

**DRAFT FINAL – INTEGRATED NATURAL RESOURCES MANAGEMENT
PLAN**

**Devens Reserve Forces Training Area
Devens, Massachusetts**

Prepared for:



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**Integrated Natural Resources Management Plan
Signature Page**

**Devens Reserve Forces Training Area
Devens, Massachusetts**

This Integrated Natural Resource Management Plan meets the requirements of the Sikes Act (16 USC 670a et seq.) as amended.

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Table of Contents

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Table of Contents	i
List of Tables	iv
Appendices	v
1. Purpose and Scope.....	1
2. Goals, Objectives, and Measures of Effectiveness	2
3. Installation History.....	4
4. Natural Resource Management History	5
4.1. Land Management.....	5
4.2. Woodland/Forest Management	6
4.3. Fish and Wildlife Management	6
5. Installation Overview.....	7
5.1. Maps.....	7
5.2. Installation Information	8
5.3. Regional Land Use and Setting.....	8
5.4. Natural Environment.....	9
5.4.1. Climate.....	9
5.4.2. Air Quality.....	9
5.4.3. Topography.....	10
5.4.4. Geology.....	10
5.4.5. Hydrology	10
5.4.6. Ecoregions.....	11
5.5. Public and Affiliate Access.....	11
5.6. Unique Natural Resources.....	11
6. Natural Resource Management Program Elements.....	12
6.1. Geographic Information System Development.....	12
6.2. Climate Change Management.....	13
6.3. Soil Conservation and Erosion and Sedimentation Control.....	14
6.4. Water Resource Management	18
6.4.1. Surface Water.....	18
6.4.2. Stormwater.....	20

6.4.3.	Groundwater	20
6.4.4.	Drinking Water	21
6.4.5.	Wetlands.....	21
6.4.6.	Floodplains	27
6.5.	Sensitive Species Management.....	27
6.5.1.	Federally Listed Threatened and Endangered Species	32
6.5.1.1.	Northern Long-Eared Bat (Federally Threatened, State Endangered)	33
6.5.1.2.	Small Whorled Pogonia (Federally Threatened; State Endangered).....	33
6.5.2.	State Listed Species and Species of Concern.....	34
6.5.2.1.	Grasshopper Sparrow (State Threatened).....	34
6.5.2.2.	Blanding’s Turtle (State Threatened).....	35
6.5.2.3.	Eastern Whip-poor-will (State special concern).....	35
6.5.2.4.	Monarch Butterfly (under review).....	36
6.5.2.5.	New England Blazing Star (State special concern)	36
6.6.	Migratory Bird Management	37
6.7.	Fish and Wildlife Management	38
6.7.1.	Fish and Wildlife Species Known to Occur on DRFTA	38
6.7.1.1.	Fish	39
6.7.1.2.	Mammals	39
6.7.1.3.	Birds	39
6.7.1.4.	Reptiles and Amphibians.....	40
6.7.1.5.	Invertebrates	40
6.7.2.	Hunting Program	40
6.8.	Vegetation Management	41
6.8.1.	Grasslands.....	42
6.8.2.	Forests.....	43
6.8.3.	Invasive Plants.....	44
6.8.4.	Urban Landscapes	44
6.9.	Integrated Pest Management	45
6.9.1.	Forest Pests	46
6.9.2.	Forest Diseases.....	47
6.9.3.	Invasive Plant Species	47
6.10.	Wildland Fire Management.....	48

7. Implementation	49
7.1. Conservation Awareness.....	50
7.2. Natural Resources Staffing.....	50
7.3. Funding.....	50
8. Five-Year Implementation Plan.....	53

List of Tables

Table 2-1:	DRFTA Integrated Natural Resource Management Plan Goals & Objectives
Table 5-1:	DRFTA Figures Included in Appendix A1
Table 5-2:	DRFTA Property Parcels
Table 6-1:	Climate Change Strategies at DRFTA
Table 6-2:	Soil Series Map Units at DRFTA
Table 6-3:	Surface Water Bodies at DRFTA
Table 6-4:	Wetlands at Fort Devens
Table 6-5:	CWA Regulatory Information Applicable to DRFTA
Table 6-6:	Sensitive Species and Species of Concern at DRFTA
Table 6-7:	Vegetation at DRFTA
Table 6-8:	Invasive Plants and Control Activities at DRFTA
Table 8-1:	DRFTA INRMP Five-Year Implementation Plan

Appendices

Appendix A. Maps and References

A1. Figures

- Figure 1 Installation Map
- Figure 2A Military Constraints South Post
- Figure 2B Military Constraints – Northern Areas
- Figure 3A Environmental Constraints - South Post
- Figure 3B Environmental Constraints – Northern Areas
- Figure 4 DRFTA Regional Overview
- Figure 5 DRFTA Soils
- Figure 6 DRFTA Vegetation
- Figure 7 NHSEP Priority and Estimated Habitats
- Figure 8 BioMap2 Habitat

A2. List of Acronyms

A3. Literature Cited

A4. Agreements and Site-Specific Data

1. Sikes Act Tripartite Agreement Memorandum of Understanding
2. MassWildlife Letter regarding 2019 INRMP and EA Preliminary Comments from the Massachusetts Division of Fisheries and Wildlife, dated May 8, 2019
3. USFWS Consultation and IPaC for Airspace Change Proposal
4. USFWS Preliminary IPaC Entire Property
5. USFWS Consultation and IPaC for MS4 NOI
6. a. Table of Confirmed Fauna at DRFTA (Fort Devens, 2010)
b. Table of Vernal Pool Species (Oxbow, 2019)
7. DRFTA Waterfowl Plot Check dated April 22, 2019
8. USFWS Field Office Email Correspondence regarding Northern Long-Eared Bat, dated June 17, 2019.

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1. Purpose and Scope

Natural resources are the materials and capabilities provided by nature. The term, natural resources, includes minerals, soils, forests, water, fish, wildlife, and plants. Natural resources define the wealth of a nation and where lands are managed by the federal government, natural resources are held in trust for the public. This common law principle is known as the Public Trust Doctrine. In accordance with this principal, the Army is entrusted with managing the natural resources of its lands in a responsible, sustainable manner, making them available for future generations.

Because natural resources belong to the public, the United States (US) Congress established the *Sikes Act* (16 United States Code [USC] 670a et seq.) in 1960 to ensure that the Department of Defense (DoD) conserves and protects the natural resources of its lands. Because military lands are generally protected from commercial and residential development, they are some of our nation's most significant remaining large tracts of land and contain valuable natural resources. In 1997, Congress amended the Act (*Sikes Improvement Act*) requiring the DoD to manage the natural resources of its installations in a manner that ensures no net loss in the capability of lands to support the military mission while at the same time, sustaining the multipurpose use of natural resources and providing for public access to the extent that such access is not inconsistent with the military mission. To ensure compliance with this directive, the *Sikes Improvement Act* requires the DoD to develop and implement Integrated Natural Resources Management Plans (INRMPs) for all military installations that have significant natural resources.

This INRMP is for Devens Reserve Force Training Area (DRFTA) located in Devens, Massachusetts. It was developed in accordance with the *Sikes Act* and DoD and Army directives including:

- Department of Defense Instruction (DoDI) 4715.03, Natural Resources Conservation Program (US Army, 2018a);
- US Army Environmental Command's (USAEC) Guidelines to Prepare Integrated Resource Management Plans for Army Installations and Activities – Modified for Small Installations Template (US AEC, 2015a);
- The Natural Resource Conservation Program Instruction Manual (DoDI/Manual 4715.03.) (US Army, 2018a); and
- The Environmental Protection and Enhancement (Army Regulation [AR] 200-1) (US Army, 2007).

In accordance with the *Sikes Act*, this INRMP provides for continued and enhanced cooperation between the US Army, the US Fish and Wildlife Service (USFWS), the Massachusetts Division of Fisheries and Wildlife (MassWildlife), and other appropriate stakeholders for the conservation of natural resources on DRFTA. This INRMP describes DRFTA's existing natural resource management program and presents practicable alternatives and recommendations for the conservation and enhancement of the installation's natural resources into the future. The natural resource management program at DRFTA is an integral part of the installation's military mission

sustainment efforts and reflects the Army's commitment to responsible natural resource management.

In addition to the *Sikes Act*, this INRMP is also required by DRFTA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision (ROD) document issued in 1996 by the US Environmental Protection Agency (EPA) for the South Post Impact Area (SPIA) and associated Areas of Contamination (AOCs) (US AEC BRAC Division, 1996). The SPIA is a CERCLA Superfund site for contamination in groundwater associated with historical disposal practices. As a requirement of the ROD for the Superfund site, this INRMP is an important part of the installation's CERCLA compliance program.

2. Goals, Objectives, and Measures of Effectiveness

This INRMP is DRFTA's primary planning tool for managing natural resources while ensuring the success and sustainment of the installation's military mission. It will be used to guide the implementation of the natural resources program on DRFTA from fiscal years 2020 through 2024. The four overarching goals of this INRMP along with the specific objectives that will be used to attain each goal are presented in **Table 2-1**.

