-3: NRCS Soil Map Units at CFTS

Soil Map Unit	Description	Acres	Hydric Soil	K-factor	Land Use Capability Class	Hydrologic Soil Group	Woodland Productivity	Prime Farmland
BhA	Bridgehampton silt loam, 0 to 3 percent slopes	0.0	No	0.49	1	B	3o	PF
BhB	Bridgehampton silt loam, 3 to 8 percent slopes	12.7	No	0.49	2e	B	3o	SI
BmA	Bridgehampton silt loam, till substratum, 0 to 3 percent slopes	5.4	No	0.49	1	B	3o	PF
BnB	Bridgehampton-Charlton complex, very stony, 0 to 8 percent slopes	7.1	No	0.49	6s	B	3o	No
HkA	Hinckley loamy sand, 0 to 3 percent slopes	6.7	No	0.17	3s	A	5s	SI
HkC	Hinckley loamy sand, 8 to 15 percent slopes	7.2	No	0.17	4e	A	5s	SI
HnC	Hinckley-Enfield complex, rolling	8.6	No	0.17	4s	A	5s	SI
NbB	Narragansett very stony silt loam, 0 to 8 percent slopes	116.0	No	0.32	6s	B	4o	No
NcC	Narragansett extremely stony silt loam, 3 to 15 percent slopes	41.5	No	0.32	7s	B	4x	No
Rf	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	16.2	Yes	0.24	7s	D	4x	No
UD	Udorthents-Urban land complex	149.0	No	--	8s	--	--	No
Ur	Urban land	10.9	--	--	--	--	--	No
WbB	Wapping silt loam, 3 to 8 percent slopes	0.1	No	0.49	2e	C	3o	PF
CFTS Total Acreage		**381.4***						

Source: (NRCS, 2018; Rector, 1981)
*This total acreage value is slightly higher than the true acreage of CFTS (376.6 acres), and is likely due to slight variations in the settings of the Web Soil Survey (NRCS, 2018) application.
Abbreviations: PF = Prime Farmland; SI = Farmland of Statewide Importance
See text below for more information on the land use capability classes, hydrologic soil groups, and woodland productivity ratings.

Soil Erodibility

The K-factor indicates a soils susceptibility to water erosion. A K-factor or "erodibility factor" of 0.34 or greater indicates a highly erodible soil. Soils at CFTS range between a K-factor of 0.17 to 0.49. The highly erodible soils at CFTS cumulatively comprise a relatively small 25.3 acres (6.6 percent of CFTS), and are not located in areas used for training besides where roads and trails traverse them. In general, soil erosion resulting from military training at CFTS is limited because slopes are usually not steep, off-road vehicle usage is rare, and there are few areas of bare soil. However, erosion does occur on the trail network; the RIARNG implements the 2007 CFTS Trail System BMP Manual to minimize and manage erosion along the trails.

Land Use Capability Classification System

Since intensive tracked vehicle use can disrupt and compact the soil (similar in ways to the effects of cultivation), the Land Use Capability Classification System can be used as an index for military training. In this system, the class numerals (1 - 8) indicate progressively greater limitations and narrower choices for practical use. The subclass letter (e, w, or s) designates limitations due to erosion (e), water (w), and shallowness, drought, or stoniness (s).

The capability class/subclasses from the soil survey reveal that approximately 90 percent (345.1 acres) of the installation's soils are limited due to shallowness, droughtiness, or stoniness, although this includes areas already developed. Approximately 5 percent (20.0 acres) of the soils at the installation are limited due to risk of erosion, although these areas are generally located along the installation's boundaries. Therefore, most soils at CFTS require special treatment and consideration when planning for land use and rehabilitation. No soils display limitations resulting from water.

Hydrologic Soil Groups

Hydrologic soil group classifications refer to soils grouped by their runoff-producing characteristics. Since infiltration rate generally is inversely related to runoff and erosion, the hydrologic soil group is an indirect index to site erodibility. Group A soils have a high infiltration rate when thoroughly wet and have a low runoff potential (i.e., they are the least erodible). Group B soils have moderate infiltration rates when thoroughly wet. Group A and Group B soils are most desirable for military training activities. Group C soils have slow infiltration rates when thoroughly wet and are borderline for military training activities. Group D soils have a very slow infiltration rate when thoroughly wet and are marginally suitable for military training activities. Although UD and Ur soil map units are not assigned a soil hydrologic group, the remaining soils at CFTS are generally within the A and B hydrologic groups, with the primary exception being the Ridgebury, Leicester, and Whitman soils (0 to 8 percent slopes, extremely stony) found along existing CFTS streams and wetlands.

Woodland Management and Productivity

Approximately 268 acres of CFTS is forested. Woodland areas exist on all CFTS soil map units except Ur, but are also less common on UD soils. In this index, the numerical value indicates a progressively lower potential for woodland productivity and greater limitations (i.e., 1 represents very high productivity, and 5 represents low productivity). The subclass letter (s or x) indicates sandy texture (s), or stoniness or rockiness (x). The letter 'o' indicates that there are insignificant limitations or restrictions. Approximately

5.9 percent of the soils are limited by sandy texture, and approximately 15.1 percent are hindered by stoniness or rockiness.

Prime Farmland

Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops using acceptable farming methods. Approximately 5.5 acres (1 percent) of CFTS is classified as prime farmland, which is primarily located in the southern portion of the installation. However, an additional 35.2 acres (9 percent) of CFTS are designated as farmland of statewide importance, which is determined by Rhode Island to also be important for the production of the aforementioned crops. These soils at CFTS are located in the southern portion of the installation and north and west of the CSMS building.

2.2.5 Water Resources

Water resources considered in this INRMP include both surface water and groundwater. Surface water resources typically include lakes, rivers, and streams and are important for a variety of reasons including ecological, economic, recreational, and human health. Groundwater is an essential resource in many areas because it is used as a source of potable water, for agricultural irrigation, and for industrial purposes.

The RIDEM Office of Water Resources manages the quality and quantity of water resources in Rhode Island, including regulatory programs for wetlands, stormwater discharge, Clean Water Act (CWA) Section 401 Water Quality Certification (WQC), and consumptive use of water, among other programs.

2.2.5.1 Groundwater Resources

The entire CFTS is located within the Hunt River Aquifer recharge area, a US Environmental Protection Agency (USEPA)-designated Sole Source Aquifer which serves as a potable water source for a large population of southeastern Rhode Island. The aquifer, which is located east of the CFTS, is comprised of stratified glacial fluvial sand, silt, and gravel within the Hunt River basin. RIDEM classifies groundwater of the State into classifications, which govern intended uses. Groundwater at the CFTS is classified as Class 'GAA,' which means it is known or presumed to be suitable for drinking water use without treatment.

CFTS is serviced by potable water from the Kent County Water Supply, which operates high capacity municipal production wells located less than 3 miles from the site. CFTS is located in a Wellhead Protection Overlay District. No potable water wells are in use at the site.

2.2.5.2 Surface Waters

CFTS contains surface water in the form of intermittent and perennial streams (see **Figure 2-6**). Overall, CFTS contains 8 wetlands/wetland complexes. Four of these features contain streams or ponds; these three features (Wetlands A, C, and E) are described below. All 8 wetlands at CFTS are discussed below in the Wetlands section.

Figure 2-6: Surface Waters, Wetlands, and Floodplains at CFTS

Two small ponds occur within Wetlands A and E where anthropogenic activities have impounded water flow. The RIDEM classifies all surface water of the State into one of four Water Use Classifications which are defined by designated uses, and therefore serve as the governing use intended for protection. Water Use Classifications for the Hunt River waters are designated as Class B. Class B areas are defined as waters which are designated for fish and wildlife habitat and primary and secondary contact recreational activities (RIDEM, 2011). Freshwater tributaries hydrologically connected by surface water and upstream of Class B waters are also designated as Class B waters; therefore, all tributaries to the Hunt River on CFTS are designated as Class B.

Surface waters and flowing bodies of water within CFTS are associated with Wetlands A, C, and E; these features are described below:

- **Wetland A** lies within the southwest corner of the facility and contains a pond (approximately 1 acre) which is fed by an unnamed perennial stream that flows south off-site under South Road at the southern perimeter of the site, ultimately draining to the Hunt River. Headwaters to the stream are upgradient to the west of CFTS where the stream flows onto the property. The watercourse is characterized as a first order tributary with riffles and pools. Stones and boulders are common and the substrate is sandy/gravelly bottom. Channel width averages less than 10 feet. The stream is considered a lower perennial riverine system with an unconsolidated bottom (R2UB).

- **Wetland C** lies along the northern property boundary and contains an unnamed intermittent streambed (R4SB) which flows into a forested wetland. The wetland is a depressional area that receives surface flow from a drainage flowing northeasterly through the wetland. The watercourse is characterized as a first order tributary with riffles and pools. Stones and boulders are common and the substrate is sandy/gravelly bottom.

- **Wetland E** includes a standing open water body located west of Reese Street and the confidence course. This open water body appears to have been part of a riparian wetland system that was historically filled and culverted during the construction of the confidence course and firing ranges.

2.2.5.3 Floodplains

Floodplains are generally areas of low, level ground present on one or both sides of a stream channel that are subject to periodic inundation by flood waters. Floodplains are typically the result of lateral erosion and deposition that occurs as a river valley is widened. The porous material that composes the floodplain is conducive to retaining water that enters the soil via flooding events and elevated groundwater tables. Inundation dangers associated with floodplains have prompted federal, state, and local legislation limiting the development in these areas to recreation, agriculture, and preservation activities. Floodplains are regulated by the Federal Emergency Management Agency (FEMA) with standards outlined in 44 CFR Part 60.3. EO 11988 (Floodplain Management) requires agencies to assess the effects that their actions may have on floodplains and to consider alternatives to avoid adverse effects and incompatible development on floodplains.

A 100-year floodplain comprises approximately 14.2 acres of CFTS along the stream channels in the southwestern portion of the installation (see **Figure 2-6**). This floodplain is shown on FEMA Flood Insurance Rate Maps (FIRM) 44003C0232G. FEMA FIRM 44003C0251G also contains a portion of the installation (eastern portion), but no additional 100-year floodplains are shown at CFTS.

2.2.5.4 Wetlands

EO 11990 (Protection of Wetlands) requires federal agencies to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands. Wetlands are an important natural system because of the diverse biological and hydrologic functions they perform. These functions may include water quality improvement, groundwater recharge, pollution treatment, nutrient cycling, the provision of wildlife habitat and niches for unique flora and fauna, storm water storage, and erosion protection. The United States Army Corps of Engineers (USACE) defines wetlands as

> "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas," (33 CFR 328).

Wetlands are protected as a subset of the "waters of the United States" under Section 404 of the CWA. Jurisdictional "waters of the United States" are areas regulated under the CWA and may also include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, and other waters, that if degraded or destroyed could affect interstate commerce. For an area to be classified as a wetland, three conditions must be present: (1) wetland hydrology; (2) hydric soil; and (3) hydrophytic vegetation. Areas that may be periodically wet, but that do not meet the requisite criteria, are not classified as wetlands.

Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material into the "waters of the United States," including wetlands. Section 401 of the CWA gives the State of Rhode Island the authority to regulate, through the state WQC program, proposed federally permitted activities that may result in a discharge to water bodies, including wetlands. The Fresh Water Wetlands Act (Sections 2-1-18 through 2-1-25 of the Rhode Island General Laws [R.I.G.L.]), as implemented in 250-Rhode Island Code of Regulations [RICR]-150-15-1, sets forth provisions that give the State jurisdiction over those areas that are delineated wetlands, including all isolated wetlands (i.e., non-jurisdictional wetlands). Further discussion on regulatory authority and protection of wetlands is included in **Section 4.3.1**.

Previous field studies at CFTS (ABS, 2000; RIARNG, 2007) have identified a total of 8 wetlands at CFTS, excluding the Impact Area, comprising a total of 12.64 acres (approximately 3 percent of the total land area). Wetlands were classified using the USFWS's Classification of Wetland and Deep Water Habitats (Cowardin, Carter, Golet, & LaRoe, 1979) and are illustrated in **Figure 2-6**. The dominant wetland vegetative community at CFTS is Palustrine Deciduous Forested Wetland (PF01) dominated by red maple (*Acer rubrum*), although Palustrine Deciduous Scrub Shrub Wetlands (PSS1) are also present. Palustrine Open Water (POW) systems associated with these wetlands are described in **Section 2.2.5.2**. Wetlands principally occur along drainageways in the western portion of the site and, to a lesser extent, as areas subject to seasonal flooding in the Cantonment Area. Wetland boundaries have not been verified by state or federal agencies. **Table 2-4** summarizes the characteristics of wetlands at CFTS that are described further below.

Table 2-4: Freshwater Wetlands at CFTS

Wetland	Size (acres)	Dominant Wetland Class	Watercourse	RIDEM Status	RIDEM Setback / Buffers
A	8.63	PF01 POW R2UB	Yes – perennial	Wooded Swamp Pond River (USGS blue line)	50-foot Perimeter Wetland 100-foot Riverbank Wetland
B	1.00	PSS1	No	Forested Wetland	None
C	1.44	PF01 R4SB	Yes – intermittent	Forested Wetland Intermittent Stream	100-foot Riverbank Wetland
D	0.14	PF01	No	Forested Wetland	None
E	0.66	POW PFO1	No	Pond Forested Wetland	None
F	0.60	PSS1	No	Forested Wetland	None
G	0.13	PSS1	No	Forested Wetland	None
H	0.04	PF01	No	Forested Wetland	None

Wetland A

Wetland A is the largest and most vegetatively diverse wetland system at CFTS, and is located in the southwest corner of the property. This forested riparian system occupies 8.63 acres of CFTS and is characterized by two braided perennial rocky/sandy bottom streams, which are tributaries to the Hunt River. The internal perennial stream system is classified as Riverine Lower Perennial Unconsolidated Bottom (R2UB). These streams make this area attractive to a variety of amphibians, stream invertebrates, white-tailed deer (*Odocoileus virginianus*), and avian fauna. During the spring, wetland areas adjacent to the stream are temporarily flooded. The system enters the CFTS property along the western boundary and flows southerly, ultimately draining through a culvert at the southernmost portion of the site adjacent to South Road where the Perimeter Road along the facility fence line allows access.

A pond, previously discussed as a surface water feature, is located in the southwestern corner of the wetland at the Perimeter Road where a culvert conducts flow south under South Road. The pond is classified as Palustrine Open Water (POW), and is characterized as having an unconsolidated organic bottom. Vegetated wetlands dominated by red maple form a narrow band around the open water. Other wetland tree species include black birch (*Betula lenta*) and yellow birch (*B. alleghaniensis*). Wetland shrubs include spicebush (*Lindera benzoin*), sweet pepperbush (*Clethra alnifolia*), and highbush blueberry (*Vaccinium corymbosom*). Ground cover species included Canada mayflower (*Maianthemum canadense*), poison ivy (*Toxicodendron radicans*), and skunk cabbage (*Symplocarpus foetidus*). Surrounding uplands are dominated by red maple, white oak (*Quercas alba*), poplar (*Populus* species [*sp*.]), grey birch (*B. populifolia*), and American beech (*Fagus grandifolia*).

Wetland A transitions from an open waterbody to a shrub swamp and quickly grades into a palustrine forested (swamp/riverine) wetland (PFO1) dominated by red maple and green ash (*Fraxinus*

pennsylvanica). Other common wetland tree species include white oak and yellow birch. Shrub species include northern arrowwood (*Viburnum recognitum*), spicebush, sweet pepperbush, winterberry (*Ilex verticilata*), and witchhazel (*Hamamelis virginiana*). Herbaceous groundcover includes skunk cabbage, cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*) jewelweed (*Impatiens capensis*), and poison ivy. Upland species include white oak, red maple, grey birch, hickory (*Carya sp*.), and poplar.

The soils in this wetland area are classified by Rector (1981) as Ridgebury, Whitman and Leicester extremely stony fine sandy loams, a complex of poorly to very poorly drained hydric soils which occur in glacial till upland drainageways and depressions. Surface stones and boulders cover up to 35 percent of the ground surface. This wetland complex is an important natural resource within the CFTS as it is relatively isolated from the Cantonment Area, is surrounded by undeveloped woodland, has permanent water features, and supports several wetland classes. RIDEM's Freshwater Wetlands program would classify this area as a Wooded Swamp with an internal River and would retain jurisdiction over the biological wetland area, and a 50-foot Perimeter Wetland extending from the biological edge, as defined. The internal watercourse would classify as a River as it is perennial and is illustrated on US Geological Survey (USGS) mapping, is less than 10 feet in width, and would have a 100-foot Riverbank Wetland extending from the stream channel. Activities within these regulated areas require authorization from RIDEM.

Wetland B

This 1.00-acre manmade system is located in the southeastern portion of the site on the portion of CFTS fragmented by SR 4. The system occurs within a large area extensively mined for source materials (i.e., sand and gravel) associated with highway construction; cuts in the area approach 30 feet below original grade. Within the basin, scrub-shrub species such as willow (*Salix sp.*), red maple, and gray birch (generally less than 20 feet in height) dominate, with an understory of meadowsweet (*Spirea sp.*) and reed canarygrass (*Phalaris arundinacea*). The basin hydroperiod appears to be seasonally flooded to seasonally saturated. No internal watercourses were noted. According to Rector (1981), this area consists of UD soils based on the extensive land disturbance. The wetland is classified as a PSS1. RIDEM would classify the wetland as a Forested Wetland with no Perimeter Wetland as the total area is less than 3 acres in size.

Wetland C

This 1.44-acre wetland area is located within the upper northeast corner of the CFTS south of Perimeter Road. This wetland consists of a narrow (<10 ft.) drainage swale with a north-south orientation dominated by shrub vegetation that transitions into a forested wetland (PFO1). Standing water was observed within the swale during the June 2005 wetland delineation, and water depths averaged 1 ft. No flow was observed at the time of delineation and does not appear to occur during the majority of the year (RIARNG, 2007). A small intermittent stream (R4SB) enters the northern portion of this complex.

Wetland species within the drainage swale consist of red maple, willow, alder (*Alnus* sp.), multiflora rose (*Rosa multiflora*) and northern arrowwood. Ground cover includes poison ivy, sensitive fern, and soft rush (*Juncus effusus*). Wetland tree species within the remainder of the complex include green ash, red maple, black birch, and white oak. Shrub species include spicebush, northern arrowwood, and highbush

blueberry. Herbaceous plants include cinnamon fern, reed canarygrass, sensitive fern, grape (*Vitis* sp.), and skunk cabbage. Surrounding uplands are dominated by red maple and white oak.

Rector (1981) identifies soils within the wetland as UD, which consists of soils that have been disturbed by cutting or filling. Soils within the area are more adequately classified as Aquents, or poorly drained soils which have been altered. This wetland appears to be important for breeding amphibians based on the observance of wood frog (*Rana sylvatica*) egg masses in the spring of 2000 (ABS, 2000). RIDEM would regulate this wetland area as a Forested Wetland with no Perimeter Wetland. The intermittent stream would have a 100-foot Riverbank Wetland from the edge of the defined channel.

Wetland D

This 0.14-acre isolated wetland is located along the eastern property line near the SR 4 on-ramp. It appears to be flooded temporarily during the spring, fall, and winter. Dominant wetland vegetation is red maple. The wetland may serve as a local vernal pool although no amphibians have been observed to date. According to Rector (1981), this area contains UD soils. In this case, the soils within the area are better classified as Aquents, or poorly drained soils disturbed by anthropogenic activities. This isolated wetland appears to have been disturbed by heavy siltation near the culvert and clearing of road side vegetation. The wetland is a PF01; RIDEM would regulate this wetland area as a Forested Wetland with no Perimeter Wetland.

Wetland E

This 0.66-acre wetland includes a standing open water body (POW) west of Reese Street and the confidence course. The wetland appears to have been part of an older riparian system that was altered during the construction of the confidence course and firing ranges. The area is culverted at its southern portion and discharges southeast toward Wetland F. Rector (1981) identifies the wetland on the edge of UD soils immediately adjacent to Narragansett silt loam. The wetland area surrounding the open water area is a PF01 dominated by red maple. RIDEM would likely regulate this wetland as a Small Pond with no Perimeter Wetland if the PFO1 area is less than 0.25 acre in size.

Wetland F

Wetland F encompasses 0.60 acre located along the eastern portion of the site. This isolated shrub dominated wetland receives overland runoff and channelized drainage from the surrounding area, including Wetland E. Vegetation within the wetland is dominated by multiflora rose which covers the drainage channel. Rector (1981) classifies this area as Bridgehampton silt loam (BhB), a well drained soil which is located on the slopes of glacial till uplands and has a thick mantle of windblown silt loam overlying a sandy till substratum. Manmade drainage swales within the wetland provide the hydrology that supports wetland vegetation such as sphagnum moss (*Sphagnum sp.*) and silky dogwood (*Cornus arnomum*). This wetland seemingly drains to the southeast into a stormwater retention basin. It is classified as Palustrine Scrub-Shrub (PSS1). The wetland is regulated by RIDEM as a Forested Wetland with no Perimeter Wetland.

Wetland G

Wetland G is 0.13 acre in size. It is located just south of Wetland F, and has the same overall characteristics. Its biological value is constrained by its proximity to the CSMS building and a nearby parking lot. Wetland G seemingly drains into a stormwater retention basis immediately to its east. This wetland would be regulated as a Forested Wetland with no Perimeter Wetland.

Wetland H

This wetland area is located southeast of Wetland G within the corner of two side roads. This wetland is a 0.04-acre small depression dominated with willow shrubs. It is located between a parking lot and the CSMS building, and is surrounded my maintained lawn.

2.3 Ecosystem and Biotic Environment

2.3.1 Ecosystem Classification

CFTS is located in the US Ecoregion – Humid Temperate Domain – Hot Continental Division – Eastern Broadleaf Forest (Oceanic) Province (Bailey, 1995), which is equivalent to the USEPA Level II Ecoregion[1] – Eastern Temperate Forests – Mixed Wood Plains (Commission for Environmental Cooperation, 2006). The Eastern Broadleaf Forest (Oceanic) Province includes two geographic areas: the western Appalachian plateaus and the New England coastal plain, which is where CFTS is located. This portion of the Province is dominated by Piedmont Plateau and coastal plain, with elevations generally less than 1,000 feet amsl (Bailey, 1995).

Based on USEPA ecoregions mapping, CFTS is located in the Level III Northeastern Coastal Zone ecoregion (59). More specifically, the installation is on the very edge of the Level IV ecoregion Southern New England Coastal Plains and Hills (59c). The Southern New England Coastal Plains and Hills ecoregion was historically dominated by forest communities consisting of a mix of oaks, American chestnut (*Castanea dentata*), hickories, and other hardwoods, and some eastern hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*). However, these forests were mostly cleared for agriculture, and, as the agricultural fields reverted to forest again, now consist of dry to mesic successional oak and oak-pine forests, with some red maple, ash, and elm (*Ulmus* sp.) (Griffith, et al., 2009).

2.3.2 Vegetation

Documentation of vegetative species includes general observations documented in the 1998 to 2000 Endangered Species Survey of CFTS (ABS, 2000), the 2004 Botanical Inventory and Invasive Species Mapping Report (Leeson, 2004), and the 2018 FSP (see **Appendix C**). Please also refer to **Appendix B** for a complete list of all plant species recorded at CFTS during the botanical inventory.

[1] Ecoregions are identified through the analysis of the patterns and the composition of biotic and abiotic features, such as geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. Level I is the coarsest level, while Level IV is the most detailed level.

Table 2-5 below lists the 10 forest stands that comprise CFTS and outlines the dominant forest type in each; these forest stands are depicted visually in **Figure 2-7**. Overall, the majority of wooded portions of CFTS consist of deciduous upland vegetation dominated by black oak (*Quercus velutina*), white oak, red maple, white pine, and black birch. Woody shrub and understory species include blueberry (*Vaccinium sp.*), autumn olive (*Elaeagnus umbellata*), eastern redcedar (*Juniperus virginiana*), American beech, black cherry (*Prunus serontina*), black locust (*Robinia pseudoacacia*), and greenbrier (*Smilax rotundifolia*). Dense undergrowth of greenbrier exists within the northern half of Stand 1 and 5, as well as in the northern portion of Stand 4. Dense stands of multiflora rose and autumn olive are located in Stand 7. Ground cover generally includes species like hay-scented fern (*Dennstaedtia punctilobula*), princess pine (*Lycopodium obscurum*), upland sedge species (*Carex sp*.), Indian cucumber (*Medeola virginiana*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy.

Table 2-5: Forest Stands and Types at CFTS

Forest Stand	Forest Type
Stand 1	Oak-White Pine
Stand 2	Oak-Red Maple-Birch
Stand 3	Red Maple-Birch-Oak
Stand 4	Red Maple- Oak
Stand 5	Oak
Stand 6	Oak-Red Maple-Birch
Stand 7	Red Maple-Black Locust-Black Cherry
Stand 8	Red Maple
Stand 9	Oak
Stand 10	Red Maple

Forested deciduous wetlands are dominated by a red maple overstory with a woody understory of spicebush, red maple, arrowwood, sweet pepperbush, and silky dogwood. Herbaceous ground story species include skunk cabbage, jack-in-the-pulpit (*Arisaema triphyllum*), and jewelweed. In the more disturbed wetland areas adjacent to SR 4 (e.g., Wetland D), opportunistic (invasive) plant species such as autumn olive and multiflora rose have become established.

CFTS contains over 28 acres of successional open field and maintained grass areas associated with the Cantonment Area, firing ranges, Impact Area, confidence course, and other small grassland areas. These areas include fields and managed lawns within the base property that consist predominantly of old field successional vegetation. Vegetation within these areas includes aster species (*Aster* sp.), Queen Anne's lace (*Daucus carota*), common mullein (*Verbascum thapsus*), clover species (*Trifolium* sp.), bracted plantain (*Plantago aristata*), daisy fleabane (*Erigeron annuus*), goldenrod species (*Solidago* sp.), common dandelion (*Taraxacum officinale*), velvet grass (*Hokus lanatus*), spotted knapweed (*Centaurea maculosa*), deer-tongue grass (*Panicum clandestinum*), and oxeye daisy (*Chrysanthemum leucanthemum*). In successional old field areas, woody shrub/sapling species include big tooth aspen (*Populus tremuloides*), staghorn sumac (*Rhus typhina*), eastern redcedar, and autumn olive.

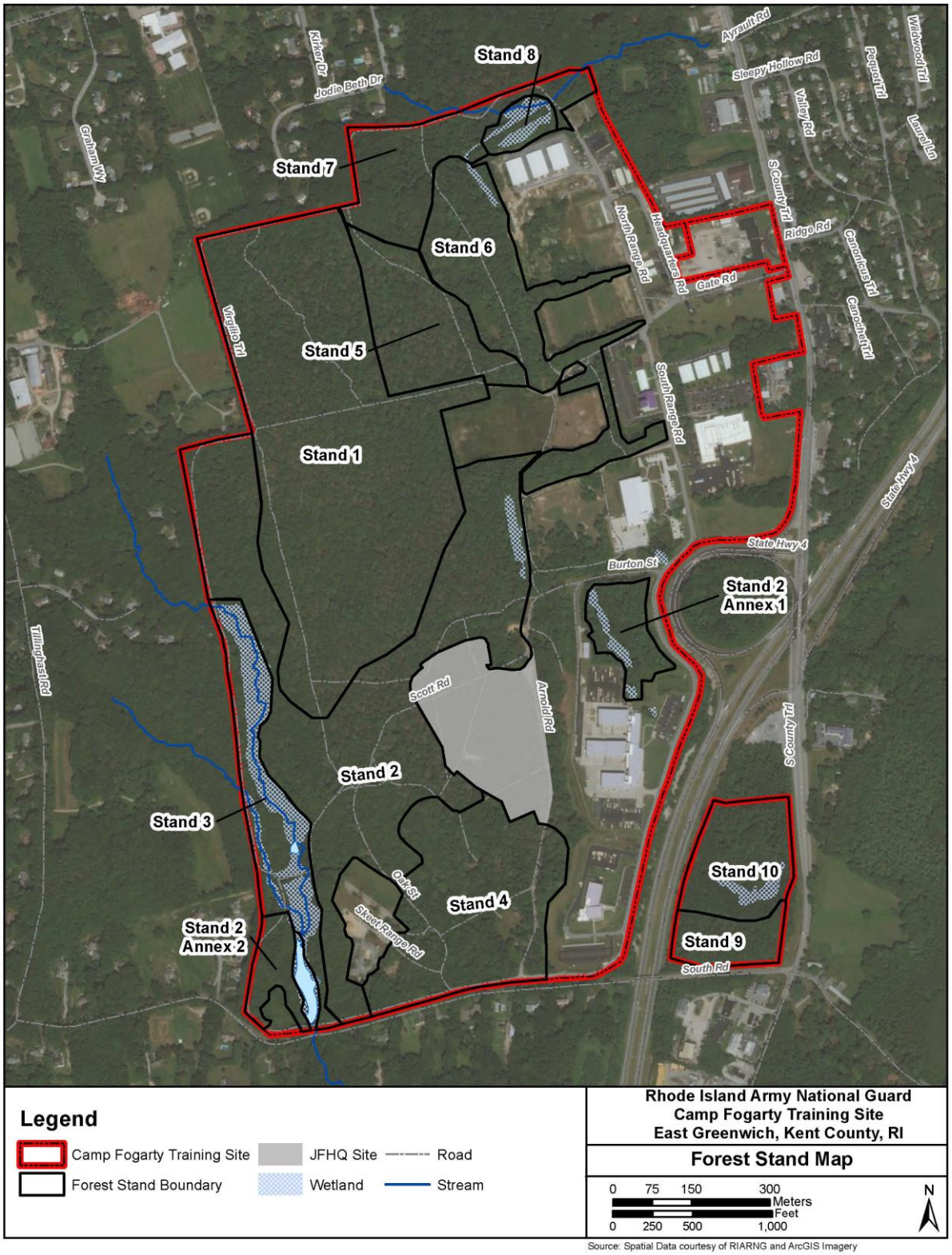

Figure 2-7: Forest Stands at CFTS

Two state-listed plant species have been observed at CFTS: perennial woolly bean (*Strophostyles umbellata*) and lesser clearweed (*Pilea fontana*). Perennial woolly bean is listed as state endangered, and lesser clearweed is listed as a state species of concern. These species are discussed further in **Section 2.3.4**. No federally listed plant species have been documented at CFTS.

CFTS contains a number of documented plant species that are considered invasive, as defined by EO 13112 (Invasive Species) and the Rhode Island Invasive Species Council (2000). The Botanical Inventory and Invasive Plant Species Mapping report (Leeson, 2004) documented 31 such species, including, but not limited to, autumn olive, multiflora rose, oriental bittersweet (*Celastrus orbiculatus*), spotted knapweed, and Japanese knotweed (*Polygonum cuspidatum*). These species should be monitored closely. Further information regarding invasive species and appropriate management guidelines is included in **Section 4.8**.

2.3.3 Fish and Wildlife

Much of CFTS is undeveloped and supports a representative population of mammals, birds, amphibians, and reptiles. From 1998 to 2000, flora and fauna surveys were conducted to baseline natural systems at CFTS (ABS, 2000). The project extended over several years to allow field observations over several seasons. Two cross-base transect lines were established to provide fixed locations for wildlife observations and passerine listening posts. Eight categories of flora and fauna were inventoried for the surveys. The categories included: mammals, birds (emphasis on neotropical passerines using the site for breeding), fish, mollusks, plants, invertebrates, reptiles/amphibians, and critical habitats.

The following sections provide an overview of the fish and wildlife found within CFTS. Fauna surveys and other studies have been conducted onsite for rare, threatened, and endangered species (ABS, 2000; Brown & Puryear, 2005), and odonata and asilidae species (i.e., dragonflies, damselflies, and robber flies) (Brown & Puryear, 2005). No federally regulated threatened, or endangered mammal species were observed during the wildlife surveys. Please refer to **Appendix B** for complete lists of species that have been recorded at CFTS.

Birds

According to the fauna surveys conducted (ABS, 2000), 62 species of birds have been observed within the CFTS during numerous wildlife surveys conducted from September 1998 to March 2000. Many of the birds identified are known to nest in Rhode Island and are likely to be nesting within CFTS boundaries. A number of migratory birds were also observed and include short-distance migrants (migrate to areas within the US) and long-distance migrants (migrate to neotropical areas of the world during the winter). Most of the migratory birds observed were deciduous forest-dwelling species. Several of the migratory species observed within the base property include: wood thrush (*Hylocichla mustelina*), blueheaded vireo (*Vireo solitarius*), scarlet tanager (*Piranga olivacea*), northern parula (*Setophaga americana*), northern waterthrush (*Seiurus noveboracensis*), eastern wood pewee (*Contopus virens*), red-eyed vireo (*Vireo olivaceus*), barn swallow (*Hirundo rustica*), black and white warbler (*Mniotilta varia*), black-billed cuckoo (*Coccyzus erythropthalmus*), black-throated green warbler (*Setophaga virens*), eastern kingbird (*Tyrannus Tyrannus*), great-crested flycatcher (*Myiarchus crinitus*), northern oriole (*Icterus galbula*), ovenbird (*Seiurus aurocapillus*), prairie warbler (*Setophaga discolor*), and veery (*Catharus fuscescens*).

Several of the migratory species observed are likely to nest within the base property because they were observed during summer months (June through August 1999). These species included eastern wood pewee, great-crested flycatcher, blue-winged warbler, black-billed cuckoo, ovenbird, red-eyed vireo, scarlet tanager, veery, and wood thrush. Deciduous woodland, which is abundant within CFTS, is an important habitat for migrating and nesting birds.

Mammals

Six species of mammals have been observed during field surveys conducted at CFTS (ABS, 2000). These include: gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), southern red-backed vole (*Myodes gapperi*), white-footed mouse (*Peromyscus leucopus*), white-tailed deer, and woodchuck (*Marmota monax*). Chipmunks are abundant at CFTS. Their loud repetitive chirping can be heard throughout the base during the summer months. Other mammals that were not observed, but are expected within the CFTS include: various species of bats (*Eptesicus* sp.), coyotes (*Canis latrans*), fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), striped skunk (*Mephites mephites*), opossum (*Dedelphis niarsupialis*), and eastern cottontail (*Sylvilagus floridanus*). It is expected that the long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), and the short-tailed weasel (*Mustela erminea*) inhabit habitats on site as well. Their secretive nature makes observation of these mammals difficult; however, suitable woodland and aquatic habitat exists to support these species. The water shrew (*Sorex palustris*) might inhabit riparian habitats, although none were documented during field surveys (Brown & Puryear, 2005). The RIDEM lists the water shrew as a species of concern.

Mollusks

No mollusk species were observed within any of the wetland/watercourses during the wildlife surveys. Surveys conducted to date indicate that there is limited suitable habitat for these species.

Fish

No fish surveys have been conducted within the surface water bodies at CFTS. However, numerous studies by RIDEM's Division of Fish and Wildlife in the surrounding tributaries to the Hunt River have been conducted to draw conclusions. Of particular significance is a survey done within the Hunt River watershed in 1997 during a phase of the statewide fishery survey of streams and ponds in Rhode Island (sampling station 7.08 located south of CFTS within the unnamed perennial tributary of the Hunt River that flows south from Wetland A). Based on this study, only two species of fish would be expected to use the stream corridors and/or pond within the CFTS: brook trout (*Salvelinus fontinalis*) and American eel (*Anguilla rostrata*).

From the same RIDEM study, another sampling station (7.09) was taken northeast of the CFTS at a small intermittent stream which flows northeasterly from CFTS and eventually joins a major tributary to the Hunt River, Frenchtown Brook. This study found several species of fish within the Frenchtown Brook station including brook trout, white sucker (*Catostornus commersoni*), Atlantic salmon (*Salmo salar*), American eel, pumpkinseed (*Lepomis gibbosus*), redfin pickerel (*Esox americanus arnericanus*), longnose dace (*Rhinichthys sp.*), largemouth bass (*Micropterus salmoides*), and bluegill (*Lepoinis macrochirus*). However, several representative streams at CFTS are intermittent and would not support these fish species. Only the watercourse in Wetland A is perennial.

Invertebrates

Two surveys relating to invertebrates have been conducted at CFTS. From 1998 to 2000, invertebrates were observed during the endangered species survey (ABS, 2000). Invertebrates that were observed within the base included numerous butterflies such as mourning cloaks (*Nymphalis antiopa*) and monarch butterflies (*Danaus plexippus*), dragonflies, aquatic invertebrates, grasshoppers, beetles, and biting insects. The pond contained several species of dragonflies, water striders, whirligig beetles, and other aquatic invertebrates. The open field habitats, especially the confidence course, and the gravel roads provide foraging habitat for many species of dragonflies. Open fields contained many species of grasshoppers during late summer. The streams within the property provide habitat for the ebony jewelwing damselfly (*Caloptetyx aequabilis*) and several other aquatic organisms. Stream macroinvertebrates observed include caddisfly larvae.

In 2005, a survey of dragonflies, damselflies, and robber flies was conducted at CFTS (Brown & Puryear, 2005). This survey identified a total of 27 species of dragonflies, 10 species of damselflies, and 17 species of robber flies. Most of these species were common throughout Rhode Island. However, three rare dragonflies and one rare robber fly were observed (see **Section 2.3.4**). The majority of the dragonflies and damselflies observed utilize ponds, lakes, marshes, and vernal pools as habitat, and the stream complex in the southwestern portion of the installation was identified as a sensitive habitat to be conserved. Robber flies were typically observed along wooded roadsides, and are common in forests, fields, sand and gravel pits, and in disturbed areas. The rare species of robber fly, *Efferia pogonias*, was observed at the southern end of the helicopter field where the soil consists of course sand and gravel, and the field is typically dry and sparsely vegetated. Habitats like these, which were further utilized by several species of tiger beetles, were also recommended to be conserved.

The RIARNG has also planted three pollinator areas at CFTS. Two of these areas (an approximately 1-acre pollinator meadow just west of the pond in the southwest corner of the installation, and a small planting area atop of the M-60 Shotgun Range) have been seeded to attract pollinators and are mowed every several years in order to prevent them from reforesting. The third pollinator area, a pollinator garden around the CFTS flagpole, was planted with pollinator-friendly shrubs and is maintained as a landscaped garden. These areas are expected to attract numerous insect species, but have never been formally surveyed.

Amphibians and Reptiles

The amphibians that were observed within the property include pickerel frog (*Rana palustris*), wood frog, spotted salamander (*Ambystoma maculatum*), and green frog (*Rana clamitans*). Species of salamanders were searched for within the stream channels and under overturned logs and stones. However, the only salamander observed was a spotted salamander that was found injured (most likely by a hawk species) near the Administration building. Red-backed salamander (*Plethodon cinereus*), American toad (*Bufo americanus*), and bullfrog (*Rana catesbeiana*) are also expected to inhabit the base. Surprisingly, no turtles or snakes were observed within the property. However, eastern painted turtle (*Chrysemys p. picta*), snapping turtle (*Chelydra s. serpentina*), eastern ribbon snake (*Thamnophis s. sauritus*), northern brown snake (*Storeria d. dekayi*), and eastern garter snake (*Thamnophis s. sirtalis*) are expected to inhabit the property.

Game Species

Wildlife game species known to exist within the base property include: white-tailed deer, wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), American woodcock (*Scolopax minor*), American crow (*Corvus brachyrhynchos*), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), gray squirrel, woodchuck, raccoon, and coyote. These species are all managed by the RIDEM – Division of Fish and Wildlife. Other game species that may occur within the base property include ruffed grouse (*Bonasa umbellus*), red fox, eastern cottontail, and mink. In Rhode Island, there is no closed season on red squirrel (*Tamiasciurus huclsonicus*), woodchuck, house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), monk parakeet (*Myiopsitta monachus*), rock dove (*Columba livia*), eastern chipmunk, or coyote. However, no hunting or trapping is permitted at CFTS.

2.3.4 Threatened and Endangered Species

Federal status as a threatened or endangered species is derived from the ESA (16 USC §1531 *et seq*.) and is administered by USFWS. They maintain a current list of federally endangered and threatened species, candidate species, and species of concern. Candidate species and species of concern designated by USFWS receive no statutory protection under the ESA. The Rhode Island Endangered Species of Animals and Plants Act (RIESAPA; R.I.G.L. 20-37) further conserves federal and state-listed wildlife and plants. RIDEM maintains the state lists of plants and animals designated as federally endangered or threatened, state endangered or threatened, or state species of concern per its authority granted in R.I.G.L. 20-37-2. However, the state endangered species law currently only states that:

> "No person shall buy, sell, offer for sale, store, transport, import, export, or otherwise traffic in any animal or plant, or any part of any animal or plant, whether living, dead, processed, manufactured, preserved, or raw if the animal or plant has been declared to be an endangered species by either the United States Secretaries of the Interior or Commerce or the director of the Rhode Island department of environmental management." (R.I.G.L. 20-37-3)

As such, the State of Rhode Island currently only specifically protects state endangered species; no protections for state threatened species or state species of concern are codified. Information regarding rare species is typically provided by RIDEM in an advisory capacity. However, the *Rules and Regulations Governing the Administration of the Fresh Water Wetlands Act* (250- RICR-150-15-1) do consider impacts to rare species, including species that are state endangered, state threatened, and state species of concern, as well as their habitat, in the wetlands permitting process.

In accordance with AR 200-1 and DoDI 4715.03, RIARNG has conducted surveys for federally threatened and endangered species, federal species of concern and candidate species, and state-listed species at CFTS (ABS, 2000; Leeson, 2004; Brown & Puryear, 2005). Currently, RIDEM lists 9 federally endangered animal species, 5 federally threatened animal species, 12 state-designated endangered animal species, 16 state-designated threatened animal species, and 89 state animal species of concern (Enser, 2006; USFWS, 2018). Additionally, 15 animal species are listed as state historical (i.e., native species which have been documented in the state within the last 100 years, but are currently not known to occur). Of these 146 listed animal species in Rhode Island, four have been observed at CFTS. No federally designated critical habitat occurs within CFTS. Additionally, 414 plant species are listed: 1 federally endangered plant, 1 federally threatened plant, 71 state endangered plants, 48 state threatened plants,

208 plants of state concern, and 85 state historical plants (RINHS, 2016). Of these 414 listed plant species in Rhode Island, two are known to occur at CFTS: the perennial woolly bean (state endangered) and lesser clearweed (state species of concern) (Leeson, 2004).

Based on an Information for Planning and Consultation (IPaC) query and consultation with USFWS (see **Appendix E**), the northern long-eared bat (NLEB; *Myotis septentrionalis*) is the only federally listed species with the potential to occur at CFTS. No federally listed plants have the potential to occur at CFTS.

A survey of federally and state-listed threatened and endangered wildlife species at CFTS, conducted by Applied Bio-Systems, Inc. (ABS) from 1998 to 2000, did not document any federally listed wildlife species (ABS, 2000). The survey did identify four species (all birds) at CFTS that are state-listed. These species include the northern parula (state threatened), great blue heron (*Ardea herodias*; state species of concern), white-throated sparrow (*Zonotrichia albicollis*; state species of concern), and dark-eyed junco (*Junco hyemalis*; state species of concern).

Finally, a survey of dragonflies and damselflies, robber flies, and water shrews was conducted in 2005. This survey did not identify any federally or state-listed species. However, it did record a relatively large population of southern pygmy clubtails (*Lanthus vernalis*), which is a species of dragonflies that is rare in Rhode Island; at the time, this population provided the only detailed population data for this species in the state. Two other species of uncommon dragonflies were also observed at CFTS. These three species were all observed in the stream complex in the southwestern portion of the installation (i.e., Wetland A). The only other rare species observed during the survey was a robber fly, *Efferia pogonias*, although only one individual of this species was recorded. This species was found in the dry, sparsely vegetated southern portion of the helicopter field where there is course sand and gravel. This report suggested that Wetland A and the dry, sparsely vegetated helicopter field (and similar areas) be preserved as sensitive habitat for these and other species (Brown & Puryear, 2005).

A number of wildlife species, such as neotropical migrant birds, are also a concern for breeding habitat protection within the base. The Migratory Bird Treaty Act (MBTA), signed in 1918, provides for the protection of all species of birds in Rhode Island, except for invasive species, such as European starlings and house sparrows. All of the 62 avian species observed during the ABS (2000) survey period are protected under the MBTA. **Table 2-6** lists birds of conservation concern (BCC) that may occur near CFTS and their breeding season (if applicable in Rhode Island).

Table 2-6: Birds of Conservation Concern with Potential to Occur Near CFTS

Common Name	Scientific Name	Breeding Season	Documented at CFTS
American Oystercatcher	*Haematopus palliatus*	15 April – 31 August	No
Black-billed Cuckoo	*Coccyzus erythropthalmus*	15 May – 10 October	Yes
Buff-breasted Sandpiper	*Calidris subru*	Not Applicable	No
Canada Warbler	*Cardellina canadensis*	20 May – 10 August	No
Least Tern	*Sterna antillarum*	20 April – 10 September	No

Common Name	Scientific Name	Breeding Season	Documented at CFTS
Prairie Warbler	*Setophaga discolor*	1 May – 31 July	Yes
Purple Sandpiper	*Calidris maritima*	Not Applicable	No
Red-throated Loon	*Gavia stellata*	Not Applicable	No
Rusty Blackbird	*Euphagus carolinus*	Not Applicable	No
Semipalmated Sandpiper	*Calidris pusilla*	Not Applicable	No
Short-billed Dowitcher	*Limnodromus griseus*	Not Applicable	No
Wood Thrush	*Hylocichla mustelina*	10 May – 31 August	Yes

Listed below are the BCC that have been documented at CFTS as well as a brief description of their habitat requirements.

- **Black-billed cuckoo.** Deciduous/coniferous forest and open woodland (Ehrlich et al, 1988). Uncommon nesting species in Rhode Island (Enser, 1992).
- **Prairie warbler.** Dry brushy clearings, forest margin, pine barrens (Ehrlich et al, 1988). Common summer resident in Rhode Island found in successional dry shrubby habitats such as abandoned fields, utility corridors, and edges of woodlands (Enser, 1992).
- **Wood thrush.** Deciduous or deciduous-coniferous forest, especially near water, occasionally near human habitation (Ehrlich et al, 1988). This species is currently widespread throughout Rhode Island and prefers mesic deciduous forests (Enser, 1992).

The bald eagle (*Haliaeetus leucocephalus*), while not listed under the ESA or identified as a BCC, is protected by the Bald and Golden Eagle Protection Act. Its breeding season is 15 October to 31 August, but has not been observed at CFTS.

3.0 MISSION SUSTAINABILITY

3.1 Integrating Natural Resources Management and Military Mission

An effective INRMP integrates aspects of natural resources management into the military mission. As such, it becomes the primary tool for ecosystem management at CFTS while ensuring the successful, efficient accomplishment of the military mission. A multiple-use ecosystem management approach will be implemented to accommodate mission-oriented activities and provide for good stewardship, thereby maintaining and improving the quality, aesthetic values, and ecological relationships of the environment.

The purpose of the CFTS is to ***maintain sustainable natural resources as a critical training asset*** upon which to accomplish the RIARNG mission. To accomplish this goal, natural resource managers need to:

- Ensure ***no net loss*** in capability to support existing and projected military training.
- Maintain ***quality training lands*** through monitoring, minimizing damage, mitigation, and rehabilitation.

Specific military missions and training requirements are fluid and change from time to time with realignments, transformations, and changes in equipment and tactics. This requires the establishment of basic underlying natural resource management principles and practices that have broad application and can be adapted for multiple situations. Implementation of this INRMP will successfully promote adaptive stewardship practices that protect and enhance natural resources for multiple use, sustainable yield, and biological integrity, while supporting the military mission.

As part of implementing this approach, there are two interrelated programs that are used: ITAM and Environmental Programs. ITAM and Environmental Programs integrate the military mission and natural resources in different ways and together ensure sustainable use of training lands while providing strong consideration for environmental and public concerns.

3.1.1 Operations Planning & Review

Projects, activities, new development, and mission changes are typically reviewed by multiple entities within RIARNG including the TSM and Environmental Office. If there is potential for environmental impacts, the NEPA process is started, as described in **Section 3.3.** If there are additional environmental compliance requirements, the Environmental Office facilitates any required consultation or permit applications, as described in **Section 3.2**.

3.1.2 Natural Resources Considerations for Mission Planning and Initiation

Missionscape refers to the condition of the landscape best suited to support the various training missions and varies depending upon the type of training. All the landscapes at CFTS are important in supporting training activities. Military training is done in conjunction with the existing landscape and when necessary the landscape is modified to better support the training mission needs, such as restoring grassland for range development. The ideal missionscape for CFTS consists of open grassland areas for ranges, and woodlands and forested areas with access roads and trails throughout the facility. Management activities in this INRMP are designed to support the desired type of natural landscapes. Concealment and bivouac

exercises are conducted in existing forested areas. Realistic training is dependent upon an intact natural setting. Management activities in this INRMP are designed to support the desired type of natural landscapes.

3.1.3 Training and Protection of Natural Resources

Degradation of natural resources can result in unintended impacts to the military mission, impaired readiness, and funds spent on natural resources crisis management and interventions rather than the military mission. RIARNG needs the land and its natural resources to function together in a healthy ecosystem to support the military mission.

The military mission at CFTS generally does not impact natural resources. However, there are significant requirements for management of vegetation and water resources to support the military mission, although the military mission does not generally impact them directly. Active management of vegetation (see **Section 4.4** below) is a critical and necessary component of natural resources management at CFTS, and is enacted in accordance with the invasive species management plan (Leeson, 2008) and FSP (see **Appendix C**). Water resources could be put at risk without the current natural resources management program. Water resources have the greatest potential to be impacted at CFTS from erosion of the trails, which can result in runoff of sediment and other pollutants into the streams and wetlands.

The ultimate goal of this INRMP, as well as its subsequent updates or revisions, is to ensure long-term capability for RIARNG to meet their missions and training requirements, while managing for sustainable natural resources at CFTS. The general natural resources management practices, policies, and procedures identified in this INRMP, will enable the RIARNG to successfully develop the training site to meet mission requirements, while minimizing impacts from the military mission on natural resources

3.2 Consultation Requirements

RIARNG has multiple natural resources consultation requirements in addition to the INRMP development and review requirements identified in the SAIA (see **Section 1.0**). Federally listed threatened and endangered species management requires ESA Section 7 consultation with USFWS. State-listed rare species management and game species management requires consultation with RIDEM. Actions that fall under the jurisdiction of Section 404 or 401 of the CWA necessitate permitting from USACE and RIDEM. In addition to natural resources consultation requirements, there are National Historic Preservation Act and tribal consultation requirements, which are presented in full in the ICRMP for CFTS (RIARNG, 2019).

3.3 NEPA Compliance

CFTS follows the process established in the 2011 ARNG NEPA Handbook, Guidance on Preparing Environmental Documentation for Army National Guard Actions in Compliance with the National Environmental Policy Act of 1969 (ARNG, 2011). The initial step in compliance with NEPA for any RIARNG activity that might impact the environment is to complete a REC and Check Form. The form is prepared to aid in the development of the assessment; it provides information on the proposed action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an EA or Environmental Impact Statement (EIS) might be required for a specific action. Some sections are

prepared by the proponent and other sections are prepared by RIARNG Environmental Office. For activities where a REC and Check is sufficient, the Environmental Office completes and/or reviews the REC and Check. For activities where additional NEPA analysis is required, the Environmental Office prepares and manages the analysis.