Table 2-1: DRFTA Integrated Natural Resource Management Plan Goals & Objectives	
Goal 1 <i>Maintain the training value of lands required to accomplish and sustain DRFTA's military mission.</i>	
Objective 1.	Use range monitoring, damage minimization, mitigation, and rehabilitation to maintain and enhance the training value of DRFTA lands in support of current and future military training and operations.
Goal 2 <i>Comply with all laws and regulations that pertain to management of the natural resources at DRFTA.</i>	
Objective 1.	Manage natural resources in accordance with State and Federal environmental laws, particularly the <i>Sikes Act</i> upon which this INRMP is predicated.
Objective 2.	Employ the procedures of the National Environmental Policy Act (NEPA) to make informed decisions on all proposed Army actions in a manner that includes consideration of natural resource management goals.
Objective 3.	Implement this INRMP within the framework of US Army policies and regulations.
Objective 4.	Protect and manage threatened and endangered species and critical habitat in accordance with the Endangered Species Act (ESA), the Massachusetts Endangered Species Act (MESA), NEPA, AR 200-3, DoDI 4715.3, USFWS regulations and agreements, and all other applicable laws or guidance from headquarters.
Goal 3 <i>Manage natural resources on DRFTA in a manner that assures good stewardship of public lands entrusted to the care of the Army.</i>	
Objective 1.	Use a structured, iterative process of adaptive ecosystem management to protect, conserve, and enhance native fauna and flora, sensitive species, habitats, and wetlands on DRFTA.
Objective 2.	Implement natural resource management programs that are on a scale compatible with natural processes, are cognizant of nature's timeframes, recognize social and economic constraints, and are adaptable to complex and changing requirements.
Objective 3.	Monitor and manage soils, water, vegetation, and wildlife on DRFTA with consideration for the value of all natural communities and for the human values associated with those resources.
Objective 4.	Provide for human use of products generated from renewable natural resources when those products can be produced in a sustainable manner without significant negative impacts on the military mission or other natural resources.
Objective 5.	Ensure the coordination of DRFTA's natural resource management program with installation personnel, soldiers and all other visitors.

Table 2-1: DRFTA Integrated Natural Resource Management Plan Goals & Objectives	
Objective 6.	Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.
Objective 7.	Coordinate the enforcement of natural resources-related laws on DRFTA, including Massachusetts General Law (MGL) Chapter 131§ 80A.
<i>Goal 4 Provide quality natural resources-based recreation opportunities that improve the quality of life for those in surrounding communities.</i>	
Objective 1.	Provide high quality opportunities for hunting and other consumptive recreational activities.
Objective 2.	Provide opportunities for non-consumptive outdoor recreation, such as nature study.
Objective 3.	Provide conservation education opportunities.

3. Installation History

DRFTA’s predecessor, Camp Devens, was established in 1917 on approximately 5,000 acres of land in the towns of Ayer, Harvard, Lancaster and Shirley that was leased then later purchased from private owners. The land consisted primarily of farms along the Nashua River and timber land (Fort Devens Museum, 2019). The original Main Post location was selected for its proximity to a large railroad depot. During World War I Camp Devens served as a temporary cantonment for training soldiers, reception center for draftees, and demobilization and separation center for returning troops. Construction of permanent barracks, a hospital, a cantonment area and other buildings began in 1927 and continued into 1930s. Camp Devens became a permanent military installation in 1932 and was officially renamed Fort Devens.

Fort Devens continued to grow in the early 1940s during World War II with construction of over 1,000 wooden structures and the addition of the airfield and the South Post training area. Fort Devens was placed in a caretaker status in 1946 and reactivated during the Korean Conflict, with construction of additional permanent and temporary buildings through the early 1950s (US Army Reserve, 2001). At its height, Fort Devens encompassed over 9,000 acres.

Fort Devens served as an Active Army Installation until March 31, 1996 when it was realigned as an Army Reserve Installation pursuant to the 1991 Base Realignment and Closure Commission actions and named Devens Reserve Forces Training Area. Most of the North and Main Post Areas were transferred to the Commonwealth of Massachusetts or other Federal Government Agencies, including MassDevelopment, a State instrumentality created to oversee redevelopment of former Fort Devens lands. In 2007, the base was reassigned to the U.S. Army Installation Management Command (IMCOM) and renamed the Fort Devens Reserve Forces Training Area. The Base currently consists of five parcels known as the Main Cantonment Area, the 3400 or Shirley Area, the Airfield Area, the Fort Devens Cemetery, and the South Post Range Complex.

Today DRFTA is the major Army Reserve presence in New England. The installation's mission enables the operational readiness of the Total Army Forces and the DRFTA community by providing training capabilities, standardized services, and sustainable infrastructure for both military and law enforcement organizations.

4. Natural Resource Management History

A philosophy of multiple uses is reflected in the historical management of natural resources on DRFTA and former Fort Devens lands. Programs for management of natural resources were historically divided into three administrative areas:

- Forestry/Woodland Management,
- Fish and Wildlife Management, and
- Land Management.

These programs initially functioned as administrative sections under the Land Management Branch, part of the Directorate of Engineering and Housing, on Fort Devens. The first management plan for the installation was the *Land Management Plan*, developed in 1949. Its purpose was to “provide an overall guide for the utilization of... Fort Devens land areas so as to conserve the Natural Resources, upgrade the living environment, and properly support the Military mission in a manner consistent with established national policy”. Since the early 1950s, DRFTA has continually improved the natural resource program by implementing new plans and improving existing plans. These historical plans provide the foundation for today's INRMP.

4.1. Land Management

The land management program was initiated on Fort Devens in 1949 when the first *Land Management Plan* (Fort Devens, 1949) was approved. The plan was subsequently revised in 1958, 1971, and 1979. The plan and its revisions shared the following objectives:

- To coordinate programs that improve, utilize, and maintain land and water areas for the greatest net public benefit while supporting the military mission; and
- To provide protection for environmentally sensitive areas (Fort Devens, 1983).

During the early years of the program, particular emphasis was placed on grounds maintenance and landscape management. By the 1960s, controlling erosion on the installation had become a priority. In 1963, Fort Devens entered into a Cooperative Agreement with the Soil Conservation Service (SCS) for assistance in soil conservation (Fort Devens, 1983). Soil surveys were conducted on the installation by the SCS in 1985 and 1991. To alleviate the environmental impacts of military training and help restore training areas, Fort Devens in collaboration with the SCS, initiated the DoD's Integrated Training Area Management Program (ITAM) in 1997. The ITAM program has become a core component of DRFTA's Sustainable Range Program (SRP) and is responsible for maintaining training land on DRFTA to ensure that lands meet the Army's training requirements.

4.2. Woodland/Forest Management

Prior to government acquisition in 1941, the landscape of South Post was dominated by farms with some small-scale industrial activities including forestry for the local pulpwood market (Fort Devens, 1949). Following government acquisition, no timber harvest occurred on the installation from 1941 to 1967 (Fort Devens, 1968). In 1968, Fort Devens initiated a commercial forestry program implemented and managed under Fort Devens' *Woodland Management Plan*, approved in 1968 with several subsequent revisions. Since 1967, over 3,500,000 board feet of pine and hardwood saw timber have been harvested on DRFTA. As the pulpwood market declined in the 1970's and oil prices rose sharply, timber harvest shifted from pulpwood to predominantly hardwoods for home heating. Beginning in 1980, Fort Devens initiated a program to improve the health of timber stands focused on improving softwood and hardwood stands. Since 2001, Geographical Information System (GIS) mapping and aerial photography have been used to track timber composition, invasive species, and insect pests as part of the natural resource management of forested lands on DRFTA. At present there is no timbering occurring on DRFTA due to unfavorable market conditions.

4.3. Fish and Wildlife Management

Active wildlife management has occurred on DRFTA since 1954 when a Fish and Wildlife Section was created within the Post Engineer Organization of Fort Devens, and the first *Fish and Wildlife Management Plan* was completed (Fort Devens, 1954). From 1954 to 1959, wildlife management was limited to fisheries and improving fishing waters (Fort Devens, 1981). In 1957, a trout stocking program was started on the installation with the assistance of MassWildlife. By the late 1960s, about 127 acres of lakes and ponds and nine miles of streams were managed for fish habitat (Fort Devens, 1983).

Initially, hunting and fishing on the installation were restricted to military personnel. However, in 1960, fishing and hunting privileges were extended to civilians. In 1963, the first Cooperative Agreement was signed between the Garrison Commander and MassWildlife. In support of fish and wildlife management on DRFTA, MassWildlife initiated a trout stocking program in specified waters on the installation. In addition, pheasant, and snowshoe hare were introduced in game management areas. As part of its wildlife management, the Fish and Wildlife Section of DRFTA's Directorate of Public Works (DPW) promoted habitat improvement by growing food plots for foraging wildlife (e.g., deer, turkey, and waterfowl) and posting nesting boxes for breeding birds (e.g., Wood duck), among other activities. At present DRFTA has a small game, turkey and deer hunting program.

Recreational fishing at DRFTA is generally restricted by fish consumption advisories placed by the Massachusetts Department of Public Health. For a discussion of potential contaminant sources to the surface waters on DRFTA, refer to documents available on the EPA's website: <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0100966>. Moreover, as access to DRFTA is restricted and there are a large number of fishable waters in the vicinity of DRFTA (e.g.,

Nashua River), the potential for significant recreational fishing on, and the consumption of fish from DRFTA waters, is highly limited and will not be pursued as an INRMP program.

5. Installation Overview

This section provides information on the current DRFTA installation. It covers general installation information, the regional land use and setting, the natural environment, public and affiliate access, and the unique natural resources found at the installation.

5.1. Maps

The key features, constraints, natural resources, and regions of DRFTA are mapped in this INRMP using Environmental Systems Research Institute (ESRI) base maps, DRFTA GIS resources, and open data sources. Sources are noted on the maps and described in applicable text sections. **Table 5-1** provides a list and description of map figures included in **Appendix A1**.

Table 5-1: DRFTA Figures Included in Appendix A1		
FIGURE	TITLE	DESCRIPTION
Figure 1	Draft Installation Map	Depicts all DRFTA parcels that are part of the current installation.
Figure 2A	Military Constraints - South Post	Depicts all environmentally-regulated features including water supply wells, surface water sampling locations, AOCs, and the SPIA at a scale large enough to view a base map of roads, buildings, and training areas.
Figure 2B	Military Constraints - Northern Areas	
Figure 3A	Environmental Constraints - South Post	Depicts natural resources characteristics pertaining to water and wetlands, recreation, and adjacent wildlife management areas.
Figure 3B	Environmental Constraints - Northern Areas	
Figure 4	DRFTA Regional Overview	Depicts DRFTA's location within the local area and shows water resources features, town borders, county boundaries, and highways.
Figure 5	DRFTA Soils	Depicts Natural Resources Conservation Service (NRCS) soil types throughout DRFTA.
Figure 6	DRFTA Vegetation	Depicts vegetative communities on DRFTA.
Figure 7	Natural Heritage and Endangered Species Program (NHESP) Priority and Estimated Habitats	Depicts Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife Projects in these areas which could alter habitats are subject to regulatory review by the NHESP. (MA DFG and TNC, 2012 and MassGIS and NHESP, 2017a and 2017b).

Table 5-1: DRFTA Figures Included in Appendix A1		
FIGURE	TITLE	DESCRIPTION
Figure 8	BioMap2 Habitat	Depicts Core Habitats and Critical Natural Landscape identified in BioMap2 which together identify key areas for conserving biodiversity. Priority Natural Communities and Species of Conservation Concern overlays are also included. (MA DFG and TNC, 2012).

5.2. Installation Information

DRFTA is located approximately 35 miles northwest of Boston, Massachusetts in northern Worcester and western Middlesex Counties. DRFTA is approximately 5,130 acres, consisting of five non-contiguous parcels: South Post, the Main Cantonment, the 3400 Area, the Airfield, and the Post Cemetery. **Table 5-2** provides a summary of DRFTA parcels. **Figure 1** and **Figure 4** outline parcel boundaries, locations, and features.

Table 5-2: DRFTA Property Parcels			
Parcel	Approximate Size	Location	Uses
Main Cantonment	136 acres	Devens, Worcester County	Administration and operations.
3400 Area	140 acres	Devens, Middlesex County	Equipment storage and maintenance, and military functions.
Post Cemetery	3.47 acres	Devens, Worcester County	Fully developed cemetery.
Airfield	14 acres	Devens, Middlesex County	Equipment storage and unused building space.
South Post	4,837 acres	Towns of Harvard and Lancaster, Worcester County	Training areas, ranges, and the Turner Drop Zone.

5.3. Regional Land Use and Setting

Towns adjacent to DRFTA include Bolton to the southeast, Lancaster to the southwest, Harvard to the east, Ayer and Shirley to the north, and Leominster to the west. Devens, a MassDevelopment planned community consisting of parcels of former Fort Devens land, surrounds the Main Cantonment, Cemetery, and 3400 Area. The City of Fitchburg, with a population of about 41,000, is the largest nearby city. DRFTA’s regional setting is shown in

Figure 4. The region surrounding DRFTA is largely rural residential with increasing suburbanization.

DRFTA lies within the Nashua River Watershed. Conservation lands are abundant in the area near DRFTA. Bordering South Post is the USFWS's Oxbow National Wildlife Refuge (NWR) and MassWildlife's Bolton Flats Wildlife Management Area. Both were created during the BRAC process by the transfer of former Fort Devens lands from the Army to their respective owners. Additional natural areas in the vicinity of DRFTA include:

- Devens Open Space (1,700 acres of protected environmentally sensitive areas including lakes, bogs, and steep slopes owned by MassDevelopment);
- The Groton Memorial Forest (523 acres owned by the Town of Groton);
- The Cowdrey Nature Center (313 acres owned and managed by Town of Lunenburg Conservation Commission);
- The Leominster State Forest (4,246 acres publicly owned forest managed by Massachusetts Department of Conservation and Recreation in Town of Leominster, City of Fitchburg, Town of Princeton, Town of Sterling and Town of Westminster);
- Bare Hill Pond (320-acre pond in the Town of Harvard);
- Lake Shirley (354-acre reservoir with dam owned by the Town of Lunenburg);
- Sandy Pond (largest of six interconnected ponds owned by the Town of Ayer);
- Fort Pond (79-acre state pond in Town of Lancaster); and
- Spectacle Pond (66-acre state pond in Town of Lancaster).

5.4. Natural Environment

This section describes the different elements that make up the natural environment at DRFTA. It covers climate, air quality, topography, geology, hydrology, and eco-regions found at the installation.

5.4.1. Climate

DRFTA experiences four distinct seasons with warm summers, cold winters, and mild springs and falls. The average annual temperature at DRFTA is 47.8°F. January is the coldest month, with an average low of 17°F. July is the warmest month with an average high of 79°F. Precipitation is relatively stable throughout the year, with an average rainfall of about 48 inches and an average snowfall of 64 inches (US Climate Data, 2019).

5.4.2. Air Quality

As of 2017, all areas of Massachusetts met National Air Quality Standards (NAAQS) for all criteria pollutants set by the EPA under the authority of the Clean Air Act (CAA) (MassDEP, 2018). Impacts to air quality from activities on DRFTA include emissions from boilers, backup generators, and vehicles. Other impacts to air quality for DRFTA include the use of smoke as an obscurant in training, occasional wildfires caused by range use, and some dust generated by maneuver

activities. In addition to existing impacts, planned prescribed burning as a natural resource and training land management tool may also impact air quality. DRFTA has a Final Restricted Emissions Status Approval issued by the Massachusetts Department of Environmental Protection (MassDEP) and is in compliance with all permit requirements.

5.4.3. Topography

DRFTA has a glaciated topography that includes wetlands, floodplains, hilly uplands, and steep slopes. Elevations generally range between 250 and 400 feet above mean sea level (MSL). The installation's highest point, Whittemore Hill, on South Post, is 455 feet above MSL while the lowest elevations are along the Nashua River near the 3400 Area, approximately 200 feet above MSL. The Main Cantonment, 3400 Area, Cemetery, and Airfield are relatively flat or gently sloping lands while South Post contains rolling terrain with hills and steep slopes.

5.4.4. Geology

The geology of DRFTA consists mainly of glacial alluvium and swamp deposits overlying metamorphic bedrock. Much of DRFTA's surficial geology can be attributed to the retreat of the continental ice sheets during the Wisconsin Glaciation approximately 10,000 to 20,000 years ago. The advance and retreat of ice sheets led to scouring of bedrock and transport and eventual deposition of rock and other geological material. The slow retreat of the ice sheet shaped the landscape, leading to depressions and grooved or smoothed outcrop bedrock. Evidence of past glaciation can be seen in many of the Garrison's glacial features including kettles, kames, and glacial till hills called drumlins. Whittemore Hill on South Post is one example of the many drumlins on DRFTA.

The bedrock underlying DRFTA is part of the Merrimack Belt, composed of calcareous metasilstones, phyllite, metasandstones, and quartzites of Paleozoic age (Fracture Characterization document). Low-angle thrust faults exist along the eastern boundary of the South Post and intense folding and faulting can also be seen in bedrock outcrops. On the South Post, the top 5 to 10 feet of bedrock is highly weathered and clay-like (USACE, 2012).

5.4.5. Hydrology

DRFTA is located in the Nashua River watershed. The Nashua River forms the eastern boundary of South Post and the 3400 Area. Its tributary, the North Nashua River, flows along the western boundary of South Post. In addition to the Nashua River, a number of small streams, wetland areas, ponds, and kettle lakes are present within the boundaries of DRFTA (**Figure 3A** and **Figure 3B**). Surface waters in DRFTA allow for localized groundwater discharge. Groundwater at DRFTA primarily exists in glacial drift deposits that overlie bedrock. The glacial deposits are composed of well-sorted sands and gravels, with the capacity to store considerable amounts of groundwater. Glacial deposit aquifers in DRFTA are often medium or high yield and are used as a water supply by DRFTA and nearby municipalities. Groundwater also exists in lesser quantities in

fractured bedrock beneath glacial deposits. Supply wells that are developed from bedrock aquifers are primarily used as private wells (USACE, 2012).

5.4.6. Ecoregions

DRFTA falls within the EPA designated Southern New England Coastal Plains and Hills ecoregion. This region is characterized by irregular plains and low hills. Surface materials are mostly glacial till. A variety of successional oak and oak-pine forests cover this region. The EPA's description of this ecoregion is consistent with the surface materials and vegetation found at DRFTA (Griffith et al, 2009).

5.5. Public and Affiliate Access

All portions of DRFTA are secured fenced areas and access is restricted to authorized personnel and visitors. Public access to DRFTA is permitted upon receipt of proper authorization for recreational hunting as described in **Section 6.7.2**. Affiliate access for natural resources, cultural resources, and historical studies and assessments is permitted through coordination with DRFTA DPW Environmental staff.

5.6. Unique Natural Resources

DRFTA has numerous unique natural resources throughout South Post and additionally along the eastern property line of the 3400 Area as shown on **Figure 3A, Figure 3B, and Figure 8**. These natural features which include unique wetland areas, large contiguous mixed forests, and perennial streams and adjacent corridors, provide a variety of aquatic and terrestrial habitats that support a diverse assemblage of plants and wildlife including rare, threatened or endangered species. A brief description of each of these unique features is provided below.