If the action is not covered by a categorical exclusion, then an EA is prepared to determine if there are potential significant impacts. If potential significant impacts are identified while completing the REC and Check or during the EA, then an EIS is prepared. The majority of natural resources management actions are covered by categorical exclusions.

3.4 Beneficial Partnerships and Collaborative Resource Planning

RIARNG maintains a Memorandum of Agreement (MOA) with RIDEM that permits RIARNG units to use properties under the control of RIDEM (see **Appendix F**). Per this MOA, which was signed in 2013, the RIARNG submits a list of specific locations, dates, times, and proposed uses of RIDEM properties to the RIDEM semiannually by 1 November and 1 May. RIDEM then approves Special Use Permits for RIARNG by 1 January and 1 July. Under this MOA, the RIARNG has requested permits to use Big River Management Area, Buck Hill Management Area, George Washington Management Area, Burlingame State Park, Great Swamp Management Area, and Arcadia Management Area for land navigation and small unit maneuver training.

The RIARNG has begun to establish constructive relationships with the RIDEM and NRCS to gather knowledge of the natural resources present at CFTS and potential management strategies. In 2017, representatives from both of these agencies accompanied RIARNG on site visits of CFTS to discuss forest health, wildfire potential, bird species presence, habitat management, and invasive species management.

The RIARNG partners with the University of Rhode Island, which maintains the RIARNG's Geographic Information System (GIS) library. The RIARNG also partners with local schools on an annual basis to host Earth Day activities. In the past, these activities have included planting gardens to benefit pollinator species. Finally, during the summer months, the RIARNG hosts the Junior Marines Program and the Civil Air Patrol group at CFTS. During this time, both the Quonset huts and tents set up in the bivouac areas are used for participant housing.

3.5 Climate Change Assessment

In order to assess the potential impacts from climate change on the natural resources at a given facility, the first step is to identify what the projected range of change might be in the future both in the mid-term (i.e., mid-century) and long-term (i.e., end of century). The second step is to identify which species or ecological systems are most likely to be affected by the projected range of changes. Climate change vulnerability assessments are part of this process. Finally, the third step is to identify management activities and projects now and in the future that can respond to these challenges.

According to the Narragansett Bay Estuary Program (2017), which sources air temperature data from the National Oceanic and Atmospheric Administration (NOAA), the average annual temperature in Rhode Island increased by approximately 3.4°F between 1895 and 2015, and the rate of temperature increase

was greater during the period of 1960 to 2015 than it was prior to 1960. Since the 1990s, the number of hot days (days where the high temperature exceeds 90°F) has also been above the long-term average, and the number of very cold days (days where the low temperature is less than 0°F) has been below the long-term average (Runkle, et al., 2017).

Precipitation in Rhode Island has also been increasing since 1895. Average annual precipitation has increased at a rate of 0.40 inch per decade during that span; based on the long-term average annual precipitation, the state has been receiving above-average annual precipitation amounts since approximately 1970, while precipitation amounts received prior to 1970 are now generallly considered below average (Narragansett Bay Estuary Program, 2017). In addition to average annual precipitation increases, there have been more extreme precipitation events (i.e., precipitation events with more than 2 inches of rain) in the state during the most recent decade with data (2005 to 2014) than any other decade since 1950, when this data started being collected (Runkle, et al., 2017).

Models of future air temperature trends in Rhode Island currently project that the average annual temperature will increase between 3.6 and 11°F by 2100 as compared to 1950, and will be largely influenced by future greenhouse gas emissions. For comparison, this degree of temperature increase could alter the Rhode Island climate to be more like that of present-day Virginia (Narragansett Bay Estuary Program, 2017). As a result of this trend, heat waves would likely become more common, while cold waves would likely become rarer (Runkle, et al., 2017).

Models of future precipitation changes in Rhode Island include increased annual precipitation and greater seasonality. In the mid-term, annual precipitation could increase by 5 to 10 percent by 2050 (Runkle, et al., 2017). However, in the long-term, average annual precipitation could increase by 0 to 3 inches per decade by 2100, which would likely exceed the existing rate of increase (0.5 to 1.0 inch per year). Additionally, while average annual precipitation is expected to increase, it would be largely concentrated during winter, and more likely to fall as rain than snow compared to present-day conditions (Narragansett Bay Estuary Program, 2017). During the summer season, increased temperatures could increase the evaporation rate, which would likely cause more frequent drought conditions. Finally, precipitation events are expected to increase in both frequency and intensity, which could lead to a greater incidence of flood events (Runkle, et al., 2017).

Figure 3-1 below depicts historic and projected annual precipitation and average temperature for Rhode Island based on data from The Nature Conservancy's (2009) ClimateWizard. ClimateWizard can be used to depict future mid-term and long-term climate regimes (temperature and precipitation) under low, medium, and high greenhouse gas emissions scenarios based on an average of 16 different models. For this analysis, the projections represent the medium emissions scenario over the mid-term. Overall with the likely increase in rainfall and temperature, the resources most likely to be impacted by climate change are water resources, listed species, invasive species, and vegetation. For more detailed analysis associated with those resources, see **Section 4.0**.

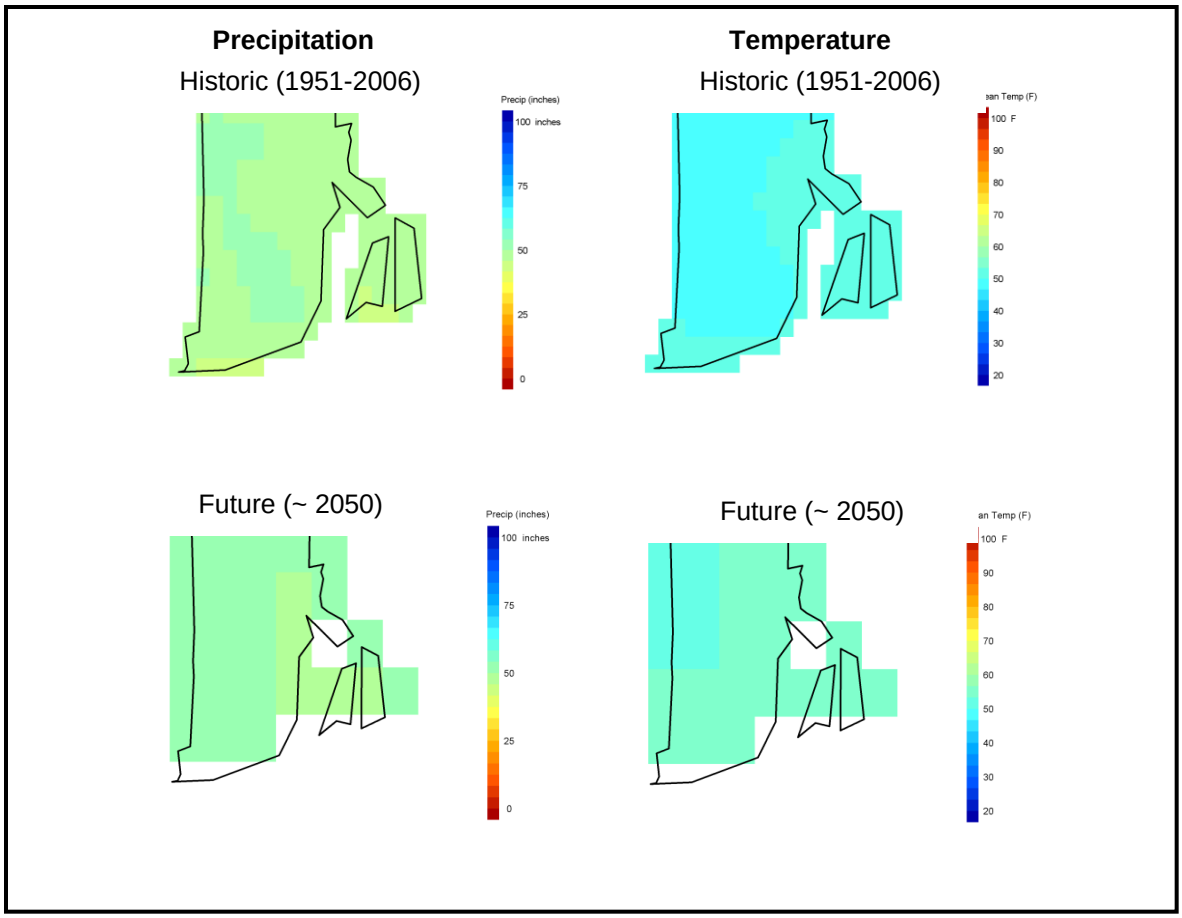

Figure 3-1: Historic and Projected Annual Precipitation and Average Temperature for Rhode Island

If the current climate change trends continue, projected effects in Rhode Island will likely include the following (Narragansett Bay Estuary Program, 2017; Runkle, et al., 2017; USEPA, 2016):

- More frequent downpours and flooding
- Precipitation is more likely to arrive in the form of heavy rains
- Winter seasons will be wetter, but summer will be drier
- More frequent short-term droughts
- More frequent heat waves and less frequent cold waves
- Warmer winters and a longer growing season will enable invasive species and other pests (e.g., ticks) to expand their range
- Annual species migrations and other seasonal biological events (e.g., spring blooming seasons) may shift, which could disrupt ecosystems

Climate change does not currently pose a notable threat to the military mission at CFTS, as training activities (e.g., firearms ranges, mounted and dismounted maneuver training, navigation training, bivouac training, etc.) are unlikely to be impacted. As discussed in **Section 4.4**, the Rhode Island climate is anticipated to become more suitable for oak/hickory forests, which are already the primary forest type in

Rhode Island. While some tree species may become less prominent, the dominance of oak trees in the CFTS forests is unlikely to change. Finally, CFTS facilities are unlikely to be adversely impacted by changing precipitation or temperature regimes.

3.6 State Wildlife Action Plan

During the INRMP development process, RIARNG consulted the *Rhode Island Wildlife Action Plan* (RIDEM, 2015) to ensure INRMP goals, objectives, and strategies are consistent with Rhode Island's overall statewide and habitat-specific plans. Rhode Island's SWAP is a strategic vision of the integrated conservation efforts needed to sustain the broad array of wildlife in the state. The purpose of Rhode Island's SWAP is to serve as a starting point for building a common framework for the state's numerous wildlife conservation partners. Rhode Island's SWAP is available at http://www.dem.ri.gov/programs/fish-wildlife/wildlifehuntered/swap15.php.

The goals of Rhode Island's SWAP are to:

- Coordinate natural resource conservation by (1) implementing and revising the 2005 SWAP; (2) developing and maintaining partnerships; and (3) managing the State Wildlife Grants Program.
- Facilitate habitat conservation efforts, including preservation of remaining wild lands, on high-priority habitat categories to improve their health and resiliency and to achieve their long-term ecological sustainability.
- Compile, evaluate, and present summary status information for Species of Greatest Conservation Need (SGCN), and foster improved monitoring of both species and larger biological communities through effective partnerships and information sharing.
- Analyze current threats to SGCN and their habitats, and discuss conservation initiatives and other efforts that have been established to encourage proper management of natural resources.
- Recommend a range of action steps, based on a comprehensive review of numerous existing conservation and management plans, intended to address Rhode Island's conservation needs.

Key statewide threats identified in the SWAP include residential and commercial development, natural system modifications, pollution, use of biological resources, and invasive species; the top three threats facing key habitats in the state are invasive species, residential and commercial development, and climate change/severe weather. Primary conservation actions are generally associated with land/water protection, land/water management, law and policy, or education and outreach. While all INRMP goals, objectives, and strategies were found to be consistent with Rhode Island's SWAP, not all of them contribute specifically to one of the SWAP's goals or conservation actions.

Key habitats in Rhode Island were ranked based on their current condition, importance to biodiversity, vulnerability to climate change, and the degree of threat they face. Key habitats identified in the SWAP that may be present at CFTS include mixed hardwood riverside forest, mixed oak/white pine forest, and upper perennial cold water streams with course sediment.

The SGCN list identifies the broad range of Rhode Island's animal species that are imperiled or at risk of becoming imperiled in the future. After assessing all native freshwater, marine, and terrestrial wildlife species known to occur within Rhode Island, 454 SGCN were identified, including 123 birds, 13 reptiles, 10 amphibians, 45 fish, and 242 invertebrates. SGCNs include federal and state-listed species as well as numerous other categories of species that merit particular conservation priority, such as keystone species, endemic species, indicator species, and species whose populations are declining or are prone to concentrate (e.g., bat roosts), among others. This list was developed based on an extensive review of information from government agencies, academia, non-government organizations, and private individuals, and included consideration of species' statuses regionally and globally in addition to their statuses within Rhode Island. Numerous SCGN occur within CFTS that benefit from the natural resources program. Fish and wildlife management and rare species management are discussed in **Sections 4.6** and 4.7, respectively. For a complete list of Rhode Island SGCN, refer to the SWAP.

3.7 INRMP Implementation Analysis

The primary measure of INRMP effectiveness is whether it helps prevent net loss in the capability of military lands to support the military mission. RIARNG is preserving CFTS's capability to support training through its natural resources management practices outlined in the 2007 INRMP and in this update. Long-term management effectiveness is also evaluated through periodic inventories of species populations, habitat quantity and quality, and habitat values through the recurring PLSs. Trends can be used to indicate the degree of success. RIARNG will evaluate these recurring data as they become available. A practical evaluation of INRMP implementation includes reviewing whether planned projects have been accomplished. An analysis of the FY 2007 – 2012 projects and their implementation status is included in **Table 3-1**.

Table 3-1: Implementation Status of FY 2007 – 2012 INRMP Projects

Project	Description	Funding Source	Status	Included in Updated INRMP?
1	Trail Impact Monitoring and Maintenance	ITAM	Complete	Yes
2	Rare, Threatened, or Endangered Monitoring	CONS	Implemented/Ongoing	Yes
3	Map and Post Signage at all SMZ Boundaries	CONS	Complete	No
4	Wetland Delineation, Survey and GIS Update	In-house	Implemented/Ongoing	Yes
5	Wetland Functional Assessment	CONS	Not implemented	Yes
6	Riparian Enhancement – Wetland E	CONS or MILCON	Not implemented	Yes
7	Baseline Fisheries Survey	CONS	Not implemented	Yes
8	Water Quality Monitoring Program	CONS	Not implemented	Yes
9	Educational Fact Sheet	ITAM	Implemented/Ongoing	Yes
10	Grounds and Forested Areas Assessment	CONS	Complete	No
11	Habitat Enhancement Area Survey	CONS	Partially complete	Yes
12	Recreational Needs Assessment	CONS	Not implemented	No
13	Mixed Habitats Management Plan	ITAM	Not implemented	No

Project	Description	Funding Source	Status	Included in Updated INRMP?
14	Pest and Invasive Species Management Summary	ITAM	Implemented/Ongoing	Yes
Funding Types: CONS (Conservation [Environmental] funds), ITAM (ITAM program funds), MILCON (Military Construction funds)				

The Recreational Needs Assessment was not completed or included in this INRMP update because CFTS is not open to the public (see **Section 4.1.3**). Accordingly, a Recreational Needs Assessment would provide limited value to the installation and is not a priority at this time. The Mixed Habitats Management Plan was not completed or included in this INRMP update due to its similarity with the Grounds and Forested Areas Assessment, which was completed in the form of a FSP (see **Appendix C**). Because forests comprise a large majority of the natural habitat at CFTS, and wildlife habitat is included as a primary management focus in the FSP, developing an additional Mixed Habitats Management Plan is not necessary.

Overall, CFTS has benefited from the INRMP as a management tool. The program and goals in the 2007 INRMP are being addressed through implementation of management actions. Most of the specific management actions have been implemented through projects, while some have been in-house activities. A large number of the projects are recurring actions that are continued in this INRMP. See **Section 4.0** for topic specific goals and objectives and **Appendix A** for a complete list of associated projects and activities.

4.0 NATURAL RESOURCES PROGRAM MANAGEMENT

The guiding philosophy of this INRMP is to take an ecosystem approach to managing the natural resources present at CFTS (see **Section 1.5.3**). Ecosystem management provides a framework to link the military mission to local, regional, and global ecological integrity. Sustaining ecosystem integrity is the best way to protect and enhance biodiversity, ensure sustainable use, and minimize the effort and cost of management.

Ecosystem management is based on clearly stated goals and objectives, and associated activities and projects. This INRMP identifies goals and objectives, and presents the means to accomplish them as well as the methodologies to monitor results. Activities generally refer to in-house, no-cost actions (e.g., maintenance/monitoring) undertaken by RIARNG and CFTS personnel on a regular basis. Projects generally refer to discrete actions, often performed by others under contract or other agreement, intended to satisfy a particular need (e.g., natural resources surveys, plan development, etc.). In addition, projects can be performed using non-DoD funds or by volunteers. See **Section 5.3** for more details about funding.

This chapter summarizes each technical area of natural resources management. In a given section, relevant management strategies, practices, guidelines, BMPs, and priorities will be presented, as applicable to the technical topic. Goals and objectives are presented below by section. Projects (i.e., discrete and/or contracted tasks) and activities (i.e., recurring, in-house tasks) associated with those goals and objectives are presented in **Table A-1** and **Table A-2** respectively. Laws and regulations are not summarized in each sub-section, although primary legal drivers are identified. A summary of relevant laws, regulations, EOs, and policies is provided in **Appendix I**.

The following sections set forth in the DoD INRMP Template are not included separately in this INRMP because they are included within other sections or do not apply to CFTS:

- Coastal/Marine Management – No coastal or marine habitat occurs within CFTS.
- Bird/Wildlife Aircraft Strike Hazard (BASH) – There is no BASH program at CFTS.
- Agricultural Outleasing – CFTS does not currently have cropland, hay, or grazing leases.
- Law Enforcement, GIS Management, and Training of Natural Resources Personnel, and Outdoor Recreation – These sections are presented together under INRMP Implementation in **Section 4.1**.
- Floodplain Management – Floodplain management is presented with water resources in **Section 4.3**.
- Forestry Management – There is no income-generating forestry program at CFTS. Forest management is in vegetation management in **Section 4.4**.
- Migratory Birds Management – Migratory birds are managed as part of fish and wildlife management and presented in **Section 4.6**.

4.1 Natural Resources Program Development

GOAL 1: Program Management (PM): Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and DA regulations and policies.

- OBJECTIVE PM1: Identify military needs for natural resources at CFTS, including natural training environments (e.g., woodlands) and services provided (e.g., noise and aesthetic buffers).
- OBJECTIVE PM2: Encourage robust land planning at CFTS that seeks to conserve natural resources, enhance training land and natural resources-dependent training opportunities, and retain flexibility for accommodating potential future changes in mission, while maintaining no net loss of training ability.
- OBJECTIVE PM3: Consistent with the requirements of AR 200-1, evaluate the impacts of military activities on the natural environment, including its functions, values, and opportunities.
- OBJECTIVE PM4: Maintain productive communication and coordination channels with relevant federal, state, and local agencies and partner organizations that can advise on prudent natural resources management.
- OBJECTIVE PM5: Continue internal environmental awareness activities to minimize impacts to natural resources from RIARNG and visiting personnel.
- OBJECTIVE PM6: Consider opportunities to cooperate with other agencies and local landowners on regional land and natural resources management efforts.
- OBJECTIVE PM7: Continue cooperating with outside organizations to provide organized outdoor recreation opportunities to CFTS users, without impacting military mission or ecological health.
- OBJECTIVE PM8: Continue public outreach activities in coordination with other regional entities as appropriate and practical.
- OBJECTIVE PM9: Use adaptive ecosystem management as the primary natural resources management paradigm.
- OBJECTIVE PM10: Continue to maintain a consolidated GIS database for CFTS, and ensure the RIARNG has the necessary equipment and personnel training to use GIS data for natural resources management and installation planning purposes.

Programmatic management includes the overall program elements to implement a comprehensive natural resources management program. Elements included in this section generally include areas that intersect with all or most components of the program, such as environmental awareness, public outreach, natural resources law enforcement, INRMP annual reviews, adaptive management, and other objectives relating to implementing a natural resources management program.

Primary Regulatory Drivers

- SAIA
- DoDI 4715.03
- AR 200-1

4.1.1 Environmental Awareness and Public Outreach

Environmental awareness activities at CFTS are primarily conducted by the Environmental Office. These activities are designed to improve the understanding of CFTS site users of the effects of the CFTS mission, training, and activities on the installation's natural resources. To date, the RIARNG has installed two bat boxes at the CFTS skeet range to improve bat habitat. These boxes are monitored informally by CFTS personnel. The Environmental Office has also mapped and posted signage around all SMZs at CFTS in order to educate CFTS site users of their position in the ecological landscape and inform use restrictions associated with each area. Finally, the Environmental Office has begun to develop some birding materials (e.g., a species list) that can be used by CFTS personnel to learn more about the installation's biological resources. These materials are being developed in support of an educational fact sheet the RIARNG seeks to create that will teach CFTS site users about the goals and objectives of the INRMP, the existing natural resources at CFTS, and the management philosophy and activities being implemented to steward the installation's natural resources.

Environmental awareness activities can also serve as a public outreach tool to educate the public and garner their support by effectively communicating the military mission at CFTS and the level of success of natural resources management at the installation. Although public access to CFTS is limited, the RIARNG schedules annual Earth Day activities at the installation for military families. Most recently, these activities included creating a pollinator garden around the CFTS flagpole. This garden represents one of the three pollinator areas that the RIARNG has created at the installation. Additional information on environmental awareness, beneficial partnerships, and public outreach is discussed in **Section 3.0**.

4.1.2 Outdoor Recreation

CFTS is not open to the public for recreational purposes. Hunting and other passive recreational uses are not permitted on the site. However, CFTS is used by outside organizations with permission, including the Junior Marines Program and Civil Air Control group. CFTS provides these groups with opportunities to hike, camp, and use the confidence course for training.

4.1.3 Public Access

AR 200-1 provides guidance for access to military lands and waters by recreational users. Based on this regulation, public access will be within manageable quotas subject to safety, military security, and threatened or endangered species restrictions, and cannot impair the natural resources. At this time, no public access is permitted at CFTS. If, at some future time, portions of the CFTS are opened to the general public, the goals and objectives outlined in the INRMP should be reviewed and modified accordingly.

4.1.4 Natural Resources Law Enforcement

Many aspects of natural resources management require effective enforcement if they are to be successful. Such features as protection of wetlands, water pollution prevention, rare species protection, and others are very dependent on law enforcement. Range Control manages use of the entire installation except for the operations in the administrative buildings or armories. Range Control and the Camp Fogarty Security Force conduct routine patrols, observes all activities on the training site, and notifies the

Environmental Office when environmental concerns are observed within the installation. Any personnel or otherwise who wishes to enter onto the undeveloped areas of the base for any reason but report to Range Control prior to access.

4.1.5 GIS Data Management

GIS is a digital system for assembling, storing, manipulating, and displaying geographically referenced information. The RIARNG GIS program is maintained through a partnership with the University of Rhode Island, which consolidates and manipulates the data as needed. The GIS program benefits multiple users of CFTS, particularly by providing overlays to get a snapshot of a specific portion of the installation. The TSM uses these maps to plan training activities based on built and natural resources available at CFTS.

All DoD GIS data must meet the federal Spatial Data Standard for Facilities, Infrastructure and Environment. Currently, the RIARNG has GIS natural resources data for topography, aerial imagery, soils, streams, floodplains, wetlands, SMZs, and forest stands. In addition, the RIARNG has GIS data for the installation boundary, buildings, parking areas, sidewalks, roads and trails, guardrails, fences/stone walls, gates, ranges, and various other training facilities.

4.2 Soil Conservation and Sediment Management

GOAL 2: Soil (SO): Manage soil to minimize sediment loss and erosion.

OBJECTIVE SO1: Maintain trails, roads, and parking areas to minimize the potential for erosion and sedimentation and to minimize establishment of invasive species.

OBJECTIVE SO2: Prevent erosion and sedimentation through education, design, and inspection by reviewing site briefings and existing infrastructure at a minimum on an annual basis and implementing corrective measures as necessary.

OBJECTIVE SO3: Implement CFTS Trail System BMPs to minimize erosion, soil loss, and sediment deposition.

OBJECTIVE SO4: Maintain vegetation cover using native species.

OBJECTIVE SO5: Implement stabilization and recovery measures for areas not revegetating spontaneously.

Primary Regulatory Drivers

- Clean Water Act
- Water Pollution Act (R.I.G.L. 46-12)
- RIPDES (250-RICR-150-10-1)

Surface water and groundwater quality is directly related to land management practices that affect stormwater runoff. Stormwater runoff is produced when rainfall during a storm exceeds the infiltration capacity of the soil or encounters an impervious surface. Stormwater runoff can be a significant source of pollutants and sediments to surface waters, especially in areas with impervious surface cover or where groundcover has been disturbed. Water quality also may be negatively impacted by disturbances causing increased

sedimentation to wetlands and stream channels. Sources of stormwater runoff and pollution could originate from operational, maintenance, and/or administrative areas. Stormwater runoff from impervious surfaces has a high potential to carry pollutants into wetlands, surface waters, and groundwater. Impervious surfaces include roads, parking lots, taxiways, and buildings. At CFTS, these areas are generally limited to the cantonment area and a few small areas with training infrastructure.

Two main types of soil erosion exist: wind erosion and water erosion. Several factors affect water erosion: rainfall, slope steepness and length, soil texture or erodibility, cover protecting the soil, and special practices such as terracing or planting on the contour. Sediment resulting from erosion affects surface water quality and aquatic organisms. At CFTS, water erosion is most common, as vegetation cover generally protects soils from the forces of strong winds.

4.2.1 Regulatory Authority and BMPs

Non-point source pollution affecting water quality at CFTS is primarily associated with stormwater runoff that could carry sediment or chemicals into wetlands or streams. RIDEM implements the National Pollutant Discharge Elimination System (NPDES) program in the State of Rhode Island in accordance with Section 46-12 of the R.I.G.L. and the *Regulations for the Rhode Island Pollutant Discharge Elimination System* (RIPDES; 250-RICR-150-10-1). The RIPDES stormwater program regulates point source discharges of stormwater into surface waters of the State of Rhode Island from certain municipal, industrial, and construction activities.

As the NPDES stormwater permitting authority, RIDEM is responsible for promulgating rules and issuing permits, managing and reviewing permit applications, and performing compliance and enforcement activities. Construction or other land-disturbing activity that results in soil disturbance (e.g., clearing, grading or excavating) of 1-acre or more must also be permitted by RIDEM under the RIPDES permit program. The RIPDES permit establishes the required erosion control and revegetation standards.

Stormwater management could be a concern at CFTS; however, there are a number of mechanisms in place to protect water quality and soils from negative impacts from stormwater. CFTS maintains a SPCP in compliance with Rhode Island requirements (RIARNG, n.d.). The SPCP describes practices, procedures, structures, and equipment for the prevention of and response to spills of petroleum, oil, and lubricant products, hazardous material, and hazardous waste at CFTS. Additionally, in recognition that the CFTS trail system poses one of the primary erosion concerns at the installation, a Trail System BMP Manual was developed that provides information on soil erosion and sediment control within the installation and assists RIARNG personnel in maintaining the existing trail system (RIARNG, 2007). USEPA and the State of Rhode Island are also good sources for stormwater BMPs. The *Rhode Island Soil Erosion and Sediment Control Handbook* (RISCC, 2016), *Rhode Island Stormwater Design and Installation Standards Manual* (RIDEM & CRMC, 2015), and the USEPA's *Developing your Stormwater Pollution Prevention Plan: A Guide for Construction Sites* (USEPA, 2007), are useful references.

4.2.2 ITAM Program

A core component of the ITAM program is LRAM, which is specifically focused on preventing and recovering damage to vegetation and soils. The CFTS ITAM program is relatively new, but will in time enable CFTS to revegetate disturbed land (see **Section 4.2.4**), monitor the installation for potential

erosion or sedimentation concerns, and conduct trail stabilization, among other land rehabilitation actions, with dedicated funding.

4.2.3 Erosion Control Guidelines

Improper erosion control can lead to CWA violations, thus potentially resulting in fines and other penalties, which may ultimately compromise the integrity of CFTS as a viable training installation. Regardless of regulatory compliance, appropriate soil conservation and erosion control are vital to the military mission. Unmanaged and extensive soil erosion can threaten the military mission and require diversion of funds from other priorities. Delays in managing the erosion can increase the cost to repair by several orders of magnitude. Some examples of the potential effects of poor soil and erosion management include the following:

- Undermining of roads
- Loss of topsoil and vegetation, which further accelerates erosion
- Impacts to streams or other aquatic habitats, potentially resulting in water quality impairment
- Creation of unusable areas due to erosion.

As discussed in **Section 2.2.4**, undisturbed soils at CFTS are largely comprised of silt loams. Erosion at CFTS is generally limited because slopes are usually not steep, off-road vehicle usage is rare, and there are few areas of bare soil. Only 6.6 percent of CFTS soils are considered highly erodible (i.e., K-factor greater than 0.34) and require careful management due to risk of erosion, but most soils on the training center require special treatment and consideration when planning for land use and rehabilitation, especially regarding shallowness, drought, or stoniness (see **Table 2-3** and **Figure 2-5**).

RIARNG will assess the potential erodibility of a site during planning of new development, training, and other land uses. RIARNG will continue soil erosion management practices including institutional, structural, and vegetative practices.

- **Institutional practices** are procedures, policies, or regulations that ensure operations are conducted in a manner that minimizes their impact.
- **Structural practices** include permanent construction to install erosion-resistant surfaces, stabilize drainage, and modify slopes to reduce runoff velocity and trap sediments on-site.
- **Vegetative practices** consist of establishing live plants on erosive or exposed surfaces. Plants stabilize slopes by binding soils with their roots; shielding soils from rainfall impact; interrupting surface runoff by roughening the ground surface, which allows more water to infiltrate the ground rather than run off over the surface; trapping sediments in runoff; and wicking moisture out of soils through evapotranspiration. In addition, vegetative practices are self-regenerating and require relatively little maintenance.

As noted previously, the trail network comprises one of the primary erosion risks at CFTS. Per the Trail System BMP Manual, the RIARNG maintains the trails such that they experience little erosion damage and minimize the amount of sediment-laden runoff by implementing resistant design elements into the trails, such as riprap, retaining walls, appropriate grading, check dams, drainage flow energy dissipation features, and, during construction, hay bales and silt fences. Accordingly, the RIARNG will:

- Keep culverts, waterbars, inlets, outlets and ditches clear of sediment and debris.
- Repair or replace culverts when necessary.
- Rebuild waterbars when traffic wears them down.
- Protect any exposed soil until vegetation is reestablished.
- Periodically crown roads and trails.
- Crown, out-slope, or water-bar road surfaces to dissipate surface runoff and minimize erosion of the trail

4.2.4 Revegetation Management Guidelines

Success in revegetating disturbed sites depends on the chemical and physical properties of the soil. Correct pH, phosphorus levels, and nitrogen fertilization are necessary for degraded lands to be re-vegetated. Application procedures should include soil analysis to determine proper nutrient application levels. Other factors to consider are soil moisture, soil organic matter, and weather patterns.

Generally, revegetation using native plants does not require fertilizer, which can favor non-native species. If fertilizer is applied, choose and apply fertilizer according to the soil test results. Fertilizers should be incorporated as appropriate for the plants being used, and should not be applied when soils are wet. In wet soils, salt forms from the fertilizer, which can significantly reduce the percentage of seed germination, especially with grasses.

Specific recommendations concerning revegetation at CFTS are as follows.

- Maintain existing vegetation buffers around water resources.
- Generally, CFTS will revegetate itself as long as the soil is stable. Mulch or other soil stabilization methods can be used to stabilize soils until plants germinate.
- If an area does not revegetate readily, conduct a soil test and incorporate the minimum soil amendment necessary.
- If an area still does not revegetate spontaneously, only use native genotypes during restoration and landscaping projects. A list of native plants suitable for landscaping is provided in **Section 4.4.9**. Plants prohibited by the USDA or considered invasive in Rhode Island will not be planted at CFTS.

4.3 Water Resources Management

GOAL 3: Water Resources (WR): Maintain water resources so they remain resilient, functional, and with no net loss of acreage.

OBJECTIVE WR1: Minimize impacts to water resources, including wetlands, and comply with all laws pertaining to water resources.

OBJECTIVE WR2: Gather water quality data periodically to document long-term trends.

OBJECTIVE WR3: Protect and enhance water quality by minimizing nonpoint-source pollution, maintaining SMZs, and by following existing spill prevention and hazardous materials management protocols.

OBJECTIVE WR4: Maintain or enhance vegetation buffers around water resources.

CFTS has several water resources, including wetlands and perennial streams. For a complete summary of water resources at CFTS, see **Section 2.2.5**. Wetlands are some of the most productive habitats, and often provide migration corridors for a variety of species. In addition to the goal, objectives, and management strategies presented here, those presented in **Section 4.2** also contribute to the management of water resources.

Primary Regulatory Drivers

- Clean Water Act
- AR 200-1
- EO 11990
- EO 11988
- Water Quality Regulations (250-RICR-150-05-1)
- Fresh Water Wetlands Act (R.I.G.L. 2-1-18 – 2-1-25 and 250-RICR-150-15-1)
- RIPDES (250-RICR-150-10-1)

Climate change is likely to alter precipitation patterns and increase water temperature in Rhode Island. Depending on how the climate changes, water resources could be significantly impacted, either by expanding or shrinking. While water resources are highly likely to be impacted, it is not known at this time how they will be impacted.

4.3.1 Regulatory Requirements

The USACE regulates the discharge of dredged or fill material into “waters of the United States”, including wetlands, under Section 404 of the CWA. Even an inadvertent encroachment into waters of the US resulting in a displacement or movement of soil or fill material has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE. Waters of the US are defined under 33 CFR 328.3(a) and referred to as jurisdictional waters. Jurisdictional waters may include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, wetlands, and other waters, that if degraded or destroyed could affect interstate commerce. For an area to be classified as a delineated wetland, three conditions must be present: (1) wetland hydrology; (2) hydric soil; and (3) hydrophytic vegetation. Areas that may be periodically wet, but that do not meet all three criteria, are not classified as “delineated” wetlands. Once a delineation is complete, a jurisdictional determination can be made, which is dependent upon the relationship of the wetland to waters of the US.

Management of wetlands on federal lands and military installations is further indicated by EO 11990 and DoDI 4715.03, respectively. Under those instructions, wetlands are required to be managed for “no net loss” on federal lands, including military installations. In support of these policies, long- and short-term adverse impacts associated with the destruction or modification of wetlands and support of new construction in wetlands should be avoided to the maximum extent possible.

Section 401 of the CWA gives the State of Rhode Island the authority to regulate, through the State WQC program, proposed federally permitted activities that may result in a discharge to water bodies, including

wetlands. The State may issue certification, with or without conditions, or deny certification for activities that may result in a discharge to water bodies. In Rhode Island, the RIDEM Office of Water Resources WQC Program is the state water pollution control agency, and is responsible for issuing Section 401 WQCs.

FEMA-designated floodplains are protected under EO 11988 – *Floodplain Management*. The purpose of EO 11988 is to reduce the risk of flood loss, minimize the impacts of flooding, and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands.

4.3.2 Permitting

As discussed above, USACE and RIDEM have jurisdiction over water resources. The USACE issues Rhode Island General Permits that cover many routine or minor projects. For larger projects, or projects that do not meet the requirements of a General Permit, the USACE issues Individual Permits. Most CFTS projects that could impact jurisdictional waters (e.g., maintenance of existing infrastructure) would likely qualify for a General Permit.

In order for authorizations under Rhode Island General Permits to be valid and before commencing any work within USACE jurisdiction, Section 401(a)(1) of the CWA (33 USC Sec. 1341) requires that applicants obtain a WQC from RIDEM to discharge dredged or fill material into waters of the US RIDEM has conditionally granted WQC for self-verification activities in inland wetlands and waterways provided those activities meet the specified criteria contained in the General Permits. The applicant must apply to the RIDEM, Office of Water Resources, Freshwater Wetlands Program; any permit issued by the RIDEM Freshwater Wetlands Program may act as the WQC in accordance with Rule 13.A.3.(a) of the Rhode Island Water Quality Regulations (250-RICR-150-05-1). Therefore, the applicant will receive their WQC and USACE authorizations upon receipt of a permit from the RIDEM Freshwater Wetlands Program.

Rhode Island General Permits are subject to one of two review processes. If a proposed project is anticipated to have a minimal scope or impacts, it may qualify for the self-verification process, wherein an application to the USACE is not required. The project proponent must still apply for permits from RIDEM, who will forward the application, site plan, etc. to the USACE and obtain confirmation that the project can be authorized under self-verification. The RIDEM will then issue a joint RIDEM/USACE authorization for the project, and forward the authorization to the USACE.

Proposed projects seeking a General Permit that do not qualify for self-verification may be screened under the pre-construction notification (PCN) review process. Under this scenario, an application to the USACE is required, and USACE will coordinate review of all PCN activities with federal and state agencies to ensure that the proposed activity results in only minimal impacts to the aquatic environment. If the USACE determines that the PCN activity qualifies for authorization under these General Permits, they will notify RIDEM. If the RIDEM ultimately decides to issue a permit for the proposed work, the RIDEM will insert the appropriate language in their authorization to notify the applicant that the RIDEM authorization is also their USACE authorization provided that they comply with the General Permit conditions.

The RIDEM Freshwater Wetlands Program, established by the Fresh Water Wetlands Act (R.I.G.L. 2-1-18 – 2-1-25) and implemented by rules in 250-RICR-150-15-1, regulates alteration of freshwater

wetlands, including isolated wetlands, streams, and flowing bodies of water. Alteration of a wetland includes any action that changes the character of the wetland, including, but not limited to, excavating, draining, filling, placing material or effluent upon, diverting water flows into or out of, diking, damming, diverting, clearing, grading, or constructing in the wetland. Prior to issuing a permit, RIDEM must confirm the presence and location of wetlands on a property, from which it will determine what type of permit is required based on whether insignificant or significant wetland alterations are expected, or if no wetland permit is required. Additionally, certain activities, such as limited vegetation removal or structure demolition and removal, are exempt from wetland permitting requirements provided they satisfy all conditions noted in the *Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act*.

Further, any construction in, or development of, the 100-year floodplain requires a permit. Development includes such activities as filling, grading, excavation, storage of materials, and establishment of temporary stream crossings, among others. The Town of East Greenwich issues permits to alter the floodplain in accordance with the rules of the National Flood Insurance Program, and ensures that the carrying capacity of the altered or relocated watercourse remains the same (Code of the Town of East Greenwich Chapter 113).

Permitting requirements vary depending on type, location, and extent of disturbance. Prior to initiating projects or activities (e.g., dredging, filling, work in and around a stream or wetland) occurring within or with the potential to affect a floodplain, wetland, or other water body, the appropriate agencies (USACE, RIDEM, and the Town of East Greenwich) should be consulted to determine permitting requirements.

NPDES permits for construction are issued separately from Section 404/401 authorizations. Construction related NPDES permits are discussed in **Section 4.2.1**.

4.3.3 Riparian Zones and SMZs

Riparian zones are lands adjacent to streams, rivers, lakes, and wetlands. They are important features within CFTS as they intercept overland drainage, reduce streambank erosion, help trap sediments and nutrients, filter water and replenish groundwater reserves, and help to moderate flooding. See **Section 4.4** for vegetation management guidelines associated with riparian zones.

A SMZ is a BMP that is designated and maintained to protect water quality within nearby streams and wetlands. The SMZ width is based on RIDEM freshwater wetland regulations; expected applicability of these regulations to streams and wetlands at CFTS are identified in **Section 2.2.5**. SMZ widths at CFTS range from 50-foot buffers around wetlands (i.e., perimeter wetlands) to 100-foot buffers on each side of CFTS streams (i.e., riverbanks). SMZs designate sensitive and regulated habitats, and should be protected to the extent practicable. Signs have been posted along all SMZ boundaries at CFTS to educate CFTS users of their position in the ecological landscape and inform use restrictions associated with each area. SMZs at CFTS are depicted in **Figure 4-1**.

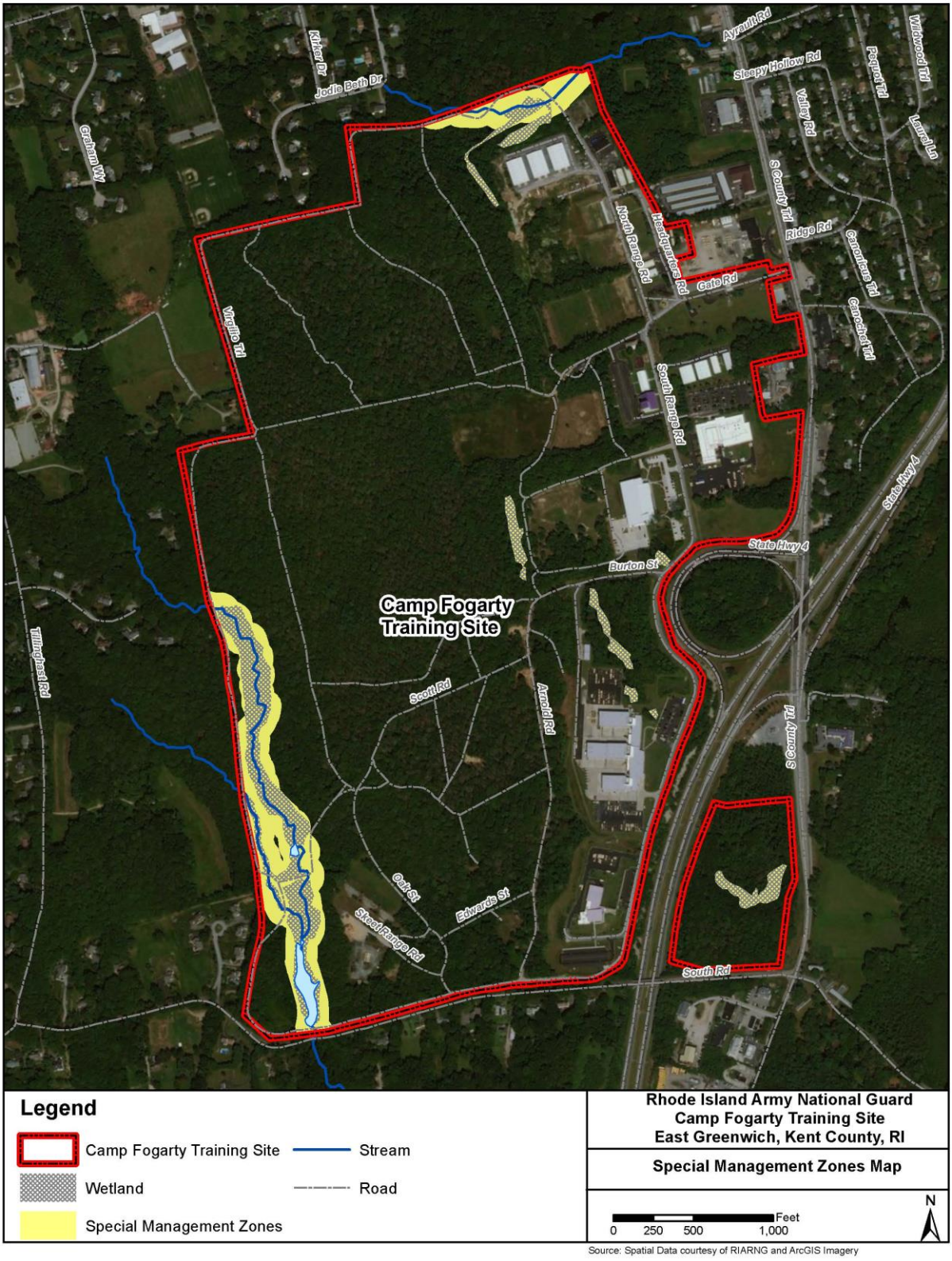

Figure 4-1: SMZs at CFTS

4.3.4 Management Guidelines

In general, water resources are managed through conservation and impact avoidance. Although water quality monitoring is not required, it is a good way to measure ecosystem health. Land-based environmental degradation eventually affects water quality and aquatic ecosystems. The following strategies are recommended to ensure compliance with regulations and to protect and enhance water resources at CFTS.

- Adhere to procedures described in the CFTS Trail System BMPs Manual and SPCP (see **Section 4.2.1**).
- Consult with RIARNG Environmental Office prior to initiating projects with the potential to disturb water resources as far in advance as possible; permits are likely necessary for projects that could result in temporary and/or permanent impacts (see **Section 4.3.2**). Conduct updated wetland delineations for new construction projects to ensure decisions are based on current information.
- Avoid the net loss of size, function, or value of wetlands and modification of floodplains and wetlands where there are practicable alternatives. Where no practicable alternatives exist, obtain all necessary permits from RIDEM/USACE (including the required Section 401 certification) and mitigate unavoidable impacts on wetlands and water resources functions. Manage potential impacts to water resources in accordance with the RIDEM Wetland BMP Manual (RIDEM, 2010).
- Whenever possible, incorporate wetland enhancement, restoration, or creation into habitat enhancement plans and into construction plans and hazardous waste remediation and closure.
- Ensure that erosion and sediment control plans are developed for activities that have the potential to impact streams and wetlands.
- Restrict vehicles from within wetlands and SMZs except where established crossings and roads exist.
- Plan military activities so that impacts to wetlands are limited or avoided.
- Review operations and maintenance programs that potentially affect water resources, and develop procedures and guidelines to avoid the loss of function.
- Minimize the amount of impervious surfaces in newly developed areas.
- Manage stormwater flow and runoff from CFTS-controlled lands to avoid or minimize impacts, including non-point source pollution, to onsite and offsite land uses/natural resources.
- Manage invasive species to promote desirable native species.
- Minimize the use of pesticides and herbicides.

4.4 Vegetation Management

GOAL 4: Vegetation (VE): Manage vegetation to support the military mission, optimize protection of existing habitats, maintain native species, and enhance wildlife habitat.

OBJECTIVE VE1: Provide a balanced array of forest types for both military training purposes and wildlife habitat (including rare species, as applicable).

OBJECTIVE VE2: Practice preservation management in ecosystems along and around waterways, with SMZs that encompass all Rhode Island regulated water resources, to benefit wildlife, rare species, and water quality.

OBJECTIVE VE3: Monitor the results of habitat management efforts, appropriate to the management objectives and projects completed for a given area.

OBJECTIVE VE4: Establish a landscaping and revegetation protocol that maximizes use of native plants and avoids invasive non-native plants.

OBJECTIVE VE5: Minimize chemical and maintenance inputs during grounds maintenance.

OBJECTIVE VE6: Maintain urban trees and landscapes at CFTS to maintain an aesthetically appealing installation while resulting in no net loss of training abilities.

OBJECTIVE VE7: Establish a wildland fire management program (see **Goal 5**) to protect the human and natural environment.

OBJECTIVE VE8: Implement an integrated pest management program (see **Goal 8**) to minimize the impact of invasive and pest species on CFTS native species and ecological integrity.

Primary Regulatory Drivers

- SAIA
- AR 200-1

Vegetation management includes riparian and forest management, fish and wildlife habitat management, protecting water quality, and supporting the military mission. There is a significant overlap in the objectives and management strategies within this section and all other sections within the INRMP, which is indicative of the essential role vegetation plays in ecosystems and in natural resources management.

Modeling of climate changes in eastern US forests indicate that Rhode Island will likely continue to consist primarily of oak/hickory forest types, based on the USDA Forest Service (USFS) Climate Change Tree Atlas (USFS, 2018; Butler, 2016). Regionally, maple/beech/birch and oak/pine forests can be expected to become less prominent over time, as the climate becomes even more suitable for oak/hickory forests. Additionally, the Climate Change Tree Atlas indicates that white pine, red maple, and northern red oak (*Quercus rubra*) are among the species most likely to become less prominent in Rhode Island forests (USFS, 2018). However, due to the prominence of oak trees throughout CFTS already, and the overall value of oak forests as ecosystems, no long-term threat to CFTS as a training site would be expected to result from these potential shifts in forest types.

The majority of vegetation on CFTS includes deciduous hardwood and deciduous-coniferous upland forest types, which transition into hardwood riparian forests along the two stream corridors and in forested wetlands. The desired future condition of CFTS is to maintain these existing forest types at the installation, including functioning, continuous riparian zones around all streams and wetlands. In addition to forests, vegetation at CFTS consists of maintained grassland areas that comprise ranges and other training facilities, landscape trees, and a pollinator meadow.

To date, the ecosystem management approach used at CFTS has primarily involved forest preservation and limited invasive plant control. More active management techniques, such as prescribed fire or timber stand management, have not historically occurred at CFTS. In general, vegetation resources will be managed through conservation and impact avoidance. The following guidelines will be implemented to ensure compliance and to protect and enhance vegetation resources at CFTS.

- Use native species in landscaping and ecological restoration.
- Maintain mature trees, including snags, unless they pose a safety hazard.
- Restrict tree management between 15 April and 10 September to prevent impacts to migratory birds and listed bats.
- Maintain SMZs around all state-regulated streams and wetlands at CFTS.
- Monitor for invasive species regularly and treat populations while they are small.

4.4.1 Native Landscaping

Landscaped areas comprise the majority of the Cantonment Area. The management and design of these areas can impact water quality, wildlife habitat, and native species. The following recommended landscaping practices should benefit the environment and reduce maintenance time and costs. General recommendations to promote environmentally beneficial landscaping include the following:

- Design landscaping to be suitable to the specific site conditions (e.g., sun exposure, soil chemistry, etc.) and appropriate for the use and operation of the facility.
- Implement water-efficient practices, use efficient irrigation systems and recycled water, and use landscaping to conserve energy.
- Limit turf areas where practical to reduce water use and maintenance requirements, as applicable.
- Use wood mulch instead of rock mulch when practical.
- Prevent expansion of nonnative plants into native plant areas by using regionally native plants for landscaping where practicable.

The use of native plants not only protects biodiversity and provides wildlife habitat, but can also reduce demands for fertilizer, pesticides, and irrigation and their associated costs. Native species suitable for planting at CFTS can be found using the *Rhode Island Native Plant Guide* developed by the University of Rhode Island and Rhode Island Natural History Survey (RINHS). This online tool suggests native plant species based on a variety of site-specific factors, such as type of plant desired, sun exposure, moisture

level, wildlife uses, height, and edible or medicinal uses, and is available at https://web.uri.edu/rinativeplants/. Generally, mast-producing (hard and soft mass) species are favored to improve habitat for many wildlife species, and mixed species plantings are preferable to single species plantings. However, the unique needs of each planting, which could also include shade, ornamental interest, etc., will need to be evaluated on a case-by-case basis.

In addition to these more general landscaping practices, the use of green infrastructure or low impact development techniques can reduce the risk of negatively impacting water quality offsite. These practices often include the use of native plants and provide some wildlife habitat as well. The *Rhode Island Low Impact Development Site Planning and Design Guidance Manual* (RIDEM & CRMC, 2011) provides details on specific BMPs. See **Section 4.2** and **4.3** above for more on managing water quality at CFTS.