The Black Spruce Kettlehole Level Bog is a 0.8-acre Kettlehole Level Bog located in the northeast portion of Training Area (TA) 9A, east of Oak Hill Pond (**Figure 8**). Kettlehole Level Bogs are a subset of level bogs that develop in depressions in sandy glacial outwash and lack inlets or outlets (NHESP, 2016a). Kettlehole Level Bogs are imperiled, indicating that there are between 6 and 20 of these sites present in the state, or there are few remaining acres (MA DFG and TNC, 2012). Additional Black Spruce Bogs are located on DRFTA in wetland areas and are characterized by floating peatland vegetation, black spruce tree canopies, and thick shrub understories.

The Nashua River Floodplain Alluvial Red Maple Swamp encompasses 54-acres near TA 13A and TA 13B (**Figure 8**). Alluvial Red Maple Swamps occur in low areas along rivers and streams and are characterized by unique vegetation due to nutrients deposited by regular overbank flooding (NHESP, 2016b). These swamps are classified as vulnerable, indicating that there are between 21 and 100 of these sites present in the state, or there is limited total acreage (MA DFG and TNC, 2012).

Pitch Pine - Scrub Oak Habitats cover approximately 43.8 acres along the southeastern edge of South Post within TA 6E and the SPIA (**Figure 8**). Pitch pine-scrub oak communities are rare, fire-

dependent communities. They develop on dry, low nutrient soils and provide habitat for many rare species (NHESP, 2016c). Pitch pine-scrub oak habitat is classified as imperiled, meaning there are between 6 and 20 of these sites present in the state, and/or there are few remaining acres (MA DFG and TNC, 2012).

Wetlands occur extensively on DRFTA, along rivers, streams, tributaries, and drainage channels (**Figures 3A and 3B**). Wetlands are discussed in more detail in **Section 6.4.5 Wetlands**, below.

Upland Grassland Habitat is a unique 190-acre area in the Turner Drop Zone (**Figure 2A**) that provides provide nesting, brood rearing, and roosting cover for a variety of mammal and bird species including game species such as quail, pheasant, and wild turkey. More importantly, grassland habitat is a breeding habitat for state listed Grasshopper Sparrow and other sensitive species.

6. Natural Resource Management Program Elements

This section describes the various elements of the natural resource management program at DRFTA. It covers the current status of the program elements and action items for the program going forward.

6.1. Geographic Information System Development

The US Army Installation Geospatial Information and Services (IGI&S) Program provides a standardized approach to geospatial data management. DRFTA creates and maintains geospatial data according to the IGI&S program, which uses the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) (US Army, 2019). The ITAM SRP GIS Program and the DPW contribute to the geospatial database at DRFTA. DPW and ITAM GIS specialists continually add to the database as new studies are completed and modify historic reports and data to fit the geospatial data standards. Additionally, DRFTA coordinates with state and federal agencies to share GIS data. DRFTA's GIS data includes layers that delineate natural resources and are used to support natural resources planning and conservation.

Information Systems and GIS Action Items:

- **Develop, update, and maintain the GIS data layers need to support DRFTA's natural resource program.**
- **Regularly replace or upgrade GIS and imagery hardware and software to maintain the capability to use developing GIS technology.**
- **Use remote imagery for improved decision-making for natural resource management.**
- **Ensure continued coordination between the Natural Resource Specialist, Range Control, the DPW and Environmental Division staff, and the ITAM Coordinator for successful use of GIS data in planning and decision-making.**
- **Continue to share GIS data with local, state and federal agencies as appropriate for the management of natural resources.**

6.2. Climate Change Management

Projected changes in climate will likely affect natural resource management strategies and decisions at DRFTA. This section describes the installation’s main climate change threats and the management strategies that will be used. This section incorporates the following state and federal guidance documents:

- Department of Defense Directive (DoDD) 4715.21 Climate Change Adaptation and Resilience (DoD, 2016);
- US Army Guidance for Addressing Climate Resiliency in Integrated Natural Resources Management Plans (US Army, 2018b); and
- Massachusetts State Wildlife Action Plan (SWAP), Chapter 5 (MassWildlife, 2016).

As directed by DoDD 4715.21, DRFTA will identify and assess the effects of climate change on its natural resources. Employing the Army Climate Assessment Tool (US Army, 2018c), DRFTA will assess its vulnerabilities to climate change and promote increased climate awareness at the Garrison. DRFTA will work with local, regional, state, and federal partners to monitor factors indicative of climate change in order to avoid adverse impacts when and where possible.

Table 6-1: Climate Change Strategies at DRFTA		
Threat	Natural Resources Affected	INRMP Management Strategy
Increased prevalence of invasive species.	Habitat, Flora and Fauna.	Semi-annual monitoring of invasive species as part of the Range and Training Lands Assessment (RTLA). Planting of native species in bare areas to prevent wind and maneuver erosion and inhibit the growth and expansion of invasive plant species. Monitoring of reports of new invasive species in the region from local, regional and state partners.
Loss of habitat for threatened and endangered species.	Habitat, Flora and Fauna.	Surveying and management for listed endangered and threatened species in cooperation with state and federal partners.
Increased duration and intensity of high temperatures and associated drought	Habitat, Flora, Fauna, and Migratory Birds	Monitoring for impacts to native flora and fauna particularly migratory birds whose breeding and nesting behaviors may be significantly impacted by longer, hotter, and drier summers.

Table 6-1: Climate Change Strategies at DRFTA		
Threat	Natural Resources Affected	INRMP Management Strategy
Increased incidence of severe weather events.	Habitat, Water Resources	<u>Short term</u> : Closing access to flooded areas to allow for natural drainage. <u>Long-term</u> : Consideration for flood hazard risks in land use planning, roadways, and bridges.
Increase incidence of wildland fires	Habitat	Development of a Wildland Fire Management program that includes prescribed burning to alleviate potential impacts.

Climate Change Action Items:

- **Manage natural resources in a manner consistent with best available science to provide resilience to climate change.**
- **Perform Phase I: Climate Awareness Module and Phase II: Vulnerability Assessment Module using the Army Climate Assessment Tool Website to use as a planning framework.**
- **Perform Phase III: Follow-on Actions using the Army Climate Assessment Tool Website.**

6.3. Soil Conservation and Erosion and Sedimentation Control

DRFTA has a glaciated topography ranging from wetlands and floodplains, to hilly uplands. Slopes in excess of 15% occur in a number of locations on South Post (Fort Devens, 2016a). Soil surveys have been performed historically at DRFTA, Worcester County, and Middlesex County. , The NRCS publishes current soils surveys and updates on its online Web Soil Survey (<https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>) (NRCS, 2019). **Figure 5** shows the NRCS soil series mapped by downloading the Web Soil Survey spatial data for DRFTA. **Table 6-2** lists the soil series in “map units” and acreages/percentages at the property.

Table 6-2 Soil Series Map Units at DRFTA			
Map Unit Symbol	Map Unit Name	Area (acres)	Approximate Percent within DRFTA
3400 Area			
653	Udorthents, sandy	59.02	1.2
253A	Hinckley loamy sand (0-3)	52.27	1.0
262E	Quonset loamy sand (25-35)	15.34	0.3
51A	Swansea muck (0-1)	10.98	0.2
1	Water	2.66	0.1
2A	Pootatuck fine sandy loam (0-3)	2.40	<0.1
626B	Merrimac-Urban land complex (0-8)	0.08	<0.1
Airfield			
656	Udorthents-Urban land complex	8.06	0.2
259B	Carver loamy coarse sand (3-8)	0.90	<0.1
255B	Windsor loamy sand (3-8)	0.18	<0.1
Main Cantonment			
651	Udorthents, smoothed	93.20	1.8
262A, 262B, 262C, 262D	Quonset loamy sand (0-3, 3-8, 8-15, 15-25)	39.12	0.8
245A, 245E	Hinckley loamy sand (0-3, 25-35)	3.82	0.1
31A	Walpole sandy loam (0-3)	0.08	<0.1
Post Cemetery			
262B	Quonset loamy sand (3-8)	2.84	0.1
102C	Chatfield-Hollis-Rock outcrop complex (0-15)	0.63	<0.1
South Post			
255A, 255B, 255C, 255D	Windsor loamy sand (0-3, 3-8, 8-15, 15-25)	1002.88	19.7
245A, 245B, 245C, 245D, 245E	Hinckley loamy sand (0-3, 3-8, 8-15, 15-25, 25-35)	953.41	18.7
262A, 262B, 262C, 262D	Quonset loamy sand (0-3, 3-8, 8-15, 15-25)	596.06	11.7
305B, 305C, 305D, 306B, 306C, 307D	Paxton fine sandy loam (0-8, 3-8, 8-15, 15-25)	305.95	6.0
52A	Freetown muck (0-1)	226.71	4.5
31A	Walpole sandy loam (0-3)	211.75	4.2
254A, 254B, 254C	Merrimac fine loamy sand (0-3, 3-8, 8-15)	186.50	3.7
51A	Swansea muck (0-1)	123.28	2.4
248B	Amostown and Belgrade soils (3-8)	119.28	2.3
651	Udorthents, smoothed	116.61	2.3