4.4.2 Forest Management

Detailed information regarding the existing forest types and recommended management focus/actions for CFTS forests is provided in the FSP (see **Appendix C**). As discussed in that document, the primary management objectives for CFTS forests are to support the military mission by providing forest conditions that enable military training, protect and enhance wildlife habitat, protect water quality, and control invasive species. Due to the limited size of CFTS forests, no timber harvesting or other forest conversion activities are recommended at this time.

CFTS forests support the military mission by providing natural training environments for land navigation and other activities. Several forest stands (e.g., Stands 1, 2, and 4) currently provide suitable areas for these activities, and should be maintained accordingly by preventing overgrowth of greenbrier or invasion of invasive species. The forests also border much of the CFTS boundary with neighboring properties. This helps provide an aesthetic and noise buffer against military training activities for those properties. The RIARNG will continue to keep these forested buffers intact to the extent feasible. Currently, the primary concern in CFTS forests as they relate to the military mission is the prevalence of standing dead wood (i.e., snags) resulting from the recent gypsy moth (*Lymantria dispar*) infestations. Snags can lead to safety concerns that threaten the military mission when they have the potential to fall on Soldiers or other training facility resources. These snags are most prevalent in Stands 1, 2 and 5, although they are scattered throughout other CFTS forest stands, and currently pose the greatest threat to trail users. To maintain the safety of CFTS personnel and equipment, and the availability of the trail network for training activities, the RIARNG should consider conducting a hazard tree assessment to determine which trees may need to be trimmed or felled to protect CFTS personnel and training resources. This assessment is included as a planned project in **Table A-1** and discussed in greater detail in the FSP.

It should be noted that the abundant snags now present at CFTS comprise valuable habitat opportunities for many species of wildlife, and should be retained when they do not pose a threat to the military mission. Snags are generally more valuable the larger they are, but snags as little as 6 feet tall and 3 inches DBH still provide valuable habitat. Ideally, forests should contain at least three snags of at least 12 inches DBH per acre (CTDEEP, 1999). High quality forested habitat at CFTS can also be maintained by minimizing further fragmentation of forested areas to the extent feasible. Contiguous forests provide wildlife with important movement corridors between habitats. When possible, new construction activities should be sited within areas that are not forested, already fragmented, or immediately adjacent to developed areas.

In addition to protecting water quality, as discussed in **Section 4.3.3**, riparian zones are important habitats for wildlife because the vegetation they support is often unique and diverse. Due to the linear nature of riparian zones, they also tend to be used as travel corridors by wildlife. At CFTS, riparian zones are located primarily in the southwestern and northeastern portions of the installation, although some scattered wetland areas are also present. These areas will be managed for protection of water resources and the wildlife that occupy those habitats. At CFTS, SMZs have been designated around streams and wetlands to prevent disturbance to these valuable habitats to the extent practicable, as military activities and vegetation clearing are generally limited in these areas. Please refer to **Section 4.3** for more details on water resources protection and management, including guidelines for protecting water quality.

Finally, forest resources should be managed to control invasive species, which are currently the greatest detrimental factor affecting CFTS forests. Invasive species outcompete native species and reduce biodiversity of forest habitats. Management of these undesirable species is necessary to maintain military training areas in usable condition, and to maintain natural ecosystems best suited to support native plant and wildlife populations. Invasive species are currently most prevalent in Stands 4, 6, 7, and 8, and along the trail network. However, once established, invasive species can be difficult and expensive to control. As such, invasive species management, which can include mechanical, chemical, and biological methods, should be prioritized in areas where the populations are still relatively small to prevent additional areas from becoming overgrown. Stands 1, 2, 3, and 5, as well as the overall trail network, currently comprise the highest priority areas for invasive species management.

No diseases are currently known to be affecting CFTS forests. However, two forest pests, gypsy moths and emerald ash borers (EAB; *Agrilus planipennis*), have the potential to adversely impact CFTS forests. Gypsy moths have repeatedly defoliated large portions of CFTS forests, particularly in Stands 1, 5, and 9, and have caused substantial oak tree mortality at the installation. EABs, have not been identified at CFTS yet, but were recently confirmed to be present in Rhode Island, and have a potential to negatively impact the ash tree population at the installation. Please refer to **Section 4.8** for additional details regarding the invasive species and forest pests present at CFTS and potential management options.

4.4.3 Pollinator Meadow

Besides garden features, there is one primary pollinator meadow designated at CFTS. This approximately 1-acre meadow is located in the southwestern corner of the installation, just west of the pond. Pollinator meadows are low maintenance areas and generally do not require watering or fertilizers. Mature pollinator meadows should be mowed periodically to prevent establishment of large shrubs and trees. Ideally, approximately 25 percent (and no more than 50 percent) of the meadow should be mowed in a single season, and no portion of the meadow should be mowed more frequently than every 2 years. Mowing should occur in early spring before most flowering species emerge. These measures help ensure that the meadow species recolonize the mowed portions. It may also be necessary to reseed the meadow every several years to improve species diversity. Seed selection and planting techniques are discussed in *Establishing Pollinator Meadows From Seed* (The Xerces Society, 2013), which is available at http://www.xerces.org/wp-content/uploads/2013/12/EstablishingPollinatorMeadows.pdf. Finally, pollinator meadows should be monitored closely for invasive species. Minor invasive species populations can likely be addressed with mechanical or precise chemical methods, but large invasive species populations may

require reestablishing a mowing schedule in the meadow several times per season to eliminate these species. These methods are also discussed in the aforementioned document.

It should also be noted that a smaller pollinator area has also been planted atop the western berm of the M-60 Shotgun Range; these management guidelines are suitable for that area as well.

4.5 Wildland Fire Management

GOAL 5: Wildland Fire (WF): Manage wildland fires at CFTS in a manner that minimizes safety risks, enhances natural resources, and results in no net loss of training ability.

OBJECTIVE WF1: Establish a wildland fire program that minimizes safety concerns and wildfire risk, enhances the military mission, benefits rare species, protects cultural resources, and maximizes habitat management and ecological benefits.

OBJECTIVE WF2: Coordinate and cooperate with other federal, state, and local agencies, and directorates within the installation, regarding proper wildland fire management strategies.

Primary Regulatory Drivers

- SAIA
- AR 200-1
- Forest Fires and Prevention Act (R.I.G.L. 2-12-6 and 250-RICR-70-00-2)
- SOP for CFTS
- Army Wildland Fire Policy Guidance (4 September 2002)

Wildfire has potential to threaten human health and safety, cause harm to personal property, and degrade military training lands. In addition to facility damage, wildfire can destroy vegetative communities essential to a realistic training environment. This degradation can result in increased soil erosion, sedimentation of waterbodies, and long-term reduction in the capacity of training areas. While wildfires have not been a concern at the CFTS to date, the potential for them to occur remains. Fire management generally does not threaten the military mission, because activities are scheduled around training activities and mission requirements, and can be used to maintain natural terrestrial communities and control invasive species. However, wildfires could negatively impact the military mission by creating smoke that interferes with visibility, and consequently training activities, and limiting areas available for training.

The RIARNG currently does not have a fire management program, and seeks to develop one to better manage CFTS. The initial step in this process would be preparation of an IWFMP. This plan would constitute the primary planning tool for the wildland fire program by specifying guidance, procedures, and protocols for the prevention, detection, and suppression of wildfires, and the planning and operating procedures involved with potentially instituting a beneficial prescribed burning program. Army Wildland Fire Policy Guidance (4 September 2002) requires that an IWFMP be developed for installations with unimproved grounds that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool.

4.5.1 Permitting

In Rhode Island, all open air fires on or adjacent to forest land require a permit (R.I.G.L. 2-12-6). These permits are generally granted by local governments; in the Town of East Greenwich, open air fire permits are authorized by the Fire Chief (Code of the Town of East Greenwich § 47-3). However, the Town of East Greenwich's policy for granting permits for land clearance purposes does not precisely allow prescribed burns, so further consultation with the state and/or local government may be necessary.

4.5.2 Wildfire Prevention and Reporting

RIARNG implements several policies designed to prevent wildfires at CFTS, which are outlined in the SOP. Open fires/warming fires are prohibited in all CFTS ranges and training areas. Additionally, units must designate fire-fighting personnel prior to the start of firing at the ranges, and must have four, 5-pound dry fire extinguishers on hand during firing activities. In the event of a forest or brush fire, all personnel will take immediate steps to extinguish the fire with means at hand, and a guide will be positioned in the area to direct fire-fighting apparatus. Further, Range Control must also be notified as soon as possible, and a general cease-fire will be enacted. All observed fires should be documented.

4.5.3 Firebreaks

Firebreaks are an essential management tool for both wildfire prevention and prescribed burning. Wildfires at CFTS could result from the use of tracer rounds during training activities or from natural causes (e.g., lightning). Natural firebreaks currently occur along the western and northern boundaries of CFTS along the two perennial stream corridors. In addition to these natural firebreaks, the CFTS trail system surrounds the installation and separates the various training areas, further reducing the ability of fire to spread across CFTS or to adjoining farms and residential properties.

4.5.4 Prescribed Burn Management

Prescribed burning is the purposeful application of fire in a controlled, knowledgeable manner that may be used as an effective land management tool. The occurrence of fire is a natural component of many ecosystems that has been virtually eliminated in most forests today due to associated health and safety concerns. Due to the lack of natural fires, land managers can use prescribed burning as a desirable and economically sound management practice; the FSP includes prescribed burns as a potential future forest management activity at CFTS subject to further feasibility analysis in an IWFMP. Prescribed fire may be used to accomplish the following:

- *Reduce hazardous fuels* - Periodically burning the underbrush can significantly decrease the chance of a catastrophic forest fire by reducing accumulated fuel loads.
- *Encourage natural forest regeneration* - Prescribed burns often expose adequate mineral soil, control invasive vegetation, and create favorable conditions for native species.
- *Improve wildlife habitat* - Prescribed burning can improve wildlife habitat and increase forage by keeping hardwood sprouts short, tender, palatable, and abundant. Deer, dove, quail, and turkey generally benefit from prescribed burns.

- *Manage competing vegetation* - Prescribed burning can be used to control invasive vegetation.
- *Control insects and disease* - Prescribed burns may be used to control some insects and diseases.
- *Enhance appearance* - Prescribed burns often enhance recreation and aesthetic values of a forest and native grasslands by removing understory brush.

Prescribed burns may also be administered to improve wildlife habitat. To enhance wildlife habitat, prescribed burns could be administered from January to March to prevent the killing of new spring growth and enhance the growth of hardwood sprouts and herbaceous growth. Burns during January to March would not interfere with the nesting season; however, some areas could remain unburned to provide sufficient cover for nesting. Turkey and small game generally benefit from prescribed burns every two years, while deer benefit from a prescribed burn rotation of two to three years (NRCS, 2016).

Development of a fire management program could potentially create public engagement opportunities for the RIARNG. Local conservation organizations and universities may be interested in providing insight into the best ways to manage the program from an ecological perspective based on the natural history of Rhode Island and the foremost conservation opportunities available at CFTS. Additionally, there may be organizations interested in participating in prescribed burns, or preparing specific prescribed burning plans, as training opportunities.

4.6 Fish and Wildlife Management

GOAL 6: Fish and Wildlife (FW): Maintain fish and wildlife populations while minimizing potential impacts to the military mission.

OBJECTIVE FW1: Manage fish and wildlife using a systematic approach that includes inventory, monitoring, management, and assessment to document changes in conditions over time.

OBJECTIVE FW2: Coordinate fish and wildlife survey efforts with RIDEM, USFWS, and NRCS, as appropriate, to ensure they are conducted in a manner consistent with standard methodologies and in compliance with federal, state, and local laws and regulations.

OBJECTIVE FW3: Maintain populations of fish and wildlife by providing healthy, diverse habitat types and corridors for movement between those habitats.

OBJECTIVE FW4: Minimize wildlife-related health risks, safety risks, and environmental damage.

Fish and wildlife management at CFTS is focused on maintaining natural habitats favorable for indigenous fish and wildlife in a manner consistent with the military mission and all applicable laws and regulations. CFTS is a relatively small installation, but it does provide both terrestrial and aquatic habitats. For a detailed summary of wildlife species and rare

Primary Regulatory Drivers

- SAIA
- MBTA
- AR 200-1
- EO 13186

species, refer to **Sections 2.3.3** and **2.3.4**, respectively. This section of the INRMP provides a summary of wildlife management at CFTS.

4.6.1 Migratory Bird Treaty Act

The MBTA prohibits, unless permitted by regulations, the pursuit, hunting, take, capture, killing or attempting to take, capture, kill, or possess any migratory bird included in the Migratory Bird Treaty, including any part, nest, or egg of any such bird (16 USC §703). The DoD has a Memorandum of Understanding (MOU) with USFWS pursuant to EO 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*), which outlines a collaborative approach to promote the conservation of migratory bird populations. This MOU specifically pertains to natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, invasive weed management, and prescribed burning. It also pertains to installation support functions, operation of industrial activities, construction and demolition activities, and hazardous waste cleanup. In February 2007, USFWS finalized regulations for issuing incidental take permits to the DoD. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of migratory bird species, then they must confer and cooperate with USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects (50 CFR Part 21).

DoD's policy is to promote and support a partnership role in protection and conservation of migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems on DoD lands consistent with the military mission. The Partners in Flight program is an umbrella network of which DoD's bird conservation program is a vital part. DoD works with the National Fish and Wildlife Foundation to develop cooperative programs and projects with other federal, state, and non-governmental organizations. Rhode Island Division of Fish and Wildlife is the state's lead agency for the Partners in Flight Program. Migratory birds include species with at least some populations breeding in the continental US and/or Canada, such as many songbirds, shorebirds, waterbirds, and waterfowl. Attention has centered on migrants, since this group is experiencing steep rates of population decline. However, decreasing populations have also been observed in resident bird species, which do not migrate, and temperate-zone migrants, which only migrate within North America.

4.6.2 Wildlife Habitat Management

Wildlife habitats available at the CFTS include upland forests, riparian forests, wetlands, streams, a meadow, and managed fields. The quality of wildlife habitat is a result of available food and cover. Generally, habitat variety and diversity is associated with wildlife diversity and abundance.

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of these habitats is focused to benefit indigenous species, particularly threatened and endangered species and game species. RIARNG will manage the wildlife and its habitats at CFTS, in conjunction with RIDEM, by implementing the strategies listed below:

- Leave snags, den trees, and fallen logs undisturbed unless they are a safety hazard. Snags are standing dead trees, while den trees are live trees with cavities in them.

- Protect large, unfragmented quality habitat as territory for viable wildlife populations. Configuration of protected habitats should conform to shapes that minimize edge-to-area ratios. Circular shapes are preferable in achieving this goal. Narrow, linear, or small-acreage habitats should be avoided if possible.
- Protect riparian areas and forested wetlands, and maintain corridors between wetlands and other waterbodies to provide for wildlife movement between areas.
- Minimize habitat fragmentation by minimizing land clearing and new road construction.
- Minimize the amount of herbicides used for invasive species control, particularly in or around surface waters and wetlands, to avoid impacts to fish and wildlife habitat by using mechanical methods to the extent possible.
- Limit mowing only to areas where it is necessary to implement the training mission. When mowing is required, if possible, raise blade heights to at least 8 inches, and mow either while reptiles and amphibians are hibernating (approximately November to February) or after turtle nesting season (i.e., after mid-July).
- Monitor natural areas, particularly SMZs, for trash and remove items found. Additionally, keep dumpsters and trash collection areas clean to prevent animals from feeding on or dispersing trash.
- Conduct periodic surveys to assess native fauna populations at CFTS, and keep an informal log of wildlife observations made by RIARNG personnel to supplement official surveys.
- Construct and maintain nesting boxes for birds known to inhabit CFTS, and monitor reproductive success periodically.

4.6.3 Game Species Management

Game species known to inhabit CFTS are discussed in **Section 2.3.3**. However, no hunting, fishing, or trapping is permitted at CFTS, and no population surveys of game species have been conducted at the installation.

4.6.4 Nuisance Wildlife

CFTS currently has two nuisance species. The first, white-tailed deer, have been browsing in recent years on eastern arborvitae (*Thuja occidentalis*) trees that were specially planted in several locations to achieve visual screening, noise buffering, and erosion control objectives around the firearms ranges. Deer population data does not currently exist for CFTS, but the population is believed to be stable and can be expected to grow, as hunting is not permitted at the installation. Deer overpopulation has the potential to cause extensive damage to forested habitats by overbrowsing the understory and herbaceous layers, which in turn inhibits forest regeneration and reduces habitat and forage opportunities for other species. CFTS personnel will monitor this nuisance species informally. If necessary, they may pursue population reduction methods in the future, which would be conducted in consultation with relevant federal and state agencies.

The other primary nuisance species currently at CFTS is Canada geese. This species congregates in numerous locations at CFTS that are mowed regularly, including the helicopter landing zone, parade field,

and firearms ranges. Geese congregations lead to feces accumulation and potentially training interruptions in those areas. The RIARNG has begun to deter geese from congregating on the landing zone and parade field to protect those training resources. However, geese are not deterred from congregating on the ranges, as those grassy areas are less often used. Geese are generally not actively deterred during July and August since this is when the flocks have goslings.

Rodents and small mammals also have the potential to be nuisance species at CFTS. Mice can occasionally invade buildings and cause damage to food and other products. Small mammals can burrow near or under buildings. All of these species have the potential to carry diseases. Nuisance wildlife problems will be evaluated in conjunction with USFWS and RIDEM personnel, as appropriate. Any solutions to nuisance wildlife problems will follow the IPMP (RIARNG, 2018).

Diseases affecting fish and wildlife could occur on the installation. As outlined in AR 200-1, installation natural resources personnel will consult with appropriate Army Veterinary Corps personnel and, if appropriate, USFWS and RIDEM regarding large-scale fish and wildlife deaths and unnatural behavior occurring on the installation.

4.7 Threatened and Endangered Species Management

GOAL 7: Threatened and Endangered Species (TE): Manage rare species using an ecosystem approach, while maintaining the military mission at CFTS.

OBJECTIVE TE1: Maintain current data regarding the status of any federal or state special status species that may exist at CFTS and where they occur on base.

OBJECTIVE TE2: Maintain high quality habitat by managing for large tracts of forest and protecting riparian areas and wetland habitats.

OBJECTIVE TE3: Limit conflicts between protection of rare species and their habitat with other military training activities.

OBJECTIVE TE4: Coordinate management of rare, threatened, and endangered species with USFWS and RIDEM to ensure use of the best available information, and to ensure compliance with federal, state, and local laws and regulations regarding management of these species.

Primary Regulatory Drivers

- Endangered Species Act
- Bald and Golden Eagle Protection Act
- RIESAPA (R.I.G.L. 20-37)

This section presents information about the management of threatened, endangered, and other rare species that could potentially occur at CFTS. RIARNG is required to manage for any federally threatened and endangered, or state-listed endangered, species documented at CFTS. Failure to protect known federally listed species could lead to an ESA violation, which could negatively impact training land availability.

In accordance with AR 200-1 and DoDI 4715.03, RIARNG has conducted surveys for federally threatened and endangered species, federal candidate species, and state-listed species at CFTS (ABS, 2000; Leeson, 2004; Brown & Puryear, 2005). No federally listed species were, or have since been, documented at CFTS. State-listed species documented at CFTS include perennial woolly bean (state endangered), lesser clearweed (state species of concern), northern parula (state threatened), great blue heron (state species of concern), white-throated sparrow (state species of concern), and dark-eyed junco (state species of concern). A complete summary of rare species survey conducted at CFTS is provided in **Section 2.3.4**.

Additionally, ABS (2000) identified one potential resource area/habitat that provides the greatest potential management opportunity in support of this INRMP goal. This opportunity is associated with Wetland A, which provides potentially suitable habitat for the following rare species in Rhode Island: purple trillium (*Trillium erectum*; state endangered; known to exist just north of CFTS within the Fry Brook Watershed), northern spring salamander (*Gyrinophilus porphyriticus*; state species of concern), and water shrew (state species of concern). None of these species have been observed at CFTS.

Consultation with USFWS (see **Appendix E**) further identified five species of conservation concern, which have not been documented at CFTS. These species are currently included in the USFWS National Listing Workplan of species under consideration for federal listing. While these species may or may not be listed following evaluation, and RIARNG is not required to take action for these species with regard to ESA compliance, voluntary conservation efforts that may benefit these species are encouraged. The species and a brief description of their habitats are listed below:

- Frosted elfin butterfly (*Incisalia irus*) – state threatened. This species inhabits pine barrens or oak savannahs, and is dependent on wild lupine (*Lupinus perennis*) and/or wild indigo (*Baptisia tinctoria*), which are its most common larval host plants (Xerces Society, 2018). Wild indigo has been documented at CFTS (Leeson, 2004).
- Wood turtle (*Clemmys insculpta*) – state species of concern. This species inhabits hard-bottomed streams/rivers with perennially flowing deep pools and adjoining woodland (van Dijk & Harding, 2011). This habitat is similar to that of Wetland A at CFTS.
- Spotted turtle (*Clemmys guttata*). This species inhabits numerous types of wetlands, including swamps, marshes, vernal pools, bogs, wet meadows, small streams, and mature wet forests (van Dijk, 2011). CFTS contains several wetlands and small streams.
- Brook floater (*Alismidonta varicosa*) – state historical. This species inhabits flowing streams and rivers with clean water and sand or gravel substrates (PANHP, n.d.). It was last observed in Rhode Island in 1897 (Enser, 2006).
- Yellow banded bumblebee (*Bombus terricola*). This species could be found in numerous types of habitats, including meadows, woodlands, farmland, wetlands, and urban areas (Hatfield, Jepsen, Thorp, Richardson, & Colla, 2015). Bees were not evaluated for the most recent Rhode Island endangered species list (Enser, 2006).

No federally designated critical habitat occurs currently within CFTS. The 2004 amendments to the ESA included provisions to exclude critical habitat designations on DoD lands. Section 4(a)(3)(B) is not discretionary and mandates that the Secretary of Interior exclude designating critical habitat on “any lands

or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an INRMP prepared under section 101 of the SAIA, if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation." Installations should request exclusion from critical habitat initially through ARNG I&E for review and concurrence and then to the appropriate USFWS office.

High priority for management was given to federally listed species with the potential to occur at CFTS and state endangered species with known documentation at CFTS. These species include the federally threatened NLEB and state endangered perennial woolly bean; management guidelines for these species are described below.

4.7.1 Federally Listed Species

Northern long-eared bat (federally threatened): NLEB is a forest-dwelling species found across much of the eastern and north central US and much of Canada. During the summer, this species generally roosts in live or dead trees that have cavities, crevices, or peeling/exfoliating bark. They may roost singly or in colonies. At dusk, they begin to feed on insects as they fly through the understory of forested areas. During winter, NLEBs hibernate in caves or mines (USFWS, 2015). NLEBs are most threatened by the fungal disease white-nose syndrome. In the Northeast US, NLEB populations have declined by up to 99 percent from pre-white-nose syndrome levels at many hibernation sites.

CFTS may contain suitable habitat for NLEB. The northern and southern portions of the installation (forest stands 4 and 7; see **Figure 2-7**) contain black locust and black cherry trees, which may be preferred roost tree species (Owen, et al., 2002). Additionally, CFTS contains an abundance of snags due to the high oak tree (*Quercus* sp.) mortality resulting from back-to-back years of heavy gypsy moth infestations. While these snags may not comprise suitable roost trees currently, they may become suitable roost trees following several years of decomposition.

RIARNG does not need to consult with USFWS for the NLEB if it determines that a proposed action would have "no effect" on NLEB (i.e., if suitable habitat is not present in the action area and the action poses no other risks to the species). In this case, the RIARNG must only document their "no effect" determination internally.

If the RIARNG determines that a proposed action "may affect" NLEBs, it must consult with USFWS under Section 7 of the ESA. The USFWS has developed a streamlined consultation process for projects within the range of the NLEB that may affect the species but would not cause prohibited take as outlined in the 4(d) rule. The framework for this consultation process is included in **Appendix G**. The NLEB 4(d) rule (as it applies to locations within the white-nose syndrome area, like CFTS) restricts incidental take by tree removal if tree removal occurs within 0.25 mile of a known hibernaculum at any time of the year, or if it occurs within 150 feet of a known occupied maternity roost tree between 1 June and 31 July (the pup season). Locations of known hibernacula and roost trees are typically maintained by state Natural Heritage Programs. Incidental take is not prohibited if the tree(s) being removed pose a hazard to human life or property.

For proposed actions that may affect NLEBs, the RIARNG should complete and submit to the USFWS the *Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form* included in **Appendix G**. This form

provides an efficient way for the RIARNG to describe its proposed action and document its determination that the action may affect NLEBs but would not result in prohibited incidental take. Following submittal of this form, the RIARNG should allow the USFWS 30 days to non-concur with its determination before starting the action. If the RIARNG determines that a proposed action would result in prohibited incidental take, the traditional Section 7 consultation process would be required.

Management Guidelines: NLEBs have not been documented at CFTS. However, the following management actions are recommended for this species at CFTS:

- Obtain current information regarding the presence/abundance of this species at, or in the vicinity of, CFTS.
- Maintain snags and other trees with cavities, crevices, or exfoliating bark within the forested portions of CFTS to the extent practical without endangering the safety of personnel or integrity of training activities.
- Maintain large, contiguous forested tracts and minimize disturbance to riparian areas.
- Maintain and monitor existing bat boxes at CFTS for NLEBs.
- Prior to conducting tree removal or forest conversion activities, consult with RINHS to identify any known hibernacula or maternity roost trees near CFTS. Subsequently, RIARNG should consult with USFWS using the streamlined consultation framework (see **Appendix G**) or traditional Section 7 consultation process, as applicable.

4.7.2 State-Listed Species

Perennial woolly bean (state endangered): Rhode Island represents the northeasternmost state where the perennial woolly bean has been found, as it is more commonly found in the southeast and central portions of the US. In Rhode Island, perennial woolly bean may inhabit disturbed areas, forest edges, woodlands, or fields/meadows, particularly in sandy soils, and is often near the coast (NEWFS, 2018).

Management Guidelines: Perennial woolly bean was observed at CFTS during a botanical inventory in 2004 (Leeson, 2004). However, no management actions have occurred for this species since that time. Because this observation was 14 years ago, the presence of this species at CFTS should be confirmed. The location of the plant was not recorded during the inventory, but the RINHS may be able to provide assistance with this effort due to their catalog of natural heritage data, and because their staff completed the original 2004 botanical inventory. If this species is confirmed to exist at CFTS, the RIARNG should consider placing the population(s) within SMZs and posting signage of the SMZs to inform personnel when they are near the sensitive area. Additionally, land disturbing activities should be restricted in that area, and training activities should be avoided in that area to the extent practicable.

4.7.3 General Management Strategies

The following general guidelines will be followed to facilitate the military mission and natural resources management objectives while minimizing negative impacts on rare species and their habitats:

- Incorporate information on rare species protection and any related restrictions in land use planning and training decisions at CFTS.

- Continue to manage for large tracts of forest.
- Avoid sensitive areas (i.e., riparian areas) during training to prevent damage to these areas, and rehabilitate damaged areas using native plants to improve habitat quality.
- Maintain corridors between wetlands, lakes, and other waterbodies to provide for wildlife movement between areas.
- Minimize the amount of herbicides used for invasive species control.
- Update biological inventories as needed as the occurrence of threatened and endangered species is subject to change over time as a result of either recruitment, identification of additional protected species, or the change in status of species that may occur at CFTS.
- Continue to coordinate and work with RIDEM on rare species management.
- Incorporate information on rare species protection and any related restrictions in environmental awareness documents and briefings to educate site users and prevent incidental take.

4.8 Invasive Species and Integrated Pest Management

GOAL 8: Invasive Species (IN): Minimize impacts of invasive and pest species, including plant and animal species, utilizing an IPM approach.

OBJECTIVE IN1: Maintain current data regarding the status of invasive species present at CFTS and map areas of infestation.

OBJECTIVE IN2: Prioritize invasive species management (either individually or grouped) based on their risk to CFTS training activities and other CFTS natural resources.

OBJECTIVE IN3: Using an IPM approach, establish a long-term plan for treating, controlling, and monitoring invasive and pest species.

OBJECTIVE IN4: Limit spread of invasive species into currently uninfested areas of CFTS

Primary Regulatory Drivers

- Federal Noxious Weed Act
- Federal Insecticide, Fungicide & Rodenticide Act
- National Aquatic Invasive Species Act
- AR 200-1
- EO 13112
- Seed Act (R.I.G.L. 2-6)

Invasive and exotic species may include plants, insects, or animals. An **invasive** species is defined as "any native or alien species whose lack of control or introduction does or is likely to cause economic or environmental harm or harm to human health." An alien (or **non-native**) species is defined as a "species including its seeds, eggs, spores, or other biological material capable of propagating that species that is not native to that ecosystem (EO 13112)." Because of their invasive capacity, many exotic species have the ability to spread rapidly through ecosystems since their natural

predators are often not present. Such species often retard natural succession and reforestation and generally cause a reduction of biological diversity in natural ecosystems.

Noxious weeds are defined as "any living stage (e.g., seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation or the fish and wildlife resources of the United States or the public health (Federal Noxious Weed Act of 1974)."

4.8.1 Integrated Pest Management

CFTS has an IPM Program implemented through the RIARNG IPMP (RIARNG, 2018). IPM is the use of multiple techniques in a compatible manner to avoid damage and minimize adverse environmental effects while obtaining control of target pests. The goal of IPM is to utilize non-chemical procedures to control pests, including both invasive and exotic plant and animal species.

Typically a combination of the following IPM techniques is required to resolve a problem on a sustained basis:

- *mechanical control*, which alters environments in which pests live, traps or removes pests (*e.g.*, glue boards and live-traps) from where they are not wanted, or excludes pests from where they are not wanted (*i.e.,* screening);
- *cultural control*, which manipulates environmental conditions to suppress or eliminate pests (*e.g.,* removal of food scraps or spreading manure on fields);
- *biological control*, which uses predators, parasites, or disease organisms to control pests; and
- *chemical control*, which relies on pesticides and/or herbicides to kill pest and/or undesirable species of plants.

The IPMP includes pest identification and management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program. This plan serves as a tool to reduce pesticide use, enhance environmental protection, and maximize the use of IPM techniques. It is the policy of RIARNG to minimize the use of all pesticides, including herbicides, at the installation. IPM actions at CFTS are generally conducted by the RIARNG's Pest Management Provider, but are overseen and managed by the RIARNG IPM Coordinator. All pest control, including management of invasive species and vertebrate pests, will be done in accordance with the requirements in the IPMP. These requirements include approval and listing of all pesticides, including herbicides, on the RIARNG State Pesticide Use List prior to their application, certification of personnel applying pesticides, and recording and reporting of pesticide usage.

The RIARNG IPMP identifies which pests are controlled, or have potential for causing pest problems, and areas of responsibility. The IPMP discusses the following priorities of pest control operations in detail; therefore, information will not be duplicated in this plan:

- Disease Vectors and Public Health Pests: mosquitoes; ticks; scorpions and black widow spiders; other spiders, bees, wasps, and stinging insects; venomous snakes; skunks, raccoons, foxes, bats; deer flies; mice; and fleas.
- Vertebrate Pests: mice and rats; gophers, moles, prairie dogs, and ground squirrels; stray animals (e.g., cats and dogs); and bats.
- Structural Pests: birds; termites and carpenter ants.
- Pests Found In and Around Buildings: stored food product pests; crawling insects (e.g., ants, cockroaches, bedbugs) and spiders.
- Stored Food Product Pests: beetles, moths, and rodents.
- Noxious and Invasive Plants and Animals
- Other Undesirable Vegetation: weeds; poison oak.

4.8.2 Guidelines for Invasive Species Management

Invasive, non-native species and noxious weeds have the capability to significantly impact native vegetation by outcompeting native species, or by changing fuel loads and flammability of natural areas. A key element of INRMP implementation is to ensure “no net loss” of military training capability. Management of undesirable species is necessary to maintain military training areas in usable condition. Uncontrolled animal pests can become health hazards, which could threaten the military mission.

The task of controlling invasive and exotic species and noxious weeds is often expensive, lengthy, and risky because total eradication is required to prevent reestablishment. However, in accordance with laws and regulations pertaining to the management of these species, RIARNG will work to prevent the introduction of these species and take measures to control them in an economically and environmentally sound manner.

In 2008, the RINHS produced a Final Report on Invasive Species Management (Leeson, 2008) for CFTS, which was intended to supplement the botanical inventory of 2004 (Leeson, 2004). This final report included an invasive species management protocol for specific species in three different types of areas (i.e., disturbed areas, fence lines, and wooded areas), and a summary of invasive species management actions performed in 2007 and 2008 and the results. This management plan outlined the following 4-step process to invasive species control:

1. **Prevention and early detection** – The most effective, economical, and ecologically sound approach to managing invasive plants is to prevent their invasion in the first place. Once established, invasive plant populations are difficult and expensive to manage. However, limited resources can have a great impact when concentrated on prevention and eradication of populations not yet established. The following guidelines apply:
    - Avoid creating environmental conditions that promote the germination and establishment of invasive species.
    - Eradicate newly established populations of invasive species detected through site monitoring.

- When projects or operations will disturb invasive plant populations, incorporate weed prevention measures into all project decisions.
- Avoid or remove sources of invasive species seed and stems to prevent new infestations and the spread of existing plants.
- Monitor for the introduction and spread of weeds caused by infested mulch, sand, gravel, and fill material.

2. **Monitoring** – Monitoring refers to repeated systematic observations over time, beginning with the pooling of all available information (an inventory of known facts) to establish baseline data (i.e., the 2004 survey). Monitoring surveys should include an assessment of the size and density of weed infestations and vegetation trends. Survey all disturbed and actively used areas on an on-going basis. Survey the perimeter fence line annually and all wooded areas biannually.

3. **Treatment** – Treatment of invasive species should be conducted on an on-going basis, and should become part of regularly scheduled site maintenance operations. All invasive species treatment should be documented.

4. **Evaluation** – Based on observations from monitoring before and after treatment, evaluate the effectiveness of the treatment. Specifically, evaluation should address changes in site conditions, and trends towards meeting management objectives, resulting from treatments applied. Changes occurring as a result of other variables in the ecosystem should also be evaluated. Thorough evaluations facilitate knowledgeable changes to the invasive species treatment protocol.

General management strategies that will be implemented during invasive species management at CFTS are described below. Please refer to Leeson (Leeson, 2008) for additional details.

- Implement BMPs to minimize land disturbances that favor invasion and re-vegetate disturbed areas with native species.
- Use local rock/substrate instead of non-indigenous rock when practical for maintenance or construction projects.
- Utilize mulches from CFTS or certified weed-free sources to facilitate the establishment of native groundcover on impoverished soils.
- Maintain biodiversity and undisturbed habitat to maximize resilience to and competition with invasive species.
- Control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.
- Limit movement of personnel and equipment, without impacting the CFTS mission, between disturbed sites and higher quality sites to minimize spread of invasive species and pests to the extent practicable.
- Favor basal application of herbicides and spot treatment, to the extent possible, to prevent adverse impacts to native plants and wildlife.

- Avoid herbicide use in and around wetlands and other surface waters (see **Section 4.3**). If application of chemicals to water features are necessary, a NPDES permit is required.
- Avoid using invasive or non-native plant species in landscaping (see **Section 4.4.1**). Native species suitable for planting at CFTS can be found using the *Rhode Island Native Plant Guide* developed by the University of Rhode Island and RINHS (https://web.uri.edu/rinativeplants/).

It is important to prevent the initial spread of invasive and exotic species and address the spread of such species as early as possible to reduce the amount of required herbicide applications. RIARNG should evaluate the threat of invasive species as well as the environmental impacts of herbicide usage (if required) to the environment prior to implementing any eradication and/or control program.

4.8.3 Invasive Species at CFTS

A botanical inventory and invasive species mapping survey was conducted at CFTS in 2004 that identified numerous invasive species on site (Leeson, 2004). This survey identified 31 invasive plant species present at CFTS. It further recorded the locations of these species, their management priorities, and management methods. Based on field reconnaissance completed during the preparation of the FSP, the general findings of the invasive species survey from 2004 (i.e., predominant species and locations) remain relevant. No invasive species observed are currently listed on the Federal Noxious Weed List (NRCS, 2018). The State of Rhode Island does not currently maintain an independent noxious weed list.

The majority of the invasive plant species at CFTS have not hindered training due to the limited training conducted off-trail in recent years. However, if training usage levels increase, some of these species could become a concern. Multiflora rose and autumn olive, for example, are present at CFTS, and could impede pedestrian use of off-trail areas in dense concentrations. **Table 4-1** below lists all invasive species observed at CFTS as well as their invasive status and management priority at CFTS.

Table 4-1: Invasive Plant Species at CFTS

Common name	Scientific name	Rhode Island Invasive Status	RIARNG High Priority
Autumn Olive	*Elaeagnus umbellata*	1	✓
Bittersweet Nightshade	*Solanum dulcamara*	2	
Black Locust	*Robinia pseudoacacia*	1	
Black Knapweed	*Centaurea nigra*	1	
Black Swallowwort	*Vincetoxicum nigrum*	1	✓
Bush Honeysuckle	*Lonicera* x *bella* *Lonicera mackii* *Lonicera morrowii*	2 2 1	✓
Cheatgrass	*Bromus tectorum*	1	
Coltsfoot	*Tussilago farfara*	-	
Common Barberry	*Berberis vulgaris*	2	
Common Buckthorn	*Rhamnus cathartica*	1	
Creeping Euonymus	*Euonymus fortune*	2	

Common name	Scientific name	Rhode Island Invasive Status	RIARNG High Priority
Crownvetch	*Coronilla varia*	4	
Cypress Spurge	*Euphorbia cyparissias*	4	
Japanese Barberry	*Berberis thunbergii*	1	✓
Japanese Honeysuckle	*Lonicera japonica*	1	✓
Japanese Knotweed	*Polygonum cuspidatum*	1	✓
Lesser Celandine	*Ficaria verna*	2	
Mulitflora Rose	*Rosa multiflora*	1	✓
Norway Maple	*Acer platanoides*	2	
Obtuse-leaved Privet	*Ligustrum obtusifolium*	2	
Oriental Bittersweet	*Celastrus orbiculatus*	1	✓
Oriental Lady's Thumb	*Polygonum caespitosum*	-	
Periwinkle	*Vinca minor*	-	
Porcelainberry	*Ampelopsis brevipedunculata*	2	
Sheep's Sorrel	*Rumex acetosella*	4	
Spotted Knapweed	*Centaurea stoebe*	2	
Wild Carrot	*Daucus carota*	3	
Wineberry	*Rubus phoenicolasius*	2	
Winged Euonymus	*Euonymus alatus*	1	✓

Rhode Island Invasive Status:
1 – Present and widespread (RIISC, 2013)
2 – Localized distribution and early detection (RIISC, 2013)
3 – Needs more research and observation/monitoring (RIISC, 2001)
4 – Weedy (RIISC, 2001)

4.8.4 Priority Invasive Plant Species

The Final Report on Invasive Species Management at CFTS identified nine species for management at CFTS. These species were identified because they are easily identifiable; are prevalent in areas already managed by the RIARNG; or have limited distribution in managed areas, and have the potential to cause widespread ecologic damage at CFTS. These nine species include autumn olive, black swallowwort (*Vincetoxicum nigrum*), bush honeysuckles (*Lonicera* sp.), Japanese barberry (*Berberis thunbergii*), Japanese honeysuckle (*Lonicera japonica*), Japanese knotweed (*Polygonum cuspidatum*), multiflora rose, oriental bittersweet, and winged euonymus (*Euonymus alatus*). Leeson (2008) contains specific treatment information for these species at CFTS, while Leeson (2004) contains additional, general information regarding all invasive species found at CFTS and their potential treatment options. Provided below are species descriptions and management suggestions for each high priority management species.

4.8.4.1 Autumn Olive

Autumn olive, a nitrogen-fixing woody shrub, typically occurs within disturbed areas, successional fields, pastures, and roadsides where it crowds out other native vegetation. It has been observed in varying

habitats from prairies to open woodlands to forest edges, however it is seldom noted in heavily wooded areas or very moist sites.

Autumn olive shrubs can grow to heights as great as 20 feet. The leaves are generally oval in shape, approximately one to three inches long, and have smooth edges. The upper surface of the leaves is dark green to grayish-green in color, while the lower surface is covered with silvery white scales, an eye-catching characteristic that can be seen from a distance. Flowers and fruits develop normally after 3 years of age. Flowers are small and light yellow, and bloom in late April and May. Small (less than 1/4 inch) pink or red fruits are produced annually as well.

Birds are the primary mode of dispersal, although raccoons, skunks, and opossums are known to feed on the fruit. Once established, this species is highly invasive and difficult to control. Mowed and cut plants will resprout vigorously.

Recommended Management: The most effective means of controlling and eradicating autumn olive is a combination of mechanical and chemical methods. Pruning or cutting plants to the ground level alone results in a thicker stem base and denser branches. Generally only younger plants can be controlled solely through mechanical means. Younger sprouts and seedlings can be hand-pulled in the spring when the soil is moist and the entire root system, as well as the above ground portion of the plant, can be removed.

For removal of well-established autumn olive shrubs, a dual method of cutting and herbicide application is recommended. Autumn olive shrubs should be cut down to the main stem and have herbicide applied directly to the stump to prevent resprouting and to kill the plants root system. Be sure to avoid dispersing seeds when cutting to avoid further spread of this species. Typically a 10 to 20 percent concentration of glyphosate in water is recommended for stump applications, and it should be applied using a sponge applicator to eliminate harm to native plants in the vicinity. The preferred time period for this treatment is late in the growing season (August or September). Alternatively, a basal stem application of Triclopyr (e.g., Garlon® 3A) can be applied to the bottom 12 inches of the main stem (including the root crown) using a low-pressure hand-held sprayer in the dormant season (November to March). If a sprayer is used, care should be taken to avoid overspray, which could harm other nearby desirable plant species. It suggested that above ground vegetation removed during the eradication process either be incinerated or allowed to air dry for one month while isolated from soil. Dried stems can then be mulched (Leeson, 2008).

4.8.4.2 Black Swallowwort

Black swallowwort is a twining vine with dark green, leaves that grow between 3 and 4 inches long. The leaves are oval shaped with a distinct point at the end. Flowers are generally dark purple with five pointed petals. This species produces fruit that looks similar to that of milkweed: tapered pods, between 2 and 3 inches long, that split open to release downy seeds. However, black swallowwort is toxic to monarch butterfly larvae as well as livestock. This species is tolerant of a wide range of conditions, but does not grow in extremely wet conditions and prefers sun exposure. Often, it will completely blanket old-field habitats (PADCNR, n.d.).

***Recommended Management*:** Black swallowwort can only be effectively mechanically controlled when populations are new, as the root crown but be removed from the soil. Once established, this species

should be controlled with a 1 percent concentration of Triclopyr in water as a foliar spray. Chemical treatment of this species can be conducted at any time throughout the growing season. Cut stems should be either incinerated or placed in a black plastic bag and left in the sun for one week before being disposed of in the landfill (Leeson, 2008).

4.8.4.3 Bush Honeysuckles

Bush honeysuckles represent four honeysuckle shrubs: tartarian honeysuckle (*Lonicera tatarica*), morrow's honeysuckle (*Lonicera morrowii*), belle honeysuckle (*Lonicera* x *bella*), and amur honeysuckle (*Lonicera maackii*). All of these except tartarian honeysuckle have been observed at CFTS. Bush honeysuckles have a broad tolerance to a variety of moisture regimes and habitats including stream banks, wetlands, prairie, and upland forest communities. The species can be differentiated based on the presence of hair on leaves, flowers, and stems. In addition, length and color of flowers can vary among species. These shrubs have a longer leaf out period than usual, which leads to excessive shading of native species. Fruits are usually red to yellow. Birds are the main contributors to the spread of these species (The Nature Conservancy Connecticut Chapter, 2010a).

***Recommended Management*:** Bush honeysuckle can be controlled through a variety measures including hand pulling of seedlings, cutting, herbicide, and biological controls (e.g., native ladybug beetles). However, mechanical methods only relieve the infestation temporarily, as resprouting will occur if the entire root system is not removed. It is recommended that bush honeysuckle be managed similarly to black locust and autumn olive. Seedlings may be hand-pulled so long as the entire root system is removed. However, larger bush honeysuckles should be cut and chemically treated with a 10 to 20 percent concentration of Glyphosate (e.g., Roundup®). Herbicide application is most effective in August and September. Cut stems should be either incinerated or allowed to air dry for one month while isolated from soil. Dried stems may then be mulched (Leeson, 2008).

4.8.4.4 Japanese Barberry

Japanese barberry is generally a small, compact bush often found in open woodlands, old fields, and along fences and roadsides. Its leaves are approximately one-half inch long and occur in clusters or whorls along the stem. Notably, a single spine occurs below each rosette of leaves. This species produces red berries, which can occur individually or in clusters. The berries are often eaten by bird species, which contributes to the spread of this species (Brunelle & Lapin, 1996).

***Recommended Management*:** Japanese barberry can be mechanically removed by hand pulling when the plants are still seedlings. For larger plants, stems should be cut and applied with a 10 to 20 percent concentration of Glyphosate in water. This is most effective during the months of August and September. Cut stems should be either incinerated or allowed to air dry for one month while isolated from soil. Dried stems may then be mulched (Leeson, 2008).

4.8.4.1 Japanese Honeysuckle

Japanese honeysuckle easily becomes established along forest edges, right-of-ways, fields, and bottomlands and readily establishes and outcompetes native flora (Nuzzo 2001). Japanese honeysuckle typically invades mature forests and open woodland areas. Cold temperatures and deep shading appears to reduce its spread. This vine has 1.5-3.2 inch (4-8 cm) long ovate leaves, white to yellow flowers in May

and June, and seeded fruits (black berries) with 2 to 3 small black seeds. Japanese honeysuckle readily invades open areas, often by seed dispersal by birds. It can blanket itself over the herbaceous layer and climb into the forest canopy, eventually smothering native plant species.

***Recommended Management*:** Japanese honeysuckle plants can be mechanically removed by hand pulling when the plants are still seedlings. To treat larger Japanese honeysuckle plants and populations, it is recommended that the stems be cut and immediately applied with a 10 to 20 percent concentration of Glyphosate in water. This method is most effective in August and September. Cut stems should be either incinerated or allowed to air dry for one month while isolated from soil. Dried stems may then be mulched (Leeson, 2008).

4.8.4.2 Japanese Knotweed

Japanese knotweed is a perennial herbaceous plant that can tolerate many moisture levels and soil types. It is most often found in disturbed areas with abundant sun exposure, such as along roads and streams. It can grow up to six feet in height and has hollow stems. The leaves resemble slightly rounded triangles and can be up to six inches long. Once established, this species generally reproduces with root sprouts, which can extend up to 60 feet away, and produces dense, shade-forming stands that outcompete native species. Long white clusters of flowers develop in August and September, which produce seeds after approximately two weeks (The Nature Conservancy Connecticut Chapter, 2010b).

***Recommended Management*:** When Japanese knotweed populations are new, they can be controlled mechanically by periodic mowing (i.e., 3 times per year), although the mower will need to be cleaned to avoid transporting the cuttings. For more established populations, there are two potential chemical methods. The first is to cut the stems 12 inches above the ground and apply a 25 percent concentration of Glyphosate in water into the hollow stem just above the node. The other option is to cut the plants at the ground level and then one month later apply a foliar spray of 2 percent Glyphosate concentration in water to resprouts. Chemical control of Japanese knotweed is most effective in August and September. Cut stems should be either incinerated or allowed to air dry for three months while isolated from soil.

4.8.4.3 Multiflora Rose

Multiflora rose, named for its white flower clusters, occurs in successional fields, pastures, and roadsides. It also may occur in dense forests, particularly near natural disturbances such as treefall gaps and along streambanks. It has a wide tolerance for soil, moisture, and light conditions, however it does not grow well in standing water. Multiflora rose readily invades prairies, savannas, open woodland, and forest edges. It is a thorny, bushy shrub that can form impenetrable thickets or "living fences" and smother out other vegetation. It is a serious pest species throughout the eastern US.

Multiflora rose is a thorny, bushy shrub that can reach 15 feet in height. Leaves are arranged alternately on the stems and divided into 5-11 leaflets (usually 7-9). Each leaflet is broadly oval and toothed along its margin. The fruits are small, firm, red hips that may remain on the plant well into winter. Plants form from seeds that can remain viable in the soil for 10-20 years. Plants typically emerge near previous plants that dispersed seeds into the soil; however, birds and mammals often consume the red hip fruit and disperse them over greater distances.

***Recommended Management*:** Mechanically removing individual plants by pulling, grubbing, or removing is successful when the entire plant, including the roots, is removed. Additionally, repeated mowing can be effective for small new populations when applied three times each year. However, these methods are highly intensive and inefficient when dealing with a large infestations. For larger infestations, the plants should first be mechanically cut to the ground. One month later, a foliar spray of 1 percent glyphosate should be applied to new sprouts. Herbicide treatment is most effective in August and September. Cut stems should be either incinerated or allowed to air dry for one month while isolated from soil before being disposed (Leeson, 2008).

4.8.4.4 Oriental Bittersweet

Oriental bittersweet is a woody vine that wraps around other species to climb into the canopy. It can reach as high 60 feet, strangling its smaller host species and shading out its competitors. It is a habitat generalist, but is particularly successful in disturbed habitats such as forest edges, abandoned fields, fence rows, and road corridors.

This species is a perennial deciduous plant. It has light green, alternate leaves that are circular or elliptical in shape, between 2 and 5 inches long, and turn golden yellow in the fall. This species generally blooms in May or June, and the fruit ripen by September. It has bright red seeds that are produced from yellow fruit, and the fruit persist during winter on the vine. Birds consume this fruit and consequently contribute to the further spread of the species. However, once established at a site, this species can quickly form dense concentrations through root suckering.

***Recommended Management*:** This species can be mechanically controlled when it is small. Seedlings may be pulled so long as the full root is removed. Small vines that are still at ground level can be mowed, but resprouts should receive a foliar spray of 1 to 2 percent Triclopyr approximately one month later (during the growing season). Large vines should have a several foot section of the vine removed (i.e., cut the vine at both shoulder height and at ground level). A 25 percent concentration of Triclopyr should then be applied to the vine at the ground-level cut. Removed oriental bittersweet stems should be incinerated or allowed to air dry for one month while isolated from soil before being disposed (Leeson, 2008).

4.8.4.5 Winged Euonymus

Winged euonymus is a medium-sized shrub (generally 5 to 10 feet tall) that establishes in a variety of habitats, including forests and fields. It is tolerant of full shade and many soil types. This species has small, opposite leaves (elliptical and serrate) that turn a vibrant scarlet to purplish red in the fall, and the stems have short wings that grow perpendicularly along the length of the stems. Showy red fruit is produced in late summer, which is readily eaten by birds, contributing to the spread of this species (NRCS, n.d. (b)).