Table 6-2 Soil Series Map Units at DRFTA			
Map Unit Symbol	Map Unit Name	Area (acres)	Approximate Percent within DRFTA
1	Water	103.57	2.0
249A	Deerfield loamy fine sand (0-3)	100.59	2.0
226B	Hinesburg loamy sand (3-8)	79.34	1.6
5A	Saco silt loam (0-3)	78.47	1.5
6A	Scarboro mucky fine sandy loam (0-3)	74.29	1.5
310A, 310B, 311B	Woodbridge fine sandy loam (0-3, 3-8)	71.69	1.4
70A, 70B, 71A, 71B	Ridgebury fine sandy loam	69.18	1.4
30A	Raynham silt loam (0-3)	68.89	1.4
260A, 260B	Sudbury fine sandy loam (0-3, 3-8)	59.75	1.2
276A	Ninigret fine sandy loam (0-3)	57.60	1.1
8A	Limerick silt loam (0-3)	50.01	1.0
72A	Whitman loam (0-3)	37.18	0.7
102C	Chatfield-Hollis-Rock outcrop complex (0-15)	30.39	0.6
98A	Winooski very fine sandy loam (0-3)	22.30	0.4
97A	Suncook loamy fine sand (0-3)	13.42	0.3
275B, 275C	Agawam fine sandy loam (3-8, 8-15)	11.79	0.2
600	Pits, gravel	10.16	0.2
420B, 421C	Canton fine sandy loam (3-8, 8-15)	9.30	0.2
96A	Hadley very fine sandy loam (0-3)	6.66	0.1

The predominant soil type occurring at DRFTA is the Hinkley Merrimac Windsor association. This dry sandy gravelly soil contains loams or sandy loams, loamy fine sands, and other sands and gravel. The soil is extremely well drained. Additional soil types found on the Garrison include generally sandy and well drained soils in upland areas and poorly drained soils in wetland areas and along the Nashua River floodplain. In the active ranges natural soils are disturbed. Soils and soils data/descriptions are inventoried and maintained by DRFTA DPW in GIS. Current surveys are sufficient for natural resource management activities covered in this INRMP.

Soil management at DRFTA focuses on using stabilization and appropriate vegetative cover to prevent and control erosion. Areas susceptible to erosion include roads, firebreaks, maneuver trails, and drop zone areas. Current land conditions across DRFTA vary from bare soils prone to erosion, to well stabilized and vegetated areas. Soil management is an important component of natural resource management and can entail such tasks as brush removal, erosion control, and culvert replacement. ITAM's Land Rehabilitation and Maintenance (LRAM) repairs, maintains, and reconfigures DRFTA's South Post training lands to support sustainable and safe maneuver training conditions. The ITAM Coordinator works continually with Range Control the Natural

Resources Specialist and the DPW to ensure that landscape management activities and training missions are integrated. (Fort Devens, 2017a).

DRFTA uses the following plans as guidance to maintain training lands:

- Sustainable Range Program Regulation 350-3 (Fort Devens, 2017b);
- Range and Training Land Assessment (Fort Devens, 2017c);
- Range Control Management Plan (Fort Devens, 2016a).

The SRP is the Army's overall approach for improving the way in which it designs, manages, and uses its ranges to ensure long-term sustainability. The SRP is defined by its core programs, the Range and Training Land Program (RTLTP) and the ITAM Program. At DRFTA, RTLA and ITAM monitoring projects include:

- Annual erosion monitoring of maneuver trails for use by military vehicles and normal maintenance vehicles.
- Semi-annual vegetation encroachment evaluations for woody encroachment in bivouac areas, maneuver trails, landing zones, and range perimeters.
- Semi-annual military training impact assessments to evaluate impacts from normal use including tree mortality and a loss of vegetative cover.

The Range Complex Master Plan (RCMP) provides a road map for developing the ranges and training facilities at DRFTA including integration with the RTLA, SRP, natural resources, and environmental factors. Soil conditions were determined susceptible to erosion when ground covering is damaged through regular training use. Erosion can be exacerbated by wind damage and helicopter blade rotor wash. Planting native species to maintain groundcover on the landing zones will help reduce airborne dust during use of the landing zones. Reducing airborne dust is beneficial to prevent erosion and maintain a good relationship with neighbors, by preventing airborne dust from impacting adjacent landowners, residents, and highways.

Another focus of the RCMP is to control and manage heavy undergrowth and overgrowing forests on maneuver trails where the vegetation impedes movement of soldiers through training areas. Trimming and removal of the dense vegetation optimizes training areas by making them more accessible and safer for light maneuver training. It also decreases wildfire danger, prevents erosion damage and promotes early successional vegetation (Fort Devens, 2017a).

The other significant activity on DRFTA with the potential to cause soil erosion is construction. Projects at DRFTA that disturb an acre or more of surface soil require Construction General Permit (CGP) coverage from EPA issued under the authority of the Clean Water Act (CWA) for stormwater discharges associated with construction projects. Obtaining a CGP requires submitting a Notice of Intent (NOI), developing a Stormwater Pollution Prevention Plan (SWPPP) with erosion and sediment control measures, endangered species consideration, historic preservation information, site information, and certification.

Soil Conservation and Erosion and Sedimentation Control Action Items:

- **Repair damaged soils to manage military activities, protect soil stability, preserve training lands, and conserve wildlife habitat.**
- **Use GIS soils data to make decisions regarding land use, rehabilitation options, and habitat management options.**
- **Stabilize roads, maneuver trails and training areas using native grasses, gravel, and woodchips, and by filling and grading ruts.**
- **Minimize new construction in previously undisturbed areas and, when necessary, obtain required permits for land disturbing activities.**
- **Manage soils to preclude or reduce the establishment of invasive plant species.**
- **Maintain grasslands through regular mowing, prescribed burning and removal of underbrush edges and maintenance of ground cover.**
- **Identify and control vegetation to prevent wind and maneuver erosion, prevent growth of invasive species, prevent successional growth, and prevent tick habitats through planting native species and grass cutting.**

6.4. Water Resource Management

This section describes the water resources at DRFTA and their management. This section covers surface water, stormwater, groundwater, drinking water, wetlands, and floodplains.

6.4.1. Surface Water

DRFTA is located in the Nashua River Watershed which flows northward toward New Hampshire and is part of the larger Merrimack River watershed. The installation has rivers, perennial streams, intermittent streams, wetlands, ponds, and lakes which are shown in **Figure 3A** and **Figure 3B**.

The Nashua River flows north along the eastern boundary of South Post. Most of the streams and tributaries on South Post eventually discharge to the Nashua River. The North Nashua River flows south in close proximity to the southwestern boundary of South Post prior to its confluence with the Nashua River to the south of DRFTA. Ponakin Brook flows from the middle of the South Post to the property line where it discharges to the North Nashua River. Spectacle Brook runs through the western side of the South Post property and also discharges to the North Nashua River. Cranberry Brook flows in a northerly direction to new Cranberry Pond, extending from Trainfire Road near the southern tip of South Post to a dam at Dixie Road. The dam discharges to a meandering stream and wetland that discharges to the Nashua River at the eastern property line. Slate Rock Brook flows from the middle of South Post to Slate Rock Pond and then discharges to the Nashua River. Nashua River also runs along the eastern property line of the 3400 Area.

Slate Rock Pond, New Cranberry Pond, and Oak Hill Pond located on South Post are all artificial ponds formed from historical clay mine and slate quarry damming and excavating. Old Cranberry Pond is a natural pond, formed by glacier ice depressions and connects to the underlying aquifer. Water levels in these ponds are controlled largely by fluctuations in the groundwater table. DRFTA’s surface water bodies are shown in **Figure 3A** and **Figure 3B**. **Table 6-3** provides a summary of the ponds and streams with approximate acreages/lengths within DRFTA.

Table 6-3: Surface Water Bodies at DRFTA		
Location	Pond/Impoundment	Approximate Area (acres)
South Post	Clear Pond	2.94
	Cranberry Pond	12.05
	Kettle Pond	4.68
	Ligett Pond	9.14
	New Cranberry Pond	26.19
	Oak Hill Pond	2.36
	Slate Rock Pond	13.71
	Unnamed ponds	43.41
3400 Area	Unnamed ponds	2.01
	Streams/Rivers	Approximate Length (miles)
South Post	Nashua River	2.8
	Ponakin Brook	1.9
	Spectacle Brook	1.4
	Slate Rock Brook	1.2
3400 Area	Nashua River	0.4

Source: DRFTA DPW, 2019.

Surface water monitoring is part of DRFTA’s CERCLA compliance program. In accordance with the EPA’s ROD for the SPIA, DRFTA has a Long Term Monitoring (LTM) program that includes sampling surface water from five locations in the SPIA: three in Kettle Pond and two in Slate Rock Brook. Currently surface water samples are collected from these locations semi-annually and analyzed for cyclotrimethylenetrinitramine (RDX) and perchlorate. Surface water sampling locations are shown in **Figure 2A**.

The 2018 surface water monitoring results showed that the southern bank of Kettle Pond has the highest perchlorate and RDX surface water concentrations. Trace levels of perchlorate and low levels of RDX were reported in surface water at sampling locations along the middle and north banks of the pond and along the outlet of the pond where it discharges to Slate Rock Brook. No concentrations of RDX or perchlorate were detected in the sample collected from the farthest downstream sampling location in Slate Rock Brook (Renova, 2019). Surface water monitoring in the SPIA will continue in accordance with the 1996 ROD and the most recent Long Term Monitoring and Maintenance Plan (LTMMP) (Sovereign and HGL, 2015).

Surface water monitoring for CERCLA compliance is not part of the natural resource management program and is not emphasized within this INRMP. However, this monitoring is covered in detail in the LTM Plan (Stone & Webster Environmental Technology & Services, 1996), LTMMP (Sovereign and HGL, 2015), Five Year Review (USACE, 2015) and documented in annual reports (Renova, 2019). For additional information about potential contaminant sources on DRFTA, refer to documents available on the EPA's website: <https://cumulis.epa.gov/supercpad/-cursites/csitinfo.cfm?id=0100966>.

6.4.2. Stormwater

Stormwater at DRFTA is managed through storm drains, stormwater Best Management Practices (BMPs) and SWPPPs. Storm drain mapping has been compiled for Main Cantonment, 3400 Area, and Airfield. The mapping contains inlets, junctions, drain lines, culverts, and headwalls. South Post and the Cemetery do not have mapped stormwater features at this time.

Municipal stormwater discharges in Massachusetts are regulated by EPA for compliance with the CWA and the Massachusetts Clean Waters Act. Massachusetts and the EPA jointly issue permits for stormwater discharges in Massachusetts. In 2018, DRFTA submitted a NOI for stormwater discharges from small municipal separate storm sewer systems (MS4) in Massachusetts, in compliance with the provisions of the CWA, as amended (33 USC § 1251 et seq.), and the Massachusetts Clean Waters Act, as amended (MGL Chapter 21 §§ 26-53). The NOI covers the Main Cantonment, 3400 Area, and Airfield. These parcels are located within an urbanized area which triggers the requirement to obtain and comply with National Pollutant Discharge Elimination System (NPDES) MS4 permit regulations. South Post is not within an urbanized area and is therefore not subject to MS4 permit requirements. South Post will be managed under the DRFTA Stormwater Management Program to ensure BMPs are implemented installation wide.

The installation has three outfalls that discharge to Nashua River and one that discharges to Robbins Pond. The Nashua River is considered impaired in the *Massachusetts 2014 List of Impaired Water* by phosphorus, E. coli, and invertebrate toxicity (i.e., sediment bioassays – acute toxicity freshwater, and aquatic macroinvertebrate bioassessments). Robbins Pond is also considered impaired due to the presence of non-native aquatic plants (MassDEP, 2015). DRFTA currently implements SWPPPs for its industrial areas.

6.4.3. Groundwater

Groundwater exists at DRFTA in two geologic formations: glacial drift deposits of sand and gravel, and in fractured bedrock. The primary aquifer is the glacial drift that overlies the bedrock. This aquifer consists of well sorted sands and gravels, fine sands, silt, and clay; and is known as the glacial outwash aquifer. It is capable of supplying relatively large quantities of water. The glacial outwash aquifer is used by DRFTA and nearby municipalities for water supply using gravel-packed or naturally developed wells. Groundwater present in the fractured bedrock beneath the glacial outwash aquifer is used most frequently for single family domestic water supply private wells in

the vicinity of DRFTA. Groundwater flow mimics topography across the South Post and depth to groundwater ranges from 0 to 40 feet. (USACE, 2012)

Groundwater monitoring is part of DRFTA's CERCLA compliance program. In accordance with the EPAs ROD for the SPIA, DRFTA has an LTM program that includes sampling groundwater from 23 groundwater wells and one hydrant at two AOCs (AOC 26 and AOC 27) and nine South Post Monitoring (SPM) wells shown on **Figure 2A** in **Appendix A1**. Groundwater samples are monitored annually or bi-annually for RDX, perchlorate, arsenic, and metals.

Groundwater monitoring for CERCLA compliance is not part of the natural resource management program and is not emphasized within this INRMP. However, this monitoring is covered in detail in the LTM Plan (Stone & Webster Environmental Technology & Services, 1996), LTMMP (Sovereign and HGL, 2015), and Five-Year Review (USACE, 2015), and documented in annual reports (Renova, 2019).

6.4.4. Drinking Water

Drinking water at the Main Cantonment and 3400 Area is supplied by MassDevelopment. Drinking water on South Post is provided by four drinking water wells shown on **Figure 2A**. Drinking water wells on South Post are permitted by the MassDEP as a transient non-community (TNC) Public Water Supply (PWS).

6.4.5. Wetlands

Wetland areas and riparian zones are critical ecosystems that provide habitat for many rare and endangered species and perform important water management functions including:

- Regulating stormwater and flood flows by absorbing excess water;
- Preventing erosion by dampening high velocity flows and surges; and
- Improving water quality by filtering water through both physical and biological processes.

The extensive and regionally significant wetlands occurring on and adjacent to DRFTA, including associated tributary drainages and headwaters, have been listed as a priority for protection under both the North American Waterfowl Management Plan and the Emergency Wetlands Resources Act of 1986. DRFTA protects its wetlands in accordance with Executive Order (EO) 11990 and manages wetlands based on a no net loss philosophy. The US Congress enacted the CWA in 1972 to *"restore and maintain the chemical, physical, and biological integrity of the Nation's waters."* Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into Waters of the United States (WOTUS), including wetlands, through a permitting process. The EPA and the US Army Corps of Engineers (USACE) jointly implement and enforce Section 404. The agencies define wetlands as *"areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

USACE issues jurisdictional determinations to determine whether a water will be regulated under Section 404.

In 2015, the EPA and the USACE published the Waters of the United States Rule, WOTUS 2015, to clarify water resource management in the United States under a provision of the CWA of 1972. The rule was published in response to the concerns of legislators, industry members, science professionals, and others about lack of clarity in defining “navigable waters” requiring federal protection under the CWA. The regulation defined the scope of federal water protection in a more consistent manner, particularly over streams and wetlands which have a significant hydrological and ecological connection to traditional navigable waters, interstate waters, and territorial seas. The rule has been contested in litigation with twenty-four states obtaining injunctions that halt enforcement of the 2015 WOTUS rule within their borders. Currently, in the Commonwealth of Massachusetts along with twenty-five other states, the WOTUS 2015 rule is in effect. Under federal jurisdiction, any tributary or upstream water on DRFTA, must show physical features of flowing water such as a bed, bank, and ordinary high water mark to warrant protection. The rule provides protection for headwaters that have these features and have a significant connection to downstream water such as the Nashua River. Adjacent waters are defined by three qualifying circumstances established by the rule. These can include wetlands, ponds, impoundments, and lakes which can impact the chemical, biological or physical integrity of neighboring waters.

Wetland studies that have been conducted on DRFTA include a 2000 US Geological Survey (USGS) delineation of four wetland complexes associated with major drainages at South Post. That delineation served to document changes in the type and extent of the four wetland complexes identified by the MassDEP Wetlands Conservancy Program using 1992 aerial imagery. A total of 282 acres, about 35 percent of the total wetland acreage on DRFTA, was surveyed. The survey found that beaver activity had caused significant change in wetland types and distribution since 1992 (Waldron and Steeves, 2002).

The most recent broad-scale identification and classification of wetlands on DRFTA was the USFWS National Wetlands Inventory (NWI) mapping using aerial photography. The USFWS updated the NWI for DRFTA and the surrounding area using 2014 leaf-on true color imagery at 1-meter resolution, the results of which were published in 2018. Polygons were created using heads-up digitization in addition to editing existing MassDEP wetlands data available through MassGIS (MassGIS, 2013). The USFWS uses the Cowardin *et al.* (1979) system for classifying wetlands and deep water habitats. The NWI identified approximately 731 acres of wetlands at DRFTA, primarily on South Post (USFWS, 2018a).

In 2018, Normandeau Associates, Inc. delineated a wetland area east of Slate Rock Pond as part of a reconfiguration study for Hotel Range. This study identified five wetland areas and two streams and found four wetlands and one stream to be under CWA regulatory jurisdiction administered by USACE, MassDEP, and Town of Lancaster Conservation Commission. One of the wetlands provides ideal habitat for waterfowl, wading birds and reptiles/amphibians, and bats (Normandeau, 2018). Oxbow Associates, Inc. performed a vernal pool evaluation of three

wetland areas containing potential vernal pool habitats identified by Normandeau. The vernal pool evaluation followed criteria for certification by MassWildlife and generally accepted by USACE New England Division and the Town of Lancaster. One of the three wetlands evaluated, Wetland 4, met MassWildlife Vernal Pool Certification (Oxbow, 2019).

Wetlands at DRFTA provide unique habitats for sensitive species and plant communities. **Table 6-4** shows the wetland types and acreage present at each area of DRFTA. These areas are shown on **Figure 3A** and **Figure 3B**.

Table 6-4: Wetlands at Fort Devens				
Wetlands	Area (ac)			
	South Post	3400 Area	Main Cantonment	Airfield
Freshwater Emergent	166.47	1.88	0.06	-
Freshwater Forested/Shrub	378.16	1.70	-	-
Freshwater Pond or Lake	150.26	0.41	-	-
Riverine	28.78	3.74	-	-
Total	723.67	7.73	0.06	-

Source: USFWS, 2018a.

Proposed projects on DRFTA that may impact wetlands require permits and/or approvals from federal, state, and/or local agencies. Coordination with USACE, MassDEP, and depending on the project location, the towns of Lancaster, Shirley, Harvard, or Ayer is required to inform each agency of the proposed project and to obtain a determination of authority regarding jurisdiction over the resources in proximity to the project limits including wetlands, streams, vernal pools, and applicable buffer zones. **Table 6-5** provides regulatory information for wetlands and potential wetlands at DRFTA.