***Recommended Management*:** Winged euonymus can be mechanically controlled through hand pulling while the plants are still small. However, it is recommended that larger plants be cut to the ground and immediately applied with a 10 to 20 percent concentration of Glyphosate in water during August or September. Cut stems should be either incinerated or allowed to air dry for one month while isolated from soil. Dried stems may then be mulched (Leeson, 2008).

4.8.5 Priority Invasive Animal Species

Potential insect pests of concern at CFTS primarily include gypsy moths and EABs. While these species are considered high priority pest species, neither of them are able to be controlled effectively throughout a forest. As noted in the following sections, these species may be effectively treated only on individual trees.

Eastern tent caterpillars (*Malacosoma americanum*), forest tent caterpillars (*Malacosoma disstria*), and winter moths (*Operophtera brumata*) are also present in Rhode Island forests and may occur at CFTS; however, they do not currently comprise high priority species. Both species of tent caterpillars are native, and it is thought that populations of winter moths, an invasive species that has declined in recent years, are beginning to be controlled by natural predators and an introduced biological agent (USFS, 2012; Drummond, 2018).

4.8.5.1 Gypsy Moth

Gypsy moth caterpillars have distinctive markings. Behind their head they have five pairs of blue spots, followed by six pairs of red spots. These hairy caterpillars are approximately 2 to 2.5 inches long, and feed on tree and shrub foliage from approximately mid-May until the beginning of July (Hoover, 2000). Host trees often consist of oaks, aspen, apple, speckled alder, basswood, birch, hickory, maple, cottonwood, and willow trees, although numerous other species, including conifers, may be eaten as well (RIDEM, 2018). Male gypsy moths are brown, while females are white. Once in the moth phase, they do not feed, and live for only 6 to 10 days, during which they mate and the females lay eggs. Egg masses can be laid on anything, including anthropomorphic objects (Stafford, 2018). When these items are moved, the moth eggs “hitchhike” to other locations. For this reason, it’s extremely important to check all vehicles and equipment when moving between infested areas and non-infested areas.

In large populations (i.e., during outbreaks), gypsy moth caterpillars are capable of stripping plants bare, leaving them vulnerable to secondary insect and disease attacks (Stafford, 2018). In 2016 and 2017, this species defoliated the majority of forest stands 1 and 5 (see FSP in **Appendix C**) in back to back years. Based on a forest survey conducted in June 2018, many of the oak trees have been able to survive and are recovering from this stress. However, many oak trees have also been killed, and in some areas, whole new openings in the canopy have been created from oak tree mortality.

Gypsy moth populations are largely influenced by spring season weather. In wetter years, the fungus *Entomophaga maimaiga* and virus Nucleopolyhedrosis (NPV) are more prevalent in forests, which typically kill gypsy moth larvae and caterpillars (RIDEM, 2018). During gypsy moth outbreaks, there are no proven ways to protect forests, but it may be possible to protect individual trees with some success. The insecticide *Bacillus thuringiensis kurstaki* (a naturally occurring bacterium) has proven successful at killing gypsy moth caterpillars; however, while it is safe for humans and pets, it may result in mortality of other caterpillars present during application. Overall, there is little RIARNG can do to protect its oak-dominated forest stands, but it could consider applying pesticides to particular landscape trees (primarily oaks in the Cantonment Area) during future outbreaks in order to help them survive. Mature, healthy trees are typically resilient and can recover from one defoliation event. It is when several consecutive defoliation events occur that the forests are at greatest risk (RIDEM, n.d.).

4.8.5.2 Emerald Ash Borer

EABs are generally up to 0.5 inch long and have metallic emerald green wing covers. Adults are active between May and July and eat leaves. Larvae, which are larger than the adults, can be up to 1.25 inches long and have a creamy white abdomen that has ten segments. Larvae burrow distinctive S-shaped tunnels beneath the bark of ash trees, including white, black, red, and green ash, and are active from June through the fall. When they emerge as adults, they exit the tree through D-shaped holes in the bark (RIDEM, 2009). The cumulative impact of EAB larval feeding inevitably causes the host tree to die.

EABs were discovered in Rhode Island (Washington County) for the first time in July 2018. Native to Asia, this pest has been recorded in 35 US states, and has killed tens of millions of ash trees. With its first confirmed observation in Rhode Island, the state has joined the federal quarantine, which heavily regulates the transport of all ash trees, including branches, chips, logs, etc., and firewood of all hardwood tree species out of those states. Currently, there is no proven method to control EAB in forested areas. As such, it is likely that most ash trees at CFTS will die in the coming years, depending on the rate at which the EAB spreads. However, the use of repeated pesticide treatments (e.g., trunk injections or soil treatments every one to two years) on individual ash trees can successfully help those trees resist EAB infestation (RIDEM, 2018). The RIARNG could consider the costs of these treatments locally and evaluate whether any ash trees at CFTS (e.g., landscape trees in the Cantonment Area) may be worth specifically saving.

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5.0 PLAN IMPLEMENTATION

5.1 Project Development

Management goals and objectives were developed through a thorough evaluation of the natural resources present on CFTS, and in accordance with AR 200-1 and the principles of adaptive ecosystem management. This INRMP will be implemented through the various policies and programs described throughout the document and accomplishment of the goals and objectives as described in **Section 4.0**. The implementation schedule, project and activity lists, and how the projects relate to INRMP implementation are detailed in **Appendix A**.

This INRMP is a living document that is based on short-, medium-, and long-term planning horizons. Short-term tasks include activities and projects that are planned to occur in less than 5 years, while medium-term tasks include activities and projects in a 6- to 10-year period. Long-term tasks are usually scheduled beyond 10 years. A majority of the tasks discussed in this INRMP are short and medium-term natural resources management tasks. Goals, objectives, and tasks should be revised over time to reflect evolving environmental conditions, adaptive management, and the completion of tasks as the INRMP is implemented. In addition, medium- and long-term tasks should eventually become short-term tasks over time.

5.1.1 Project Implementation

In accordance with Section 4-3(d)(1)(b) of AR 200-1, an INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for priority projects and activities.
- Ensures sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP.
- Coordinates annually with cooperating agencies.
- Documents specific INRMP activities and projects undertaken each year.
- Evaluates effectiveness of past and current management activities and adapts appropriately to implement future actions.

Natural resources and land use management issues are not the only factors contributing to the development and implementation of the INRMP. Range management and other seemingly unrelated issues affect implementation. It is important to the implementation of this INRMP that CFTS personnel take ownership of the INRMP by providing the necessary resources (i.e., personnel and equipment) and utilizing the appropriate funding to enact the plan. Funding for INRMP implementation is not limited to environmental funds. Responsibilities for funding natural resources management activities are outlined in the Army Sustainable Range/Installation Environmental Responsibilities Matrix, which is clarified in NGB Army Installations Division, Memorandum 17 April 2006, *Clarification of Funding Responsibilities*.

Within **Appendix A**, the implementation schedule and planned projects for this updated INRMP are detailed in **Table A-1**, which will be used to develop budget requests and schedule annual project requirements. Funding requests will be submitted in accordance with current ARNG I&E procedures for

conservation projects. **Table A-2** provides an overview of recurring natural resource management activities. These activities are generally performed in-house.

5.1.2 Priorities and Scheduling

The Army considers funding for the preparation and implementation of this INRMP, as required by the SAIA, to be a high priority. However, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. Projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. As such, these projects have been placed into three priority-based categories: (1) high priority projects which are essential for maintaining compliance or for successful natural resources management, (2) medium priority projects with no immediate compliance requirement or less impact on the natural resources, and (3) low priority projects with a natural resources benefit but no legal driver. The prioritization of the projects is based on need, legal drivers, and ability to further implement the INRMP.

Recurring requirements include projects and activities needed to cover the recurring administrative, personnel, and other costs that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential EOs, and DoD policies) or which are in direct support of the military mission. Recurring costs include manpower, training, and supplies; hazardous waste disposal; operating recycling activities; permits and fees; testing, monitoring, and/or sampling and analysis; reporting and record keeping; maintenance of environmental conservation equipment; and compliance self-assessments.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources.
- Planning documents.
- Baseline inventories and surveys of natural and cultural resources (historical and archaeological sites).
- Biological Assessments, surveys, or habitat protection for a specific listed species.
- Mitigation to meet existing regulatory permit conditions or written agreements.
- Wetland delineations in support of subsequent jurisdictional determinations and consequent permitting.
- Efforts to achieve compliance with requirements that have deadlines that have already passed.
- Initial documenting and cataloging of archaeological materials.

Maintenance requirements include those projects and activities needed that are not currently out of compliance but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Compliance with future requirements that have deadlines.
- Conservation and GIS mapping to be in compliance.
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives.
- Wetlands enhancement, in order to achieve the executive order for “no net loss” or to achieve enhancement of existing degraded wetlands.
- Public education programs that educate the public on the importance of protecting natural resources.

Lower priority projects include those that enhance conservation resources of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO and are not of an immediate nature. These projects are generally funded after those of higher priority are funded. Examples include:

- Community outreach activities, such as “Earth Day” and “Historic Preservation Week” activities.
- Educational and public awareness projects, such as interpretive displays, oral histories, nature trails, wildlife checklists, and conservation teaching materials.
- Biological Assessments, surveys, or habitat protection for a non-listed species.
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action, and there is no impact to military mission.
- Reinternment of Native American remains on DoD managed or controlled land.
- Management and execution of volunteer and partnership programs.

5.2 Cooperative Agreements

Intra- and inter-agency cooperation, coordination, and communication at the federal, state, and local levels (e.g., USFWS and RIDEM) are requisite to the success of the INRMP. USFWS and RIDEM review the INRMP and its implementation. Specialized expertise is required to adequately manage natural resources at CFTS. Technical assistance will be sought from federal and state agencies, universities, and special interest groups.

Beneficial partnerships and cooperative agreements for CFTS are discussed in greater detail in **Section 3.6**. In addition to the formal agreements, AR-200-1 addresses the management of natural resources on Army properties to comply with federal, state, and local standards.

The DoD and subcommand entities have MOUs, MOAs, and other cooperative agreements with other federal agencies, conservation and special interest groups, and various state agencies in order to provide assistance with natural resources management at installations across the US. Generally, these agreements allow installations and agencies or conservation and special interest groups to obtain mutual conservation objectives. The DoD agreements applicable to CFTS include:

- MOU between DoD and USFWS concerning ecosystem-based management of fish, wildlife, and plant resources on military lands.
- Cooperative Agreement between the DoD and The Nature Conservancy for assistance in natural resources inventory.
- MOU between the DoD and the USEPA with respect to IPM.
- MOA for federal Neotropical Migratory Bird Conservation Program and addendum ("Partners in Flight-Aves De Las Americas") among DoD, through each of the Military Services, and over 110 other federal and state agencies and non-governmental organizations.
- MOU between the DoD and Ducks Unlimited, Inc. to provide a foundation for cooperative development of selected wetlands and associated uplands in order to maintain and increase waterfowl populations and to fulfill the objectives of the North American Waterfowl Management Plan, within the context of DoD's environmental security and military missions.
- MOU for Watchable Wildlife Programs.

5.3 Funding

Implementation is subject to the availability of funding. The installation requests project validation and funding through RIARNG Environmental Office. Funding sources for specific projects can be grouped into three main categories by source: ARNG funds, other federal funds, and non-federal funds. This is not an all-inclusive list of funding sources and available sources and criteria can change from year to year. When activities or projects cannot be completed due to lack of funding or other reasons, RIARNG will review the INRMP to determine whether adjustments are necessary.

5.3.1 ARNG Funding

ARNG is the primary source of funding that supports the management of natural resources at CFTS. Environmental funds typically can be used for core natural resources activities and projects and guidance is provided in funding documents issued yearly. DoDI 4715.03 also describes activities and projects that may be funded with Environmental funds. Projects paid for with environmental funds should be submitted through the Status Tool for the Environmental Program (STEP) maintained by the ARNG I&E.

In addition to Environmental funds, Installation and ITAM funds can be used to implement INRMP activities and projects. Installation funds support facilities operation and maintenance, including facility planning, maintenance of roads, vegetation management, wildfire management, pest management, construction, and master planning. All activities have an impact on natural resources. Installation funds can also be used for pest and noxious weed control, invasive species control, facilities vegetation control, and controlled burns to manage vegetation and fuels on training areas and ranges. ITAM funds can be used for monitoring, maintenance of trails, vegetation restoration, land management, and water quality improvements related directly to military training.

The following natural resources management areas can be addressed with multiple funding sources: erosion control, invasive species management, and wildland fire. However, the type of funding used for these management areas depends on purpose. Current guidance should be referred to annually to determine the most appropriate source of funding for a specific activity or project.

5.3.2 Other Federal Funds

Cooperative agreements may be made with state or local governments, non-governmental organizations, and individuals for the improvement of natural resources or to foster research on military facilities. USFWS and RIDEM are cooperators in the development and implementation of the INRMP. In this capacity, they may facilitate access to matching funds and services.

The DoD Legacy Resource Management Program provides financial assistance for natural and cultural resources management efforts on DoD land. Legacy priority projects include regional ecosystem management initiatives, habitat preservation efforts, invasive species control, and/or rare species management. Legacy funds are generally awarded to projects that are applicable to multiple installations.

5.3.3 Non-Federal Funds

Opportunities exist to use state or local funds or private grants to support INRMP projects, particularly those relating to public access or natural resources education. For example, Public Lands Day grants are relatively easy to obtain and can be used for signs, native plant landscaping, trail construction, and other similar activities using the assistance of volunteers. Non-federal partnerships are beneficial to natural resources management and protection at CFTS. Entering into cooperative or mutual aid agreements with states, local governments, non-governmental organizations, and other individuals is also a great source of additional resources.

5.4 Natural Resources Management Staffing

INRMP implementation is directed and managed by the Environmental Office. Additional staff positions are not required to implement the INRMP; however, part-time contractors or service agreements with other state or federal agencies or academic institutions have been utilized, where applicable. Beginning in 2019, the Environmental Office will be located at CFTS following the construction of the Joint Force Headquarters facility. The Environmental Office's responsibilities are discussed in greater detail in **Section 1.3.2**.

5.5 Monitoring INRMP Implementation

5.5.1 CFTS INRMP Monitoring

Monitoring of INRMP implementation is necessary to facilitate the legal requirements of the SAIA for review for operation and effect (DoDI 4715.03 and see **Section 1.4.2**). These SAIA implementation criteria do not necessarily measure the effectiveness of an INRMP in facilitating mission accomplishment while conserving natural resources. INRMP implementation for CFTS will be monitored for meeting the legal requirements of the SAIA as well as for other mission and biological measures of effectiveness.

The ultimate successful implementation of this INRMP is realized in no net loss in the capability of CFTS training lands to support the military mission, while at the same time providing effective natural resources management. Initiation of projects is one measure that is used to monitor INRMP implementation, but it does not give the total picture of the effectiveness of the natural resources management program. Natural resources management is not simply the sum total of projects, interagency coordination, or program funding and staffing. Natural resources management at CFTS is a program and a philosophy that guides

RIARNG's approach to land use. A significant portion of INRMP implementation is done through internal coordination in regard to training site operations and land use decision making. This type of implementation cannot be measured by project implementation or funding levels. It is evidenced by such things as the ability to train continually, sustainable land use, ongoing regulatory compliance, retention of species diversity, retention of surface water quality, and the acknowledgement of sustainable natural resources management by partnering conservation agencies and other interested organizations and individuals.

In order to monitor and evaluate the effectiveness of INRMP implementation, the following will be reviewed as applicable within the context of the annual review and/or a formal review of operation and effect per DA Memorandum, *Guidance for Implementation of the SAIA,* dated 25 May 2006:

- Impacts to and from the military mission
- Conservation program budget
- Staff requirements
- Program and project implementation
- Trends in species and habitat diversity as evidenced by recurring biological surveys, land use changes, and opinions of natural resource experts
- Compliance with regulatory requirements
- Feedback from military trainers, USFWS, RIDEM, and others

Some of these areas may not be looked at every year due to lack of data or pertinent information. The effectiveness of the INRMP as a mission-enabling conservation tool will be decided by mutual agreement of USFWS, RIDEM, and RIARNG during annual reviews and/or reviews for operation and effect.

5.5.2 DA and DoD INRMP Monitoring

The Army uses the Environmental Quality Report (EQR) to monitor SAIA compliance throughout the department. EQR is the automated system used to collect installation environmental information for reporting to DoD and Congress. Established to fulfill a semi-annual requirement to report the status of DoD's Environmental Quality program to Congress, EQR collects information on enforcement actions, inspections, and other performance measures for high-level reports and quarterly reviews. EQR also helps the Army track fulfillment of DoD Measures of Merit requirements.

The DoDI 4715.03 updated the natural resources conservation metrics for preparing and implementing INRMPs. Progress toward meeting these measures of merit is reported in the annual EQR to Congress. DoDI 4715.03 reporting requirements currently include:

- Whether INRMP projects, including follow-up inventorying and monitoring work, are properly identified, developed, and submitted for funding;
- Whether project funding has been received, obligated, and expended;
- Whether projects have been completed and meet expected objectives;

- Whether conservation efforts are effective;
- Whether the INRMP provides conservation benefits necessary to preclude a critical habitat designation;
- Whether species at risk are identified and steps are being undertaken to preclude listing;
- Whether the INRMP review team (i.e., DoD, USFWS, and RIDEM) has been effective in ensuring the INRMP's implementation;
- Whether other partnerships are needed to meet the INRMP goals;
- Whether other partnerships have been effectively used to meet INRMP goals;
- Whether public recreational opportunities such as hunting, fishing, and wildlife viewing are available to base residents and employees;
- Whether public recreational opportunities such as hunting, fishing, and wildlife viewing are available to the public;
- Whether the installation's natural resources team is adequately resourced to fully implement the INRMP;
- Whether the installation's natural resources team is adequately trained to fully implement the INRMP;
- Whether the installation encourages retaining existing natural resources personnel to maintain corporate knowledge and manage resources with the most qualified professionals to support the military mission;
- To what extent the installation's native ecological systems are currently intact;
- In what ways the installation's various habitats are susceptible to change or damage from different stressors;
- What stressors affect each habitat type; and
- To what degree (i.e., high, medium, or low) the INRMP and its associated actions support the installation's ability to sustain the current and potential future military mission.

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Appendix A: Planned Projects and Ongoing Management Activities

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Table A-1: Planned Projects

	Project	STEP Project Number	Objective(s) in Section 4.0	Primary Legal Driver	Funding Type	Projected Date
	<u>High Funding Priority</u>					
1	Update/revise INRMP as determined by INRMP Task Force meeting during review for operation and effect.		PM2	SAIA	CONS	2024
2	Conduct PLS of amphibians and reptiles, with emphasis on spotted turtle and wood turtle.		FW1, FW2, TE1, TE3, TE4	SAIA, AR 200-1	CONS	2019-2024
3	Conduct survey of bats to assess species presence, population sizes, and distribution within the installation, with emphasis on NLEB.		FW1, FW2, TE1, TE3, TE4	ESA, SAIA, AR 200-1	CONS	2019-2024
4	Conduct PLS of birds, with emphasis on federally and state-listed species and BCC.		FW1, FW2, TE1, TE3, TE4	MBTA, RIESAPA	CONS	2019-2024
5	Conduct PLS of mammals (excluding bats).		FW1, FW2, TE1, TE3, TE4	SAIA, AR 200-1	CONS	2019-2024
6	Update the CFTS botanical inventory, with emphasis on federally and state-listed species including the perennial woolly bean and lesser clearweed.		FW1, FW2, TE1, TE3, TE4	SAIA, AR 200-1, RIESAPA	CONS	2019-2024
7	Conduct baseline aquatic species survey (e.g., fish, macroinvertebrates).		FW1, FW2, TE1, TE4	SAIA, AR 200-1	CONS	2019-2024
8	Conduct PLS of insects at CFTS.		FW1, FW2, TE1, TE3, TE4	SAIA, AR 200-1	CONS	2019-2024
9	Based on PLS results, conduct threatened and endangered species monitoring as required by USFWS or RIDEM.		FW1, FW2, TE1, TE3, TE4	ESA, RIESAPA	CONS	As needed
10	Conduct a wetland functional assessment and update wetland mapping.		VE2, WR2, WR4	CWA	CONS	

	Project	STEP Project Number	Objective(s) in Section 4.0	Primary Legal Driver	Funding Type	Projected Date
11	Conduct a hazard tree assessment of all trees that are either dead or in poor healthy near military resources, and cut/trim trees that pose a hazard to personnel or other training facility resources (e.g., overhanging the trail network).		VE1, VE6, WF1		ITAM	Annual
12	Develop an IWFMP according to current policies and standards and include appropriate forms, processes, and protocols.		V7, WF1, WF2	SAIA, AR 200-1	CONS or INSTAL	
	Medium Funding Priority					
13	Collect baseline water quality data for surface water features at CFTS and implement a water quality monitoring program.		WR2	CWA	CONS	
14	Conduct periodic surveys of invasive and pest species to identify new species and update population densities.		IN1, IN2, IN4	EO 13112	CONS	As needed
	Low Funding Priority					
15	Update FSP		VE1, VE2, VE6	ESA, SAIA, AR 200-1	CONS	2024
Project implementation is subject to funding availability. Funding priorities are defined as High, Medium, and Low as described in DoDI 4715.03 and **Section 5.3.** Funding Types: CONS (Conservation [Environmental] funds), INSTAL (Installation funds), ITAM (ITAM program funds), COMP (Compliance [Environmental] funds)						

Table A-2: On-going Natural Resources Management Activities

	Management Activity	Objective(s) in Section 4.0	Frequency
	<u>High Priority</u>		
1	Prepare budget to implement the natural resources management program.	PM2, PM9	Annual
2	Conduct annual INRMP review with USFWS and RIDEM.	PM2, PM9, TE4	Annual
3	Complete review for operation and effect and initiate INRMP update or revision as appropriate.	PM2, PM9	At least every 5 years
4	Continue conducting briefings for CFTS users.	PM5	As Needed
5	Review new activities and development projects for the potential to impact water resources, including jurisdictional waters.	WR1, WR3	As Needed
6	If an activity will impact a wetland or other water resource, coordinate with and obtain permits from USACE and RIDEM, and identify mitigation options as appropriate.	WR1, WR2	As Needed
7	When new activities are undertaken at CFTS, conduct a NEPA review to determine if there are potential impacts and identify options to minimize those impacts.	PM3	As Needed
8	Continue collaborative working relationship with RIDEM and NRCS on rare species, fish and wildlife management, invasive species management, soil management, and other activities.	PM4, PM7, WF2, FW2, IN2, TE4	As Needed
9	Assemble and maintain lists of DoD, RIDEM and other agency natural resource contacts for consultation.	PM4, WF2, FW2, TE4	Annual
10	Continue to maintain and establish beneficial partnerships (see **Section 3.6**).	PM6	As Needed
11	Maintain comprehensive, accurate natural resources GIS data in compliance with DoD and federal GIS data standards, including metadata.	PM1, PM2, PM10	As Needed
12	Maintain existing pollinator habitats at CFTS (e.g., periodic mowing to control woody vegetation; seeding with native plant species).	VE3, VE4, FW3	Annual/Biannual
13	Maintain accurate fire log (with map and GIS data) of all wildfires.	WF1, PM10	As Needed
14	Evaluate trails to identify areas with excessive erosion or maintenance issues, identify solutions to reduce problems, and create GIS data of problem areas.	SO1, SO3, SO4, PM10	Monthly
15	Monitor at-risk sites to ensure erosion and sediment control measures are effective.	SO2, SO5	As Needed

	Management Activity	Objective(s) in Section 4.0	Frequency
16	Monitor regularly for new invasive species or sudden increases in density of existing lower priority invasive and pest species.	IN1, IN4	Biannual
17	Monitor federal and state changes to listed species.	TE1	Annual
18	Implement IPMP, including methods for control and reporting requirements.	VE5, VE8, IN2, IN3, FW3, FW4	As Needed
19	Monitor and control priority invasive and pest species, including their density and locations, and update GIS data.	VE5, IN1, PM10	As Needed
	Medium Priority		
20	Inspect riparian areas on a regular basis to ensure that they are being maintained and no incompatible activities (e.g., filling, modifying, draining, and construction) are occurring, and to note any enhancement/restoration opportunities.	VE2, WR4	As Needed
21	Conduct habitat enhancement area survey to identify opportunity areas for beneficial landscaping or habitat enhancement projects, which could be individual projects or incorporated into other MILCON projects.	VE3, SO5, FW3, TE2	As Needed
22	Clean and maintain existing wildlife nesting/roosting boxes prior to the season and monitor their success. Construct additional nesting boxes based on results of bird PLS.	FW1, FW3	Annual
23	Continue to conduct public outreach with local community, groups and schools (e.g., Earth Day events).	PM7, PM8	Annual
24	Record incidental observations of wildlife and listed species and compile data into a permanent record (i.e., spreadsheet with date, observer, location, etc.).	FW1, TE1	As Needed
25	Continue developing an informational pamphlet regarding natural resources at CFTS using the results of the PLSs.	PM8	As Needed
Priority Codes: Priority codes are roughly equivalent to funding priorities as described in DoDI 4715.03			

Appendix B: CFTS Flora and Fauna Species Lists

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CONTENTS

Table 1: Vascular Plant Species Observed at CFTS

Family	Scientific Name	Common Name
ACERACEAE	*Acer platanoides L.*	norway maple
	Acer rubrum L.	red maple
ANACARDIACEAE	*Rhus copallinum L.*	dwarf sumac
	Rhus typhina L.	staghorn sumac
	Toxicodendron radicans var. radicans	common poison ivy
APIACEAE	*Daucus carota L.*	queen anne's lace
APOCYNACEAE	*Apocynum sp.*	dogbane
	Vinca minor L.	common periwinkle
AQUIFOLIACEAE	*Ilex verticillata var. fastigiata (Bickn.) Fern.*	winterberry
ARACEAE	*Arisaema triphyllum var. triphyllum*	jack-in-the-pulpit
	Symplocarpus foetidus (L.) Nutt.	skunk-cabbage
ARALIACEAE	*Aralia nudicaulis L.*	wild sarsaparilla
ASCLEPIADACEAE	*Vincetoxicum nigrum (L.) Moench*	black swallowwort
ASPLENIACEAE	*Asplenium platyneuron (Linnaeus) Britton, Sterns,*	ebony-spleenwort
ASTERACEAE	*Achillea millefolium millefolium*	common yarrow
	Ambrosia artemisiifolia L.	common ragweed
	Artemisia vulgaris L.	common mugwort
	Aster divaricatus var. divaricatus	white wood-aster
	Aster dumosus L.	long-stalked aster
	Aster lateriflorus (L.) Britton	starved aster
	Aster pilosus var. pilosus	heath aster
	Aster racemosus Elliott	small-headed aster
	Bidens frondosa L.	devils' beggar-ticks
	Centaurea maculosa Lam.	spotted knapweed
	Centaurea nigra L.	black knapweed
	Chrysanthemum leucanthemum L.	ox-eye daisy
	Cichorium intybus L.	chickory
	Conyza canadensis var. pusilla (Nutt.) Cronq.	horseweed
	Erigeron annuus (L.) Pers.	daisy-fleabane
	Erigeron strigosus var. beyrichii (Fischer & C. Me	rough fleabane
	Eupatorium hyssopifolium var. hyssopifolium	hyssop-leaved bonset
	Euthamia graminifolia var. nuttallii (Greene) W. S	(nuttall's) grass-leaved goldenrod
	Euthamia tenuifolia var. tenuifolia	fine grass-leaved
	Gnaphalium obtusifolium var. praecox Fern.	early catfoot
	Helenium flexuosum Raf.	southern sneezeweed
	Hieracium caespitosum Dumort.	yellow hawkweed
	Hieracium flagellare	hawkweed
	Hieracium scabrum Michx.	sticky hawkweed
	Hieracium venosum L.	rattlesnake-weed
	Krigia virginica (L.) Willd.	dwarf dandelion
	Lactuca canadensis L.	tall lettuce

Family	Scientific Name	Common Name
ASTERACEAE	*Lactuca hirsuta var. sanguinea (Bigelow) Fern.*	hairy tall lettuce
	Prenanthes trifoliolata (Cass.) Fern.	gall-of-the-earth
	Rudbeckia hirta var. pulcherrima Farw.	black-eyed susan
	Solidago bicolor L.	silverrod
	Solidago caesia L.	axillary goldenrod
	Solidago canadensis var. scabra T. & G.	tall goldenrod
	Solidago juncea Aiton	early goldenrod
	Solidago nemoralis var. nemoralis	old-field goldenrod
	Solidago odora var. odora	sweet goldenrod
	Solidago puberula var. puberula	dusty goldenrod
	Solidago rugosa rugosa var. villosa (Pursh) Fern.	(soft-hairy) rough goldenrod
	Solidago ulmifolia var. ulmifolia	elm-leaved goldenrod
	Taraxacum officinale Weber ex Wiggers	common dandelion
	Tussilago farfara L.	coltsfoot
BALSAMINACEAE	*Impatiens capensis Meerb.*	jewelweed
BERBERIDACEAE	*Berberis thunbergii DC.*	Japanese barberry
	Berberis vulgaris L.	common barberry
BETULACEAE	*Betula alleghaniensis Britton*	yellow birch
	Betula lenta L.	black birch
	Betula populifolia Marshall	gray birch
	Carpinus caroliniana var. virginiana (Marshall) Fe	musclewood
	Corylus americana Walter	American hazelnut
BIGNONIACEAE	*Catalpa sp.*	catalpa
BRASSICACEAE	*Draba verna L.*	whitlow-grass
	Lepidium campestre (L.) R. Br.	cow-cress
	Lepidium virginicum var. virginicum	poor man's pepper
CAESALPINIACEAE	*Chamaecrista fasciculata (Michx.) Greene*	partridge-pea
CAMPANULACEAE	*Lobelia inflata L.*	indian-tobacco
	Lobelia spicata var. spicata	spiked lobelia
	Triodanis perfoliata (L.) Nieuwl.	venus's looking-glass
CAPRIFOLIACEAE	*Lonicera japonica Thunb.*	Japanese honeysuckle
	Lonicera maackii (Rupr.) Herder	amur honeysuckle
	Lonicera morrowii A. Gray	morrow's fly-honeysuckle
	Lonicera X bella Zabel	bella honeysuckle
	Sambucus canadensis var. canadensis	common elderberry
	Viburnum acerifolium L.	maple-leaved viburnum
	Viburnum dentatum var. lucidum Aiton	common arrowwood
CARYOPHYLLACEAE	*Cerastium vulgatum L.*	common mouse-ear chickweed
	Dianthus armeria L.	deptford-pink
	Spergularia rubra (L.) J. & C. Presl	roadside sand-spurrey
	Stellaria graminea L.	lesser stitchwort

Family	Scientific Name	Common Name
CELASTRACEAE	*Celastrus orbiculatus Thunb.*	oriental bittersweet
	Euonymus alatus (Thunb.) Seibold	winged euonymus
	Euonymus fortunei (Turcz.) Hand.-Mazz.	climbing euonymus
CISTACEAE	*Helianthemum bicknellii Fern.*	hoary frostweed
	Helianthemum canadense (L.) Michx.	frostweed
CLETHRACEAE	*Clethra alnifolia L.*	sweet pepperbush
CLUSIACEAE	*Hypericum canadense L.*	narrow-leaved st. john's-wort
	Hypericum gentianoides (L.) BSP.	orange-grass
	Hypericum perforatum L.	common st. john's-wort
	Hypericum punctatum Lam.	spotted st. john's-wort
CONVOLVULACEAE	*Ipomoea sp.*	-
CORNACEAE	*Cornus alternifolia L.f.*	alternate-leaved dogwood
	Nyssa sylvatica var. sylvatica (Walter) Sargent	swamp blackgum
CUPRESSACEAE	*Juniperus virginiana var. virginiana*	eastern red cedar
CYPERACEAE	*Carex annectens (Bickn.) Bickn.*	yellow fox-sedge
	Carex conoidea Schk.	field-sedge
	Carex crinita var. brevicrinis Fern.	(short-haired) sedge
	Carex gracillima Schwein.	slender sedge
	Carex intumescens Rudge	bladder-sedge
	Carex lurida Wahlenb.	(reddish-yellow) sedge
	Carex pensylvanica var. pensylvanica	early sedge
	Carex spp.	sedges
	Carex stricta Lam.	tussock sedge
	Carex swanii (Fern.) Mackenzie	swan's sedge
DENNSTAEDTIACEAE	*Dennstaedtia punctilobula (Michxaux) T. Moore*	hay-scented fern
	Pteridium aquilinum var. latiusculum (Desvaux) L.	bracken fern
DRYOPTERIDACEAE	*Athyrium filix-femina var. angustum (Willdenow) G.*	northern lady fern
	Dryopteris carthusiana (Villars) H. P. Fuchs	toothed wood-fern
	Onoclea sensibilis Linnaeus	sensitive fern
	Polystichum acrostichoides (Michaux) Schott	Christmas fern
ELAEAGNACEAE	*Elaeagnus umbellata Thunb.*	autumn olive
EQUISETACEAE	*Equisetum arvense Linnaeus*	common horsetail
ERICACEAE	*Gaultheria procumbens L.*	wintergreen
	Gaylussacia baccata (Wangenh.) K. Koch	black huckleberry
	Kalmia angustifolia var. angustifolia	sheep-laurel
	Kalmia latifolia L.	mountain-laurel
	Lyonia ligustrina (L.) DC.	maleberry
	Rhododendron viscosum (L.) Torr.	swamp-azalea
	Vaccinium angustifolium Aiton	common lowbush-blueberry
	Vaccinium corymbosum L.	highbush blueberry

Family	Scientific Name	Common Name
ERICACEAE	*Vaccinium pallidum Aiton*	early sweet blueberry
EUPHORBIACEAE	*Acalypha rhomboidea Raf.*	(rhombic) three-seeded mercury
	Euphorbia cyparissias L.	cypress-spurge
FABACEAE	*Amphicarpaea bracteata (L.) Fern.*	hog-peanut
	Baptisia tinctoria (L.) R. Br.	black wild indigo
	Coronilla varia L.	crown-vetch
	Desmodium canadense (L.) DC.	Canadian tick-trefoil
	Lespedeza capitata Michx.	round-headed bush-clover
	Lotus corniculatus L.	birdsfoot-trefoil
	Melilotus alba Medikus	white sweet clover
	Robinia pseudoacacia L.	black locust
	Strophostyles helvula (L.) Elliott	annual wild bean
	Strophostyles umbellata (Muhl.) Brittob	perennial woolly bean
	Trifolium arvense L.	rabbit-foot clover
	Trifolium campestre Schreber	pinnate hop-clover
	Trifolium hybridum L.	alsike clover
	Trifolium pratense L.	red clover
	Trifolium repens L.	white clover
	Vicia sp.	locoweed species
	Wisteria sp. Nutt.	wisteria
FAGACEAE	*Castanea dentata (Marshall) Borkh.*	American chestnut
	Fagus grandifolia var. grandifolia	American beech
	Quercus alba L.	white oak
	Quercus coccinea Muenchh.	scarlet oak
	Quercus rubra L.	red oak
	Quercus velutina Lam.	black oak
GERANIACEAE	*Geranium maculatum L.*	spotted geranium
HAMAMELIDACEAE	*Hamamelis virginiana L.*	witch-hazel
IRIDACEAE	*Sisyrinchium atlanticum E. Bickn.*	eastern blue-eyed grass
JUGLANDACEAE	*Carya glabra (Miller) Sweet*	pignut-hickory
	Carya ovata (Miller) K. Koch	shagbark hickory
	Carya tomentosa (Poiret) Nutt.	mockernut hickory
JUNCACEAE	*Juncus effusus var. solutus Fern. & Wieg.*	soft rush
	Juncus greenei Oakes & Tuckerman	(greene's) rush
	Juncus tenuis var. dichotomus (Elliott) A. Wood	path-rush
	Luzula multiflora (Retz.) Lej.	common woodrush
LAMIACEAE	*Pycnanthemum muticum (Michx.) Pers.*	short-toothed mountain-mint
	Pycnanthemum tenuifolium Schrader	narrow-leaved mountain-mint
	Trichostema dichotomum L.	bastard pennyroyal
LAURACEAE	*Lindera benzoin var. benzoin*	northern spicebush
LILIACEAE	*Convallaria majalis L.*	lily-of-the-valley
	Hemerocallis fulva (L.) L.	common orange day-lily
	Maianthemum canadense var. canadense	Canada mayflower
	Medeola virginiana L.	indian cucumber-root

Family	Scientific Name	Common Name
LILIACEAE	*Polygonatum pubescens (Willd.) Pursh*	small solomon's seal
	Smilacina racemosa (L.) Desf.	false solomon's seal
	Trillium sp.	-
LINACEAE	*Linum virginianum L.*	wild yellow flax
LYCOPODIACEAE	*Diphasiastrum digitatum (Dillenius ex A. Braun) Ho*	ground-cedar
	Diphasiastrum tristachyum (Pursh) Holub	wiry ground-cedar
	Huperzia lucidula (Michaux) Trevisan	shining clubmoss
	Lycopodium obscurum Linnaeus	princess-pine
MONOTROPACEAE	*Monotropa uniflora L.*	indian pipe
MYRICACEAE	*Comptonia peregrina (L.) J. M. Coulter*	sweet fern
	Myrica pensylvanica Mirbel	northern bayberry
OLEACEAE	*Fraxinus americana L.*	white ash
	Fraxinus pennsylvanica Marshall	red ash (glabrous plants called green ash)
	Ligustrum obtusifolium Sieb. & Zucc.	Japanese privet
ONAGRACEAE	*Circaea lutetiana var. canadensis L.*	common enchanter's nightshade
	Epilobium ciliatum var. ciliatum	american willow-herb
	Oenothera biennis var. biennis	common evening-primrose
OPHIOGLOSSACEAE	*Botrychium dissectum Sprengel*	lace-frond grapefern
ORCHIDACEAE	*Goodyera pubescens (Willd.) R. Brown*	downy rattlesnake-plantain
OROBANCHACEAE	*Epifagus virginiana (L.) Barton*	beech-drops
OSMUNDACEAE	*Osmunda cinnamomea Linnaeus*	cinnamon fern
	Osmunda claytoniana Linnaeus	interrupted fern
	Osmunda regalis var. spectabilis (Willdenow) A. Gr	royal fern
OXALIDACEAE	*Oxalis stricta L.*	common yellow wood-sorrel
PAPAVERACEAE	*Chelidonium majus L.*	celandine
PINACEAE	*Picea sp.*	spruce species
	Tsuga canadensis (Linnaeus) Carriere	eastern hemlock
	Pinus rigida Miller	pitch pine
	Pinus strobus Linnaeus	eastern white pine
PLANTAGINACEAE	*Plantago aristata Michx.*	bracted plantain
	Plantago lanceolata L.	ribgrass
	Plantago major L.	common plantain
POACEAE	*Agrostis gigantea Roth*	redtop
	Agrostis stolonifera var. palustris (Hudson) Farw.	creeping or carpet bent
	Andropogon virginicus var. virginicus	broom-sedge
	Anthoxanthum odoratum L.	sweet vernal grass
	Bromus tectorum L.	junegrass
	Cinna arundinacea L.	broad-leaved wood reed-grass
	Dactylis glomerata L.	orchard-grass
	Danthonia compressa Austin	woodland-oatgrass
	Echinochloa crusgalli var. frumentacea (Roxb.) W.	Japanese millet

Family	Scientific Name	Common Name
POACEAE	*Elytrigia repens (L.) Nevski*	witch-grass
	Eragrostis pectinacea (Michx.) Nees	india-lovegrass
	Eragrostis spectabilis (Pursh) Steudel	purple lovegrass
	Festuca sp.	red fescue
	Holcus lanatus L.	common velvet-grass
	Leersia virginica Willd.	white-grass
	Panicum clandestinum L.	deertongue
	Panicum depauperatum Muhl.	(impoverished) panic-grass
	Panicum lanuginosum var. lindheimeri (Nash) Fern.	(lindheimer's woolly) panic-grass
	Panicum linearifolium Scribn.	(linear-leaved) panic-grass
	Panicum virgatum L.	switchgrass
	Poa annua L.	annual bluegrass
	Poa pratensis L.	Kentucky bluegrass
	Schizachyrium scoparium var. scoparium	little bluestem
	Setaria faberi R. Herrm.	giant foxtail
	Setaria glauca (L.) P. Beauv.	yellow foxtail
POLYGALACEAE	*Polygala nuttallii T. & G.*	nuttall's milkwort
	Polygala polygama var. obtusata Chodat	bitter milkwort
POLYGONACEAE	*Polygonella articulata (L.) Meissner*	jointweed
	Polygonum cespitosum var. longisetum (De Bruyn) St	(long-bristled) smartweed
	Polygonum convolvulus L.	climbing buckwheat
	Polygonum cuspidatum Sieb. & Zucc.	Japanese knotweed
	Polygonum lapathifolium L.	dock-leaved smartweed
	Polygonum sagittatum L.	arrow-leaved tearthumb
	Polygonum scandens var. cristatum (Engelm. & A. Gr	climbing false buckwheat
	Rumex acetosella L.	sheep-sorrel
	Rumex crispus L.	yellow dock
	Rumex obtusifolius L.	red-veined dock
POLYPODIACEAE	*Polypodium virginianum L. (tetraploid form)*	rock-fern
PRIMULACEAE	*Anagallis arvensis var. arvensis*	scarlet pimpernel
	Lysimachia quadrifolia L.	whorled loosestrife
	Trientalis americana Pursh	starflower
PYROLACEAE	*Chimaphila maculata (L.) Pursh*	spotted wintergreen
	Chimaphila umbellata var. cisatlantica S. F. Blake	pipsissewa
	Pyrola rotundifolia var. americana (Sweet) Fern.	round-leaved pyrola
RANUNCULACEAE	*Actaea alba (L.) Miller*	white baneberry
	Anemone quinquefolia var. quinquefolia	wood-anemone
	Caltha palustris L.	marsh-marigold
	Ranunculus abortivus L.	small-flowered crowfoot
	Ranunculus bulbosus L.	common buttercup
	Thalictrum pubescens Pursh	tall meadow-rue

Family	Scientific Name	Common Name
RHAMNACEAE	*Rhamnus cathartica L.*	common buckthorn
ROSACEAE	*Amelanchier spicata (Lam.) K. Koch*	serviceberry
	Fragaria vesca var. americana Porter	thin-leaved wild strawberry
	Geum virginianum L.	cream-colored avens
	Potentilla argentea L.	silvery cinquefoil
	Potentilla canadensis L.	dwarf cinquefoil
	Potentilla norvegica L.	rough cinquefoil
	Potentilla recta L.	rough-fruited cinquefoil
	Potentilla simplex Michx.	old-field cinquefoil
	Prunus serotina Ehrh.	black cherry
	Pyrus malus L.	apple
	Rosa carolina L.	pasture-rose
	Rosa multiflora Thunb.	multiflora-rose
	Rosa virginiana Miller	virginia rose
	Rubus allegheniensis T. C. Porter	common blackberry
	Rubus flagellaris Willd.	northern dewberry
	Rubus hispidus L.	evergreen dewberry
	Rubus idaeus var. strigosus (Michx.) Maxim.	red raspberry
	Rubus phoenicolasius Maxim.	wineberry
	Sorbus aucuparia L.	European mountain-ash
	Spiraea alba var. latifolia (Aiton) Dippel.	meadowsweet
	Spiraea tomentosa var. tomentosa	steeple-bush
RUBIACEAE	*Galium aparine L.*	goosegrass
	Hedyotis caerulea (L.) Hook.	quaker ladies
	Mitchella repens L.	partridge-berry
SALICACEAE	*Populus grandidentata Michx.*	big-toothed aspen
	Populus tremuloides Michx.	quaking aspen
	Salix sp.	willow species
SCROPHULARIACEAE	*Linaria canadensis var. canadensis*	old-field toadflax
	Linaria vulgaris Miller	butter-and-eggs
	Melampyrum lineare var. americanum (Michx.) Beauve	cow-wheat
	Verbascum thapsus L.	common mullein
	Veronica officinalis L.	common speedwell
SMILACACEAE	*Smilax glauca Walter*	sawbrier
	Smilax rotundifolia L.	common greenbrier
SOLANACEAE	*Solanum dulcamara L.*	climbing nightshade
	Solanum nigrum var. virginicum L.	(American) black nightshade
SPHAGNACEAE	*Sphagnum sp. (L)*	sphagnum moss
THELYPTERIDACEAE	*Thelypteris noveboracensis (Linnaeus) Nieuwland*	New York fern
	Thelypteris palustris var. pubescens (Lawson) Fern	meadow-fern
	Thelypteris simulata (Davenport) Nieuwland	Massachusetts fern
ULMACEAE	*Ulmus rubra Muhl.*	slippery elm
URTICACEAE	*Boehmeria cylindrica (L.) Swartz*	false nettle
	Pilea fontana (Lunell) Rydb.	lesser clearweed

Family	Scientific Name	Common Name
URTICACEAE	*Pilea pumila (L.) A. Gray*	(dwarf) clearweed
	Urtica dioica var. procera (Muhl.) Wedd.	stinging nettle
VERBENACEAE	*Verbena hastata L.*	common vervain
VIOLACEAE	*Viola lanceolata var. lanceolata*	strap-leaved violet
	Viola sororia Willd.	northern blue violet
VITACEAE	*Ampelopsis brevipedunculata (Maxim.) Trautv.*	porcelain-berry
	Parthenocissus quinquefolia (L.) Planchon	virginia creeper
	Vitis labrusca L.	fox-grape
References: (Leeson, 2004)		

Table 2: Amphibian Species Observed at CFTS

Order	Family	Scientific Name	Common Name
ANURA (frogs and toads)	Ranidae (true frogs)	*Rana catesbeiana*	bullfrog
		Rana clamitans	green frog
		Rana palustris	pickerel frog
		Rana sylvatica	wood frog
CAUDATA (salamanders)	Ambystomatidae	*Ambystoma maculatum*	spotted salamander
	Plethodontidae	*Eurycea bislineata*	northern two-lined salamander
		Hemidactylium scutatum	four-toed salamander
References: (ABS, 2000; Brown & Puryear, 2005) Shaded cells indicate Rhode Island SGCN.			

Table 3: Bird Species Observed at CFTS

Order	Family	Scientific Name	Common Name
ANSERIFORMES - ducks, geese, and swans	Anatidae (ducks, geese, and swans)	*Aix sponsa*	wood duck
		Anas platyrhynchos	mallard
		Branta canadensis	Canada goose
CICONIIFORMES - herons, storks, and allies	Ardeidae (herons, bitterns, and egrets)	*Ardea herodias*	great blue heron
COLUMBIFORMES - doves and pigeons	Columbidae (doves and pigeons)	*Zenaida macroura*	mourning dove
CUCULIFORMES - cuckoos	Cuculidae (cuckoos)	*Coccyzus erythropthalmus*	black-billed cuckoo

Order	Family	Scientific Name	Common Name
FALCONIFORMES - diurnal birds of prey	Accipitridae (hawks, kites, eagles, and falcons)	*Buteo jamaicensis*	red-tailed hawk
		Buteo platypterus	broad-winged hawk
		Falco sparverius	American kestrel
	Cathartidae (New World vultures)	*Cathartes aura*	turkey vulture
GALLIFORMES - chicken-like birds	Phasianidae (quails, pheasants, and turkeys)	*Meleagris gallopavo*	wild turkey
PASSERIFORMES - passerines	Bombycillidae (waxwings)	*Bombycilla cedrorum*	cedar waxwing
	Cardinalidae	*Pheucticus ludovicianus*	rose-breasted grosbeak
	Corvidae (crows and jays)	*Corvus brachyrhynchos*	American crow
		Cyanocitta cristata	blue jay
	Emberizidae (warblers, sparrows, and allies)	*Agelaius phoeniceus*	red-winged blackbird
		Cardinalis cardinalis	northern cardinal
		Geothlypis trichas	common yellowthroat
		Icterus galbula	northern oriole
		Melospiza melodia	song sparrow
		Mniotilta varia	black-and-white warbler
		Molothrus ater	brown-headed cowbird
		Pipilo erythrophthalmus	eastern towhee
		Piranga olivacea	scarlet tanager
		Quiscalus quiscula	common grackle
		Setophaga americana	northern parula
		Setophaga coronata	yellow-rumped warbler
		Setophaga discolor	prairie warbler
		Setophaga virens	black-throated green warbler
		Vermivora pinus	blue-winged warbler
		Zonotrichia albicolis	white-throated sparrow
	Fringillidae (finches)	*Carduelis tristis*	American goldfinch
		Haemorhous mexicanus	house finch
	Hirundinidae (swallows)	*Hirundo rustica*	barn swallow
	Mimidae (mimic thrushes)	*Dumetella carolinensis*	gray catbird
		Mimus polyglottos	northern mockingbird
		Toxostoma rufum	brown thrasher
PASSERIFORMES - passerines	Muscicapidae (thrushes and allies)	*Catharus fuscescens*	veery
		Hylocichla mustelina	wood thrush
		Regulus satrapa	golden-crowned kinglet
		Sialia sialis	eastern bluebird
	Muscicapidae (thrushes and allies)	*Turdus migratorius*	American robin
	Paridae (titmice and chickadees)	*Parus atricapillus*	black capped chickadee
		Parus bicolor	tufted titmouse
	Parulidae	*Parkesia noveboracensis*	northern waterthrush
		Seiurus aurocapilla	ovenbird
		Setophaga ruticilla	American redstart

Order	Family	Scientific Name	Common Name
	Passerellidae	*Junco hyemalis*	dark-eyed junco
		Spizella passerina	chipping sparrow
	Sittidae (nuthatches)	*Sitta carolinensis*	white-breasted nuthatch
	Troglodytidae (wrens)	*Thryothorus ludovicianus*	Carolina wren
		Troglodytes aedon	house wren
	Tyrannidae (flycatchers and allies)	*Contopus virens*	eastern wood-pewee
		Empidonax sp.	flycatcher sp.
		Myiarchus crinitus	great-crested flycatcher
		Sayornis phoebe	eastern phoebe
		Tyrannus tyrannus	eastern kingbird
	Vireonidae (vireos)	*Vireo olivaceus*	red-eyed vireo
		Vireo solitarius	solitary vireo
PICIFORMES - woodpeckers	Picidae (woodpeckers)	*Colaptes auratus*	northern flicker
		Melanerpes carolinus	red-bellied woodpecker
		Picoides pubescens	downy woodpecker
		Picoides villosus	hairy woodpecker
References: (ABS, 2000) Shaded cells indicate Rhode Island SGCN.			