Table 6-5: CWA Regulatory Information Applicable to DRFTA					
RULE	ADMINISTRATIVE AGENCY	PROTECTED RESOURCES	REGULATED ACTIVITIES	REGULATORY APPROVALS	REQUIRED BUFFERS
Federal					
Clean Water Act Section 404	USACE and EPA	“Waters of the US, including Wetlands”	Dredged and Fill Material Placement in Wetlands	Nationwide and Individual Permits	NA
Commonwealth of Massachusetts					
Clean Water Act Section 401	MassDEP, delegated by the EPA	“Waters of the US, including Wetlands”	Consistency of Section 404 permitted activities with state water quality standards	Section 401 Water Quality Certification	NA
Wetlands Protection Act	Local Conservation Commissions (LCC) as delegated by MassDEP	Waters of the Commonwealth and associated resource areas	Any activities involving removal, filling, dredging, or other alteration	LCC Order of Conditions; MassDEP oversees administration of the Act and hears appeals of LCC Conditions	Wetlands: 100-foot buffer zone
Town of Lancaster					
Bylaw Chapter 215, Wetlands Protection, and Chapter 306, Wetlands Protection Rules and Regulations	Lancaster Conservation Commission	Waters of the Commonwealth and associated resource areas, and added local requirements	Any activities involving removal, filling, dredging, construction or other alteration	Order of Conditions	Wetlands and vernal pools: 100-foot buffer zone 25-foot no-build or no-alteration zone
Devens					
Wetlands Protection Article XII	Devens Enterprise Commission	Freshwater wetlands, rivers, streams,	Activities that could cause adverse	Order of Conditions	Wetland resources: 100-foot setback and

Table 6-5: CWA Regulatory Information Applicable to DRFTA					
RULE	ADMINISTRATIVE AGENCY	PROTECTED RESOURCES	REGULATED ACTIVITIES	REGULATORY APPROVALS	REQUIRED BUFFERS
		ponds, and lakes	impacts from construction - erosion, siltation, loss of groundwater recharge, poor water quality, and loss of wildlife habitat.		no building within 50-setback. Stream, river, pond or bordering wetland and any certified vernal pool: 25-foot setback with no alteration of natural vegetation or substrate
Town of Shirley					
Non-Zoning Wetland Bylaw and Residential and Commercial Permitting Guidebook	Shirley Conservation Commission	Waters of the Commonwealth and associated resource areas, and added local requirements	Activities involving removing, filling, dredging, or discharging into, or otherwise altering	Order of Conditions	Wetland resource areas: 100-foot buffer zone 25-foot undisturbed vegetated strip No structures within 40-feet
Town of Harvard					
Wetlands Protection Bylaw Rules Chapters 119 and 147 and Forms	Harvard Conservation Commission	Wetlands, water resources and adjoining land areas	Activities that may have adverse impact on wetland or other resource	Order of Conditions	Setbacks from edge of wetlands: Wetland dependent structure 0-foot No disturb vegetated zone 50-foot Driveways, roads 75-foot Chemical free zone 100-foot Underground storage of

Table 6-5: CWA Regulatory Information Applicable to DRFTA					
RULE	ADMINISTRATIVE AGENCY	PROTECTED RESOURCES	REGULATED ACTIVITIES	REGULATORY APPROVALS	REQUIRED BUFFERS
					gas, oil, fuels 100-foot Vernal pool setback: No disturb vegetated zone 100-foot
Town of Ayer					
Wetlands Protection Bylaw, Article XXVI	Ayer Conservation Commission	Wetland and buffer zone resource areas	Remove, fill, dredge, discharge into, or otherwise alter any wetland resource area or buffer zone resource area	Order of Conditions	Wetlands and vernal pools: 100-foot buffer zone
Table adapted from Normandeau, 2018					

Vernal pools are temporary bodies of fresh water that provide important habitat for many vertebrate and invertebrate species (NHESP, 2009). There is one certified vernal pool just outside the DRFTA installation boundary at the southern end of South Post (**Figure 3A**). The vernal pool was certified in 2014 based on the presence of obligate species (MassGIS and NHESP, 2018).

Potential vernal pools have been identified across the state by NHESP using aerial imagery. Imagery flown in 1999 and 2000 was used to identify 39 potential vernal pools at South Post, and three potential vernal pools at the 3400 Area (MassGIS and NHESP, 2013). Two potential vernal pools were identified during the 2018 wetland delineation adjacent to Hotel Range and Slate Rock Pond (Normandeau Associates, 2018). In 2019, Oxbow Associates, Inc. performed a vernal pool evaluation of three wetland areas containing potential vernal pool habitats identified by Normandeau and found that one potential vernal pool in Wetland 4 meets MassWildlife Vernal Pool Certification criteria. The vernal pool evaluation criteria are generally accepted by USACE New England Division and the Town of Lancaster. (Oxbow, 2019). The vernal pools types and locations are provided in **Figure 3A**.

6.4.6. Floodplains

Floodplain areas along the Nashua River and North Nashua River are core and critical habitat areas within the wetlands and riparian ecosystems of DRFTA. The Nashua River floodplain along the eastern boundary of South Post, shared with the Oxbow NWR, is one of the widest Nashua River floodplains and contains extensive wetlands as well as an alluvial red maple swamp priority natural community. FEMA mapped 100-year floodplain areas along this portion of the Nashua River and to the east of the North Nashua River between the southwest property line and Ponakin Brook, and along the eastern portion of the 3400 Area where it borders the Nashua River. Floodplains in and adjacent to DRFTA are shown on **Figure 3A** and **Figure 3B**.

DRFTA complies with EO 11988 and EO 11990 and coordinates with applicable town laws to avoid actions that impact floodplains and wetlands and avoid development with a floodplain when an alternative elsewhere is available.

Water Resources Action Items:

- **Prevent and minimize erosion and sediment entering surface water bodies.**
- **Continue to update wetland data layers in GIS as wetlands are surveyed.**
- **Perform wetlands delineations for proposed projects near streams and wetlands. Consult with agencies and adhere to applicable wetland regulations.**
- **Manage wetlands to ensure no net loss (EO 11990).**
- **Inventory and certify vernal pools and avoid and minimize impacts to these areas.**
- **Inventory culverts and assess culvert impacts on the connectivity of aquatic habitat. Upgrade deficient culverts.**
- **Inventory dams and evaluate opportunities for habitat restoration by dam removal.**
- **Develop and implement a Phragmites management plan that includes an inventory of Phragmites stands, control plans for stands posing a risk to nearby sensitive communities or rare species habitat through containment or herbicide use, and prevention of impacts to native Phragmites (*Phragmites australis americanus*) which may occur.**

6.5. Sensitive Species Management

The conservation of sensitive species and their habitats is an important part of the natural resource management program at DRFTA. This section identifies the sensitive species known to occur on DRFTA and their management. **Table 6-6** provides a list of sensitive species that may occur or are known to occur on DRFTA.

Table 6-6. Sensitive Species and Species of Concern at DRFTA

Scientific Name	Common Name	Federal Status	State Status	Installation Presence	Reference / Agency Correspondence	Habitat/Locations
Mammals and Birds						
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Threatened	Endangered	Historical Presence	US AEC, 2015b USFWS, 2018b USFWS, 2018c	<ul style="list-style-type: none"> Hollow trees, caves, mines
<i>Sorex palustris</i>	Water Shrew	--	Special Concern	Present	ABB, 1993	<ul style="list-style-type: none"> Vernal pools, lakes, ponds Forested swamps
Birds						
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	MBTA	Threatened	Present	ABB, 1993 MassWildlife, 2019 Lockwood, 2009 2011, 2013	<ul style="list-style-type: none"> Sandplain grasslands, pastures, hayfields, and airfields Open knolls, sandplains within Pine Barrens Habitats with relatively low stem densities and limited ground liter Turner Drop Zone
<i>Anrostomus vociferus</i>	Whip-Poor-Will	--	Species of Concern	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Young forests and shrublands Pitch pine/scrub oak upland forests
<i>Batramia longicauda</i>	Upland Sandpiper	MBTA	Endangered	Present	ABB, 1993 MassWildlife, 2019 Lockwood, 2009, 2010	<ul style="list-style-type: none"> Open expanses of grassy fields and hay fields Grassy strips adjacent to runways and taxiways of airports and military bases Turner Drop Zone
<i>Botaurus lentiginosus</i>	American bittern	MBTA	Endangered	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Marshes and wet meadows Peatlands
<i>Caprimulgus vociferus</i>	Eastern Whip-poor-will	MBTA/BCC	Special Concern	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> High integrity fire-influenced Barrens communities Barrens
<i>Circus cyaneus</i>	Northern Harrier	MBTA	Threatened	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Establish nesting and feeding territories in wet meadows, grasslands, abandoned fields, and coastal and inland marshes Spend winter on offshore islands and along the coast
<i>Dendroica striata</i>	Blackpoll warbler	MBTA	Species of Concern	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Use young stands of evergreens and alder or willow thickets to breed Migration in evergreen and deciduous forests
<i>Falco peregrinus</i>	Peregrine falcon	MBTA	Threatened	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Prefer wide-open spaces, and thrive near coasts where shorebirds are common
<i>Gavia immer</i>	Common loon	MBTA	Special Concern	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Breed on quiet, remote freshwater lakes Sensitive to human disturbance Winter migration on lakes, rivers, estuaries, and coastlines.
<i>Haliaeetus leucocephalus</i>	Bald eagle	BGEPA, MBTA	Threatened	Present	ABB, 1993, Lockwood, 2009	<ul style="list-style-type: none"> Forested areas adjacent to large bodies of water