Table 4: Insect Species Observed at CFTS

Order	Family	Genus/Species	Common Name
Coleoptera (Beetles)	Carabidae	*Cicindela punctulata*	punctured tiger beetle
		Cicindela repanda	common shore tiger beetle
		Cicindela sexguttata	six-spotted tiger beetle
	Gyrinidae	*Pineutes americanus***	whirligig beetle
Diptera (True Flies)	Asilidae	*Atomosia puella*	-
		Dioctria baumhaueri	-
		Efferia aestuans	-
		Efferia pogonias	-
		Eudioctria brevis	-
		Holopogon phaeonotus	-
		Laphria aktis	-
		Laphria canis complex	-
		Laphria flavicollis	-
		Laphria sericea/aktis	-
		Machimas notatus	-
		Machimas novaescotiae	-
		Machimas sadyates	-
		Neoitamus flavofemoratus	-
		Ommatius tibialis	-
		Proctacanthus philadelphicus	-
		Taracticus octopunctatus	-
Ephemeroptera (Mayflies)	Gerridae	*Gerris marginatus*	water strider

Order	Family	Genus/Species	Common Name
Hymenoptera	Apidae	*Apis mellifera*	honeybee
	Formicidae	*Formica exsectoides*	Appalacian mound builder
Lepidoptera	Nymphalidae	*Danaus plexippus*	monarch butterfly
		Nymphalis antiopa	mourning cloak
	Papilionidae	*Papilio polyxenes*	eastern black swallowtail
Odonata (Dragonflies and Damselflies)	Aeshnidae	*Aeshna sp.*	darner sp.
		Aeshna umbrosa	shadow darner
		Aeshna verticalis	green-striped darner
		Anax junius	common green darner
		Boyeria vinosa	fawn darner
		Epiaeschna heros	swamp darner
		Gomphaeschna furcillata	harlequin darner
		Nasiaeschna pentacantha	cyrano darner
	Calopterygidae	*Calopteryx aequabilis*	river jewelwing
	Calopterygidae	*Calopteryx maculata*	ebony jewelwing
Odonata (Dragonflies and Damselflies)	Coenagrionidae	*Argia fumipennis*	variable dancer
		Chromagrion conditum	aurora damsel
		Enallagma aspersum	azure bluet
		Enallagma divagans	turquois bluet
		Enallagma geminatum	skimming bluet
		Ischnura hastata	citrine forktail
		Ischnura posita	fragile forktail
		Ischnura verticalis	eastern forktail
	Cordulegastridae	*Cordulegaster diastatops*	delta-spotted spiketail
		Cordulegaster maculata	twin-spotted spiketail
	Corduliidae	*Epitheca cynosura*	common baskettail
		Somatochlora tenebrosa	clamp-tipped emerald
	Gomphidae	*Gomphus exilis*	lancet clubtail
		Lanthus vernalis	southern pygmy clubtail
	Lestidae	*Lestes inaequalis*	elegant spreadwing
		Lestes sp.	spreadwing sp.
	Libellulidae	*Celithemis eponina*	halloween pennant
		Erythemis simplicicollis	eastern pondhawk
		Leucorrhinia intacta	dot-tailed whiteface
		Libellula cyanea	spangled skimmer
		Libellula incesta	slaty skimmer
		Libellula lydia	common whitetail
		Libellula pulchella	twelve-spotted skimmer
		Libellula semifasciata	painted skimmer
		Pachydiplax longipennis	blue dasher
		Pantala flavescens	wandering glider
		Pantala hymenaea	spot-winged glider
		Perithemis tenera	eastern amberwing
		Sympetrum internum	cherry-faced meadowhawk
		Sympetrum vicinum	autumn meadowhawk
		Tramea sp.	saddlebags sp.
Trichoptera (Caddisflies)	Unknown	Unknown sp.	caddisfly
References: (ABS, 2000; Brown & Puryear, 2005) Shaded cells indicate Rhode Island SGCN.			

Table 5: Mammal Species Observed at CFTS

Order	Family	Scientific Name	Common Name
ARTIDACYTYLA - even-toed ungulates	Cervidae (deer)	*Odocoileus virginianus*	white-tailed deer
CARNIVORA – carnivores	Canidae	*Canis latrans*	coyote
		Unknown	fox
	Procyonidae	*Procyon lotor*	northern raccoon
RODENTIA - rodents	Cricetidae	*Myodes gapperi*	southern red-backed vole
		Peromyscus leucopus	white-footed mouse
	Sciuridae (squirrels)	*Marmota monax*	woodchuck
		Sciurus carolinensis	gray squirrel
		Tamias striatus	eastern chipmunk
References: (ABS, 2000) No Rhode Island SGCN have been observed at CFTS.			

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Appendix C: Forest Stewardship Plan for Camp Fogarty Training Site

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Final

Forest Stewardship Plan

Camp Fogarty Training Site
East Greenwich, Kent County, Rhode Island
October 2018

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Table of Contents

Appendices

Figures

Tables

Acronyms and Abbreviations

BMP	best management practice
CFTS	Camp Fogarty Training Site
DBH	diameter at breast height
EAB	emerald ash borer
FSP	Forest Stewardship Plan
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
ITAM	Integrated Training Area Management
IWFMP	Integrated Wildland Fire Management Plan
JFHQ	Joint Force Headquarters
NLEB	northern long-eared bat
PLS	planning level survey
RIARNG	Rhode Island Army National Guard
RIGIS	Rhode Island Geographic Information System
RINHS	Rhode Island Natural History Survey
RTE	rare, threatened, or endangered
spp.	species
SMZ	special management zone
SR	State Route
TSM	Training Site Manager

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1.0 Introduction

This Forest Stewardship Plan (FSP) was developed to fulfill Projects 9 and 10 identified in the 2001 Camp Fogarty Training Site (CFTS) Integrated Natural Resources Management Plan (INRMP), and Project 10 in the 2007 CFTS INRMP. Its purpose is two-fold: 1) to document existing forest communities and habitats at CFTS and establish baseline community and species composition; and 2) to identify the primary functions and services provided to CFTS by its forests and establish a framework for managing these forests that allow Rhode Island Army National Guard (RIARNG) to achieve the goals and objectives outlined in the 2019 INRMP.

CFTS previously commissioned the Rhode Island Natural History Survey (RINHS) to complete a Botanical Inventory and Invasive Plant Species Mapping report for CFTS, which occurred between 2003 and 2004 (RINHS, 2004). This report included a comprehensive inventory of plant species present at CFTS as well as detailed mapping of invasive species presence. However, no forest stand delineation or forest management plan has been prepared for CFTS to date. Additionally, no intensive forest management has been conducted at the installation.

2.0 Property Overview

The approximately 370-acre CFTS is located in central Rhode Island. The installation lies completely within Kent County and is approximately 15 miles southwest of Providence, Rhode Island. The main gate is located on South County Trail (State Route [SR] 2) approximately 0.5 mile south of Frenchtown Road and 0.4 mile north of Colonel Rodman Highway (SR 4). CFTS is located within the municipality of East Greenwich, Rhode Island.

The RIARNG operates and manages CFTS to provide the necessary facilities to support individual and collective training from squad through company level. CFTS is divided into a Cantonment Area, Impact Area, 5 firing ranges, and 14 tactical training areas. On CFTS, the dominant land cover is deciduous and mixed upland forests (70.0 percent) which comprises the primary habitat types at the installation. Developed areas within the Cantonment Area comprise the next largest land use / cover at CFTS (25.7 percent).

The 2019 CFTS INRMP contains detailed information regarding the natural resources present at CFTS and provides recommended management activities and projects. **Table 2-1** below provides a roadmap to the INRMP sections that contain each natural resources discussion typically included in FSPs.

Table 2-1: Roadmap to Natural Resources Discussions in INRMP

Natural Resources Topics	INRMP Section References
Biodiversity	Section 2.3.3: Fish and Wildlife
Wildlife Management	Section 4.6: Fish and Wildlife Management
Threatened and Endangered Plants and Animals	Section 2.3.4: Threatened and Endangered Species Section 4.7: Threatened and Endangered Species Management

Natural Resources Topics	INRMP Section References
Riparian and Wetland Areas	Section 2.2.5: Water Resources Section 4.3: Water Resources Management
Soil and Water Quality	Section 2.2.4: Soils Section 4.2: Soil Conservation and Sediment Management Section 2.2.5: Water Resources Section 4.3: Water Resources Management
Forest Health	Section 4.4: Vegetation Management Section 4.8: Invasive Species and Integrated Pest Management See also **Section 4.0** below.
Forest Products	Not Applicable; CFTS does not have a forestry reimbursement program and one is not recommended.
Cultural Resources	See CFTS Integrated Cultural Resources Management Plan (RIARNG, 2009).
Recreation and Aesthetics Considerations	Section 4.1: Natural Resources Program Development See also **Section 5.1** below.
Wildfire Risk Assessment	Section 4.5: Wildland Fire Management See also **Section 5.5** below.

3.0 Forest Survey Methodology

To document the existing forest communities and habitats at CFTS, a forest survey was conducted on 5-7 June 2018. The forest survey was completed by qualified forestry specialists in accordance with standard forest characterization techniques used to develop FSPs for enrollment in the Rhode Island Farm, Forest, and Open Space Program. For the purposes of this FSP, a forest is defined as a contiguous biological community dominated by trees and other woody plants covering a land area of 10 acres or greater that have at least one hundred (100) trees per acre with at least fifty (50) percent of those having a two-inch or greater diameter at breast height (DBH; i.e., four and one-half [4.5] feet above the ground) or larger. Forested areas smaller than 10 acres were evaluated for inclusion in this report on a case-by-case basis.

Prior to field sampling, the forestry specialists analyzed current and historical aerial imagery of CFTS, existing topography, and available RIARNG spatial data (e.g., CFTS trail network and surface water/wetland features). Using this data, the forestry specialists identified likely forest stand boundaries and created preliminary forest stand maps on which to base the field sampling.

During the field sampling portion of the forest survey, two forestry specialists, accompanied by RIARNG personnel, traversed the forested portions of CFTS to characterize the forest types and revise the preliminary forest stand map. At one or more representative locations within each identified forest stand, the forestry specialists recorded a data plot. Data was recorded at each plot using Forest Sampling Data Worksheets, and included the tree species present, as well as their frequency and dominance by size class;

basal area; canopy, understory, and herbaceous coverages; understory and herbaceous species present; invasive species composition and coverage; frequency of standing dead trees; successional stage; and other relevant observations (e.g., gypsy moth [*Lymantria dispar*] damage, fire hazard level, etc.)[1]. Equipment used included a basal area factor 10 prism, a DBH tape, and a camera.

Upon completion of field sampling, the data collected at each data plot were summarized by stand using Forest Stand Summary Worksheets, and a final forest stand map was created that identifies each primary forest characterization. Forest characterization was primarily based on species dominance and prevalence; however, notable intra-stand variations were also noted and are discussed in **Section 4.0**. The Forest Sampling Data Worksheets completed during the field sampling and subsequent Forest Stand Summary Worksheets are provided in **Appendix A** and **Appendix B**, respectively. Additionally, photographs taken at each data plot are provided in **Appendix C**.

4.0 Forest Survey Results

Ten forest stands were identified within the CFTS property. The forest stands, as well as approximate data plot locations, are shown in **Figure 1** and **Figure 2**. Detailed descriptions of each forest stand are provided below. Additionally, each forest stand description contains a brief discussion of recommended management focus/actions, which are further elaborated upon in **Section 5.0**. Information provided below on historical aerial imagery was obtained through Rhode Island Geographic Information System (RIGIS) (RIGIS, 2018).

4.1 Stand 1: Oak-White Pine

Stand 1, located in the northwestern and central portions of CFTS, is 70.1 acres. It consists of a mid-successional oak-white pine forest, and has nearly level to gently sloping topography. Based on historical aerial imagery, the forest in this stand generally predates 1939 (oldest available imagery), although some areas may have been young at that time. Invasive plant species generally are not present in the interior of this stand; when present, they are typically observed along the trails and CFTS boundary. Stand 1 is depicted in photographs from Plots 1, 7, and 11 in **Appendix C**.

Composition and Structure

Stand 1 is a mid-successional oak-white pine forest. Dominant and codominant species consist of black oak (*Quercus velutina*), white oak (*Quercus alba*), white pine (*Pinus stroba*), and red maple (*Acer rubrum*). Subdominant and understory species include sassafras (*Sassafras albidum*), black birch (*Betula lenta*), American chestnut (*Castanea dentata*), and black cherry (*Prunus serotina*). Overall, the canopy layer has somewhat low species diversity, with an average of four tree species per plot, and the understory is relatively sparse throughout much of the stand. The herbaceous layer displays variation throughout the stand. In the northwestern portion of CFTS, and continuing east into Stand 5, it is strongly dominated by common greenbrier (*Smilax rotundifolia*), while the central and southern portions of the stand contain a greater prevalence of upland sedge species (*Carex* species [spp.]), various species of ferns, deciduous hardwood seedlings, or other common groundcover species (e.g., princess pine [*Lycopodium obscurum*], ground cedar [*Diphasiastrum digitatum*], Indian cucumber [*Medeola virginiana*], etc.).

[1] Because of the low number of plots taken in each stand, quantitative data collected is not statistically significant. Rather, its inclusion in the forest stand descriptions below is intended to provide approximate values to support the forest characterization.

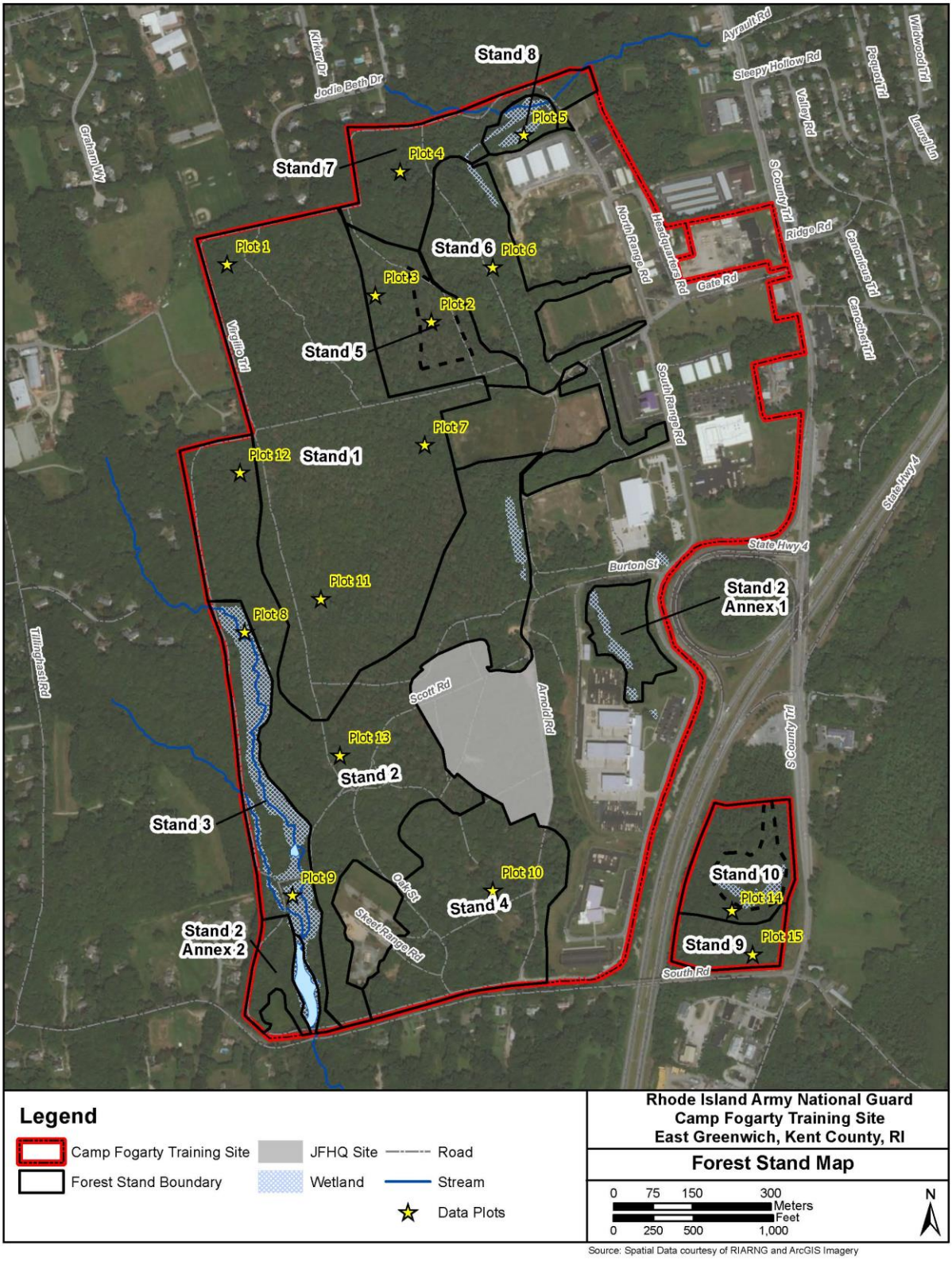

Figure 1: Forest Stands at CFTS (Aerial View)

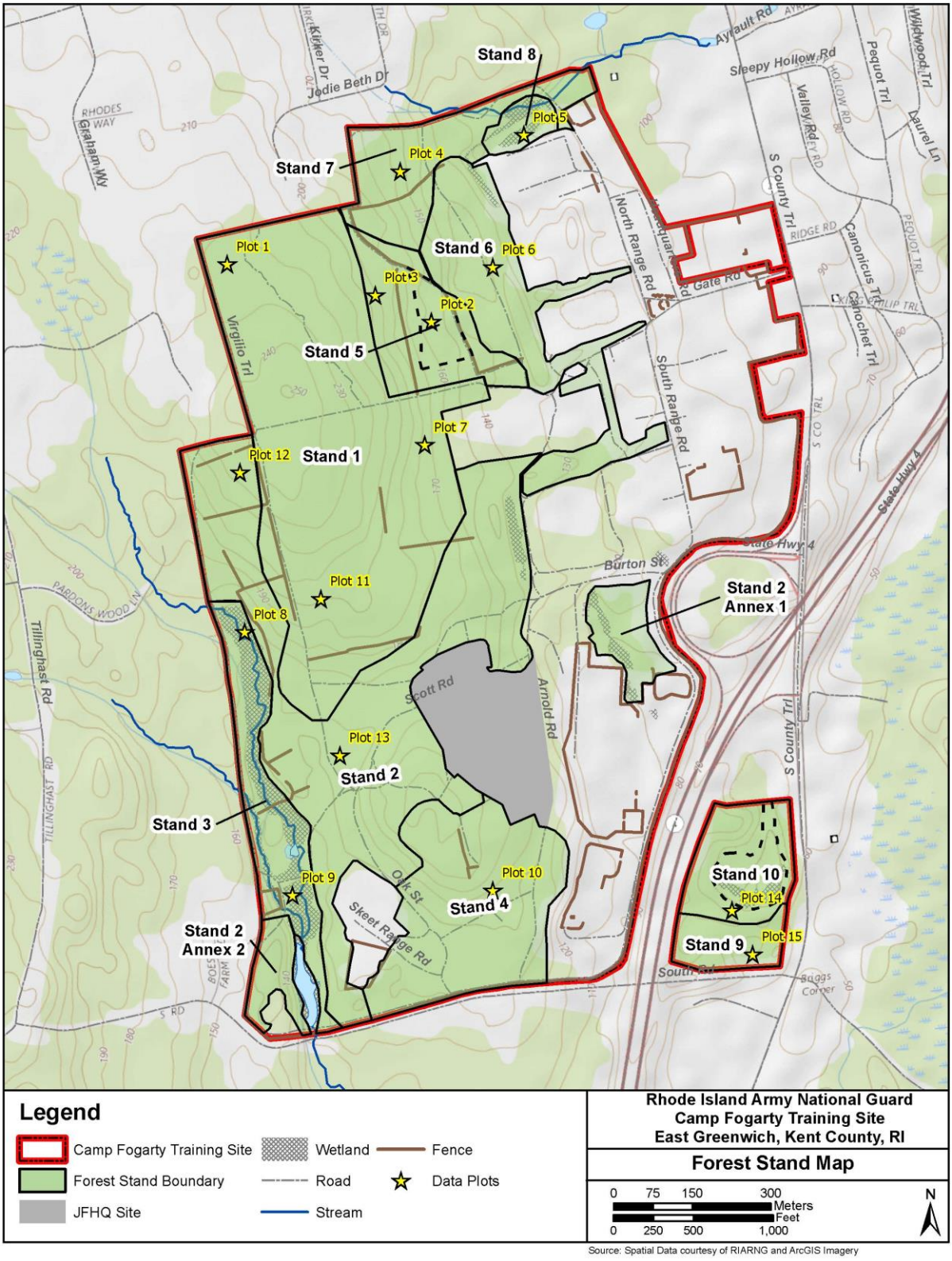

Figure 2: Forest Stands at CFTS (Topographic View)

The dominant and codominant trees in this stand are generally 6.0-11.9 and 12.0-19.9 inches DBH, with some 20-29.9 inches DBH trees scattered throughout. Canopy closure is approximately 70 percent, and the basal area is approximately 123 square feet per acre. Understory cover averages 12 percent. Overall, the understory of Stand 1 consists primarily of native deciduous saplings. The herbaceous layer of Stand 1 is characteristic of deciduous hardwood-conifer forests, and contains very few invasive species. Vegetation covers approximately 38 percent of the forest floor.

Stand Condition

The only major disease or pest concern observed in Stand 1 was gypsy moths. Stand 1 has been moderately damaged by gypsy moth infestations in recent years (2016-2017). Black oaks and white oaks, the two primary oak species at CFTS, both exhibit damage, including branches that have been killed or that display severe dieback, and, in many cases, full tree mortality. There are numerous locations throughout the stand, such as along the perimeter trail along the northwestern boundary, where pockets of dead trees have created openings in the canopy. Moreover, there are two particularly large areas of oak mortality in the central portion of Stand 1. One is near the intersection of Virgilio Trail and the perimeter trail, and the other is in the southernmost portion of Stand 1, near the existing unnamed trail extending east from Virgilio Trail towards the new Joint Force Headquarters (JFHQ) site under construction.

The canopy openings resulting from gypsy moth damage will likely create conditions (i.e., increased sunlight and reduced competition) for increased forest regeneration. Seedlings of various oak species are present in the herbaceous layer and, to some extent, in the understory layer. However, the most common small tree (2-5.9 inches DBH) and understory species appears to be red maple. Red maple is a native, fast-growing, and opportunistic species that may fill the canopy openings and gain prevalence in this predominantly oak-white pine stand. Oaks, which are typically slower-growing species, could be expected to continue growing in the understory and eventually regain dominance. However, oak regeneration could be inhibited to some extent by reduced seed production (due to damaged and killed seed-bearing oaks), thick greenbrier growth in the northern half of the stand, and potentially herbivory (if the herbivore population becomes too large).

Chestnut blight was observed on the understory American chestnut trees. American chestnut used to be a very common tree in forests in the eastern United States; however, they were decimated by chestnut blight, a fungal disease inadvertently imported to the United States, during the first half of the twentieth century (ACF, 2018). Although American chestnut seedlings and saplings can still be found growing from the seed bank, they generally all succumb to chestnut blight and die before reaching maturity.

Sensitive forest areas, such as streams and stream buffers, wetlands, floodplains, steep slopes, threatened or endangered species habitats, or areas with trees greater than 30 inches DBH, are typically not present in Stand 1.

Stand Function and Management Focus

Stand 1 provides some areas suitable for RIARNG training. The northern half of the stand is generally not ideal for training, due to the thick greenbrier growth. Additionally, this area is periodically closed while the firearms ranges are being used. The central portion of the stand (i.e., west of the M203 range to Virgilio Trail), however, is more conducive to off-trail pedestrian training activities. To ensure safety of personnel and equipment, a hazard tree assessment should be conducted in this stand along the trails and in any off-

trail areas likely to be used for training activities. Additionally, because Stand 1 borders the CFTS boundary in the northwest corner, it provides a valuable aesthetic and noise buffer to the adjacent properties, including residences, which should be maintained to the extent feasible.

Stand 1 comprises high quality wildlife habitat; this should be the primary management focus for this stand other than its ability to be used to support the military mission. The abundance of mast-producing trees (primarily oaks) normally provides a strong source of food for local wildlife. The herbaceous layer provides additional food sources, such as blueberry (*Vaccinium* spp.) and dangleberry (*Gaylussacia frondosa*) plants, as well as cover for small animals. Clusters of conifer trees (primarily white pine, with some eastern redcedar [*Juniperus virginiana*]) further provide winter shelter for birds. Due to the gypsy moth damage, snags are now prevalent throughout the stand, which could be used as perches by birds of prey and as shelter (if they develop cavities) by smaller birds, bats, small mammals, and insects. CFTS personnel have observed red-tail hawks (*Buteo jamaicensis*) and an owl perching on a snag at the installation, as well as osprey (*Pandion haliaetus*) perching on a cell phone tower on an adjacent property.

Stand 1 generally has low incidence of invasive species, which further supports its ability to provide valuable wildlife habitat. Invasive species in this stand are mostly located along the trails; these invasive species should be treated to prevent further colonization of the stand. Additionally, greenbrier thickets are currently very dense in the northern half of this stand. Although greenbrier is a native species, these thickets can inhibit forest regeneration and growth of native species, and hinder training activities. Biological control of greenbrier to reduce its density could potentially be conducted through the use of goats, as discussed in **Section 5.4**, but would require follow-up monitoring and treatment to ensure invasive species do not replace it.

4.2 Stand 2: Oak-Red Maple-Birch

Stand 2 is a 55.3-acre stand that consists of a mid-successional oak-red maple-birch forest. It is located primarily north of the skeet range and west of the JFHQ site, although it also includes areas immediately east and west of the southern half of Stand 1. Topography ranges from nearly level to moderately steep hillsides between and around two knolls. Based on historical aerial imagery, the forest in this stand also predates 1939, and is approximately the same age as Stand 1. Invasive plant species are generally not concentrated in this stand; however, some invasive plant cover is present along the trail network. Stand 2 is depicted in photographs from Plots 12 and 13 in **Appendix C**.

There are two additional areas that have been noted on **Figure 1** and **Figure 2** as annexes to Stand 2. Data plots were not recorded in these areas because they generally resemble the forest in Stand 2 and are just geographically separated. Rather, they are described qualitatively at the end of the Stand 2 description.

Composition and Structure

Stand 2 is a mid-successional oak-red maple-birch forest. Dominant and codominant species generally consist of black oak, red maple, and black birch. A codominant northern red oak (*Quercus rubra*) tree was observed in one of the plots, but this species is generally less common at CFTS. Black birch is sporadically prevalent, such as near the riparian area (Stand 3). Subdominant and understory species include white oak, eastern redcedar, black gum (*Nyssa sylvatica*), mockernut hickory (*Carya tomentosa*), American chestnut, black cherry, American beech (*Fagus grandifolia*), and spicebush (*Lindera benzoin*). The overstory has

moderate species diversity with an average of six tree species per plot. The herbaceous layer contains a diverse, not overly dense, mix of vegetation characteristic of deciduous hardwood forests, including tree seedlings (e.g., oaks, red maple, black cherry, American beech, and sassafras), shrubs (e.g., dangleberry and highbush blueberry [*Vaccinium corymbosum*]), and ground species (e.g., sedges, poison ivy [*Toxicodendron radicans*], *Rubus*, spp., Indian strawberry [*Duchesnea indica*], Indian cucumber, and princess pine).

The dominant trees present are generally 6.0-11.9 and 12.0-19.9 inches DBH, although some exceed 20 inches DBH. Canopy closure is approximately 65 percent, and basal area is approximately 105 square feet per acre. Understory cover averages 27 percent, and consists primarily of native tree saplings. The herbaceous layer of Stand 2 consists of approximately 42 percent coverage, and also contains primarily native species.

Stand Condition

Gypsy moth damage is moderate to heavy in Stand 2, similar to Stand 1. However, the canopy breaks in Stand 2 are less pronounced due to a higher prevalence of other species (e.g., red maple and black birch) in the canopy and sub-canopy that prevent large new openings for sunlight to reach the forest floor. Further, Stand 2 does not have as many concentrated areas of oak mortality. Chestnut blight was also observed on the understory American chestnut trees. No other major diseases or pests were observed in Stand 2.

Regeneration potential generally remains strong for Stand 2 and invasive species concerns are minor. There is a wetland located immediately west of the confidence course; however, overall Stand 2 has a low amount of sensitive forest habitats.

Stand Function and Management Focus

Stand 2 contains forest suitable for off-trail pedestrian training activities. The lack of dense understory and herbaceous layers eases pedestrian movement, and the lack of sensitive forest features minimizes the potential environmental impacts that could be caused. Due to tree mortality from gypsy moth damage, a hazard tree assessment should be conducted in this stand along the trails and in any off-trail areas likely to be used for training activities.

Stand 2 contains moderate wildlife habitat. Like Stand 1, it is oak-dominated, which includes mast production for food, and numerous new snags (shelter and perches) resulting from gypsy moth damage. However, Stand 2 does not contain as many conifer species to provide shelter for canopy species during the winter. The herbaceous layer of Stand 2 is similar in composition and coverage to Stand 1, but contains fewer areas of dense growth clusters, such as greenbrier or ferns. This could indicate slightly less cover for small animals. Due to the proximity of Stand 2 to the stream along the western boundary of CFTS, it also serves to protect water quality. The vegetative cover of the forest helps to minimize erosion and runoff into the stream, thereby improving habitat for aquatic species.

Stand 2 also generally has low incidence of invasive species. Invasive species in this stand are mostly located along the trails, which should be treated to prevent further colonization of the stand.

Annex 1

Annex 1 of Stand 2 is the 5.2-acre forested area bound by Burton Street to the north and west, Stony Lane to the east, and the Combined Support Maintenance Shop building to the south. Dominant trees in this annex are typically black oaks and northern red oaks, and several of them have larger DBHs than found on the rest of the installation (i.e., 20.0-29.9 and 30.0+ inches DBH). Other dominant/codominant trees include white oak, red maple, and green ash (*Fraxinus pennsylvanica*). This annex has a small emergent wetland within it; wet tolerant tree species are located around the fringe of this wetland.

The understory and herbaceous layers of this annex contain species similar to Stand 2, including eastern redcedar, black cherry, and Virginia creeper (*Parthenocissus quinquefolia*). Notably, Annex 1 has a relatively high concentration of invasive species, including oriental bittersweet (*Celastrus orbiculatus*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*), which is in contrast with the majority of Stand 2. This is likely due to the concentration of roads and development within the immediate vicinity of the annex.

The primary function of Annex 1 is water quality protection, as the annex contains a wetland. In addition to the forest serving as a buffer between adjacent development and the wetland, the wetland itself may collect (via storm drains) and store stormwater from the adjacent roads and development during storm events. By collecting this stormwater, it allows more stormwater to infiltrate into the ground (as opposed to running into a waterway), and for the stormwater that does flow to a waterway, it allows pollutants, nutrients, and suspended sediments to settle out of the water first. Due to the presence of this wetland, which is a sensitive forest area, and its relatively small size, this annex does not provide preferred training area. Additionally, its value as wildlife habitat is similar to that described for Stand 2, except that it is a forest fragment, which decreases its accessibility to wildlife.

Annex 2

Annex 2 of Stand 2 is the 3.7-acre forested area in the southwestern-most corner of CFTS, bound by the installation boundary on the west and south and by Stand 3 to the north and east. Oak trees remain the primary dominant and codominant species in this annex. Other less frequent codominant trees include black birch and some American beech trees. Red maples are not frequent in this annex, which is a differentiating factor between it and the rest of Stand 2. The understory and herbaceous layers are consistent with the rest of Stand 2. Invasive species are generally not present in the interior of this annex, but can be found along the perimeter trail.

The eastern portion of Annex 2 contains a steep slope, which is a sensitive forest area. As such, the primary forest function of this annex is erosion control and soil stabilization. The forest leaf canopy reduces the erosive impact of rainwater and the roots of forest vegetation hold soil in place. Because this annex also abuts the stream in Stand 3, the annex provides an additional water quality protection function by serving as a stream buffer. Annex 2 is quite small, contains sensitive forest areas, and directly abuts the CFTS boundary, so it is not preferred land for conducting training activities. However, it should be retained as an aesthetic and noise buffer to the residential properties adjacent to the installation in that area. The habitat quality of Annex 2 is similar to that described for the rest of Stand 2.

4.3 Stand 3: Red Maple-Birch-Oak

Stand 3 is a 13.7-acre stand that consists of a mid-successional red maple-birch-oak forest. This stand is generally similar to Stand 2, except that it includes a riparian corridor. Accordingly, it has slight variations in the frequency of certain species, but the overall species composition remains largely the same, as described below. Based on historical aerial imagery, this stand mostly predates 1939, although a small portion of it was cleared as a field up until approximately the 1960s. Several invasive plant species were observed in the interior of this stand in low concentrations; however, invasive species cover is greater along the trail edges. Stand 3 is depicted in photographs from Plots 8 and 9 in **Appendix C**.

Composition and Structure

Stand 3 is a mid-successional red maple-birch-oak forest. Dominant and codominant species consist of red maple, black birch, black oak, northern red oak, pignut hickory (*Carya glabra*), and black locust (*Robinia pseudoacacia*) trees. Subdominant and understory species further include white oak, common witch-hazel (*Hamamelis virginiana*), highbush blueberry, spicebush, and oriental bittersweet. Overall, the canopy layer has moderate species diversity, with an average of six tree species per plot. The understory contains somewhat less diversity, with primarily saplings and common shrubs. The herbaceous layer is slightly more diverse, and contains species such as Virginia creeper, New York fern (*Thelypteris noveboracensis*), spicebush, greenbrier, hay-scented fern (*Dennstaedtia punctilobula*), sassafras, northern red oak, skunk cabbage (*Symplocarpus foetidus*), Indian strawberry, jack in the pulpit (*Arisaema triphyllum*), multiflora rose, jewelweed (*Impatiens capensis*), poison ivy, sweet wood-reed (*Cinna arundinacea*), and grass species.

The dominant and codominant trees present are generally 6.0-11.9 and 12.0-19.9 inches DBH, although some do exceed 20 inches DBH. Canopy closure is approximately 85 percent, and the basal area is approximately 125 square feet per acre. Understory and herbaceous cover both average approximately 41 percent.

Stand Condition

Stand 3 shows little to no lasting damage from gypsy moths. This riparian area may not have been affected to the same extent as Stands 1 and 2 due to the lower prevalence of oak trees. No other major diseases or pests were observed in the stand. This stand has a strong regeneration potential. It contains a high prevalence of mature, seed producing trees and small trees/saplings, and relatively little invasive species coverage.

Nearly all of Stand 3 is considered sensitive forest area. This is due to the presence of the stream, stream buffer, wetlands, and floodplain.

Stand Function and Management Focus

Stand 3 is not preferred for training activities due to the high amount of sensitive forest areas. However, pedestrian activities could occur, on occasion and in low concentration, without significant impacts to the natural resources. Excessive or routine activities in these areas, particularly crossing the stream and wetlands, could lead to sediment and vegetative disturbance, which could adversely impact habitat and

water quality. Stand 3 also abuts much of the western CFTS boundary, and therefore provides a valuable aesthetic and noise buffer to adjoining properties.

Stand 3 contains high-quality wildlife habitat due to the presence of the stream and adjacent wetlands. These features comprise the majority of the aquatic habitat at CFTS, as well as the primary water sources for terrestrial species. Further, the forest adds organic debris, including course woody debris, to the stream, thereby increasing its habitat diversity and providing nutrients to the aquatic ecosystem. Mast-producing trees in Stand 3 include oaks, similar to Stands 1 and 2, as well as a higher prevalence of hickories than elsewhere on base. The understory and herbaceous layers provide adequate cover for small faunal species. In contrast to Stands 1 and 2, Stand 3 has fewer snags due to the relative lack of gypsy moth damage in the stand. However, the stand is in close proximity to other stands that do have numerous snags.

Due to the presence of the stream complex and open water, and adjacent wetlands, Stand 3 also provides a valuable water quality protection service. The vegetation reduces the erosive impact of rainwater, stabilizes the soil around the stream and wetlands, and filters runoff from upslope. These functions serve to reduce erosion and filter out total suspended solids and pollutants before runoff enters the stream. The wetlands further provide similar water treatment services by collecting runoff before it reaches the stream. Finally, the riparian forest shades the stream and regulates water temperatures, which is critical for many aquatic species.

Some invasive species shrubs (e.g., multiflora rose) were observed in the interior of Stand 3, which pose a threat to the overall condition of this stand. These small populations could quickly increase in concentration and spread further throughout the stand. In order for this stand to continue to provide its valuable wildlife habitat functions, these populations of invasive species should be addressed while they are still manageable.

4.4 Stand 4: Red Maple-Oak

Stand 4 is a 26.4-acre stand located east of the skeet range. It consists of a mid-successional red maple-oak forest. The stand includes the knoll of a hill, strongly sloping hillsides to the south and east, and a nearly level area around the ropes course and southern perimeter trail. Based on historical aerial imagery, this stand is younger than Stands 1 through 3. The southern half of the stand was maintained as fields into the early 1940s and early 1950s. Invasive plant species are somewhat prominent in this stand. Stand 4 is depicted in photographs from Plot 10 in **Appendix C**.

Composition and Structure

Stand 4 is a mid-successional red maple-oak forest. Dominant and codominant species consist of red maple, black oak, black cherry, and black locust. Subdominant and understory species further include white oak, black birch, green ash, and poison ivy. Overall, the canopy layer has somewhat low species diversity, with four species identified in the plot. The understory has moderate diversity with approximately eight woody plant species. The herbaceous layer included hay-scented fern, arrowwood (*Viburnum dentatum*), greenbrier, Virginia creeper, *Rubus* spp., multiflora rose, and seedlings of canopy trees.

This stand displays a couple of notable variations in its composition. In the northern portion of the stand, along the top of the knoll south to approximately the historic cemetery, the herbaceous layer is strongly

dominated by greenbrier, similar to the northern portion of Stand 1. The herbaceous layer becomes more diverse on the slopes and towards the bottom of the knoll. However, in the southern portion of the stand, the understory and herbaceous layers have been cleared to some extent in association with the ropes course. Although the canopy remains in this area, the forest understory appears to be artificially open. Finally, the southern portion of the stand contains slightly greater species diversity than the northern portion around the top of the knoll. Black cherry, black locust, and green ash are prominent downslope, but are mostly absent around the top of the knoll, where species consist mostly of maples and oaks.

The dominant and codominant trees present are generally between 12-19.9 inches DBH, although some are between 6-11.9 inches DBH. Canopy closure is approximately 91 percent, and the basal area is approximately 110 square feet per acre. Understory cover averages 33 percent. Herbaceous layer coverage is approximately 67 percent with a higher prevalence of invasive species (approximately 10 percent coverage) than Stands 1, 2, or 3.

Stand Condition

Gypsy moth damage is relatively low in Stand 4. Similar to Stand 3, Stand 4 has a lower frequency of oak trees. No other major diseases or pests were observed in Stand 4. Standing dead black cherry and black locust trees are present in this stand at a frequency that is fairly common for these species. As noted above, Stand 4 has a greater prevalence of invasive plant species. Common invasive species observed in this stand include multiflora rose, oriental bittersweet, and bush honeysuckle (*Lonicera* spp.). Other invasive species that are likely present in lower concentrations throughout the stand include wineberry (*Rubus phoenicolasius*), autumn olive (*Elaegnus umbellata*), Japanese honeysuckle, Japanese barberry (*Berberis thunbergii*), and winged euonymus (*Euonymus alatus*) (RINHS, 2004).

This stand generally has a high regeneration potential due to the mature, seed producing trees and presence of saplings and seedlings in the lower layers of the forest; however, regeneration potential may be limited in areas where the lower layers have been cleared near the ropes course. This is not a concern due to the necessity to keep this area available for training activities. Additionally, regeneration potential could be reduced in the future if the invasive species concentration increases, which would lead to greater competition for resources with native species.

Stand 4 generally does not contain any sensitive forest areas.

Stand Function and Management Focus

Similar to Stand 1, Stand 4 provides some areas suitable for RIARNG training. As noted, the southern portion of the stand includes features associated with the ropes course training area, and as such is already used for training activities on occasion. Across the trail to the north, the bottom of the hill also provides suitable land for off-trail pedestrian training activities. However, the northern portion of the stand, at the top of the knoll, is generally not ideal for training due to the thick growth of greenbrier and presence of a historic cemetery. Stand 4 also borders the southern CFTS boundary, and provides a valuable aesthetic and noise buffer to the residential properties across South Road.

Stand 4 contains moderate wildlife habitat. Mast-producing trees, though less prevalent than elsewhere on base, are present in this stand. Additionally, soft mast-producing trees, such as black cherries, are more

prevalent in this stand than elsewhere on base. Invasive species, while detrimental to the ecological diversity, can also provide food sources to wildlife through berry production, similar to native species like *Rubus* spp. and greenbrier. Cover for small animals is abundant in this stand (outside the ropes course area) due to the relatively thick herbaceous layer, and small snags exist in the form of dead black cherry and black locust trees, as noted above.

Invasive species shrubs are common throughout this stand, so their treatment will be more challenging. Without management, the invasive species shrubs in this stand could further reduce the limited areas currently suitable for off-trail maneuverability. Invasive species management in this stand should prioritize treatment along its boundary with Stand 2 because Stand 2 currently has a lower prevalence of invasive species and should be maintained as such to the extent possible. Additionally, the northern portion of Stand 4 has a thick greenbrier patch similar to that in Stand 1. This could comprise another opportunity for goats to reduce the density of the greenbrier to improve the stand's suitability for training and understory structure.

4.5 Stand 5: Oak

Stand 5 is a 13.1-acre stand that consists of a mid-successional oak forest. It is located in the northern portion of CFTS east of Stand 1 and immediately west of Stand 6. The topography is gently to strongly sloping. Based on historical aerial imagery, this stand generally predates 1939. Invasive plant species were generally not observed in this stand except along trail edges. Overall, Stand 5 is similar to the northern portion of Stand 1; its primary difference is that it contains substantially fewer conifer trees. Stand 5 is depicted in photographs from Plots 2 and 3 in **Appendix C**.

Composition and Structure

Stand 5 is a mid-successional oak forest. Dominant and codominant species consist of black oak, white oak, and red maple. Additional subdominant and understory species observed in the plot include black cherry, dangleberry, and lowbush blueberry. Hickories, black birch, and black locust were observed in low concentrations elsewhere throughout the stand. The overstory has low species diversity, with an average of two tree species per plot. The herbaceous layer was very thick with greenbrier, similar to Stand 1, but also contains canopy tree seedlings, Virginia creeper, princess pine, hay-scented fern, and sedges.

The dominant and codominant trees present are generally between 12-19.9 inches DBH, although some exceed 20 inches DBH. Canopy closure is approximately 56 percent, and the basal area is approximately 90 square feet per acre. Understory cover is very sparse, averaging approximately 10 percent, but the herbaceous layer is notably high (approximately 86 percent) due to the prominence of greenbrier. Greenbrier competition in this stand may also be a contributing factor to the sparse understory.

Stand Condition

Stand 5 exhibits severe gypsy moth damage. In a portion of the stand (at the bottom of the hill, adjoining Stand 6), nearly all of the oak trees were killed or severely damaged. This 3.0-acre area is noted with a dotted line on **Figure 1** and **Figure 2**. In the western half of the stand (up the slope), gypsy moth damage was observed to be moderate with a mixture of recovering and dead oaks. In the lower portion of the stand, where the oak trees have been decimated, the forest characterization could change over the coming years. Due to the loss of many of the seed-bearing oak trees in this area, and the presence of an opportunistic

species (red maple) as the next most dominant tree species, there is a strong likelihood that this area may change into a maple-dominant forest. However, the thick greenbrier cover in the herbaceous layer could also constrain and prolong regeneration of this area, as the greenbrier maintains a strong competitive advantage for resources (e.g., sunlight and nutrients). Greenbrier may also benefit this stand as well. Whereas invasive plant species, which are present along the edges of the stand, would normally readily colonize this area due to the canopy openings and increased sunlight, they may also be outcompeted by the greenbrier, and therefore not be able to spread as much as they normally might. Beyond gypsy moth damage, no other major diseases or pests were observed in Stand 5.

Stand 5 does not contain any sensitive forest areas.

Stand Function and Management Focus

Stand 5 generally does not contain land preferred for training activities. The greenbrier thicket strongly inhibits pedestrian movement, and this portion of the installation is periodically closed while the firearms ranges are in use. However, due to the prevalence of new snags resulting from the gypsy moth damage, this stand could provide an opportunity for chainsaw training activities.

Stand 5 comprises moderate wildlife habitat. The greenbrier thicket provides abundant cover to small animals and some bird species. Mast-producing trees are present in the western portion of the stand, and greenbrier produces berries as an additional food source. Due to the gypsy moth damage, snags are prevalent in the stand, particularly in the eastern portion. However, this stand is not particularly close to any surface water features. During the field sampling, an old burrow (potentially fox) was observed near Plot 3.

Recommendations for invasive species management in Stand 5 would be similar to those for Stand 1 because the existing invasive species levels and patterns in Stand 5, as well as thick greenbrier growth, are not substantially different from Stand 1.

4.6 Stand 6: Oak-Red Maple-Eastern Redcedar

Stand 6 is a 21.0-acre stand that consists of a mid-successional oak-red maple-eastern redcedar forest. It is located along numerous berms that bound the ranges and in much of the fenced area west of the firearms ranges. Based on historical aerial imagery, this stand was maintained as fields in 1939. The area west of the firearms ranges appears to have begun growing as a forest sometime before 1951. The forest on the berms around the firearms ranges appears to have begun growing between approximately the mid-1970s and the mid-1980s. Invasive plant species are somewhat prominent in the herbaceous and understory layers of the stand. Stand 6 is depicted in photographs from Plot 6 in **Appendix C**.

Composition and Structure

Stand 6 is a mid-successional oak-red maple-eastern cedar forest. Dominant and codominant species generally consist of black oak, white oak, red maple, and black cherry, although portions of this stand (such as behind the rifle range) consist predominantly of eastern redcedar. Numerous large bigtooth aspen (*Populus grandidentata*) were also observed. Additional subdominant and understory species include black birch, autumn olive, and multiflora rose. The overstory has moderate species diversity with five tree species observed in the plot. The herbaceous layer consists of greenbrier, sedges, hay-scented fern, Virginia

creeper, and poison ivy, but invasive species such as Japanese barberry, multiflora rose, oriental bittersweet, and Japanese honeysuckle are also prevalent.

The dominant and codominant trees present are generally 6.0-11.9 and 12.0-19.9 inches DBH, although some do exceed 20 inches DBH. Canopy closure is approximately 76 percent, and basal area is approximately 140 square feet per acre. Understory cover averages 24 percent, and consists mainly of small native trees and invasive shrubs. The herbaceous layer of Stand 6 consists of approximately 51 percent coverage, and is fairly diverse. However, invasive species coverage in Stand 6 is high at approximately 35 percent; this is higher than all other stands on base except for Stand 7.

Stand Condition

Gypsy moth damage in Stand 6 was observed to be relatively low in most areas, despite oak trees being prevalent. It is unknown whether the stand is just recovering well, or if it was less affected over the past several years than other nearby stands (e.g., Stand 5). A tent caterpillar silk tent was observed in this stand. Tent caterpillars are native to Rhode Island, but can also cause defoliation of trees. At this time, tent caterpillars do not appear to be a major pest species or threat to the CFTS forest.

Stand 6 has a moderate regeneration potential. Numerous small trees and saplings of canopy tree species were observed throughout the stand. However, as the invasive species continue to spread within this stand, they will provide increasing competition for native species, particularly in the herbaceous layer. This could inhibit growth of seedlings and potentially reduce regeneration in the future.

Stand 6 generally does not contain any sensitive forest areas.

Stand Function and Management Focus

Stand 6 does not provide preferred land for training activities, as it is primarily comprised of the berms enclosing various training ranges. The portion of the stand west of the berms could potentially be used for pedestrian training activities, but this area is relatively small. Additionally, the majority of this stand is closed to all personnel while the firearms ranges are in use.

Stand 6 provides moderate wildlife habitat. The oak trees in this stand appear to be in better health than in other nearby stands (e.g., Stand 5). As such, this stand could provide a more stable source of hard mast for food. Additionally, its somewhat diverse herbaceous layer contains numerous soft mass-producing species, such as greenbrier, honeysuckles, and oriental bittersweet. The herbaceous layer further provides cover for small animals, and the presence of eastern redcedar trees provides winter shelter to various species of birds. Snags are less common in this stand, but are abundant in Stand 5, immediately to the west. Further, much of the stand consists of long, narrow stretches of forest adjacent to cleared and/or developed areas. These portions of the stand could provide movement corridors for species amongst the ranges and Cantonment Area. Finally, much of this stand is relatively close to a stream and wetland complex along the northern boundary of the installation, which provides a source of water.

Invasive species are common throughout this stand, so their treatment will be more challenging. Invasive species management in this stand should prioritize treatment along its boundary with Stand 5 because

Stand 5 currently has a lower prevalence of invasive species and should be maintained as such to the extent possible.

4.7 Stand 7: Red Maple-Black Locust-Black Cherry

Stand 7 is a 13.1-acre stand located along the northern boundary of CFTS, which abuts Stands 5 and 6 to the south. It consists of an early to mid-successional red maple-black locust-black cherry forest. The western portion of the stand contains a strongly sloping hill, which flattens out in the eastern portion of the stand. Based on historical aerial imagery, the western portion of the stand dates to approximately the 1960s, while the eastern portion of the stand dates to approximately the 1980s and 1990s. Invasive plant species are very prominent in this stand. Stand 7 is depicted in photographs from Plot 4 in **Appendix C**.

Composition and Structure

Stand 7 is an early to mid-successional red maple-black locust-black cherry forest. Dominant and codominant species consist of red maple, black locust, black cherry, green ash, and eastern cottonwood. Additional subdominant and understory species include eastern redcedar, arrowwood, spicebush, multiflora rose, and oriental bittersweet. The canopy layer has moderate species diversity, as six species were identified in the plot. The understory predominantly contains the same canopy trees that were noted in the overstory, as well as several shrub species. Oriental bittersweet vines are notably present approximately three-fourths of the way into the canopy. The herbaceous layer contained native species such as greenbrier, Virginia creeper, *Rubus* spp., Jack in the pulpit, and several species of oak seedlings, and invasive species including multiflora rose, oriental bittersweet, Japanese honeysuckle, and bush honeysuckles. Of the invasive species in the herbaceous and lower understory layers, multiflora rose was the most prominent.

The dominant and codominant trees present are generally 6.0-11.9 and 12.0-19.9 inches DBH. Canopy closure is approximately 57 percent, and the basal area is approximately 80 square feet per acre. Understory cover averages 48 percent. Herbaceous cover is approximately 63 percent, and includes a high concentration of invasive species.

Stand Condition

Gypsy moth damage is low throughout much of Stand 7 due to the relative lack of oak trees. No mature oak trees were noted in the data plot collected; however, oaks were noted elsewhere within the stand while traveling on the perimeter trail. Those oaks did appear to be either damaged or killed, similar to Stand 5. No other major diseases or pests were observed in Stand 7. As noted above, Stand 7 has a high prevalence of invasive plant species, which may in part be due to the relatively low canopy coverage (i.e., approximately 57 percent). With approximately 75 percent invasive species coverage within the data plot, Stand 7 appears to contain the largest invasive species concentration at CFTS. This degree of invasive species infestation has the potential to significantly inhibit growth of native species and consequently reduce the regeneration potential for the stand over time.

Stand 7 contains a small portion of a stream (and associated stream buffer) along the northern boundary of the installation. While existing wetland mapping for CFTS show a wetland in the northeastern corner of the installation, this area appeared to lack wetland vegetation, and therefore may not be a wetland. However, a

small seep or wetland was observed within the data plot for this stand, which does not appear on the existing wetland mapping.

Stand Function and Management Focus

Stand 7 does not contain land preferred for training activities. Due to the high concentration of multiflora rose in the western portion of the stand and the presence of a stream through the eastern portion of the stand, maneuverability is limited for off-trail training activities. Additionally, the stand is fairly small. The stand does however provide a valuable aesthetic and noise buffer to residential properties adjacent to CFTS, as the stand constitutes much of the northern boundary of CFTS.

Stand 7 contains moderate wildlife habitat. There are fewer mast-producing trees in this stand, compared to the rest of the installation, but the herbaceous and understory layers do contain some mast-producing plants, including Japanese and bush honeysuckles, oriental bittersweet, greenbrier, and *Rubus* spp. Several snags are present in this stand, and CFTS personnel have observed birds of prey perching on them in the recent past. There is abundant herbaceous cover for small animals, and there are several large brush piles that have been created by dumped woody debris along the northern perimeter trail, which provide additional shelter opportunities for small animals. The stream in this stand provides a water source. The seep/wetland observed in the data plot could provide a small area of additional aquatic habitat.

Stand 7 contains a stream and stream buffer along the northern boundary of the installation. As such, this stand provides a valuable water quality protection service. As described under Stand 3, vegetation stabilizes the soil around the stream, reduces the erosive impact of rainwater, and filters runoff from upslope. These functions serve to reduce erosion and filter out total suspended solids and pollutants before runoff enters the stream. Additionally, because the perimeter trail, which has a higher than average risk of erosion, crosses and parallels the stream in one area, the robust herbaceous layer is helpful to filter any sediment-laden stormwater that runs off from the trail. Finally, the forest shade helps regulate stream water temperature, which is critical for many aquatic species.

Invasive species are very common throughout this stand, so their treatment will be more challenging. Invasive species management in this stand should prioritize treatment along the riparian corridor and the stand's boundary with Stand 5 because Stand 5 currently has a lower prevalence of invasive species and should be maintained as such to the extent possible.

4.8 Stand 8: Red Maple Wetland

Stand 8 is a 2.6-acre stand located in the northeastern portion of CFTS adjacent to Stands 6 and 7. It consists of an early to mid-successional red maple wetland forest. The two wetland areas comprise the majority of the stand, but are bisected in an east-west fashion by a substantial historical fill pile. Based on historical aerial imagery, this historical fill pile may have been the northern berm for a historical range in this location. As such, the stand appears to have begun growing in two primary phases: north of the berm, the forest dates to approximately the 1970s, and south of the berm, the forest dates to approximately the late 1980s and 1990s. Invasive plant species are present, but not prominent, in this stand. Stand 8 is depicted in photographs from Plot 5 in **Appendix C**.

Composition and Structure

Stand 8 is an early to mid-successional red maple wetland forest. Dominant and codominant trees consist primarily of red maple, although black oak and eastern cottonwood were also observed. Additional subdominant and understory species include eastern redcedar, spicebush, multiflora rose, and autumn olive. Overall, the canopy layer has fairly low species diversity, as only four species were identified in the plot. The understory, within the data plot, did not contain any additional tree species; it predominantly contained red maple saplings and several shrub species. The herbaceous layer contained a more diverse collection of plants, including highbush blueberry, greenbrier, oriental bittersweet, multiflora rose, Japanese honeysuckle, Virginia creeper, jewelweed, woodreed, poison ivy, arrowwood, jack in the pulpit, rush (*Juncus spp.*), and grape (*Vitis spp.*).

The dominant and codominant trees present are widely spread between 2.0-5.9, 6.0-11.9, and 12.-19.9 inches DBH. Canopy closure is approximately 75 percent, and the basal area is approximately 120 square feet per acre. Understory cover averages 37 percent. Vegetation covers approximately 36 percent of the herbaceous layer, and includes numerous invasive species generally in the higher elevation (upland) portions of the stand.

Stand Condition

Stand 8 contains little to no gypsy moth damage. This is likely due to the low prevalence of oak trees in the stand. No other major diseases or pests were observed in Stand 8.

Regeneration potential is currently strong for this stand due to the presence of opportunistic, prolific species and the abundance of young trees and saplings. However, as noted above, Stand 8 contains some incidence of invasive species, although they tend to occur on the fringe of the wetland or in upland areas. Stand 8 is also largely surrounded by Stand 7, which has one of the highest concentrations of invasive species at the installation. Without management in Stands 7 and/or 8, the invasive species coverage in Stand 8 may increase in the upland areas. Much of Stand 8 consists of water resources, including a stream, wetlands, and stream and wetland buffers, which constitute sensitive forest areas.

Stand Function and Management Focus

Stand 8 does not contain land preferred for training activities, as the majority of the stand consists of sensitive forest areas. Further, the stand is relatively small, and is isolated from other forest stands that do contain suitable training areas.

Stand 8 contains moderate wildlife habitat. Most notably, this stand provides aquatic habitat in the stream and adjoining wetlands. These features further constitute a water source for wildlife. While there are few mast-producing trees in this stand, the herbaceous and understory layers do contain some mast-producing plants, including highbush blueberry, greenbrier, poison ivy, grape, Japanese honeysuckle, and oriental bittersweet. Snags are rare in this stand, but are available in Stand 7 to the north and west. There is moderate herbaceous and understory cover for small animals; this cover is generally more prevalent on the wetland edges and in the uplands, although jewelweed covers much of the wetland basin.

Stand 8 is predominately a wetland forest and therefore provides a valuable water quality protection service. As described under Stand 3, vegetation stabilizes the soil around the stream and wetlands, catches rainwater before it reaches the ground, and filters runoff from upslope. These functions serve to prevent erosion and filter out total suspended solids and pollutants before runoff enters the stream. The wetlands further provide similar water treatment services by collecting runoff before it reaches the stream. Finally, the forest shades the stream, which regulates the water temperature and improves the aquatic habitat.

Invasive species inhabit the upland portion of this stand. Invasive species management in this stand would be preferable to improve the buffer habitat around the wetland. However, due to the proximity of invasive species strongholds in Stands 6 and 7, and the general lack of high quality forest stands near Stand 8, this treatment would not be the highest priority at the installation.

4.9 Stand 9: Oak

Stand 9 is a 4.9-acre stand that consists of a mid-successional oak forest. It is located in the southern portion of the CFTS property separated from the main base by State Route 4 (i.e., the area known as the "Island"). The topography in the stand resembles a bowl, as the interior of the stand is generally at a lower elevation than the stand's edges along the roadways. The northern boundary of the stand is along a large, steep berm that separates it from Stand 10. Based on historical aerial imagery, this area consisted of partial forest cover in 1939, and filled in during the 1940s. Invasive plant species were generally not observed in this stand, except potentially along the stand's edges near public road rights-of-way. Stand 9 is depicted in photographs from Plot 15 in **Appendix C**.

Composition and Structure

Stand 9 is a mid-successional oak forest. Dominant and codominant species consist of black oak and red maple. Understory species observed in the plot include red maple, highbush blueberry, and greenbrier. Overall, the overstory has low species diversity, as only two canopy tree species were observed in the plot. The herbaceous layer contains greenbrier, sedges, Indian cucumber, and lowbush blueberry, as well as red maple, sassafras, black cherry, and black oak seedlings.

The dominant and codominant trees present are generally in the 6.0-11.9 and 12.0-19.9 inches DBH. Canopy closure is approximately 69 percent, and the basal area is approximately 130 square feet per acre. Understory cover is moderate at approximately 40 percent, and the herbaceous layer is typical of deciduous hardwood forests with approximately 32 percent coverage.

Stand Condition

Stand 9 exhibits moderate gypsy moth damage. Eight standing dead trees (partially resulting from gypsy moth damage) were observed in the plot, which is unusually high mortality. These dead trees have created large openings in the canopy, which will likely spur increased growth in the herbaceous and understory layers. However, across much of the installation, black oaks appear to have generally sustained the most damage from gypsy moths, and the data plot in Stand 9 contained ten living black oak trees. Besides gypsy moths, no other major diseases or pests were observed in Stand 9.

Regeneration potential in Stand 9 is strong. The understory has moderate growth, and several species of canopy tree seedlings were observed in the herbaceous layer. As noted, both the understory and herbaceous layer can be expected to benefit from the new canopy openings. Despite the gypsy moth damage, numerous mature oak seed trees remain in the stand. The red maple saplings and seedlings, which are faster growing than oaks, may be expected to increase in frequency in the stand, but due to the lower frequency of mature red maple trees, the stand is not likely to substantially change in composition.

Stand 9 includes a steep slope across the majority of its northern boundary (i.e., the berm previously mentioned).

Stand Function and Management Focus

Stand 9 generally does not contain land preferred for training activities. While the forest composition and structure are largely suitable, the stand is relatively small and isolated from the main CFTS property. The Island is not currently fenced; it is rarely visited by CFTS personnel. Because this stand is proximal to three public roads, a hazard tree assessment should be conducted along the boundary of the stand to ensure that snags do not pose a threat to the public.

Stand 9 comprises moderate wildlife habitat for small mammals and birds. The oak trees normally provide abundant hard mast food sources, and the understory and herbaceous layers contain several soft mast species and herbaceous browsing opportunities. Numerous new snags have recently formed as a result of the gypsy moth infestation. Additionally, this stand is adjacent to Stand 10, which, as will be noted below, contains thick understory cover and a wetland (i.e., a potential water source). However, as noted, the Island is a forest fragment, as it is isolated from other forest habitats by State Routes 2 and 4 and other developed areas.

Invasive species cover in Stand 9 is generally low. Invasive species management in this stand would be preferable in order to keep invasive species from becoming prominent, especially since this stand is bounded by three public roads and has a high risk of invasive species infestation. However, this stand is rarely used by the RIARNG, so limited resources could be concentrated on the main portion of CFTS where they could achieve greater gains.

4.10 Stand 10: Red Maple

Stand 10 is a 10.1-acre stand located in the northern portion of the Island. This stand consists of two separate, but similar, areas. The first area is the slope of the berm separating Stands 9 and 10, as well as the shelf that rings the majority of Stand 10. The other portion of the stand is a basin at the bottom of the berm, which is located in the interior of the stand. These areas are differentiated with a dotted line on **Figure 1**and **Figure 2**. The outer portion of the stand, which is larger (approximately 6.4 acres), was characterized with a data plot; the interior basin (approximately 3.7 acres) was characterized by a brief walk-through survey, but safe access was inhibited by the presence of an unknown encampment. As such, the description of this stand below includes the data observed in the plot for the outer portion of the stand as well as qualitative characterization of the interior basin.

Stand 10 consists of a mid-successional red maple forest. Based on historical aerial imagery, this stand historically was converted into a reservoir in the 1960s or early 1970s. The forest in the outer portion of the

stand (i.e., the shelf) appears to have begun growing generally around the mid- or late 1970s, as the reservoir was gone by 1982. However, the interior basin of the stand was again inundated sometime between 1985 and 1988, and drained by 1997. As such, the forest in the interior basin appears to have begun growing generally in the 1990s. Invasive plant species are typically not present in the interior of this stand, but may be present along the stand edges where they border State Routes 2 and 4. Stand 10 is depicted in photographs from Plot 14 in **Appendix C**.

Composition and Structure

Stand 10 is a mid-successional red maple forest; red maple trees were the only dominant and codominant trees observed in the data plot. Additional subdominant and understory species observed in the outer portion of the stand include black birch and coastal pepperbush (*Clethra alnifolia*), while black birch and river birch (*Betula nigra*) were observed in the interior basin. Overall, the canopy layer has low species diversity, as only one species was identified in the plot. The understory, within the data plot, only contained one other potential canopy tree species (black birch). The herbaceous layer consisted of coastal pepperbush as well as New York fern. Due to the lack of diversity in each layer of the forest, the outer portion of Stand 10 is rather homogenous. The interior basin contains slightly more diversity due to the notable presence of river birch trees.

The dominant and codominant trees present are typically in the 6.0-11.9, and 12.0-19.9 inches DBH. Within the data plot, canopy closure was very high, at approximately 98 percent, and the basal area is approximately 110 square feet per acre. Understory cover averages 63 percent, also higher than normal, due to the high concentration of coastal pepperbush plants. Vegetation covers approximately 19 percent of the herbaceous layer. The interior basin was observed to contain slightly lower cover percentages, and the trees had slightly smaller DBHs on average, which would lead to a slightly lower basal area.

Stand Condition

Stand 10 contains little to no gypsy moth damage, which is congruent with the lack of oak trees observed in the stand. No other major diseases, pests, or invasive species were observed in Stand 10. However, an unknown encampment was observed in the northern portion of the interior basin. Frequent pedestrian entry into the stand could lead to more invasive species introduction, and human habitation would be expected to lead to some level of damage to the existing forest (e.g., establishment of trails/trampling of herbaceous species, cutting/destruction of vegetation, introduction of pollution, etc.). Additionally, the river birch trees in the interior basin were observed to be severely damaged, as many of them were bent over. This type of tree damage sometimes results from severe winter weather, such as ice or heavy snowstorms.

Stand 10 contains two primary features that make the majority of the stand a sensitive forest area. These include the large berm with steep slopes, as well as the wetland area located in the interior basin at the base of the berm.

Stand Function and Management Focus

Stand 10 does not contain land preferred for training activities, as the majority of the stand consists of sensitive forest areas. Further, the stand is relatively small and located on the Island, and is therefore subject to the constraints identified for Stand 9.

Stand 10 contains somewhat poor wildlife habitat. There is low species diversity in each layer of the stand, and the species present do not provide preferred food sources. Snags are rare in this stand, but are available in Stand 9 to the south. Stand 10 does provide a wetland area in the interior basin, which could be a potential water source, and abundant canopy and understory cover for small animals and birds.

Stand 10 provides an important soil stabilization function since it occupies steep slopes. The unusually high canopy and understory coverage protects the soil from the erosive impact of rainfall, and the root systems of this vegetation prevent the soil from excessively eroding during runoff events. This soil stabilization function further assists in a water quality protection function, as the stand contains a wetland in the interior basin. Stand 10 provides a forested wetland buffer around the interior wetland that also filters stormwater.

Due to the similarity of invasive species status in Stands 9 and 10, invasive species management in Stand 10 would be similar to that described for Stand 9.

5.0 Management Objectives and Recommendations

This Forest Stewardship Plan was prepared to fulfill Projects 9 and 10 in the 2001 INRMP and Project 10 in the 2007 INRMP. In turn, this plan seeks to assist the RIARNG in achieving the goals identified in the current INRMP, which are listed below in **Table 5-1**. To that end, it is recommended that the CFTS forests be managed primarily to support the military mission, protect and enhance wildlife habitat, protect water quality, and control invasive species. Due to the relatively small size of CFTS's forest resources, the time investment required for forests to regenerate, and the need for forests to provide the other aforementioned ecosystem services, no timber harvesting is recommended at this time.

To date, no intensive forest management has occurred at CFTS. On occasion, the RIARNG has utilized in-house labor to conduct manual removal of invasive species (i.e., cutting/pulling of individual plants).

Table 5-1: INRMP Management Goals

Goal No.	INRMP Management Goal
1	Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and DA regulations and policies.
2	Manage soil to minimize sediment loss and erosion.
3	Maintain water resources so they remain resilient, functional, and with no net loss of acreage.
4	Manage vegetation to support the military mission, optimize protection of existing habitats, maintain native species, and enhance wildlife habitat.
5	Manage wildland fires at CFTS in a manner that minimizes safety risks, enhances natural resources, and results in no net loss of training ability.
6	Maintain fish and wildlife populations while minimizing potential impacts to the military mission.
7	Manage rare species using an ecosystem approach, while maintaining the military mission at CFTS.
8	Minimize impacts of invasive and pest species, including plant and animal species, utilizing an Integrated Pest Management (IPM) approach.

5.1 Military Mission

Training Activities

CFTS serves the RIARNG military mission by providing a training site to prepare units of the RIARNG for transition to war and respond to the Governor's requirements, and by providing inactive duty training facilities for the assigned units. Forests at CFTS are used for navigation, search and rescue, bivouacking, and concealment training. Forest management is carefully coordinated with military training needs, and is conducted to provide forest conditions that support training while perpetuating existing forest ecosystems. Military training is conducted in accordance with the training site Standard Operating Procedures. Designated off-limits areas (e.g., special management zones [SMZ]; see **Figure 3**) are marked on training maps and in the field. The Training Site Manager (TSM), with knowledge of the training site conditions, routinely provides guidance on appropriate changes in training types or levels based on natural resources conditions.

As discussed in **Section 4.0**, Stands 1, 2, and 4, or portions thereof, generally provide the best opportunities for training activities. The remaining stands would not be preferred for training activities due to the presence of less conducive understories (e.g., high concentrations of greenbrier or multiflora rose), presence of sensitive resources, or because the stands are not contiguous with the main base (i.e., the Island). When training activities are conducted within the CFTS forests, the following management strategies can help reduce potential impacts to forest resources:

- Implementing Integrated Training Area Management (ITAM) projects to reduce erosion (e.g., maintaining adequate drainage culverts at key locations).
- Regulating access to wetlands through signage posted in the field.
- Prohibiting dead and live trees from being cut without prior approval from the TSM.
- Using only native plant species in landscaping and seed mixes.
- Scheduling training activities during times when they will be least likely to have a negative impact on the land, to the extent feasible without limiting the ability of RIARNG to meet its military mission.
- Confining vehicle traffic to existing roads.
- Crossing streams only at established trail and road culvert crossings.
- Requiring movement of soil to be approved by the TSM.
- Removing litter and trash from all bivouac areas prior to units departing the training site. No waste or garbage will be buried or dumped on site.
- Requiring off-road use of vehicles, excluding all-terrain vehicles, to be authorized by the TSM.
- Foot traffic in wetlands is permissible at any time of the year; however, because excessive foot traffic can cause soil instability, which can increase sedimentation in adjacent creeks, it should be limited to the extent practicable.

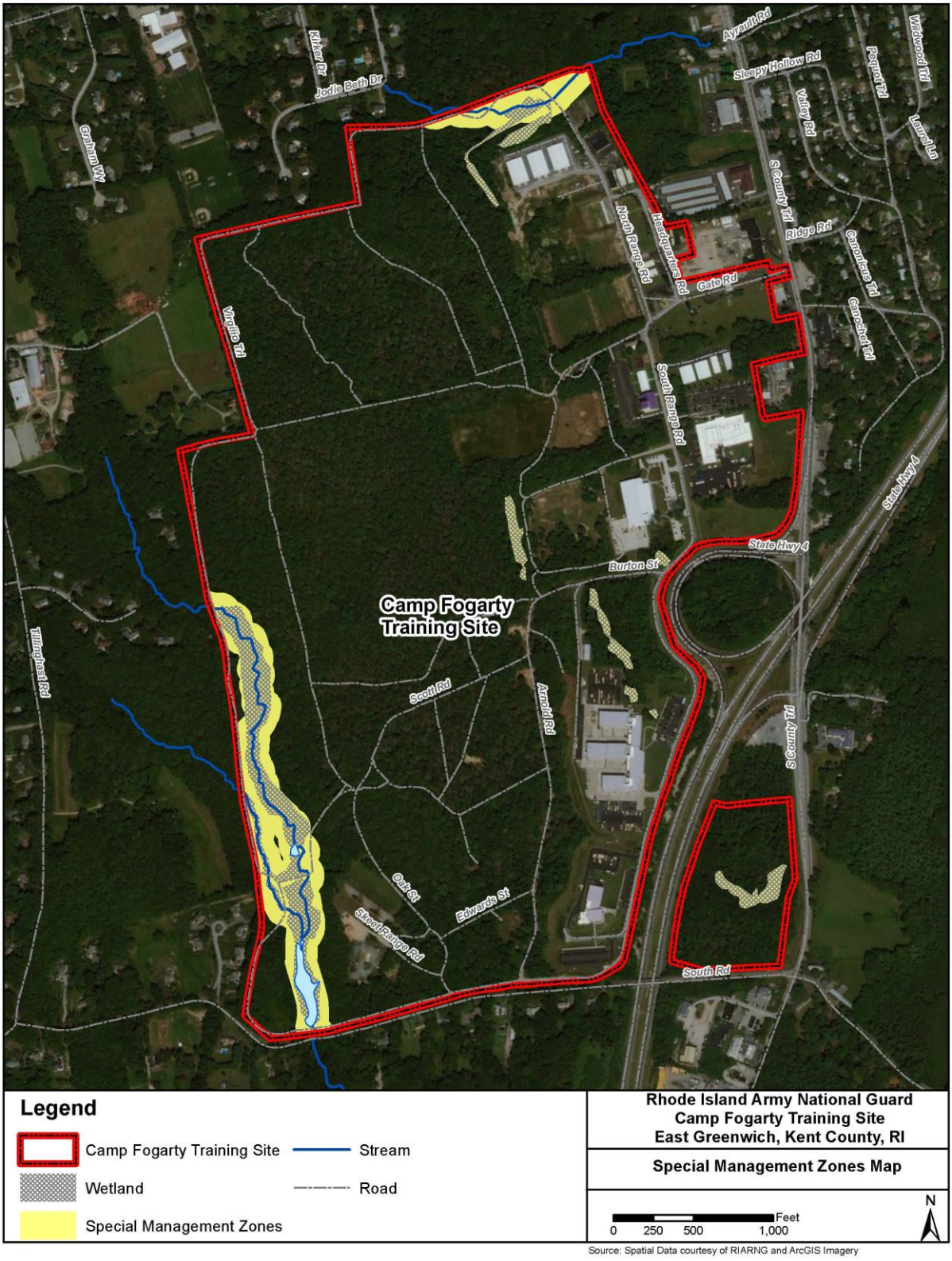

Figure 3: SMZs at CFTS

Hazard Trees

Maintaining the health of the urban forest can prevent disruptions to the military mission by reducing the risk of trees from falling into fences, roads, parking lots, utilities, and personnel. When trees are damaged to the point of posing a threat to buildings, walkways, parking lots, or other areas used by people, they are considered to be 'hazard trees.' Hazardous tree defects include decayed wood; cracks; root problems; weak branch unions; cankers; poor architecture or leaning; and dead trees, tops or branches (USDA, 2003). Currently, the primary concern in CFTS forests is the prevalence of standing dead wood (i.e., snags) resulting from the recent gypsy moth infestations. Snags can lead to safety concerns that threaten the military mission when they have the potential to fall on Soldiers or other training facility resources. These snags are most prevalent in Stands 1, 2 and 5, although they are scattered throughout other CFTS forest stands, and currently pose the greatest threat to trail users.

To maintain the safety of CFTS personnel and equipment, and the availability of the trail network for training activities, the RIARNG should consider conducting a hazard tree assessment. This assessment would include identifying all trees that are either dead or in poor health near military resources at CFTS. Based on the characteristics of each tree (e.g., proximity to military resources, type of hazardous defect, likelihood of falling branches/tree, general location, etc.), a determination can be made as to which trees should be addressed to reduce their hazard potential. Addressing hazard trees could take several forms. Some trees, depending on their location, may need to be felled, while others may only need to have particular branches or the top of the tree trimmed. When possible, preference should be given to tree trimming, as snags as short as 6 feet can generally still provide valuable wildlife habitat (CTDEEP, 1999). The publication *Urban Tree Risk Management: A Community Guide to Program Design and Implementation* provides detailed information on assessing and addressing hazard trees (USDA, 2003); it is available online at https://parks.ny.gov/publications/documents/UrbanTreeRiskMgmnt.pdf.

Aesthetic and Noise Buffers

CFTS forests currently provide valuable aesthetic and noise buffers between the installation and neighboring properties, particularly residential properties. When feasible, and consistent with the military mission, these buffers should be retained. The Town of East Greenwich has a zoning regulation that commercial developments must provide a 100-foot buffer between the development and adjacent residential properties (Code of the Town of East Greenwich, RI § 260-8I). While this regulation may not legally apply to CFTS, the RIARNG should still seek to maintain at least a 100-foot buffer along its boundaries with other properties. Preferably, this buffer would consist of existing or replanted forest, but could also consist of planted evergreen screening trees.

5.2 Wildlife Habitat and Protected Species

A forest can be home to countless species of wildlife, including birds, mammals, reptiles, amphibians, and many types of invertebrates. Each of these species has specific habitat needs and requirements, and the requirements among species may differ radically. While old-growth trees are needed by some species, others need young, developing stands of pole-size trees or saplings. Many common species of mammals, birds, reptiles, amphibians, and insects have been identified at CFTS, and are discussed in the 2019 INRMP.

CFTS provides several types of habitats and open space for a variety of species, including migratory birds that migrate annually within and beyond North America. The most prominent habitats at CFTS are mature deciduous and deciduous-coniferous forest, which comprise the majority of the installation outside the Cantonment Area. Other smaller, but notable, habitats include a meadow, pond, boulder pile, and numerous grass fields periodically maintained by mowing. Although a more varied assemblage of habitats generally leads to greater biodiversity, this is largely precluded by the size of CFTS. As such, CFTS forests should be managed to maintain their existing types; no active forest conversion activities are recommended at this time. Within the deciduous and deciduous-coniferous forests, CFTS does contain multiple forest type associations (e.g., oak-pine, red maple-oak, etc.) and a variety of understory structures and compositions. This provides diversity within the mature forest environment. Further, large, contiguous tracts of forest are valuable habitats for many species. Regionally, these habitats are becoming rarer due to suburban sprawl, particularly of residential developments, which fragment forest habitats with new roads, housing, and commercial centers (RIDEM, 2015). While CFTS forests are not considered large (i.e., 500 acres minimum), they are large enough to independently provide valuable habitat to many species. To protect this habitat at CFTS, new construction activities should be sited, to the extent feasible, within areas of the installation that are either not forested, already fragmented, or immediately adjacent to developed areas. Further fragmentation of CFTS forest resources should be minimized when possible.

Forests should also be managed to maintain connective corridors between habitats when possible and when consistent with the military mission. As previously discussed, new construction at CFTS should seek to avoid fragmentation of the forested areas, when feasible. However, the role of CFTS forests in the regional landscape can also be considered. According to the East Greenwich Comprehensive Plan, the Town of East Greenwich Land Trust (Municipal Land Trust) owns outright, or the development rights for, two properties adjacent to or within the immediate vicinity of CFTS forests: the Briggs Farm is adjacent to the northwestern boundary of the installation (i.e., Stands 1 and 2), and the Briggs-Boesch Farm is catty-corner to the southwestern corner of the installation (i.e., Stand 2 Annex 2). These properties consist primarily of agricultural and forested land, and were acquired by the Municipal Land Trust for the purpose of conservation. The Municipal Land Trust also owns Merriam Field, Frenchtown Park, Laurel Wood, and Fry Family Nature Preserve (Town of East Greenwich, 2014). Cumulatively, these holdings comprise an apparent linear corridor of conservation-oriented properties in East Greenwich, and CFTS forests, particularly Stands 2 and 3, are currently a contributing element to this corridor.

Within CFTS, snags, living trees with cavities, fallen logs, and trees with exfoliating bark serve important ecological functions and are vitally important to many types of wildlife. These resources provide nesting, roosting, and denning sites for numerous species of birds, bats and other small mammals, reptiles, and amphibians. Further, as they decompose, they become a source of food for invertebrates, which then subsequently provide food for other species. Eighty-five (85) species of North American birds, 35 of which occur in the Northeast United States, as well as many mammals, reptiles, and amphibians use cavity trees and snags for cover and for feeding. Snags are generally more valuable the larger they are, but snags as little as 6 feet tall and 3 inches DBH still provide valuable habitat. Ideally, forests should contain at least three snags of at least 12 inches DBH per acre (CTDEEP, 1999). As noted in **Section 4.0**, CFTS forests, most notably Stands 1, 2, and 5, have recently been substantially impacted by gypsy moth infestation, which has led to the creation of many new snags that will also become fallen logs over time. To ensure high quality habitat is maintained within forested areas at CFTS, all of these valuable resources should be left in place when they do not pose a fire hazard or safety hazard to troops.

Currently, the only federally listed species that may occur at CFTS is the federally threatened northern long-eared bat (NLEB). As discussed in the INRMP, this species forages in forest understories and roosts in trees with cavities, crevices, or exfoliating bark. Although NLEBs have not been documented at CFTS, the installation does contain suitable habitat for this species, which could further improve if the newly created snags are generally left undisturbed and become suitable roost trees.

While no federally listed species are known to occur at CFTS, several state-listed and other rare species have been observed at CFTS during past surveys, including two species of plants, four species of birds, one species of dragonfly, and one species of robber fly (ABS, 2000; Leeson, 2004; Brown & Puryear, 2005). The primary forested sensitive habitat that has been identified during these surveys is the stream complex in the southwestern portion of the installation (i.e., Stand 3). Preservation of that riparian area has the highest likelihood of supporting rare species at CFTS generally, and also protects the largest aquatic habitat and water source at the installation. Because the flora and fauna planning level surveys (PLS) previously conducted at CFTS are between 13 and 18 years old, it is recommended that these PLSs be updated, with an emphasis on rare, threatened, and endangered (RTE) species. Additional habitat management actions (e.g., designation of additional SMZs for sensitive habitats, or minor vegetative alterations) could be considered in CFTS forests once more current information on RTE species is available.

5.3 Water Quality and Watershed Protection

As described above, forested riparian areas provide numerous services to forest ecosystems, including rainfall and stormwater retention, filtering of pollutants, soil stabilization, and water temperature moderation. All streams and most wetlands, as well as their immediate vicinities, are currently forested at CFTS. SMZs (see **Figure 3**) have been designated for all streams and wetlands, as well as 50- to 100-foot buffers around these resources, as applicable, at the installation in accordance with RIDEM freshwater wetland regulations. Currently, SMZs include buffers around the streams and adjacent wetlands located in the southwestern and northeastern portions of the installation.

To the extent practicable, no clearing should be conducted within SMZs, so that they can continue to protect the quality of CFTS water resources and provide aquatic habitat, drinking water sources, and movement corridors for wildlife. Additionally, prior to any land disturbance, mowing, tree removal, or construction activities within SMZs, the TSM and the Environmental Office should review and approve these activities. Vehicle operations within SMZs should be avoided except on designated trails and roads, and streams should be crossed only at established trail and road culvert crossings.

Soil properties and erosion potential of soils should also be considered prior to any military and forest management activities at CFTS with the potential for ground disturbance. Soil erosion, even outside of SMZs, has the potential to run off into surface water features and degrade water quality. Soil types and properties are discussed in detail within the CFTS INRMP, and are managed to prevent erosion and subsequent sedimentation in streams. At a minimum, erosion control and stormwater management Best Management Practices (BMPs) should be implemented during all land-disturbing activities, including ITAM projects and road/trail maintenance. Following land-disturbing activities, bare soil should be revegetated with native species to prevent runoff and water pollution. Native species suitable for planting at CFTS can be found using the *Rhode Island Native Plant Guide* developed by the University of Rhode Island and RINHS. This online tool suggests native plant species based on a variety of site-specific factors, such as type of plant desired, sun exposure, moisture level, wildlife uses, height, and edible or medicinal uses, and

is available at https://web.uri.edu/rinativeplants/. Generally, mast-producing (hard and soft mass) species are favored to improve habitat for many wildlife species, and mixed species plantings are preferable to single species plantings. However, the unique needs of each planting, which could also include shade, ornamental interest, etc., will need to be evaluated on a case-by-case basis.

Please refer to the INRMP for further information regarding water quality and soil conservation BMPs.

5.4 Pest Species and Invasive Species Management

IPM is "a comprehensive approach to pest control or prevention that considers various chemical, physical, and biological suppression techniques; the habitat of the pest; and the interrelationship between pest populations and the ecosystem" (AR 200-1). The statewide IPM Plan includes pest identification and management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program (RIARNG, n.d.). Overall, invasion by non-native species is currently the most detrimental factor affecting the health of the natural communities at CFTS. IPM and invasive species management at CFTS are discussed in detail in the INRMP; however, a summary is provided below.

Invasive Plant Species

Invasive, non-native species have the capability to significantly impact native vegetation by outcompeting native species, or by changing fuel loads and flammability of natural areas. A key element of INRMP implementation is to ensure "no net loss" of military training capability. Management of undesirable species is necessary to maintain military training areas in usable condition, and to maintain natural ecosystems best suited to support native plant and wildlife populations. General invasive species management strategies and BMPs are provided in the INRMP.

An invasive species management plan was drafted for CFTS in 2008 (Leeson, 2008) following the Botanical Inventory and Invasive Plant Mapping report prepared in 2004 (Leeson, 2004). Based on field reconnaissance completed in 2018, the general findings of the invasive species survey from 2004 (i.e., predominant species and locations) remain relevant. Although 31 invasive plant species were identified at CFTS, the invasive species management plan identified 9 of these species as priority for management, based on the following criteria: (1) they are easily identifiable; (2) they are prevalent in areas already managed by RIARNG; or (3) they have limited distribution in managed areas, and have the potential to cause widespread damage at CFTS. The nine species are autumn olive, Japanese barberry, oriental bittersweet, black swallowwort (*Vincetoxicum nigrum*), winged euonymus, Japanese honeysuckle, bush honeysuckles, Japanese knotweed (*Polygonum cuspidatum*), and multiflora rose. Please refer to the INRMP, Botanical Inventory and Invasive Plant Mapping report, and invasive species management plan for detailed information on these species, their locations at CFTS, and specific treatment recommendations for each (Leeson, 2004; Leeson, 2008).

The CFTS invasive species management plan outlines a 4-step process to invasive species control, which includes prevention and early detection, monitoring, treatment, and evaluation; these steps are discussed further in the INRMP. Generally, new populations of invasive species that have not yet established should be targeted first for management. Once established, invasive plant populations are difficult and expensive to manage, but limited resources can be most effective if they prevent invasions in the first place. At CFTS,

invasive species are typically most prevalent in Stands 4, 6, 7, and 8. They are also typically found along the trail network. Due to the movement of personnel and equipment along the trail network, including between stands with prominent invasive species and stands generally without invasive species, it is one of the primary pathways for invasive species to spread throughout the installation. As such, the trail network should be considered a priority for invasive species treatment in addition to the stands with the lowest existing concentrations (e.g., Stands 1, 2, 3, and 5). Remaining invasive species treatment resources can be focused on combatting established invasive species populations. In this case, the populations should be treated from the outside in, in order to contain the populations to their current locations to the extent possible.

Mechanical and Chemical Control

The two primary methods for invasive species removal at CFTS are mechanical and chemical. Mechanical control includes cutting, mowing, uprooting, and other methods that physically harm invasive plants. However, unless invasive plants are completely uprooted and removed from the natural environment, they will typically resprout in response to mechanical control. As such, these methods require repeated application to be effective. Chemical control involves the application of herbicides to kill invasive species. Herbicides can be applied via several methods, such as foliar spray, basal spray, or 'painting' of cut stumps. Often, a combination of mechanical and chemical treatment is most effective in controlling invasive species. For example, cutting invasive plants down to the stump and then applying herbicides, which poison the root system, is effective at killing individual plants and preventing resprouts. This method is also one of the most ecologically safe ways to apply herbicides, as it poses the least risk for overspray that could potentially harm native species nearby. There are numerous commercially available herbicides that can be used to treat different invasive species, including some herbicides that are approved for use near wetlands. The CFTS invasive species management plan contains specific herbicides recommended for treating each priority management species at CFTS.

Biological Control

One possible method of biological control of invasive species is the use of a goat herd to eat the vegetation in a particular area. This method involves contracting a private company to fence their goats within a desired tract of property until they clear the vegetation to the property owner's satisfaction. Goats will consume a wide variety of vegetation, including many CFTS priority management species, such as multiflora rose, autumn olive, and honeysuckles. The RIARNG has utilized this method of vegetation control previously at Camp Varnum Training Site to clear invasive species (Hartsook, 2016). Because goats are generalists, they are best utilized in low quality habitats where invasive species are very prominent. As is the case with other methods of mechanical control, undesirable plants may resprout following goat treatment and require follow-up treatment with additional mechanical and/or chemical control methods. However, goat treatment is likely to improve the ability of personnel to move throughout areas previously overgrown with invasive species, so follow-up control could be conducted more easily and efficiently, as necessary.

At CFTS, there are several areas where goat treatment could be considered. Stand 7, particularly the western portion, contains the highest concentration of invasive species at the installation. This stand also generally does not contain high quality trees or native vegetation. Allowing goats to clear the ground layer and understory in this stand where invasive species, such as multiflora rose and oriental bittersweet, are most prominent would facilitate easier future management of invasive species in this area. Two additional

areas that could be considered for goat management are the dense greenbrier thickets in Stands 1 and 5 and in Stand 4. Although greenbrier is a native species, greenbrier coverage has reached the point that it severely restricts personnel movement, and military use generally, in these areas. Goat treatment could clear these areas of the established greenbrier thickets; while the greenbrier would almost certainly resprout afterwards, there would be an opportunity for other forest understory species to gain a toehold and begin establishing a more open ground layer and understory layer in these stands. However, it should also be noted that invasive species, which are generally not prominent in dense greenbrier thickets currently, could move into these areas following the goat treatment and require additional control. Further, although this area is not technically a forest, goat treatment could be utilized in the pollinator plot meadow in the southwestern corner of the installation. Meadows should typically be burned or mowed every few years to prevent woody vegetation from establishing. Since the use of prescribed fire is not currently a possibility, a less intensive goat treatment could potentially be an effective alternative to mowing. However, since woody vegetation in this pollinator plot likely already exceeds the maximum height that goats can feed, supplementary removal of woody shrubs would likely be necessary.

Forest Insect Pests

Potential insect pests of concern to forest resources at CFTS primarily include gypsy moths and emerald ash borers (EAB; *Agrilus planipennis*). Eastern tent caterpillars (*Malacosoma americanum*), forest tent caterpillars (*Malacosoma disstria*), and winter moths (*Operophtera brumata*) are also present in Rhode Island forests and may occur at CFTS. Forest stands within CFTS are inspected regularly for evidence of pest infestations. However, forest pest species are generally not controllable except on the scale of individual trees. Additionally, due to the small size of CFTS forests, silvicultural control methods (i.e., logging and removal of infested forest stands) are not practicable.

Gypsy Moth

Gypsy moth caterpillars have distinctive markings. Behind their head they have five pairs of blue spots, followed by six pairs of red spots. These hairy caterpillars are approximately 2 to 2.5 inches long, and feed on tree and shrub foliage from approximately mid-May until the beginning of July (Hoover, 2000). Host trees often consist of oaks, aspen, apple, speckled alder, basswood, birch, hickory, maple, cottonwood, and willow trees, although numerous other species, including conifers, may be eaten as well (RIDEM, 2018). Male gypsy moths are brown, while females are white. Once in the moth phase, they do not feed, and live for only 6 to 10 days, during which they mate and the females lay eggs. Egg masses can be laid on anything, including anthropomorphic objects (Stafford, 2018). When these items are moved, the moth eggs “hitchhike” to other locations. For this reason, it’s extremely important to check all vehicles and equipment when moving between infested areas and non-infested areas.

In large populations (i.e., during outbreaks), gypsy moth caterpillars are capable of stripping plants bare, leaving them vulnerable to secondary insect and disease attacks (Stafford, 2018). In 2016 and 2017, this species defoliated the majority of forest stands 1 and 5 in back to back years, as noted above. Based on a forest survey conducted in June 2018, many of the oak trees have been able to survive and are recovering from this stress. However, many oak trees have also been killed, and in some areas, whole new openings in the canopy have been created from oak tree mortality.

Gypsy moth populations are largely influenced by spring season weather. In wetter years, the fungus *Entomophaga maimaiga* and virus Nucleopolyhedrosis (NPV) are more prevalent in forests, which typically kill gypsy moth larvae and caterpillars (RIDEM, 2018). During gypsy moth outbreaks, there are no proven ways to protect forests, but it may be possible to protect individual trees with some success. The insecticide *Bacillus thuringiensis kurstaki* (a naturally occurring bacterium) has proven successful at killing gypsy moth caterpillars; however, while it is safe for humans and pets, it may result in mortality of other caterpillars present during application. Overall, there is little RIARNG can do to protect its oak-dominated forest stands, but it could consider applying pesticides to particular landscape trees (primarily oaks in the Cantonment Area) during future outbreaks in order to help them survive. Mature, healthy trees are typically resilient and can recover from one defoliation event. It is when several consecutive defoliation events occur that the forests are at greatest risk (RIDEM, n.d.).

In addition to the gypsy moth, the eastern tent caterpillar and forest tent caterpillar (native species) are found in Rhode Island and can defoliate trees early in the growing season. The effects of these species on individual trees are similar to gypsy moths, but generally they will not lead to tree mortality unless in combination with other insect outbreaks or environmental stressors (e.g., drought) (NYSDEC, 2018). Winter moths, an invasive species, also occur in Rhode Island and can lead to widespread defoliation events, but this species has declined in recent years, and it is believed that natural predators and an introduced biological agent are beginning to control this species (USFS, 2012; Drummond, 2018). Treatment of each of these additional defoliating caterpillars is similar to that of gypsy moths, in that it can only effectively be conducted on individual trees.

Emerald Ash Borer

EABs are generally up to 0.5 inch long and have metallic emerald green wing covers. Adults are active between May and July and eat leaves. Larvae, which are larger than the adults, can be up to 1.25 inches long and have a creamy white abdomen that has ten segments. Larvae burrow distinctive S-shaped tunnels beneath the bark of ash trees, including white, black, red, and green ash, and are active from June through the fall. When they emerge as adults, they exit the tree through D-shaped holes in the bark (RIDEM, 2009). The cumulative impact of EAB larval feeding inevitably causes the host tree to die.

EABs were discovered in Rhode Island (Washington County) for the first time in July 2018. Native to Asia, this pest has been recorded in 35 US states, and has killed tens of millions of ash trees. With its first confirmed observation in Rhode Island, the state has joined the federal quarantine, which heavily regulates the transport of all ash trees, including branches, chips, logs, etc., and firewood of all hardwood tree species out of those states. Currently, there is no proven method to control EAB in forested areas. As such, it is likely that EABs will have a negative impact on the ash tree population at CFTS in the coming years, depending on the rate at which the EAB spreads. However, the use of repeated pesticide treatments (e.g., trunk injections or soil treatments every one to two years) on individual ash trees can successfully help those trees resist EAB infestation (RIDEM, 2018). The RIARNG could consider the costs of these treatments locally and evaluate whether any ash trees at CFTS (e.g., landscape trees in the Cantonment Area) may be worth specifically saving.

5.5 Fire Management

Historically, particularly prior to European settlement, fire was a natural and integral component of forest ecosystems throughout the Northeast US. Periodic, low-intensity fires would reduce fuel loads and the risk of catastrophic fires, reduce understory density, and release fire-tolerant species from competition plant species beginning to creep into the ecosystem. This vital component of the ecosystem is largely absent from forests today, especially near developed areas, due to the risk it poses to the health and safety of both people and property. However, to achieve the benefits of a natural fire regime in a controlled manner, land managers can now plan and seek approval for prescribed burns – carefully planned and monitored fires intentionally set under specific conditions in order to achieve specific management objectives for a property in a safe and effective way. The RIARNG does not presently conduct prescribed burns at CFTS, but has considered introducing fire to manage fuel loads and species composition and density in forested areas. Conducting prescribed burns at CFTS would be difficult due to the proximity of residential and commercial properties on all sides of the installation and potential concerns regarding smoke management and safety. However, under favorable conditions, it could be possible to conduct prescribed burns on smaller tracts of interior forest at the installation, such as in Stands 1 or 2.

As noted in the INRMP, the first step in establishing a fire management program at CFTS would be for the RIARNG to develop an Integrated Wildland Fire Management Plan (IWFMP), which would fully evaluate the potential for a prescribed burning program to be implemented at the installation. Additionally, and more importantly, the IWFMP would specify guidance, procedures, and protocols for the prevention, detection, and suppression of wildfires at CFTS. CFTS does not have a history of wildfires, but were one to occur, an IWFMP would help to protect both the built and natural environments and help prevent wildfires from spreading to neighboring properties to the extent practicable.

Currently, the risk of wildfires at CFTS is generally low to moderate. Locations at the installation that would be considered to have a moderate wildfire risk are generally those with denser growth or more frequent dead wood in the understory layer. Examples of these locations include Stand 7, where the understory has nearly 50 percent coverage and a higher abundance of oriental bittersweet vines that reach high into the canopy; Stand 6 and the eastern central portion of Stand 1, where dead eastern redcedar trees and dead lower pine braches create a fire ladder; and Stand 10, which contains a very thick understory and has some downed trees/limbs. Wildfire risk is generally low throughout the rest of the CFTS forest stands due to the presence of water resources and/or thin understories. It is worth noting that Stands 1, 2, and 5 now contain an abundance of snags resulting from the gypsy moth infestations. This standing dead wood is not currently a high risk for wildfire because they are still early in the decomposition process. However, over the coming years, these stands could increase in wildfire risk as the snags rot and increase in flammability. As standing dead wood, they could increase the risk of a potential wildfire spreading into the forest canopy, and as they begin to fall or drop branches, they are likely to increase the fuel loads on the forest floor.

One way to control fires at CFTS would be through the establishment of designated firebreaks at the installation. The two stream corridors at CFTS, along the southwestern and northeastern boundaries, currently comprise natural firebreaks. Additionally, the trail network, which generally consists of stone and/or bare soil, is non-flammable and would inhibit the spread of fires in the ground layer. However, an IWFMP would determine which trails should be managed as official firebreaks, such as through minimum widths, additional shrub or understory control (e.g., mowing) along their edges, or other actions.

6.0 Conclusion

Based on the field sampling effort conducted between 5-7 June 2018, ten distinct forest stands were identified at CFTS, encompassing approximately 239.2 acres. These stands vary in age: some stands predate available historical aerial imagery (circa 1939), while others have been influenced by land management at CFTS over time, including the transition of historical farm fields into forests and the development of program areas. Oak trees, particularly black oak and white oak, are generally the most prevalent dominant and codominant trees at the installation. Other dominant and codominant trees with a notable presence at CFTS include, but are not limited to, red maple, white pine, black birch, and several other species. In most stands, the dominant and codominant trees are within the 6.0-11.9 and 12.0-19.9 inches DBH size classes, but larger trees are also present.

The oak trees at CFTS have been adversely impacted by substantial gypsy moth damage over the previous two years. The level of enduring damage varies from individual branches exhibiting dieback to full tree mortality. In some locations, oak mortality has resulted in large new canopy openings, which are likely to increase growth of the herbaceous and understory layers. However, many oak trees appear to be recovering from the damage, and will likely be successful provided no further defoliation events occur in the near future. Besides this gypsy moth damage, the forest stands at CFTS appear to be in relatively good condition. No other major diseases or pests were noted. Further, invasive species coverage is generally low in most stands, although it has the potential to increase as it spreads along the trail network. Sensitive forest areas at the installation are primarily located in Stands 3, 7, 8, 9, and 10; these areas contain streams, wetlands, and steep slopes.

Future management of CFTS forests should focus primarily on supporting the military mission, protecting and enhancing wildlife habitat, protecting water quality, and controlling invasive species. Stands 1, 2, and 4, or portions thereof, generally provide the most suitable forested areas for training activities. To the extent practicable, new development at CFTS should avoid further fragmentation of forested areas, and off-trail training and other types of disturbance should avoid established SMZs in order to protect wildlife habitat and water quality. Many new snags have been created at CFTS due to the gypsy moth infestations. These snags create valuable new habitat, but also present a potential health and safety threat to RIARNG personnel and equipment. A hazard tree assessment should be conducted for all snags located in close proximity to military resources (e.g., buildings, trails, above-ground utilities, etc.) in order to determine which trees may need to be felled or trimmed. Finally, besides the potential for future forest pest infestations, which generally cannot be managed on a forest-wide scale, invasive species currently pose the greatest threat to CFTS forests. While most stands contain generally low invasive species coverage, this coverage would be expected to expand without proactive management.

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Appendix A: Forest Sampling Data Worksheets

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Property: CFTS Prepared By Busam / Moreland

Stand #: 1 Plot #: 1 Plot Size: 1/10 ac Date: 6/5/18

Basal Area in sf/acre: 160

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple			1													10
White Pine																2
Black Oak											X					5
White Oak																2
Total Number of Trees per Size Class	5			6			6			2			0			19
Number & Size of Standing Dead Trees	0			0			0			0			0			0

List of Common Understory Species 3'-20':
Red Maple

% of Canopy Closure					
C	N	E	S	W	Total
100	80	25	70	95	74

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
common greenbrier, Princess Pine, Hay scented fern, Indian cucumber, Dangleberry, White oak, red maple

% Understory Cover 3'-20'					
C	N	E	S	W	Total
5	5	35	0	5	10

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
35	90	35	35	40	47

Comments: Gypsy moth damage: Moderate; spp. affected include black oak, white oak
Localized areas of heavy damage / mortality
Fire hazard: low, thin understory, little dead / downed wood

Sheet 1 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 5 Plot #: 2 Plot Size: 1/10 ac Date: 6/5/18

Basal Area in sf/acre: 90	Size class of trees > 20' height within sample plot															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple																4
Total Number of Trees per Size Class	0			2			2			0			0			4
Number & Size of Standing Dead Trees	0			0			2 white oak			2 black oak			0			4

List of Common Understory Species 3'-20':
blueberry/deerberry

% of Canopy Closure					
C	N	E	S	W	Total
45	50	0	5	75	35

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
common greenbrier
Virginia creeper
dangleberry
princess pine
red maple
Hay scented fern

% Understory Cover 3'-20'					
C	N	E	S	W	Total
0	0	0	0	0	0

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
25	100	100	100	95	84

Comments Gypsy Moth damage: Severe - most oaks killed/badly damaged
↳ black oak in perimeter, also white oak
Fire hazard: low-mid - standing dead wood, little understory, heavy greenbrier

Sheet 2 of 15

saw red-tailed hawk

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busem / Moreland

Stand #: 5 Plot #: 3 Plot Size: 1/10 ac Date: 6/5/18

Basal Area in sf/acre: 90

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Oak																4
Red Maple			1													8
White Oak																3
Total Number of Trees per Size Class	5			2			7			1			0			15
Number & Size of Standing Dead Trees	0			0			1 black oak			0			0			

List of Common Understory Species 3'-20':
Black cherry
dangleberry
red maple

% of Canopy Closure

C	N	E	S	W	Total
80	50	95	95	80	80

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
greenbrier
White oak
red maple
sedge

% Understory Cover 3'-20'

C	N	E	S	W	Total
70	0	0	0	25	19

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
90	100	85	80	80	87

Comments: Gypsy moth damage: moderate, some fatality. Black oak + white oak affected
Fire hazard: low
old, large burrow in plot ~~Mayle~~ Fox

Sheet 3 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 7 Plot #: 4 Plot Size: 1/10 ac Date: 6/5/18

Basal Area in sf/acre: 80

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple			:		L			•								9
Black Cherry					•			•								2
Black Locust					:	:		•	•							6
Eastern Cottonwood					•											1
Green Ash					•											1
Eastern Redcedar						•										1
Total Number of Trees per Size Class	2			14			4			0			0			20
Number & Size of Standing Dead Trees	1 E. redcedar			0			0			0			0			1

2/3 or 3/4 of way into canopy

List of Common Understory Species 3'-20':
Oriental bittersweet, black locust, multiflora rose, green ash, arrowwood, spicebush

% of Canopy Closure

C	N	E	S	W	Total
100	95	15	0	75	57

Percent of Invasive Cover per Plot (All Layers): 75

Plot Successional Stage: early-mid

List of Herbaceous Species 0'-3':
multiflora rose, greenbrier, Virginia creeper, Jack in the pulpit, Oriental bittersweet, Japanese honeysuckle, white oak, black oak, Rubus spp., bush honeysuckle

% Understory Cover 3'-20'

C	N	E	S	W	Total
50	20	65	80	25	48

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
80	80	60	10	85	63

Comments: Gypsy moth damage: no mature oaks in plot

Fire hazard: low-mid, decent understory, some vines, some dead downed wood

Sheet 4 of 15 Trees of low value/poor condition

Small wetland/seep in plot

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 8 Plot #: 5 Plot Size: 1/10 ac Date: 6/6/18

Basal Area in sf/acre: 120

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple		⊠	⊠		LI			1:								33
Black Oak			•		•											2
Eastern Cottonwood		•			•											2
Eastern Redcedar			•													1
Total Number of Trees per Size Class	24			9			5			0			0			38
Number & Size of Standing Dead Trees	0			0			0			0			0			0

List of Common Understory Species 3'-20':
multiflora rose Autumn olive
red maple
spicebush

% of Canopy Closure					
C	N	E	S	W	Total
100	25	100	50	100	75

Percent of Invasive Cover per Plot (All Layers): 10

Plot Successional Stage: early - mid

List of Herbaceous Species 0'-3':
highbush blueberry
greenbrier
Oriental bittersweet
multiflora rose
Japanese honeysuckle
Virginia creeper
Jewelweed
woodreed
Poison ivy
arrowwood
rushes
Jack-in-the pulpit
Cinque

% Understory Cover 3'-20'					
C	N	E	S	W	Total
35	15	35	85	15	37

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
40	5	30	60	45	36

Comments Gypsy moth damage: little to none
Fire hazard: low, wetland, moderate understory w/ some dead twigs

Sheet 5 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 6 Plot #: 6 Plot Size: 1/10 ac Date: 6/6/18

Basal Area in sf/acre: 140

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Eastern redcedar																4
Black Oak																14
Red Maple																8
White Oak																2
Black Cherry																2
Total Number of Trees per Size Class	8			14			7			1			0			30
Number & Size of Standing Dead Trees	1 Black Cherry			0			0			0			0			1

List of Common Understory Species 3'-20':
black cherry, eastern redcedar, white oak, Autumn olive, black birch, multiflora rose, red maple

% of Canopy Closure

C	N	E	S	W	Total
70		95	95	45	76

Percent of Invasive Cover per Plot (All Layers): 35

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
greenbrier, white oak, poison ivy, sedges, Japanese barberry, hay scented fern, multiflora rose, Virginia creeper, oriental bittersweet, Japanese honeysuckle

% Understory Cover 3'-20'

C	N	E	S	W	Total
30		15	30	20	24

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
70		5	75	55	51

Comments: Gypsy moth damage: low, mostly unaffected
Fire hazard: low-moderate, some down wood/understory

Sheet 6 of 15 tent caterpillar tent observed

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busom/Moreland

Stand #: 1 Plot #: 7 Plot Size: 1/10 ac Date: 6/6/18

Basal Area in sf/acre: 130

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
White Pine					:			:								4
White Oak					: :			: :								6
Red Maple			1:		:			:								8
Black Oak								:								2
Sassafras						.										1
Black Birch			.													1
Total Number of Trees per Size Class	6			8			8			0			0			22
Number & Size of Standing Dead Trees	3 E. redcedar 1 White Pine 2 red maple			7 E. redcedar			1 White pine 1 white oak			0			0			15

List of Common Understory Species 3'-20':
Greenbriar
Red Maple
Sassafras

% of Canopy Closure

C	N	E	S	W	Total
70	90	100	80	40	76

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Greenbriar
Indian cucumber
Princess pine
Hay scented fern
Virginia creeper
white oak
red maple
ground cedar

% Understory Cover 3'-20'

C	N	E	S	W	Total
100	10	15	0	0	25

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
5	5	5	15	5	7

Comments: Gypsy Moth: Moderate damage w/ fatality; affected white oaks + black oaks
Fire hazard: Moderate; down + standing dead wood (E. redcedar), dead lower pine branches

Sheet 7 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busom / Moreland

Stand #: 3 Plot #: 8 Plot Size: 1/10 ac Date: 6/6/18

Basal Area in sf/acre: 130

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Pignut Hickory		•	•••		•											4
Northern Red Oak								•								1
Black Oak			•		•••			•								6
Black Birch		•	••		••	•		••								11
Red Maple					•			••		•						4
White Oak			•												•	1
Total Number of Trees per Size Class	9			11			~~7~~ 6			1			0			27
Number & Size of Standing Dead Trees	0			0			0			0			0			0

List of Common Understory Species 3'-20':
common witch hazel
pignut hickory
red maple
highbush blueberry

% of Canopy Closure					
C	N	E	S	W	Total
100	95	85	95	100	95

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Virginia creeper
common greenbriar
hay scented fern
New York fern
sassafras
red oak
skunk cabbage
spicebush
Indian strawberry

% Understory Cover 3'-20'					
C	N	E	S	W	Total
100	25	75	55	5	52

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
10	90	25	20	75	44

Comments: Gypsy Moth damage: low to none
fire hazard: low; little dead wood but somewhat thick understory

Sheet 8 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam / Moreland

Stand #: 3 Plot #: 9 Plot Size: 1/10 ac Date: 6/6/18

Basal Area in sf/acre: 120

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Birch			L													12
Pignut Hickory																1
Black Oak																3
Red Maple																6
Black Locust																1
Total Number of Trees per Size Class	10			7			5			1			0			23
Number & Size of Standing Dead Trees	0			0			0			0			0			0

List of Common Understory Species 3'-20':
Black birch, Pignut hickory, spicebush, Oriental bittersweet

List of Herbaceous Species 0'-3':
Hay scented fern, woodreed grasses, Jack in the pulpit, Multiflora rose, Spicebush, Jewelweed, poison ivy

% of Canopy Closure					
C	N	E	S	W	Total
95	70	95	100	10	74

% Understory Cover 3'-20'					
C	N	E	S	W	Total
5	50	10	20	60	29

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
5	5	60	50	70	38

Percent of Invasive Cover per Plot (All Layers): 10

Plot Successional Stage: mid

Comments: Gypsy Moth damage: low to none
Fire hazard: low, some dead downed wood, moist area from stream/wetlands

Sheet 9 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam / Moreland

Stand #: 4 Plot #: 10 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 110

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple			::		·	·		11								13
Black Locust								·								1
Black Cherry					:·			:·								4
Black Oak								:·								2
Total Number of Trees per Size Class	4			4			12			0			0			20
Number & Size of Standing Dead Trees	0			3 Black locust 1 Black cherry			1 Black locust			0			0			5

List of Common Understory Species 3'-20':
White Oak, Poison Ivy
Black Birch, Black Cherry
Green Ash
Red Maple

% of Canopy Closure

C	N	E	S	W	Total
60	100	100	95	100	91

Percent of Invasive Cover per Plot (All Layers): 10

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Hay scented fern, multiflora rose
Arrowwood, black locust
greenbriar
Virginia creeper
Black Cherry
Poison Ivy
Rubus spp.

% Understory Cover 3'-20'

C	N	E	S	W	Total
100	0	10	50	5	33

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
60	60	60	70	85	67

Comments: Gypsy Moth damage: low
Fire hazard: low, some standing dead wood
Strong understory regeneration

Sheet 10 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam / Moreland

Stand #: 1 Plot #: 11 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 80

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Oak			•		••	•		••	•	•						8
White Pine										•	•					2
Red Maple					•											1
Total Number of Trees per Size Class	1			4			3			3			0			11
Number & Size of Standing Dead Trees	2			1			0			0			0			3

List of Common Understory Species 3'-20':
American chestnut, Black cherry, Black birch, Sassafras, Highbush blueberry, Black oak, Dangleberry

List of Herbaceous Species 0'-3':
Bracken fern, greenbriar, Sedges, White oak, Black cherry, red maple, Sassafras

% of Canopy Closure

C	N	E	S	W	Total
50	0	95	75	85	61

% Understory Cover 3'-20'

C	N	E	S	W	Total
0	0	0	0	5	1

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
60	80	30	30	100	60

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

Comments: Gypsy Moth damage: low - moderate, occassional mortality
Fire hazard: low - little understory

Sheet 11 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 2 Plot #: 12 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 90

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple			□		•						•					10
Black gum			•													1
Black Birch			• •		•											4
Black Oak					•	•		• •		•						6
White Oak			• •													2
Northern Red Oak					•											1
E. redcedar									•						•	1
Total Number of Trees per Size Class	14			5			4			2			0			25
Number & Size of Standing Dead Trees	1			1 E. redcedar			1 E. redcedar			0			0			3

List of Common Understory Species 3'-20':
Red maple
White Oak
American chestnut
Black gum

% of Canopy Closure					
C	N	E	S	W	Total
85	40	0	10	100	47

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Indian cucumber, Dangleberry
White oak, Princess Pine
greenbriar
highbush blueberry
red maple
Black oak
Black cherry

% Understory Cover 3'-20'					
C	N	E	S	W	Total
10	30	15	30	80	33

% of Herbaceous Cover 0'-3'					
C	N	E	S	W	Total
25	25	30	55	20	31

Comments: Gypsy Moth damage: moderate-heavy on oaks; decent canopy closure remains from other species

Fire hazard: low-moderate; some standing dead wood, somewhat substantial understory

Sheet 12 of 15

Forest Sampling Data Worksheet C:1

Property: CFTS Prepared By Busam/Moreland

Stand #: 2 Plot #: 13 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 120

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple																9
Black Oak																7
Mockernut Hickory																1
Black Birch																4
Total Number of Trees per Size Class	9			6			5			1			0			21
Number & Size of Standing Dead Trees	0			2 red maple			1 E. redcedar			1			0			4

List of Common Understory Species 3'-20':
Red maple American beech
spicebush
Black cherry

% of Canopy Closure

C	N	E	S	W	Total
40	90	95	100	90	83

Percent of Invasive Cover per Plot (All Layers): 5

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Oriental bittersweet Greenbriar
Indian cucumber Rubus spp
Sedges American Beech
Indian strawberry Black cherry
Poison Ivy Hay scented fern
Red Maple Sassafras
Black Oak

% Understory Cover 3'-20'

C	N	E	S	W	Total
0	5	70	30	0	21

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
10	95	10	60	85	52

Comments Gypsy Moth Damage: Moderate, some fatality, some dead limbs
Recently killed dominant black oak >20" DBH
Fire hazard: low, some downed wood + standing dead wood

Sheet 13 of 15

Forest Sampling Data Worksheet C:1

Property: CFT3 Prepared By Busam / Moreland
Stand #: 10 Plot #: 14 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 110

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple			•		1	3	•	1								15
Black Birch			•													1
Total Number of Trees per Size Class	2			7			7			0			0			16
Number & Size of Standing Dead Trees	0			0			0			0			0			0

List of Common Understory Species 3'-20':
Coast pepperbush
Red maple
Black birch

% of Canopy Closure

C	N	E	S	W	Total
95	95	100	100	100	98

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
Coast pepperbush
New York fern

% Understory Cover 3'-20'

C	N	E	S	W	Total
50	65	75	50	75	63

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
10	10	35	25	15	19

Comments: Gypsy Moth: No damage
Fire hazard: Moderate - pretty thick understory + some downed branches

Sheet 14 of 15

Forest Sampling Data Worksheet C:1

Property: CFTB Prepared By Busam/Moreland
Stand #: 9 Plot #: 15 Plot Size: 1/10 ac Date: 6/7/18

Basal Area in sf/acre: 130

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Oak					:		:	:								10
Red Maple			:		.											5
Total Number of Trees per Size Class	4			4			7			0			0			15
Number & Size of Standing Dead Trees	1			4			3			0			0			8

List of Common Understory Species 3'-20':
Red maple
Highbush blueberry
greenbriar

% of Canopy Closure

C	N	E	S	W	Total
10	100	50	85	100	69

Percent of Invasive Cover per Plot (All Layers): 0

Plot Successional Stage: mid

List of Herbaceous Species 0'-3':
greenbriar lowbush blueberry
Indian cucumber
Red maple
Sassafras
Black cherry
Black oak

% Understory Cover 3'-20'

C	N	E	S	W	Total
0	0	50	75	75	40

% of Herbaceous Cover 0'-3'

C	N	E	S	W	Total
40	20	10	50	40	32

Comments Gypsy Moth damage: moderate, several dead trees
fire hazard: low-moderate, downed limbs + some understory

Sheet 15 of 15

Forest Sampling Data Worksheet C:1

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Appendix B: Forest Stand Summary Worksheets

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Property Name: CFTS
Location: East Greenwich, Kent Co., RI (Town, County, ADC Map#, and Grid Coordinates)
Prepared By: Busam/Moreland Date: 6/7/18

Stand Variable	Stand # 1	Stand # 2
1. Dominant species/Codominant species	Black Oak White Oak White Pine Red Maple	Black Oak Northern Red Oak Black Birch Red Maple
2. Successional stage	mid	mid
3. Basal area in s.f. per acre	123	105
4. Size class of dominant species	20.0 - 29.9"	20.0 - 29.9" and 12.0 - 19.9"
5. Percent of canopy closure	70%	65%
6. Number of tree species per ~~acre~~ plot	4	6
7. Common understory species per ~~acre~~ plot	Red Maple Common Greenbrier Sassafras	Red Maple Spicebush Black Cherry White oak American Chestnut
8. Percent of understory cover 3' to 20' tall	12%	27%
9. Number of woody plant species 3' to 20' tall	11	8
10. Common herbaceous species 0' to 3' tall	Common greenbrier Princess Pine Hay scented fern white oak Indian cucumber red maple	greenbrier red maple Indian cucumber Black oak Black cherry
11. Percent of herbaceous & woody plant cover 0' to 3' tall	38%	42%
12. List of major invasive plant species & percent of cover	No major species	oriental bittersweet - 3%
13. Number of standing dead trees 6" dbh or greater per acre	33	30
14. Comments Sheet 1 of 5	Moderate gypsy moth damage low fire hazard	Moderate gypsy moth damage low fire hazard

Forest Stand Summary Worksheet C:2

Property Name: CFTS
Location: East Greenwich, Kent Co, RI (Town, County, ADC Map#, and Grid Coordinates)
Prepared By: Busam/Moreland Date: 6/7/18

Stand Variable	Stand # 3	Stand # 4
1. Dominant species/Codominant species	Red Maple, Pignut hickory, Black Oak, N. red oak, Black Birch, Black locust	Red Maple, Black locust, Black Cherry, Black Oak
2. Successional stage	mid	mid
3. Basal area in s.f. per acre	125	110
4. Size class of dominant species	12.0-19.9" and 20.0-29.9"	12.0-19.9"
5. Percent of canopy closure	85%	91%
6. Number of tree species per ~~acre~~ plot	6	4
7. Common understory species per ~~acre~~ plot	pignut hickory, ~~common witchhazel~~, red maple, highbush blueberry	white oak, red maple, black birch, black cherry, green ash, poison ivy
8. Percent of understory cover 3' to 20' tall	41%	33%
9. Number of woody plant species 3' to 20' tall	8	6
10. Common herbaceous species 0' to 3' tall	spicebush, hay scented fern, ~~skunk cabbage~~, woodreed, poison ivy	Hay scented fern, Rubus, arrowwood, black locust, multiflora rose, greenbrier
11. Percent of herbaceous & woody plant cover 0' to 3' tall	41%	67%
12. List of major invasive plant species & percent of cover	multiflora rose - 5%	multiflora rose - 10%
13. Number of standing dead trees 6" dbh or greater per acre	0	50
14. Comments	low to no gypsy moth damage, low fire hazard	low gypsy moth damage, low fire hazard

Sheet 2 of 5

Forest Stand Summary Worksheet C:2

Property Name: CFTS
Location: East Greenwich, Kent Co., RI (Town, County, ADC Map#, and Grid Coordinates)
Prepared By: Busam / Moreland Date: 6/7/18

Stand Variable	Stand # 5	Stand # 6
1. Dominant species/Codominant species	Black Oak Red Maple White Oak	Black Oak Black Cherry Red Maple White oak
2. Successional stage	mid	mid
3. Basal area in s.f. per acre	90	140
4. Size class of dominant species	12.0-19.9"	12.0-19.9"
5. Percent of canopy closure	58%	76%
6. Number of tree species per ~~acre~~ plot	2	5
7. Common understory species per ~~acre~~ plot	Dangleberry blueberry red maple black cherry	Black cherry red maple Eastern redcedar white oak Autumn olive Black birch multi. flora rose
8. Percent of understory cover 3' to 20' tall	10%	24%
9. Number of woody plant species 3' to 20' tall	4	7
10. Common herbaceous species 0' to 3' tall	greenbrier white oak red maple hay scented fern	greenbrier poison ivy hay scented fern multiflora rose oriental bittersweet
11. Percent of herbaceous & woody plant cover 0' to 3' tall	86%	57%
12. List of major invasive plant species & percent of cover	No major species	oriental bittersweet multiflora rose Japanese barberry honeysuckle Autumn Olive 35%
13. Number of standing dead trees 6" dbh or greater per acre	25	0
14. Comments Sheet 3 of 5	Moderate to severe gypsy moth damage low fire hazard	low gypsy moth damage low to moderate fire hazard

Forest Stand Summary Worksheet C:2

Property Name: CFTS
Location: East Greenwich, Kent Co., RI (Town, County, ADC Map#, and Grid Coordinates)
Prepared By: Busam / Moreland Date: 6/7/18

Stand Variable	Stand # 7	Stand # 8
1. Dominant species/Codominant species	Red Maple, Eastern cottonwood, Black locust, green ash, Black cherry	Red Maple, Eastern cottonwood, Black Oak
2. Successional stage	early - mid	early - mid
3. Basal area in s.f. per acre	80	120
4. Size class of dominant species	12.0 - 19.9"	12.0 - 19.9"
5. Percent of canopy closure	57%	75%
6. Number of tree species per ~~acre~~ plot	6	4
7. Common understory species per ~~acre~~ plot	oriental bittersweet, black locust, multiflora rose, green ash, arrowwood, spicebush	red maple, Autumn olive, multiflora rose, spicebush
8. Percent of understory cover 3' to 20' tall	48%	37%
9. Number of woody plant species 3' to 20' tall	6	4
10. Common herbaceous species 0' to 3' tall	multiflora rose, Rubus, greenbrier, bush honeysuckle, Japanese honeysuckle, Jack-in-the-Pulpit	Jewelweed, poison ivy, grape, woodreed, virginia creeper
11. Percent of herbaceous & woody plant cover 0' to 3' tall	63%	36%
12. List of major invasive plant species & percent of cover	Oriental bittersweet, multiflora rose, Japanese honeysuckle, bush " | 75%	multiflora rose, Autumn olive, oriental bittersweet, Japanese honeysuckle | 10%
13. Number of standing dead trees 6" dbh or greater per acre	0	0
14. Comments Sheet 4 of 5	low to no gypsy moth damage, low to moderate fire hazard, Trees in poor condition	low to no gypsy moth damage, low fire hazard, plot in wetland

Forest Stand Summary Worksheet C:2

Property Name: CFTS
Location: East Greenwich, Kent Co., RI (Town, County, ADC Map#, and Grid Coordinates)
Prepared By: Bysam/Moreland Date: 6/7/18

Stand Variable	Stand # 9	Stand # 10
1. Dominant species/Codominant species	Black oak Red maple	Red Maple
2. Successional stage	mid	mid
3. Basal area in s.f. per acre	130	110
4. Size class of dominant species	12.0 - 19.9"	12.0 - 19.9"
5. Percent of canopy closure	69 %	98 %
6. Number of tree species per ~~acre~~ plot	2	2
7. Common understory species per ~~acre~~ plot	red maple highbush blueberry greenbrier	coastal pepperbush red maple black birch
8. Percent of understory cover 3' to 20' tall	40 %	63 %
9. Number of woody plant species 3' to 20' tall	3	3
10. Common herbaceous species 0' to 3' tall	greenbrier lowbush blueberry black oak black cherry Indian cucumber sassafras	coastal pepperbush NY fern
11. Percent of herbaceous & woody plant cover 0' to 3' tall	32 %	19 %
12. List of major invasive plant species & percent of cover	No major species	No major species
13. Number of standing dead trees 6" dbh or greater per acre	70	0
14. Comments Sheet 5 of 5	Moderate gypsy moth damage low to moderate fire hazard	No gypsy moth damage Moderate fire hazard

Forest Stand Summary Worksheet C:2

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Appendix C: Photolog

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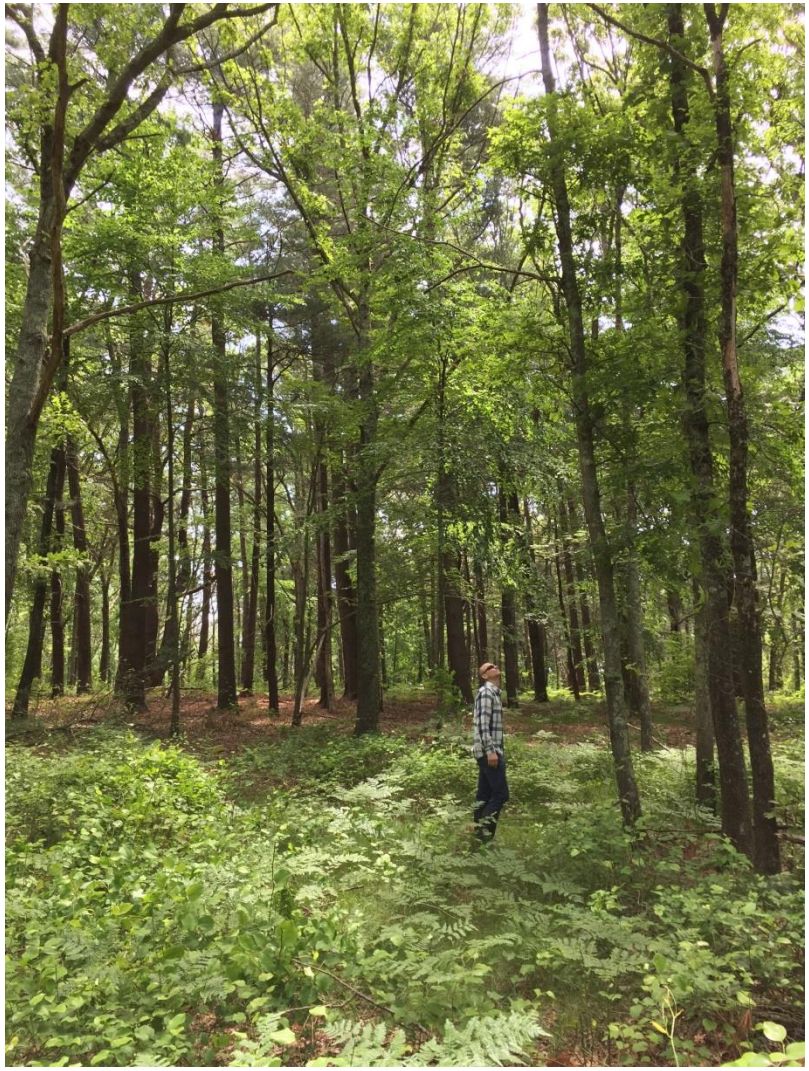
Stand 1: Plot 1

Stand 1: Plot 7

Stand 1: Plot 11

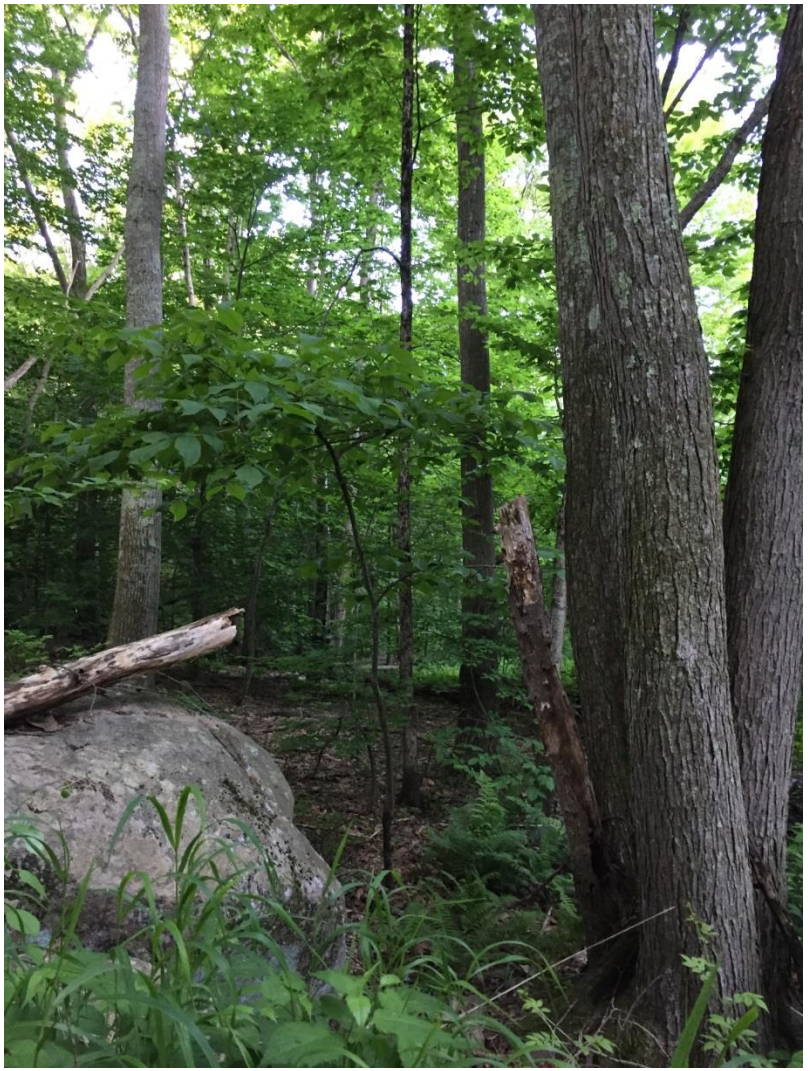


Stand 2: Plot 12

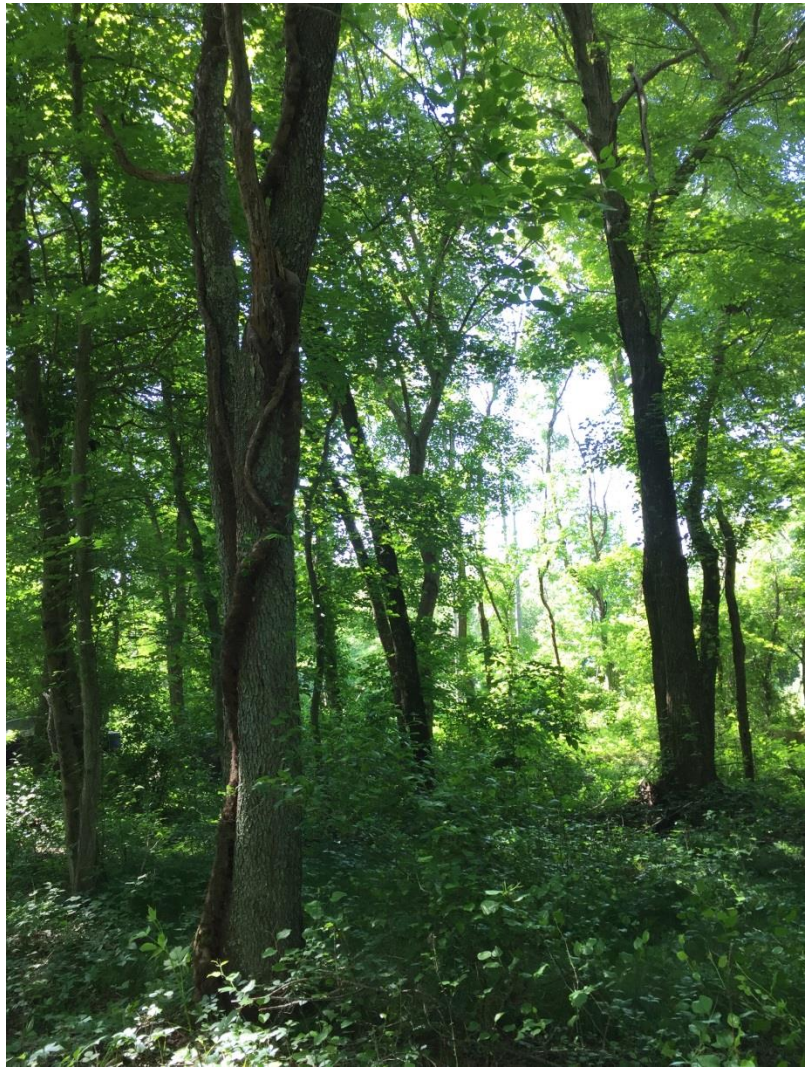
Stand 2: Plot 13

Stand 3: Plot 8

Stand 3: Plot 9



Stand 4: Plot 10

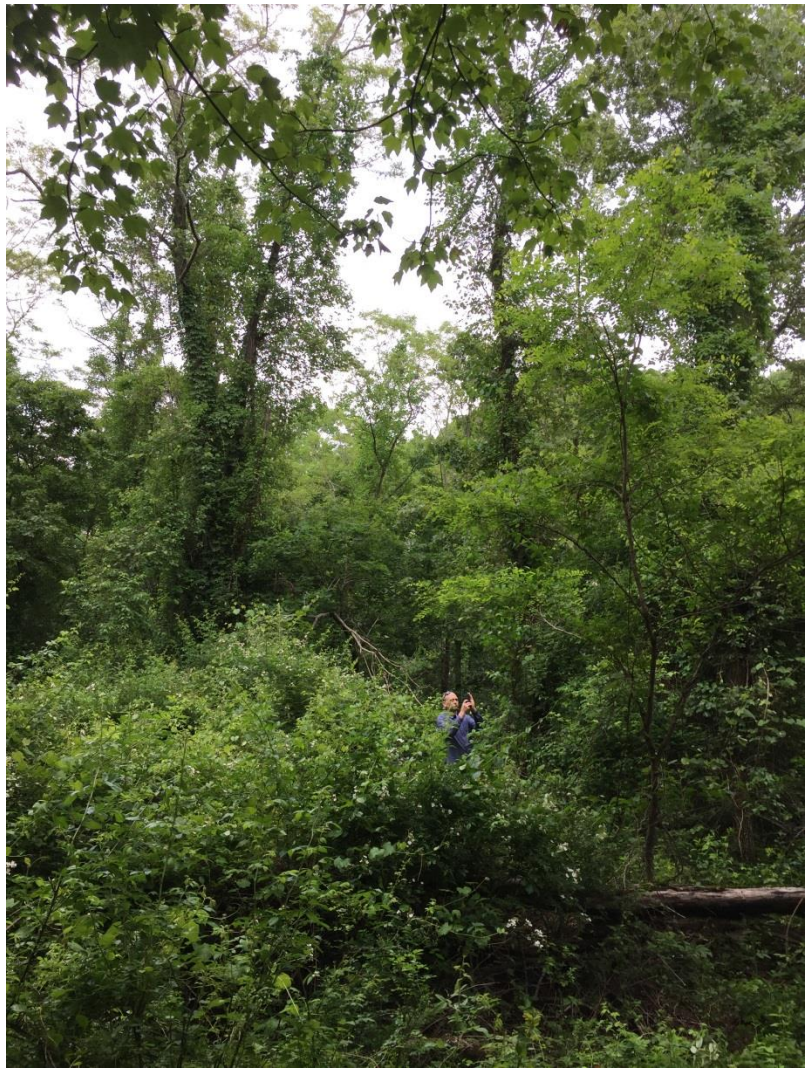


Stand 5: Plot 2

Stand 5: Plot 3

Stand 6: Plot 6

Stand 7: Plot 4



Stand 8: Plot 5

Stand 9: Plot 15

Stand 10: Plot 14

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Appendix D: INRMP Annual Review Documentation

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NATIONAL GUARD BUREAU
111 SOUTH GEORGE MASON DRIVE
ARLINGTON VA 22204-1382

ARNG-ILE

30 Sep 10

MEMORANDUM FOR ENVIRONMENTAL PROGRAM MANAGERS

SUBJECT: Guidance for Integrated Natural Resource Management Plan (INRMP) Annual Review and Reporting

1. References:

a. Memorandum, NGB-ARE-C, 30 Nov 2006, Subject: Interim Guidance for Revisions and Updates to Existing Integrated Natural Resources Management Plans (INRMPs).

b. Memorandum, DAIM-ED, 25 May 2006, Subject: Guidance for Implementation of the Sikes Act Improvement Act.

c. 16 USC 670a, et eq, Sikes Act Improvement Act of 1997 (SAIA).

2. In accordance with references 1a, 1b, and 1c, Integrated Natural Resource Management Plans (INRMP) must be reviewed annually. The annual review must be submitted to ARNG-ILE, the respective U.S. Fish and Wildlife Service Regional and/or Field Offices, and the State Fish and Wildlife agencies. The annual review *DOES NOT* require agency concurrence, public review, or ARNG-ILE staffing and concurrence.

3. In accordance with reference 1b Army policy requires the following program areas be addressed annually:

a. All "must fund" projects and activities have been budgeted for and implementation is on schedule.

b. All required trained natural resources positions are filled or are in the process of being filled.

c. Projects and activities for the upcoming year have been identified and included in the INRMP. Any changes made during the previous year shall also be discussed.

d. All required coordination has occurred.

e. All significant changes to the installation's mission requirements or its natural resources have been identified.

f. The INRMP goals and objectives are still valid.

g. No net loss of training capability has occurred due to implementation of the INRMP in accordance with the Sikes Act.

4. An ARNG-ILE Annual Review Template is attached and is intended to address required elements of the annual review. Plan implementation is best addressed via tables indicating current and planned activities, as well as the status of current activities. Internal and external personnel and stakeholders may be addressed with a simple list of positions and status of required personnel to meet INRMP goals and objectives.

5. The deadline for submission of the 2010 annual review and report to ARNG-ILE is 15 Oct 2010. If you have not submitted an annual review for 2010 please do so before this deadline.

6. Beginning in 2011, deadlines for the annual review and report will be dependent on the date of the initial INRMP approval. Reports may be submitted at any time in the quarter prior to the reporting deadline. Reviews should occur at approximately the same time each year. A list of INRMP's and their annual review dates is also attached. If you believe the date for the completion of your INRMP is incorrect, please contact the Point of Contact (POC) listed below.

7. Also beginning in 2011, the submission of the annual report will be tracked in the State Performance Indicator Report System (SPIRS) and reported on a quarterly basis. The SPIRS is submitted to the state Adjutant General (TAG) from ARNG-ILE. It provides the TAG a brief picture on how ARNG-ILE sees state compliance with various requirements. A list of SPIRS deadline dates can be seen in the attached SPIRS INRMP Guidance file.

8. The POC is Mr. Chuck Chamberlain, Army National Guard Natural Resource Program Manager, 703-607-7982, or chuck.chamberlain@us.army.mil.

Beth A Erickson

Encl
as

BETH A. ERICKSON
Chief, Training and Infrastructure Branch

INRMP ANNUAL REPORT

To:

From:

Subject: ARNG Annual Report on Implementation Status of the Integrated Natural Resource Management Plan (INRMP)

Date:

Reporting Period:
(Period report covers, i.e. 1 May 09 – 1 May 10.)

Annual Coordination Meeting: *(Identify the date and attendees of annual coordination. Indicate if this correspondence will be used in lieu of 'face-to-face' meetings. Use the following headers to document review findings)*

Program Overview: *(Short paragraph addressing the goals and objectives of the plan, the status of the mission requirements relative to the current plan and the issue of "no net loss" to training.)*

Current Implementation Status: *(List all projects for the current reporting period, those completed or on-going, and those that were planned but not initiated. Also indicate if any projects were rescheduled and the proposed new timeline. Please attach a table of projects for the last fiscal year.)*

Proposed Implementation: *(List all projects and actions planned for the next reporting period. Please attach a table of proposed projects for next fiscal year.)*

Installation Personnel: *(List by title natural and cultural resource management personnel involved with implementation of the INRMP.)*

USFWS Regional Office Contact Information: *(Enter Point of Contact and contact information.)*

USFWS Field Office Contact Information: *(Enter Point of Contact and contact information.)*

State Fish and Game Agency Contact Information: *(Enter Point of Contact and contact information as applicable. Include all agencies or division involved.)*

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Appendix E: Agency Correspondence and Concurrence Letters

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

March 8, 2019

Jennifer Warf
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

Re: Integrated Natural Resources Management Plan Final Review
Camp Fogarty Training Site, East Greenwich, RI

Dear Ms. Warf:

This responds to the Rhode Island Army National Guard's (RIARNG) correspondence, dated February 6, 2019, requesting a review of the subject draft Integrated Natural Resources Management Plan (INRMP), in particular the sections relating to natural resources under the jurisdiction of the U.S. Fish and Wildlife Service (Service). The request and our response are a follow-up to the review conducted by our office in June of 2018, regarding a review of operation and effect of the RIARNG's INRMP, including input on limitations of the existing INRMP with regard to natural resources management, areas that could use improvement, as well as areas that are working well. The RIARNG's request and our response are provided in accordance with the Sikes Act (16 USC § 670A, as amended 2011).

The RIARNG has fully incorporated the comments provided by our office during our June 2018 review of the draft INRMP, including information on the northern long-eared bat (NLEB) and associated streamlined consultation framework and a list and descriptions of species included in the Service's National Listing Workplan that have the potential to occur on RIARNG property. In addition, our comments related to the identification and preservation of potential northern long-eared bat roost trees have been incorporated. The RTE surveys planned for 2010 have not been completed, but the effort to update this information is ongoing. As discussed during a telephone exchange with Elizabeth Stefanik on March 7, 2019, the Service's Summer Survey Guidelines for Indiana Bat and NLEB are enclosed, and will be used to the extent practicable during RTE surveys. More information on NLEB surveys can be found at:

https://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html
(accessed March 2019)

With these comments incorporated into the final INRMP, we find the description of natural resources to be accurate and the management strategies to be appropriate. No further coordination between our agencies pursuant to the Sikes Act is necessary until the next revision of the INRMP. Thank you for your coordination, and we look forward to working with you in the future. Please contact Ms. Cindy Corsair of this office at 401-213-4416 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

Rhode Island Department of Environmental Management

Division of Fish & Wildlife
Great Swamp Field Headquarters
277 Great Neck Rd
West Kingston, RI 02892
Tel: 401-789-0281
Fax: 401-783-7490

Jennifer Warf
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

Re: Camp Fogarty Training Site Integrated Natural Resources Management Plan Letter of Concurrence

Ms. Warf,

In response to your letter dated February 6, 2019 seeking review of the Camp Fogarty Training Site (CFTS) draft Final Integrated Natural Resources Management Plan (INRMP), I have, acting as the technical reviewer for the Rhode Island Department of Environmental Management (RIDEM) reviewed the draft Final INRMP document you provided. I concur with this plan and find the description of natural resources to be accurate and the management strategies appropriate. I acknowledge that the Rhode Island Army National Guard (RIARNG) has requested review and received comment from RIDEM on the CFTS INRMP in accordance with the Sikes Act.

Sincerely,

Tanner Steeves

Digitally signed by Tanner Steeves
DN: cn=Tanner Steeves, o=RIDEM Div Fish & Wildlife, ou, email=tanner.steeves@dem.ri.gov, c=US
Date: 2019.03.13 17:14:05 -04'00'

Tanner Steeves
Wildlife Biologist, RIDEM Division of Fish and Wildlife

Cc:

Elizabeth Stefanik, Natural Resources and Cultural Resources Manager, RI Army National Guard

Jay Osenkowski, Deputy Chief of Wildlife, RIDEM Division of Fish and Wildlife

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

June 5, 2018

Jennifer Warf
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

Re: RIARNG Camp Fogarty Integrated Natural Resources Management Plan Update

Dear Ms. Warf:

This responds to the Rhode Island Army National Guard's (RIARNG) correspondence, dated April 17, 2018, requesting our cooperation in the review for operation and effect of the RIARNG's Integrated Natural Resources Management Plan (INRMP), including input on limitations of the existing INRMP with regard to natural resources management, areas that could use improvement, as well as areas that are working well. We understand this INRMP is an update and not an INRMP revision. The RIARNG also requested any new or additional information, new natural resources topics or issues of concern, updates on policies or regulations, updates on rare flora and fauna listings, identification of issues of regional concern, or other new information that should be considered during development of the updated plan. The RIARNG's request and our response are provided in accordance with the Sikes Act (16 USC § 670A as amended 2011), the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531, *et seq.*) (ESA), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*).

Updates on Rare Flora and Fauna Listings

Since the last update of the RIARNG's INRMP in 2006, the U.S. Fish and Wildlife Service (Service) listed one species under the ESA that may occur on the property. The Service listed the northern long-eared bat (*Myotis septentrionalis*) (NLEB) as threatened on April 2, 2015, and issued a final rule under section 4(d) of the ESA on January 14, 2016, that defines take prohibitions specific to the NLEB. The NLEB is a medium-sized bat about 3 to 3.7 inches in length, but with a wingspan of 9-10 inches. As its name suggests, this bat is distinguished by its long ears, particularly compared to other bats in its genus, *Myotis*. The NLEB is a forest-dwelling species found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. White-

nose syndrome, a fungal disease known to affect bats, is currently the predominant threat to this bat, especially throughout the Northeast where the species has declined by up to 99 percent from pre-white-nose syndrome levels at many hibernation sites. Although the disease has not yet spread throughout the entire range (white-nose syndrome is currently found in at least 25 of 37 states where the NLEB occurs), it continues to spread.

Consultation Requirements

Because the RIARNG property falls within the range of the threatened northern long-eared bat, activities involving tree removal or forest conversion may affect this species and will require consultation with the Service under section 7 of the ESA. The Service has developed a streamlined consultation process to help Federal agencies fulfill their section 7 responsibilities for projects within the range of the NLEB that may affect the species but will not cause prohibited take as outlined in the 4(d) rule. The framework for this streamlined consultation process can be found at:

https://www.fws.gov/Midwest/endangered/mammals/nleb/s7.html (accessed May 2018)

New Information

The Service developed a National Listing Workplan (Workplan) in 2016 for addressing ESA listing and critical habitat decisions through 2023. The Workplan can be found here:

https://www.fws.gov/endangered/esa-library/pdf/Listing%207-Year%20Workplan%20Sept%202016.pdf (accessed May 2018)

A species' inclusion in this Workplan does not mean it is going to be listed as endangered or threatened under the ESA, but it enables us to prioritize our workload based on the needs of candidate and petitioned species, while providing greater clarity and predictability about the timing of listing determinations to state wildlife agencies, non-profit organizations, and other diverse stakeholders and partners, with the goal of encouraging proactive conservation so that Federal protections are not needed in the first place. The RIARNG property falls within the range of the following species included in the Workplan: brook floater (*Alasmidonta varicose*), yellow banded bumblebee (*Bombus terricola*), frosted elfin butterfly (*Callophrys irus*), spotted turtle (*Clemmys guttata*), and wood turtle (*Glyptemys insculpta*). While no action is required by RIARNG with regard to ESA compliance for these species at this time, we encourage voluntary conservation efforts that may be beneficial to the species listed in the Workplan.

General Comments

Section 6.4.2 of the RIARNG INRMP covers rare, threatened, and endangered (RTE) species and supplements the information contained in Section 6.4.6 of the 2001 INRMP and Environmental Assessment. Table 6-4 of the 2001 INRMP identifies surveys for RTE species as an activity planned for 2010. We recommend including the results of this survey in the latest INRMP update, with additional details that identify the species that are included in these surveys and a description of, or reference to, the survey protocols that were followed. We also recommend adding consultation with the Service to the "Required Outside Agency Coordination" field.

Section 6.4.10 of the INRMP describes the need to identify any unique tree species or communities, and this activity would involve a qualified forester or arborist walking the property to inventory tree species. These surveys may be helpful in identifying potential maternity roost trees for the NLEB or other bat species, data which is currently lacking in the State of Rhode Island. We recommend that characteristics of suitable roosting trees be included as data fields in these surveys if possible. These characteristics include shaggy or peeling bark and/or the presence of cavities or crevices of both live trees and snags (dead trees).

Thank you for your coordination, and we look forward to working with you in the future. Please contact Ms. Cindy Corsair of this office at 401-213-4416 if we can be of further assistance.

Sincerely yours,

Susanna Von Oettingen

acting for Thomas R. Chapman
Supervisor
New England Field Office

Rhode Island Department of Environmental Management

Division of Fish & Wildlife
Great Swamp Field Headquarters
277 Great Neck Rd
West Kingston, RI 02892
Tel: 401-789-0281
Fax: 401-783-7490

Jennifer Warf

AECOM

12420 Milestone Center Drive, Suite 150

Germantown, MD 20876

Ms. Warf,

In response to your letter dated October 16, 2018 seeking review of the Camp Fogarty Training Site (CFTS) draft Integrated Natural Resources Management Plan (INRMP), I have, acting as the technical reviewer for the Rhode Island Department of Environmental Management (RIDEM) reviewed the draft INRMP document you provided. I find the description of existing natural resources to be accurate; and I concur with the Management Strategies. I have no updates or comments to provide at this time. Please let me know if you need additional information or confirmation of this review.

Sincerely,

Tanner Steeves

Digitally signed by Tanner Steeves
DN: cn=Tanner Steeves, o=RIDEM Div Fish & Wildlife, ou, email=tanner.steeves@dem.ri.gov, c=US
Date: 2018.11.30 11:49:49 -05'00'

Tanner Steeves
Wildlife Biologist, RIDEM Division of Fish and Wildlife

Cc:

Elizabeth Stefanik, Natural Resources and Cultural Resources Manager, RI Army National Guard

Jay Osenkowski, Deputy Chief of Wildlife, RIDEM Division of Fish and Wildlife

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

MILITARY STAFF
OFFICE OF THE ADJUTANT GENERAL
Command Readiness Center
645 New London Avenue
Cranston, RI 02920-3097

Gina M. Raimondo
Governor
MG Christopher P. Callahan
Director

17 April 2018

Cindy Corsair
U.S. Fish and Wildlife Service
Southern New England
50 Bend Road
Charlestown, RI 02813

Dear Ms. Corsair:

The Rhode Island Army National Guard (RIARNG) is planning to update the 2007 Integrated Natural Resources Management Plan (INRMP) for the Camp Fogarty Training Site (CFTS) in East Greenwich, Kent County, RI. This INRMP is required by the Sikes Act to reflect the mutual agreement of the U.S. Fish and Wildlife Service (USFWS) and the Rhode Island Department of Environmental Management (RIDEM), and is required to undergo a review for operation and effect. The purpose of the INRMP update is to document the policies and desired future direction of RIARNG's natural resources program at this training center. The RIARNG anticipates the following modifications will be made to the INRMP:

- Reorganization of the 2001 and 2007 INRMPs in accordance with the Department of Defense (DoD) template guidance.
- Incorporation of updated natural resources data, including a Forest Survey and Forest Stewardship Plan being conducted concurrently with this INRMP update.
- No substantial change to the military mission, natural resources program, or management philosophies.

The RIARNG is responsible for the prudent management and use of the 375-acre CFTS. The RIARNG provides support for federal, state, and community interests by providing highly trained personnel and mission-ready equipment for federal contingency missions and state and local emergency missions; protecting life and property; and preserving peace, order, and public safety.

For this review for operation and effect, we are seeking input from your agency regarding any limitations of the existing INRMP with regard to natural resources management and areas that could use improvement, as well as areas that are working well, and your concurrence with the RIARNG's determination that this is an INRMP update and not an INRMP revision. We are seeking from your agency any new or additional information, new natural resources topics or issues of concern, updates on policies or regulations, updates on rare flora and fauna listings, identification of issues of regional concern, or other new information that your agency thinks

should be considered during development of this updated plan. Generally, these data would be more recent than 2006, as data prior to 2006 were incorporated into the 2007 INRMP. Any data that your agency provides will be evaluated and used to help update the INRMP.

We look forward to and welcome your participation in the INRMP update process. Your response on or before 22 May 2018 will enable us to complete this phase of the project within the scheduled timeframe. The RIARNG has hired AECOM to facilitate the INRMP update. Please send your correspondence directly to AECOM at the following address:

Jennifer Warf
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
Jennifer.warf@aecom.com

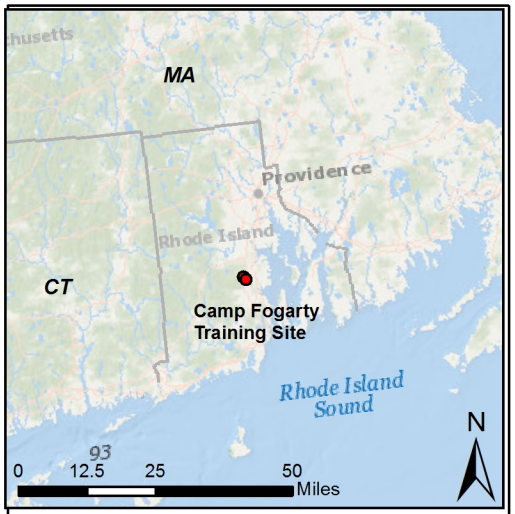
If you have any questions concerning this request, please do not hesitate to contact Ms. Warf at (202) 740-5948 or jennifer.warf@aecom.com, or the undersigned at (401) 275-4035 or elizabeth.a.stefanik.nfg@mail.mil.

Sincerely,

Elizabeth Stefanik

Elizabeth Stefanik
Natural Resources and Cultural Resources Manager
Rhode Island Army National Guard

Attachments: Site Location Map



State of Rhode Island

Legend

- Camp Fogarty Training Site
- Stream

0 375 750 1,500 Feet

N

Source: Spatial Data courtesy of RIARNG and ArcGIS Imagery

Rhode Island Army National Guard
Camp Fogarty Training Site
East Greenwich, Kent County, RI

Site Location Map

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

MILITARY STAFF
OFFICE OF THE ADJUTANT GENERAL
Command Readiness Center
645 New London Avenue
Cranston, RI 02920-3097

Gina M. Raimondo
Governor
MG Christopher P. Callahan
Director

17 April 2018

Jason Osenkowski, Deputy Chief
Rhode Island Department of Environmental Management
Great Swamp Field Headquarters
277 Great Neck Road
West Kingston, RI 02892

Dear Mr. Osenkowski:

The Rhode Island Army National Guard (RIARNG) is planning to update the 2007 Integrated Natural Resources Management Plan (INRMP) for the Camp Fogarty Training Site (CFTS) in East Greenwich, Kent County, RI. This INRMP is required by the Sikes Act to reflect the mutual agreement of the U.S. Fish and Wildlife Service (USFWS) and the Rhode Island Department of Environmental Management (RIDEM), and is required to undergo a review for operation and effect. The purpose of the INRMP update is to document the policies and desired future direction of RIARNG's natural resources program at this training center. The RIARNG anticipates the following modifications will be made to the INRMP:

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The RIARNG is responsible for the prudent management and use of the 375-acre CFTS. The RIARNG provides support for federal, state, and community interests by providing highly trained personnel and mission-ready equipment for federal contingency missions and state and local emergency missions; protecting life and property; and preserving peace, order, and public safety.

For this review for operation and effect, we are seeking input from your agency regarding any limitations of the existing INRMP with regard to natural resources management and areas that could use improvement, as well as areas that are working well, and your concurrence with the RIARNG's determination that this is an INRMP update and not an INRMP revision. We are seeking from your agency any new or additional information, new natural resources topics or issues of concern, updates on policies or regulations, updates on rare flora and fauna listings, identification of issues of regional concern, or other new information that your agency thinks

should be considered during development of this updated plan. Generally, these data would be more recent than 2006, as data prior to 2006 were incorporated into the 2007 INRMP. Any data that your agency provides will be evaluated and used to help update the INRMP.

We look forward to and welcome your participation in the INRMP update process. Your response on or before 22 May 2018 will enable us to complete this phase of the project within the scheduled timeframe. The RIARNG has hired AECOM to facilitate the INRMP update. Please send your correspondence directly to AECOM at the following address:

Jennifer Warf
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
Jennifer.warf@aecom.com

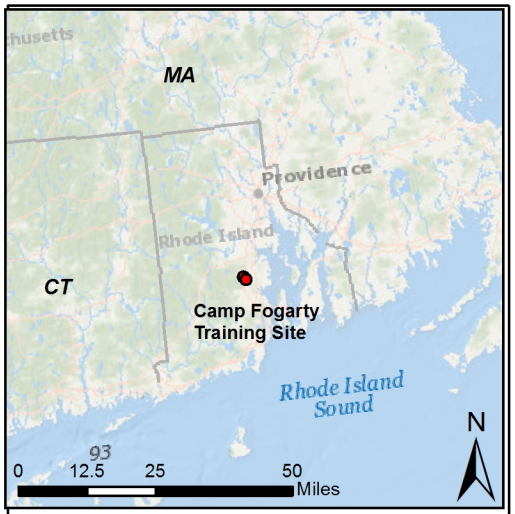
If you have any questions concerning this request, please do not hesitate to contact Ms. Warf at (202) 740-5948 or jennifer.warf@aecom.com, or the undersigned at (401) 275-4035 or elizabeth.a.stefanik.nfg@mail.mil.

Sincerely,

Elizabeth Stefanik

Elizabeth Stefanik
Natural Resources and Cultural Resources Manager
Rhode Island Army National Guard

Attachments: Site Location Map



State of Rhode Island

Legend

- Camp Fogarty Training Site
- Stream

0 375 750 1,500 Feet

N

Source: Spatial Data courtesy of RIARNG and ArcGIS Imagery

Rhode Island Army National Guard
Camp Fogarty Training Site
East Greenwich, Kent County, RI

Site Location Map

IPaC **U.S. Fish & Wildlife Service**

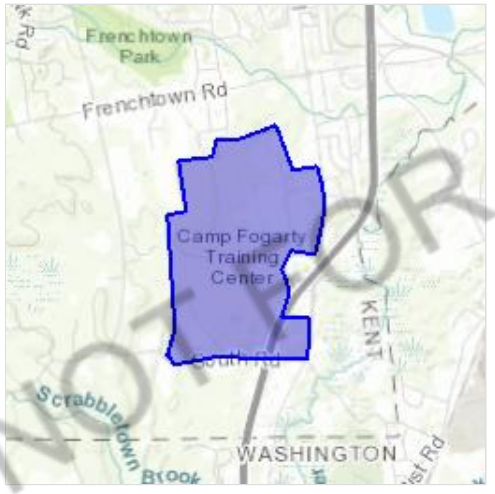
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Kent County, Rhode Island



Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Northern Long-eared Bat Myotis septentrionalis Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
American Oystercatcher Haematopus palliatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo Coccyzus erythropthalmus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Buff-breasted Sandpiper Calidris subruficollis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9488	Breeds elsewhere
Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Least Tern Sterna antillarum This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 20 to Sep 10

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Purple Sandpiper Calidris maritima — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-throated Loon Gavia stellata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

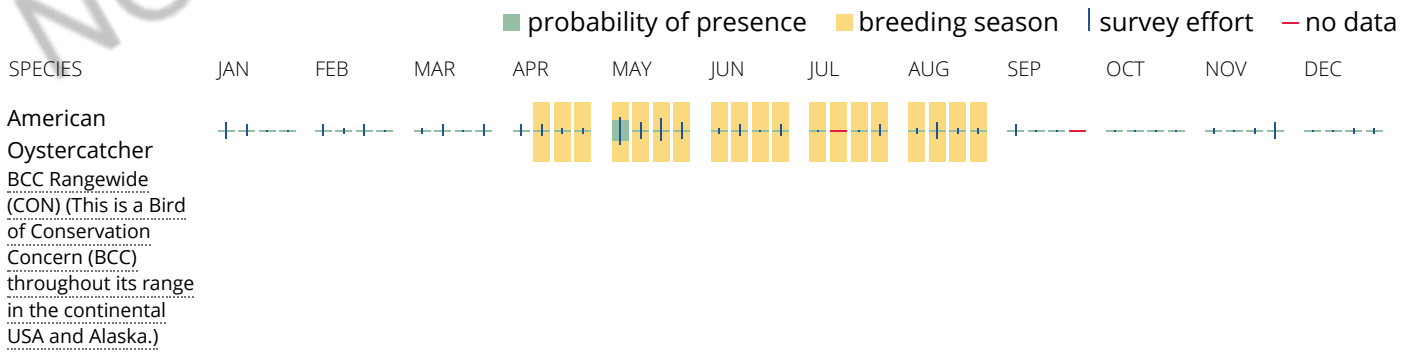
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

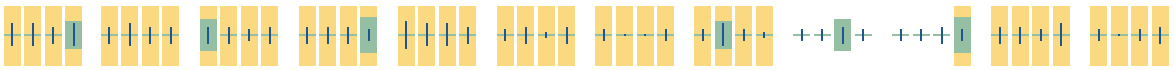
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

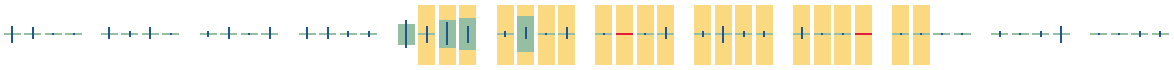
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

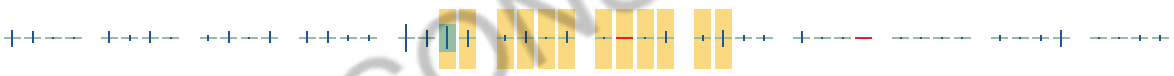


Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

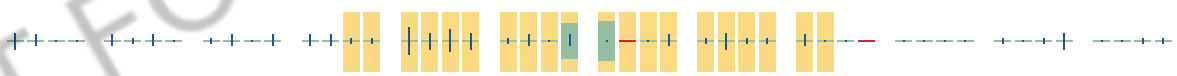


Buff-breasted Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Canada Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

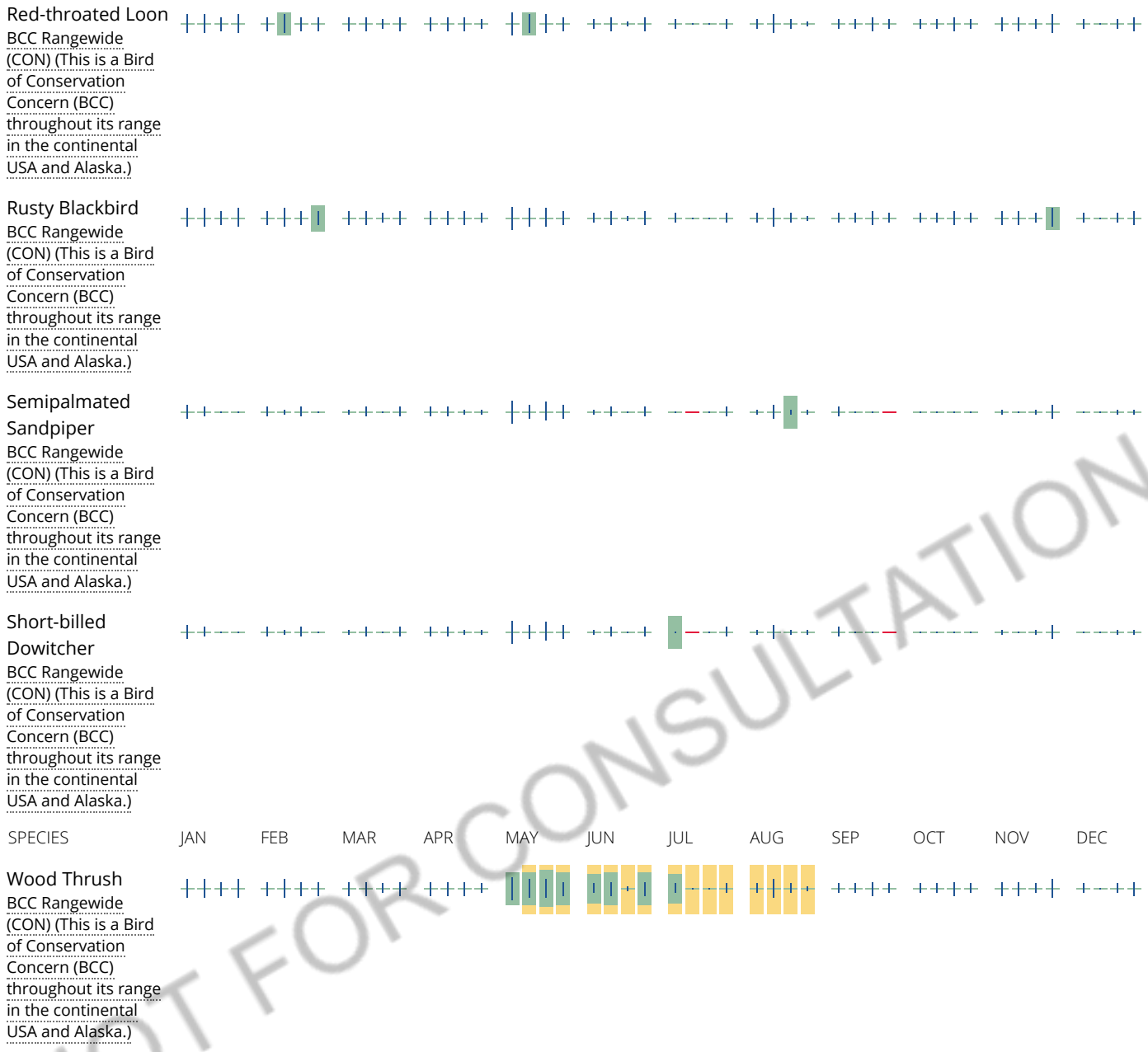


Least Tern
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Purple Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project

intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

PFO1C

FRESHWATER POND

PUBHh

RIVERINE

R2UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal,

state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix F: Memorandum of Agreement Between RIDEM and the RIARNG

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MEMORANDUM OF AGREEMENT

BETWEEN

THE STATE OF RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

AND THE

RHODE ISLAND NATIONAL GUARD

This Memorandum of Agreement is entered this 18 day of November, 2013 between the State of Rhode Island, Department of Environmental Management (the "DEM"), 235 Promenade Street, Providence, Rhode Island 02908 and the Rhode Island National Guard (the "National Guard"), 645 New London Avenue, Cranston, Rhode Island, 02920.

WHEREAS, the DEM and the National Guard recognize the importance of protecting the security of our nation and the need for training of National Guard troops in the State of Rhode Island, and

WHEREAS the National Guard desires to utilize portions of properties under the care, control and custody of DEM for training purposes, and

WHEREAS, the DEM and the National Guard recognize that properties under custody of DEM are primarily for purposes of public use for access and recreational enjoyment, for the protection and management of forests, wildlife and the associated habitat values therein, and for water quality protection purposes, and

WHEREAS, the United States of America, the State of Rhode Island, its citizens and the citizens of this country shall benefit from National Guard training;

NOW THEREFORE, in consideration of the above, the mutual promises and covenants contained herein, and for other good and valuable consideration, the parties agree as follows:

1. The National Guard shall provide DEM with a list all anticipated locations, times, dates and proposed uses of DEM property on a semiannual basis by November 1st and May 1st and make application to utilize these lands under DEM's Special Use Permit process.
2. DEM and National Guard agree to meet biannually by December 1st and June 1st to discuss the National Guard's proposed use of DEM properties. DEM shall provide approved Special Use Permits to the National Guard by January 1st and July 1st biannually.
3. DEM and National Guard agree that any and all use of DEM properties shall be consistent with the Special Use Permit including any terms and conditions of said permits and the natural resource protection and public access goals of the DEM.
4. This Agreement shall remain in full force and effect until either party elects to terminate,

notice of any such termination must be provided to the other party in writing.

In Witness Whereof, the parties have hereto caused this Agreement and a duplicate hereof to be executed on the day and date first written above.

Rhode Island National Guard

By: _____
MG Kevin R. McBride
Adjutant General

Date: 16 Oct 2013

State of Rhode Island
Department of Environmental Management

By: _____
Janet L. Coit, Director

Date: 18 Nov 2013

Appendix G: Northern Long-Eared Bat Streamlined Section 7 Consultation Framework

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Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats

A separate key is available for non-federal activities

Federal agency actions that involve incidental take not prohibited under the final 4(d) rule may result in effects to individual northern long-eared bats. Per section 7 of the Act, if a federal agency's action may affect a listed species, consultation with the Service is required. This requirement does not change when a 4(d) rule is implemented. However, for this 4(d) rule, the Service proposed a framework to streamline section 7 consultations when federal actions may affect the northern long-eared bat but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework. This key will help federal agencies determine if their actions may cause prohibited incidental take of northern long-eared bats as defined in the 4(d) rule under the Endangered Species Act and if separate section 7 consultation may be necessary. Also, the framework for streamlining northern long-eared bat section 7 consultation is provided.

1. **Have you determined that the proposed action will have "no effect" on the northern long-eared bat?**

   Yes, the proposed action will have "no effect" on the northern long-eared bat.
   When the action agency determines its proposed action will not affect a listed species, there is no need to coordinate further with the Service. If the northern long-eared bat will not be exposed directly or indirectly to the proposed action or any resulting environmental changes, an agency should conclude "no effect" and document the finding and this completes the section 7 process. For example, if suitable habitat is not present in the action area and the project does not otherwise present a risk to the species, conclude "species not present" and document your finding.

   No, the proposed action "may affect" the northern long-eared bat or individual northern long-eared bats.
   Continue to #2

2. **Will your activity purposefully take (see Definitions below) northern long-eared bats? For example, are you removing bats from a human structure or capturing bats for research?**

   Yes, my activity includes purposefully taking northern long-eared bats.

   - Removing bats from human structures is not prohibited and take of northern long-eared bats as required for public health monitoring (disease testing) is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is

optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

- Research that involves handling bats does require a permit after May 4, 2016; if you are conducting research that includes capturing and handling northern long-eared bats, you should contact the U.S. Fish and Wildlife Service to apply for a permit. www.fws.gov/endangered/regions

- Other purposeful take (see Definitions below) of northern long-eared bats is prohibited. You should contact the U.S. Fish and Wildlife Service as the standard section 7 consultation procedures apply.

No, my activity does not include purposefully taking northern long-eared bats.
Continue to #3.

3. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly outside the White-nose Syndrome Zone? For the most current version of the White-nose Syndrome Zone map, please see www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

Yes, the action area is located wholly outside the white-nose syndrome zone.
Incidental take (see Definitions below) of northern long-eared bats is not prohibited in areas outside the White-nose Syndrome Zone. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

No, the action area is located partially or wholly inside the white-nose syndrome zone.
Continue to #4

4. Will the action take affect caves or mines where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

Yes, the action will affect a northern long-eared bat hibernaculum or it could alter the entrance or the environment (physical or other alteration) of a hibernaculum.
Take (see Definitions below) of northern long-eared bats within hibernacula is prohibited, including actions that may change the nature of the hibernaculum's environment or entrance to it, even when the bats are not present. If your activity includes work in a hibernaculum or it could alter its entrance or environment, please contact the Service's Ecological Services Field Office located nearest to the project area. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices.

No, the action will not take place within a northern long-eared bat hibernaculum or alter its entrance or environment.
Continue to #5

5. Will the action involve tree removal (see definition below)?

No, the action does not include tree removal.
Incidental take (see Definitions below) from activities that do not involve tree removal and do not take place within hibernacula or would not alter the hibernaculum's entrance or environment (see Question #4), is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes, the action involves tree removal.
Continue to #6

6. Is the action the removal of hazardous trees for protection of human life or property?

Yes, the action is removing hazardous trees.
Incidental take (see Definitions below) of northern long-eared bats as a result of hazardous tree removal is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

No, the action is not removing hazardous trees.
Continue to #7

7. Will the action include one or both of the following: 1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?

No
Incidental take (see Definitions below) from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes
Incidental take (see Definitions below) of northern long-eared bats is prohibited if it occurs as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31 or as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. This does not mean that you cannot conduct your action; however, standard section 7 consultation procedures apply. Please contact your nearest Ecological Services Field Office. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices

How do I know if there is a maternity roost tree or hibernacula in the action area?
We acknowledge that it can be difficult to determine if a maternity roost tree or a hibernaculum is in your project area. Location information for both resources is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

When looking for information on the presence of maternity roost trees or hibernacula within your project area, our expectation is that the federal action agency will complete due diligence to determine if date is available. If information is not available, document your attempt to find the information and send it with your determination under step 1 of the framework (see below).

We do not require federal agencies to conduct surveys; however, we recommend that surveys be conducted whenever possible. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat. In addition, should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could have greater flexibility under section 7(a)(2) of the Act. Recommended survey methods are available at www.fws.gov/midwest/endangered/mammals/nleb.

Definitions

"Incidental take" is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

"Known hibernacula" are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the challenges of surveying for northern long-eared bats in the winter, any hibernacula with northern long-eared bats observed at least once, will continue to be considered "known hibernacula" as long as the hibernacula remains suitable for northern long-eared bat.

"Known occupied maternity roost trees" is defined in the 4(d) rule as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a "known occupied maternity roost" as long as the tree and surrounding habitat remain suitable for northern long-eared bat. The incidental take prohibition for known occupied maternity roosts trees applies only during the during the pup season (June 1 through July 31).

"Purposeful take" is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take. Intentionally killing or harming bats is also purposeful take and is prohibited.

"Take" is defined by the ESA as 'to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purpose*f*ul take.

"Tree removal" is defined in the 4(d) rule as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

Optional Framework to Streamline Section 7 Consultation for the Northern Long-Eared Bat

The primary objective of the framework is to provide an efficient means for U.S. Fish and Wildlife Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and do not require separate consultation. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. Federal agencies may rely on this Biological Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the northern long-eared bat, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the northern long-eared bat, but would not cause prohibited incidental take. This documentation must follow these procedures:

    a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
    b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
    c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
    d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
    e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
    f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the northern long-eared bat is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.

g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the northern long-eared bat fulfilled through this programmatic Biological Opinion.

2. Reporting

    a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
    b. The action agency must provide the results of any surveys for the northern long-eared bat to the appropriate Service Field Office within their jurisdiction.
    c. Parties finding a dead, injured, or sick northern long-eared bat must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the northern long-eared bat:

1. Perform northern long-eared bat surveys according to the most recent Range-wide Indiana Bat/ northern long-eared bat Summer Survey Guidelines. Benefits from agencies voluntarily performing northern long-eared bat surveys include:

    a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of northern long-eared bats, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat.
    b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.

2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on northern long-eared bats. Conservation measures include:

    a. Conduct tree removal activities outside of the northern long-eared bat pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.
    b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
    c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
    d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than northern long-eared bat roosting heights) during the summer maternity season to minimize direct impacts to northern long-eared bat.
    e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the northern long-eared bat active season (April 1 to October 31) in areas where northern long-eared bats are known to roost on bridges or where such use is likely.
    f. Do not use military smoke and obscurants within forested suitable northern long-eared bat habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
    g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
    h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
    i. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal agencies.

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

Information to Determine 4(d) Rule Compliance:	**YES**	**NO**
1. Does the project occur wholly outside of the WNS Zone[1]?	☐	☐
2. Have you contacted the appropriate agency[2] to determine if your project is near known hibernacula or maternity roost trees?	☐	☐
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	☐	☐
4. Could the project alter the entrance or interior environment of a known hibernaculum?	☐	☐
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	☐	☐
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	☐	☐

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant[3] (Name, Email, Phone No.):

Project Name:

Project Location (include coordinates if known):

Basic Project Description (provide narrative below or attach additional information):

[1] http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf
[2] See http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html
[3] If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

General Project Information	YES	NO
Does the project occur within 0.25 miles of a known hibernaculum?	☐	☐
Does the project occur within 150 feet of a known maternity roost tree?	☐	☐
Does the project include forest conversion[4]? (if yes, report acreage below)	☐	☐
Estimated total acres of forest conversion		
If known, estimated acres[5] of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31[6]		
Does the project include timber harvest? (if yes, report acreage below)	☐	☐
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	☐	☐
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	☐	☐
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: _____ Date Submitted: _____

[4] Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).
[5] If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.
[6] If the activity includes tree clearing in June and July, also include those acreage in April to October.

Appendix H: Record of Environmental Consideration (REC) and Environmental Checklist for 2019 INRMP Update

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Enviro Tracking #:	ARNG ENVIRONMENTAL CHECKLIST	State ARNG
RC18-0001	Enter information in the yellow shaded areas.	Rhode Island

PART A - PROJECT INFORMATION

1. PROJECT NAME:

5-Year Update of the RIARNG Integrated Natural Resources Management Plan (INRMP)

2. PROJECT NUMBER: (MILCON if applicable)	3. DATE PREPARED: 2 October 2017

4. DESCRIPTION AND LOCATION OF THE PROJECT/PROPOSED ACTION:

a. Location (Include a detailed map, if applicable):

Statewide

b. Description:

Revision of the RIARNG INRMP.

c. The proposed action will involve (check all that apply):

- ☐ Training activities/areas
- ☐ Maintenance/repair/rehabilitation
- ☐ Innovative readiness training project
- ☐ Other (Explain):
- ☐ Construction
- ☐ Real estate action
- ☐ Natural resource management
- ■ Environmental plans/surveys

d. Project size (acres): (if applicable) Acres of new surface disturbance (proposed): (if applicable)

5. START DATE of PROPOSED ACTION (dd-mmm-yy): 01-Jan-18 Note: This must be a future date.

6. PROGRAMMED FISCAL YEAR (if applicable): FY18

7. END DATE (if applicable): N/A

PART B - DECISION ANALYSIS GUIDE

To use a categorical exclusion, the project must satisfy the following three screening criteria: no segmentation, no exceptional circumstances and a qualifying categorical exclusion that covers the project. The following decision tree will guide the application and documentation of these three screening criteria. The criteria were extracted from 32 CFR Section 651.29 and represent the most common screening conditions experienced in the ARNG. NOTE: Each question in Part B must have an applicable block checked for concurrence with REC.

1. Is this action segmented (the scope of the action must include the consideration of connected, cumulative, and similar actions)? ☐ YES (go to #30) ■ NO (go to #2)

2. Is there reasonable likelihood of significant environmental effects (direct, indirect,and cumulative)? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #3)

3. Is there a reasonable likelihood of significant effects on public health, safety or the environment? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #4)

4. Is there an imposition of uncertain or unique environmental risks? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #5)

5. Is the project of greater scope or size than is normal for the category of action? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #6)

6. Does the project introduce or employ unproven technology? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #7)

PART B - DECISION ANALYSIS (continued)

7. Will there be reportable releases of hazardous or toxic substances as specified in 40 CFR Part 302? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ■ NO (go to #8)

8. If proposed action is in a non-attainment or maintenance area, will air emissions exceed de minimus levels or otherwise require a formal Clean Air Act (CAA) conformity determination? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ☐ NO (go to #9) ☑ NA (go to #9)

9. Will the project have effects on the quality of the environment that are likely to be highly controversial? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ■ NO (go to #10)

10. Will the project establish a precedent (or make decisions in principle) for future or subsequent actions that are reasonably likely to have future significant effects? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #11)

11. Has federal funding been secured for the Innovative Readiness Training (IRT) project?

■ N/A (go to #13) ☐ YES (go to #13) ☐ NO (go to #12)

12. NOTE: IRT projects not currently funded can secure approved NEPA documentation. However, once funding is secured State ARNG is required to coordinate with ARNG-ILE-T to complete natural and cultural surveys via proponent funding.

☐ CONFIRMED (go to #27)

13. Do you have a species list from the U.S. Fish and Wildlife Service that is less than 90 days old?

■ YES (go to #14) Date of List: 2-Oct-17 ☐ NO (update species list return to #13)

14. In reviewing the species list, what determination was made by the State ARNG?

☐ No species present (go to #16)
■ No affect (go to #16)
☐ May affect but not likely to adversely affect (go to # Date of USFWS concurrence:
☐ May affect likely to adversely affect (go to #15)

15. Does an existing Biological Opinion cover the action?

☐ YES (go to #16) Date of BO: ☐ NO (go to #30)

16. Have the Endangered Species Act, Section 7 requirements completed?

■ YES (go to #17) Date of Documentation: 2-Oct-17 ☐ NO (complete documentation, return to #16)

17. Does the project involve an undertaking to a building or structure that is 50 years of age or older?

☐ YES (go to #18) ■ NO (go to #20)

18. Has the building or structure been surveyed for the National Register of Historic Places?

☐ YES (go to #19) ☐ NO (complete inventory, return to #18)

19. Is the building or structure eligible for or listed on the National Register of Historic Places?

☐ YES (go to #20) ☐ NO (go to #20)

20. Does the action involve ground disturbing activities?

☐ YES (go to #21) ■ NO (go to #22)

21. Has an archaeological inventory or research been completed to determine if there are any archeological resources present?

☐ YES (go to #22) ☐ NO (complete inventory or conduct research, return to #21)

22. In reviewing the undertaking, under the National Historic Preservation Act (NHPA) (for both above and below ground resources), what determination was made by the State ARNG?

■ No 106 undertaking; no additional consultation required under NHPA (go to question #27)
☐ No properties affected (go to #24) Date of SHPO Concurrence:
☐ No adverse effect (go to #24) Date of SHPO Concurrence:
☐ Adverse effect (go to #23)

23. Has the State ARNG addressed the adverse effect?

☐ YES (place date of MOA or existing PA and explanation of mitigation in box below, go to #24) ☐ NO (go to #30)

23a.

PART B - DECISION ANALYSIS (continued)

24. Per DoDI 4710.02 did the state ARNG determine that tribal consultation was necessary for this project?

☐ YES (go to #25)

☐ NO (Provide reason in this block 24a, go to #27)

24a.

25. Did the Tribes express an interest or respond with concerns about the project?

☐ YES (go to #26) ☐ NO (go to #27) Date of Documentation:

26. Has the State ARNG addressed the Tribal concerns?

☐ YES (place date of MOU or explanation of how State ARNG addressed tribal concerns in box below, go to #27)

☐ NO (address concerns, return to #26)

Complete only if additional documentation is required in question #26

26a.

27. Does the project involve an unresolved effect on areas having special designation or recognition such as those listed below? For any yes responses go to #30 otherwise go to #28. If any No response is a result of negotiated and/or previously resolved effects please describe resolution in box 27a below.

TYPE	Unresolved Effects?	TYPE	Unresolved Effects?
a. Prime/Unique Farmland	no	e. Wild/Scenic River	no
b. Wilderness Area/National Park	no	f. Coastal Zones	no
c. Sole-Source Aquifer	no	g. 100-year Floodplains	no
d. Wetlands	no	h. National Wildlife Refuges	no

27a.

28. Is this project addressed in a separate EA or EIS review?

☐ YES (complete table below; go to Part C, Determination) ■ NO (go to #29)

Document Title:	
Lead Agency:	
Date of Decision Document:	

29. Does the project meet at least one of the categorical exclusions listed in 32 CFR 651 App B?

■ YES (complete table below; go to Part C, Determination) ☐ NO (go to #30)

List primary CAT EX code	B-3: Preparation of regulations, procedures, manuals, and other…
Descibe why CAT EX applies	Update of the INRMP.

30. At this time your project has not met all the qualifications for using a categorical exclusion under 32 CFR 651. Unless the scope of the project is changed, it will require an Environmental Assessment or possibly an Environmental Impact Statement. If you feel this is in error, please call your NEPA Regional Manager to discuss. If needed, go to Part C Determination.

Additional Information (if needed):

PART C - DETERMINATION

On the basis of this initial evaluation, the following is appropriate:

- ☐ IAW 32 CFR 651 Appendix B, the proposed action qualifies for a Categorical Exclusion (CX) that does not require a Record of Environmental Consideration.
- ☐ A Record of Environmental Consideration (REC).
- ☐ An Environmental Assessment (EA).
- ☐ A Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS).

Elizabeth Stefanik	
Signature of Proponent (Requester)	Environmental Program Manager
Ms. Elizabeth Stefanik	MAJ Bradford Labine
Printed Name of Proponent (Requester)	Printed Name of Env. Program Manager
2-Oct-17	2-Oct-17
Date Signed	Date Signed

Other concurrence (as needed):

Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed
Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed
Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed

Enviro Tracking #:	**ARNG Record of Environmental Consideration** **Enter information in the yellow shaded areas.**	**State ARNG**

1. PROJECT NAME:
5-Year Update of the RIARNG Integrated Natural Resources Management Plan (INRMP)

2. PROJECT NUMBER: (MILCON if applicable)

3. DATE PREPARED: 2 October 2017

4. START DATE of PROPOSED ACTION (dd-mmm-yy): 1-Jan-18 Note: This must be a future date

5. PROGRAMMED FISCAL YEAR: FY18

6. END DATE (if applicable): N/A

7. DESCRIPTION AND LOCATION OF THE PROPOSED ACTION:

a. Location (Include a detailed map, if applicable):

Statewide.

b. Description:

Update of the RIARNG INRMP.

8. CHOOSE **ONE** OF THE FOLLOWING:

☐ An existing environmental assessment* adequately covers the scope of this project. Attach FNSI if EA was completed by another federal agency (non-ARNG).
EA Date (dd-mmm-yy): Lead Agency:

☐ An existing environmental impact statement* adequately covers the scope of this project.
EIS Date (dd-mmm-yy): Lead Agency:

■ After reviewing the screening criteria and completing the ARNG environmental checklist, this project qualifies for a
Categorical Exclusion Code: B-3: Preparation of regulations, procedures, manuals, and other..
See 32 CFR 651 App. B
Categorical Exclusion Code:
See 32 CFR 651 App. B
Categorical Exclusion Code:
See 32 CFR 651 App. B

☐ This project is exempt from NEPA requirements under the provisions of:
Cite superseding law:

*Copies of the referenced EA or EIS can be found in the ARNG Environmental Office within each state.

9. REMARKS:

Elizabeth Stefanik
Signature of Proponent (Requester)

Ms. Elizabeth Stefanik
Printed Name of Proponent (Requester)

2-Oct-17
Date Signed

Environmental Program Manager

MAJ Bradford Labine
Printed Name of Env. Program Manager

2-Oct-17
Date Signed

Proponent Information:

10. Proponent: RIARNG Environmental Branch

11. Address: 645 New London Avenue, Cranston, RI 02920

12. POC: Elizabeth Stefanik

13. Comm. Voice: 401-275-4035

14. Proponent POC e-mail: elizabeth.a.stefanik.nfg@mail.mil

RHODE ISLAND ARMY NATIONAL GUARD
COMMAND READINESS CENTER
645 NEW LONDON AVENUE
CRANSTON RI 02920

NGRI-FMO-ENV

2 October 2017

MEMORANDUM FOR RECORD

SUBJECT: Section 7 Endangered Species Act Analysis for the 5-Year Update of the Integrated Natural Resources Management Plan (INRMP)

1. In accordance with the environmental stewardship responsibilities of the Rhode Island Army National Guard (RIARNG) under the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA), the RIARNG has prepared this Memorandum for Record to meet Section 7 ESA requirements for endangered species determination.

2. The RIARNG INRMP is primarily for Camp Fogarty, located in East Greenwich, Rhode Island, but the guidance provided will be implemented at all RIARNG sites within the state.

3. The U.S. Fish and Wildlife Endangered Species website (https://www.fws.gov/newengland/pdfs/RI%20species%20by%20town.pdf) was reviewed for threatened and endangered species. Enclosure 1 provides the list of Federally Listed Endangered and Threatened Species in Rhode Island. The INRMP will support protection of the listed species.

4. The RIARNG has determined that there will be "no adverse effects" to any federally or state listed species for this proposed activity.

Encls

BRADFORD LABINE
MAJ, MS
Environmental Program Manager

Enclosure 1

Accessed 2-Oct-17.

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN RHODE ISLAND

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Bristol	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- Unknown, Summer – wide variety of forested habitats	Statewide
Kent	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter-Unknown, Summer – wide variety of forested habitats	Statewide
Newport	Piping Plover	Threatened	Coastal Beaches	Little Compton, Middletown, Tiverton
	Roseate Tern	Endangered	Coastal beaches, islands and the Atlantic Ocean	Newport
	Red knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- Unknown, Summer – wide variety of forested habitats	Statewide
Providence	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Glocester
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- Unknown, Summer – wide variety of forested habitats	Statewide
Washington	Roseate Tern	Endangered	Coastal beaches, islands and the Atlantic Ocean	Westerly
	Piping Plover	Threatened	Coastal Beaches	Narragansett, Charlestown, Westerly, New Shoreham and South Kingstown.
	Red knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal towns
	American burying beetle	Endangered	Upland grassy meadows	New Shoreham
	Sandplain Gerardia	Endangered	Sandplain grasslands	Charlestown, Exeter, Richmond
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter - Unknown, Summer – wide variety of forested habitats	Statewide

[1]Migratory only. scattered along the coast in small numbers

-Eastern cougar, gray wolf and Northeastern beach tiger beetle are considered extirpated in Rhode Island.

-There is no federally-designated Critical Habitat in Rhode Island.

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Appendix I: Environmental Laws, Regulations, Executive Orders, and Policies

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CONTENTS

Federal Laws and Regulations

- **American Indian Religious Freedom Act of 1978 (Public Law 95-341; 42 United States Code [USC] §1196)** – requires the US, where appropriate, to protect and preserve religious rights of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.
- **Animal Damage Control Act of 1931 (7 USC §426 *et seq.*)** – provides broad authority for investigation, demonstrations and control of mammalian predators, rodents and birds.
- **Anti-Deficiency Act of 1982 (31 USC §1341 *et seq.*)** – provides that no federal official or employee may obligate the government for the expenditure of funds before funds have been authorized and appropriated by Congress for that purpose.
- **American Antiquities Act of 1906 (Public Law 59-209; 16 USC §431-433)** – authorizes the President to designate historic and natural resources of national significance, located on federal lands, as National Monuments for the purpose of protecting items of archeological significance.
- **Americans with Disabilities Act of 1990 (Public Law 101-336; 42 USC 12101) –** prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and governmental activities.
- **Archeological and Historical Preservation Act of 1974 (Public Law 95-96; 16 USC §469 *et seq*.)** – provides for the preservation of historical and archeological data, including relics and specimens, threatened by federally funded or assisted construction projects.
- **Archeological Resources Protection Act of 1979 (16 USC §470 *et seq.*)** – prohibits the excavation or removal from federal or Indian lands any archeological resources without a permit from the land manager.
- **Bald and Golden Eagle Protection Act of 1940 (Public Law 87-884; 16 USC §668a-d)** – prohibits taking or harming bald or golden eagles, their eggs, nests, or young without appropriate permit.
- **Clean Air Act of 1970, as amended (42 USC §7401 *et seq.*)** – regulates air emissions from area, stationary, and mobile sources. This law authorizes the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.
- **Clean Water Act (CWA) of 1972 (Public Law 92-500; 33 USC §1251 *et seq.*)** – aims to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Under Section 401, states have authority to review federal permits that may result in a discharge to wetlands or water bodies under state jurisdiction. Under section 404, a program is established to regulate the discharge of dredged or fill material into the Nation's waters, including wetlands.
- **Conservation and Rehabilitation Program on Military and Public Lands (Public Law 93-452; 16 USC §670 *et seq.*)** – provides for fish and wildlife habitat improvements, range rehabilitation, and control of off-road vehicles on federal lands.
- **Conservation Programs on Military Reservations (Public Law 90-465; 16 USC §670 *et seq.*)** – Requires each military department to manage natural resources and to ensure that services are

provided which are necessary for management of fish and wildlife resources on each installation; to provide their personnel with professional training in fish and wildlife management; and to give priority to contracting work with federal and state agencies that have responsibility for conservation or management of fish and wildlife. In addition it authorizes cooperative agreements (with states, local governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects or initiatives.

- **Endangered Species Act of 1973, as amended (16 USC §1531 *et seq.*)** – provides for the identification and protection of threatened and endangered plants and animals, including their critical habitats. Requires federal agencies to conserve threatened and endangered species and cooperate with state and local authorities to resolve water resources issues in concert with the conservation of threatened and endangered species. This law establishes a consultation process involving federal agencies to facilitate avoidance of agency action that would adversely affect species or habitat. Further, it prohibits all persons subject to US jurisdiction from taking, including any harm or harassment, endangered species.
- **Farmland Protection Policy Act (7 CFR 658)** – The FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that—to the extent possible—Federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two years. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.
- **Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (Public Law 92-516; 7 USC §136)** – governs the use and application of pesticides in natural resource management programs.
- **Federal Land Policy and Management Act (43 USC §1701)** – establishes public land policy and guidelines for its administration and provides for the management, protection, development, and enhancement of the public lands.
- **Federal Noxious Weed Act of 1974 (Public Law 93-629; 7 USC §2801 *et seq*.)** – establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- **Federal Water Pollution Control Act as amended by the CWA of 1977 (33 USC §1251)** – regulates dredging and filling of wetlands and waterbodies and establishes procedures for identifying and regulating non-point sources of pollutants, including turbidity, into waterways.
- **Federal Water Pollution Control Act: Section 404, as amended by the CWA of 1977 (33 USC §1251)** – prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from US Army Corps of Engineers (USACE). Activities in wetlands that require federal permits include, but are not limited to: placement of fill material; ditching activities when the excavated material is sidecast, mechanized land clearing; land leveling; and most road construction.
- **Fish and Wildlife Conservation Act of 1980 (Public Law 96-366; 16 USC §2901)** – provides for the protection of non-game fish and wildlife.

- **Fish and Wildlife Coordination Act of 1934 (16 USC §661 *et seq.*)** – provides mechanism for wildlife conservation to receive equal consideration and be coordinated with water-resource development programs.
- **Forest and Rangeland Renewable Resources Planning Act (16 USC §1601 *et seq.*)** – requires and inventory of potential renewable resources and an evaluation of opportunities for improving their yield on goods and services. Agencies must provide an opportunity for public involvement and consultation with other agencies in establishing policies for multiple use and sustained yield.
- **Hunting and Fishing on Federal Lands (10 USC §2671 *et seq.*)** – establishes requirements for regulating hunting, fishing, and trapping on military lands.
- **Land and Water Conservation Act of 1965 (16 USC §4601 *et seq.*)** – assists in preserving, developing, and assuring accessibility to outdoor recreation resources.
- **Legacy Resource Protection Program Act (Public Law 101-511)** – established a program for the stewardship of biological, geophysical, cultural and historic resources on Department of Defense (DoD) lands.
- **Migratory Bird Conservation Act of 1929 (16 USC §715 *et seq.*)** – establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.
- **Migratory Bird Treaty Act of 1918, as amended (Public Law 65-186; 16 USC §703-712)** – prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- **National Environmental Policy Act of 1969 (NEPA), as amended (Public Law 91-190; 42 USC §4321 *et seq.*)** – provides a national charter for protection of the environment and requires federal agencies to prepare a statement of environmental impact in advance of each major action that may significantly affect the quality of the human environment.
- **National Historic Preservation Act of 1966 (16 USC §470 *et seq.*)** – provides for the preservation of historic properties throughout the US.
- **Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601; 25 USC §§3001-3013)** – addresses the recovery, treatment, and repatriation of Native American and Native Hawaiian cultural items by federal agencies and museums. It includes provisions for data gathering, reporting, consultation, and issuance of permits. **Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 USC 4701 *et seq.*)** – establishes program to prevent the introduction of and to control the spread of introduced aquatic nuisance species and the brown tree snake.
- **North American Wetlands Conservation Act of 1989 (USC 4401 et seq.) –** encourages partnerships to conserve North American wetland ecosystems for waterfowl, other migratory birds, fish, and wildlife. It encourages the formation of public-private partnerships to develop and implement wetland conservation projects consistent with the North American Waterfowl Management Plan (NAWMP).

- **Oil Pollution Prevention Act of 1990 (Public Law 101-380) –** redefines the requirements of the National Contingency Plan to include planning for, rescue of, minimization of injury to, and assessment of damages for injury to fish and wildlife resources.
- **Outleasing for Grazing and Agriculture on Military Lands (10 USC §2667**) – provides for the outleasing of public lands.
- **Resource Conservation and Recovery Act of 1976 (42 USC §6901 *et seq.*)** – establishes a comprehensive program which manages solid and hazardous waste. Subtitle C, Hazardous Waste Management, sets up a framework for managing hazardous waste from its initial generation to its final disposal. Waste pesticides and equipment/containers contaminated by pesticides are included under hazardous waste management requirements.
- **Sale of Certain Interests in Land, Logs (10 USC §2665)** – authorizes the sale of forest products and the reimbursement of the costs of managing forest resources for timber production.
- **Sikes Act "Conservation Programs on Military Reservations" (16 USC §670a *et seq.*) –** requires federal military installations with significant natural resources to implement cooperative agreements with other agencies and develop long-range integrated natural resources management plans. Thereby, it is appropriate to manage natural resources for multipurpose uses and provide the public access to those uses to the extent consistent with the military mission. The act also sets guidelines for the collection of fees for the use of natural resources such as hunting and fishing.
- **Soil Conservation Act (16 USC §590a *et seq.*)** – provides for soil conservation practices on federal lands.

Federal Executive Orders (EOs)

- **Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870)** - restricts the use of chemical toxicants for mammal and bird control.
- **Exotic Organisms (EO 11987)** – restricts federal agencies in the use of exotic plant species in any landscape and erosion control measures.
- **Energy Efficiencies and Water Conservation at Federal Facilities (EO 12902)** – federal agency use of energy and water resources is directed towards the goals of increased conservation and efficiency.
- **Floodplain Management (EO 11988)** – specifies that agencies shall encourage and provide appropriate guidance to applicant to evaluate the effects of their proposals in floodplains prior to submitting applications. This includes wetlands that are within the 100-year floodplain and especially discourages filling.
- **Greening the Government through Leadership in Environmental Management (EO 13148)** – requires the head of each federal agency to be responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes across all agency missions, activities, and functions.
- **Indian Sacred Sites (EO 13007)** – provides for the protection of and access to Indian sacred sites.

- **Invasive Species (EO 13112)** – requires federal agencies to: (1) prevent the introduction of invasive species; (2) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (3) monitor invasive species populations accurately and reliably, provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (4) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (5) promote public education on invasive species and the means to address them.
- **Off Road Vehicle Use on Public Lands (EO 11989)** – limits the use of off-road vehicles on federal lands soil, water, or natural resources could be adversely affected.
- **Protection and Enhancement of the Cultural Environment (EO 11593)** – supports previous laws and provides for additional protection of cultural resources.
- **Protection and Enhancement of Environmental Quality (EO 11514)** – provides for environmental protection of federal lands and enforces requirements of NEPA.
- **Protection of Wetlands (EO 11990)** – directs all federal agencies to take action to minimize the destruction loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. This applies to the acquisition, management, and disposal of federal lands and facilities; to construction or improvements undertaken, financed, or assisted by the federal government; and to the conduct of federal activities and programs which affect land use.
- **Recreational Fisheries (EO 12962)** – requires federal agencies, to the extent practicable and where permitted by law, to improve the quantity, function, sustainable productivity, and distribution of US aquatic resources for increased recreational fishing opportunities.
- **Responsibilities of Federal Entities to Protect Migratory Birds (EO 13186)** – directs all federal agencies taking actions that have a potential to negatively affect migratory bird populations to develop and implement a Memorandum of Understanding with the US Fish and Wildlife Service (USFWS) that shall promote the conservation of migratory bird populations.

State Laws and Regulations

- **Fish and Wildlife (R.I.G.L. Title 20), as implemented by 250-Rhode Island Code of Regulations (RICR) Chapter 60** – establishes regulation of hunting and fishing activities and conservation policies in Rhode Island intended to promote the conservation and perpetuation of all species of fish and wildlife in the state.
- **Fugitive Dust (250-RICR-120-05-5) –** requires that no person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties.
- **Rhode Island Endangered Species Act (Rhode Island General Laws [R.I.G.L.] 20-37)** – establishes that no person shall buy, sell, offer for sale, store, transport, import, export, or otherwise traffic in any animal or plant, or any part of any animal or plant, whether living, dead, processed, manufactured, preserved, or raw if the animal or plant has been declared to be an endangered species by either the United States Secretaries of the Interior or Commerce or the director of RIDEM without a special permit for scientific or educational purposes. This Act further establishes enforcement provisions and penalties for violations.

- **Rhode Island Forest Fires and Prevention Act (R.I.G.L. 2-12), as implemented by 250-RICR-70-00-2** – establishes policy of the state to prevent and minimize forest fires, including prohibiting open burning on or adjacent to any forest land without a permit. Open burning is prohibited in general except between 5:00 PM and 10:00 AM between 15 March and 15 May, or when it is raining or the ground is covered in snow, unless a permit is obtained.
- **Rhode Island Fresh Water Wetlands Act (R.I.G.L. 2-1-18 – 2-1-25), as implemented by 250-RICR)-150-15-1** – establishes the authority of RIDEM to regulate the use of freshwater wetlands, buffers, and floodplains, as defined. These regulations further enumerate prohibited and exempted activities that can be conducted in or near wetlands, and establishes the appropriate procedure for obtaining permits depending on the degree of anticipated impacts.
- **Rhode Island General Plant Pest Act (R.I.G.L. 2-16)** – prohibits anyone from knowingly allowing plant pests (including disease and insects) to exist on their property, and authorizes RIDEM to order the destruction of such plants if necessary.
- **Rhode Island Groundwater Protection Act (R.I.G.L. 46-13.1), as implemented by 250-RICR-150-05-3** – establishes groundwater classifications, sets minimum standards for groundwater quality, and prohibits groundwater pollution without a permit.
- **Rhode Island Pesticide Control Act (R.I.G.L. 23-25), as implemented by 250-RICR-40-15-2** – regulates the collection, examination, and reporting of samples of pesticides or devices; the safe use, handling, transportation, storage, display, distribution, and disposal of pesticides and their containers; provide for labeling requirements of all pesticides; prescribe methods to be used in the application of pesticides; and establish standards of minimum competence levels for applicators of pesticides.
- **Rhode Island Seed Act (R.I.G.L. 2-6)** – establishes standards for sale of seeds, including prohibitions on the sale, offer for sale, or transport for sale of any agricultural or vegetable seed that contains noxious weed seeds.
- **Rhode Island Soil Conservation Act (R.I.G.L. 2-4)** – establishes a policy of the state to provide for the conservation of the land and renewable natural resources, and establishes conservation districts to serve as local units of the state conservation committee. CFTS is located in the southern Rhode Island conservation district.
- **Rhode Island Water Pollution Act (R.I.G.L. 46-12), as implemented by 250-RICR-150-10-1** – provides the power and authority to RIDEM to assume the NPDES permitting program from the USEPA and to implement the program in accordance with the CWA. These regulations further establish generic permits and their coverage under the NPDES program that are issued by RIDEM for pollutant discharges to surface waters of the state.
- **Visible Emissions (205-RICR-120-05-1) –** controls visible emissions from the operation of any air contaminant source. No owner or operator of any air contaminant source shall allow emissions from said source for longer than 3 minutes if opacity is greater than 20 percent.

DoD Regulations and Guidance

- **32 Code of Federal Regulations (CFR) 651 –** Environmental Analysis of Army Actions
- **32 CFR 190** – Appendix-Integrated Natural Resources Management

- **Army Regulation (AR) 200-1** – Environmental Protection and Enhancement
- **AR 210-9** – Use of Off-Road Vehicles on Army Lands
- **AR 215-1** – Morale, Welfare, and Recreation Activities and Non-appropriated Fund Instrumentalities
- **AR 315-19** – The Army Sustainable Range Program
- **AR 405-80** – Management of Title and Granting Use of Real Estate
- **AR 420-40** – Historic Preservation
- **AR 420-90** – Fire and Emergency Services
- **DoD Instruction (DoDI) 4150.7** – DoD Pest Management Program
- **DoDI 4715.03 –** Natural Resources Conservation Program
- **DoDI 6055.6** – DoD Fire and Emergency Service Program
- **Memorandum**, DAIM-ED Guidance for Implementation of the SAIA,25 May 2006
- **Memorandum**, DAIM-ZA (200-3) Army Wildland Fire Policy Guidance, 04 September 2002
- **Memorandum**, Deputy under Secretary of Defense (Environment, Safety & Occupational Health [ES&OH]), *Implementation of SAIA Amendments: Supplemental Guidance Concerning INRMP Reviews*, 1 November 2004
- **Memorandum**, United States Army policy entitled Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and INRMP ("Army INRMP Policy"); 21 March 1997
- **Memorandum**, Army National Guard Directorate, Environmental Programs Division (ARNG-ILE) Guidance for the Creation, Implementation, Review, and Revision and Update of INRMPs; 9 April 2012
- **Memorandum**, Deputy Assistant Secretary of the Army (ES&OH) Deputy Assistant Secretary of the Navy (Environment) Deputy Assistant Secretary of the Air Force (ES&OH) Director Defense Logistics Agency, *INRMP Template*, 14 August 2006
- **Memorandum**, Army National Guard Directorate, Environmental Programs Division (ARNG-ILE) Integrated Pest Management Program Policy, 04 February 2016
- **Training Circular (TC) 25-1 –** Training Land
- **Training Manual (TM) 5-631 –** Installations – General Woodland Management
- **TM 5-633** – Natural Resources Fish Wildlife Management

CFTS Regulations and Guidance

- **Standard Operating Procedure for CFTS**