Table 6-6. Sensitive Species and Species of Concern at DRFTA

Scientific Name	Common Name	Federal Status	State Status	Installation Presence	Reference / Agency Correspondence	Habitat/Locations
<i>Podilymbus podiceps</i>	Pied-Billed Grebe	MBTA	Endangered	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Marshes, lakes, large ponds Wetlands with an abundant supply of vegetation to provide cover and nesting materials Spend winter in open lakes and rivers, estuaries, and tidal creeks
<i>Poocetes gramineus</i>	Vesper Sparrow	MBTA	Threatened	Present	ABB, 1993 MassWildlife, 2019 Lockwood, 2009, 2010	<ul style="list-style-type: none"> Taller woody vegetation interspersed within grassland Dry, well drained sites with mixture of short grass, bare ground, and shrubs, trees Grasslands/Turner Drop Zone
<i>Sturnella magna</i>	Eastern Meadowlark	--	Proposed Special Concern	Present	ABB, 1993 Lockwood, 2009 MassWildlife, 2019	<ul style="list-style-type: none"> Turner Drop Zone Breeds in grasslands, meadows, weedy pastures
Invertebrates						
<i>Danaus plexippus</i>	Monarch Butterfly	Under Review	--	Present	ABB, 1993	<ul style="list-style-type: none"> Open fields and meadows with milkweed
<i>Euchlaena madusaria</i>	Sandplain Euchlaena	--	Special Concern	Present	ABB, 1993 MassWildlife, 2019	<ul style="list-style-type: none"> Fire-influenced Barrens communities (with scrub oak and blueberry understories) Host plant: Polyphagous, often lowbush blueberries (<i>Vaccinium spp.</i>)
<i>Lycia rachelae</i>	Twilight Moth	--	Endangered	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Fire-influenced Barrens communities (with scrub oak and blueberry understories) Host plant: Polyphagous (preference for <i>Populus</i> and <i>Salix</i>)
<i>Psectraglaea carnosa</i>	Pink Sallow Moth	--	Special Concern	Present	ABB, 1993 MassWildlife, 2019	<ul style="list-style-type: none"> Fire-influenced Barrens communities (with scrub oak and blueberry understories) Host plant: Lowbush blueberries (<i>Vaccinium spp.</i>)
<i>Speranza exonerata</i>	Pine Barrens Speranza	--	Special Concern	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Fire-influenced Barrens communities (with scrub oak and blueberry understories) Host plant: Scrub oak (<i>Quercus ilicifolia</i>)
<i>Zanclognatha martha</i>	Pine Barrens Zanclognatha	--	Special Concern	Present	ABB, 1993 MassWildlife, 2019	<ul style="list-style-type: none"> Fire-influenced Barrens communities (with scrub oak and blueberry understories) Host plant: Pitch Pine (<i>Pinus rigida</i>)
<i>Williamsonia lintneri</i>	Ringed Boghaunter	--	Threatened	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Acidic sedge fens and sphagnum bogs with soupy sphagnum pools or troughs, surrounded by woodlands

Table 6-6. Sensitive Species and Species of Concern at DRFTA

Scientific Name	Common Name	Federal Status	State Status	Installation Presence	Reference / Agency Correspondence	Habitat/Locations
Reptiles/Amphibians						
<i>Ambystoma laterale</i>	Blue Spotted Salamander	--	Special Concern	Present	ABB, 1993 MassWildlife, 2019	<ul style="list-style-type: none"> Deciduous and coniferous forests (northern hardwoods, spruce-fir upland)
<i>Clemmys guttata</i>	Spotted Turtle	Under Review	At risk	Present	ABB, 1993	<ul style="list-style-type: none"> Vernal pools, shrub swamps Forested swamps Oxbow NWR
<i>Emydoidea blandingii</i>	Blanding's Turtle	Under Review	Threatened	Present	ABB, 1993, MassWildlife, 2019, Oxbow Assoc., 2003	<ul style="list-style-type: none"> Observed in seasonal pools, marshes, scrub-shrub wetlands, and open uplands Wetlands for overwintering during the inactive season
<i>Glyptemys insculpta</i>	Wood Turtle	Under Review	Watching / Oxbow	Present	ABB, 1993	<ul style="list-style-type: none"> Rivers and large streams, riparian forests, wetlands, hayfields, and other early successional habitats Oxbow NWR
<i>Lithobates pipiens</i>	Northern Leopard Frog	--	Species of Greatest Conservation Need	Present	ABB, 1993, MassWildlife, 2019	<ul style="list-style-type: none"> Along shrubby / marshy margins (or floodplains) Large shrub swamps near streams
<i>Terrapene carolina</i>	Eastern Box turtle	--	Special Concern	Present	ABB, 1993	<ul style="list-style-type: none"> Deciduous/mixed forests Grasslands
Fish						
<i>Notropis bifrenatus</i>	Bridle Shiner	--	Special Concern	Present	Fort Devens, 2010	<ul style="list-style-type: none"> Lakes, ponds Large & mid-sized rivers Small streams
Plants						
<i>Carex typhina</i>	Cat-tail Sedge	--	Threatened	Present	ABB, 1993, MassWildlife, 2019	<ul style="list-style-type: none"> Riparian
<i>Carex mesochorea</i>	Midland Sedge	--	Endangered	Present	ABB, 1993	<ul style="list-style-type: none"> Grasslands
<i>Cyperus houghtonii</i>	Houghton's Flatsedge	--	Endangered	Present	ABB, 1993, MassWildlife, 2019	<ul style="list-style-type: none"> Northern hardwoods, spruce-fir, grasslands Pitch pine-oak Riverbanks, sand bars, lakeshores, sand dunes, sandy openings in woods
<i>Eleocharis ovata</i>	Ovate spike-sedge	--	Endangered	Present	ABB, 1993	<ul style="list-style-type: none"> Large and mid-size rivers, lakes, and ponds
<i>Elymus macgregorii</i>	Early Wild Rye	--	Watch List	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Moist, deep, alluvial or residual, calcareous or other base-rich soils in woods and thickets

Table 6-6. Sensitive Species and Species of Concern at DRFTA

Scientific Name	Common Name	Federal Status	State Status	Installation Presence	Reference / Agency Correspondence	Habitat/Locations
<i>Isotria medeoloides</i>	Small Whorled Pogonia	Threatened	Endangered	Unknown	USFWS, 2018c	<ul style="list-style-type: none"> Older hardwood stands of beech, birch, maple, oak, and hickory Acidic soils with a thick layer of dead leaves Slopes near small streams small light gaps, or canopy breaks, and generally grows in areas with sparse to moderate ground cover
<i>Liatriis scariosa var. novaeangliae</i>	New England Blazing Star	--	Special Concern	Present	ABB, 1993, MassWildlife, 2019	<ul style="list-style-type: none"> Grassland / Barrens
<i>Lupinus perennis</i>	Wild Lupine	--	Watch List	Present	ABB, 1993, MassWildlife, 2019	<ul style="list-style-type: none"> Grassland / Barrens
<i>Lygodium palmatum</i>	Climbing Fern	--	Special Concern	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Forested swamp, shrub swamp, transitional hardwoods
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	--	Watch List	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Bogs, fens, of wet woods in cool areas
<i>Panicum philadelphicum sp.</i>	Philadelphia Panic-grass	--	Special Concern	Unknown	MassWildlife, 2019	<ul style="list-style-type: none"> Coastal Plain ponds
<i>Senna hebecarpa</i>	Wild senna	--	Endangered	Present	Fort Devens, 2010	<ul style="list-style-type: none"> Grasslands
<i>Sparganium natans</i>	Small bur-reed	--	Endangered	Present	Fort Devens, 2010	<ul style="list-style-type: none"> Lakes and ponds
Bird Species Classified as MBTA/BCC Only						
<i>Ammodramus nelson</i>	Nelson's Sparrow	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Breeds in wet meadows, marshes, and saltmarshes
<i>Bubo scandiacus</i>	Snowy owl	MBTA/BCC	--	Present	ABB, 1993	<ul style="list-style-type: none"> Treeless places and wide-open spaces (e.g. airport field)
<i>Calidris alpina arctica</i>	Dunlin	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Winters along a variety of wet areas including mudflats, marshes, flooded fields, estuaries, and sandy beaches
<i>Calidris pusilla</i>	Semipalmated sandpiper	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Winters and migrates along mudflats, sandy beaches, shores of lakes and ponds, and wet meadows
<i>Calidris subruficollis</i>	Buff-breasted sandpiper	MBTA/BCC	--	Present	ABB, 1993	<ul style="list-style-type: none"> On migration and in winter found in dry grasslands (usually short grass), pastures, plowed fields and, rarely, mudflats
<i>Cardellina canadensis</i>	Canada Warbler	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Mixed conifer and deciduous forests with a shrubby/mossy understory
<i>Coccythraustes vespertinus</i>	Evening Grosbeak	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Winters in evergreen and deciduous forests
<i>Coccyzus erythrophthalmus</i>	Black-billed cuckoo	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Woodlands and thickets, including aspen, poplar, birch, sugar maple, hickory, hawthorn, and willow. Winter in forest, woodlands, and scrub

Table 6-6. Sensitive Species and Species of Concern at DRFTA

Scientific Name	Common Name	Federal Status	State Status	Installation Presence	Reference / Agency Correspondence	Habitat/Locations
<i>Dendroica discolor</i>	Prairie warbler	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Bushy pastures, low pines. Breeds in dry old clearings, edges of forest Sandy pine barrens with undergrowth of scrub oaks
<i>Dolichonyx oryzivorus</i>	Bobolink	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009, 2010	<ul style="list-style-type: none"> Grasslands Large fields with a mixture of grasses/broad-leaved plants like legumes, dandelions
<i>Euphagus carolinus</i>	Rusty blackbird	MBTA/BCC	--	Present	ABB, 1993	<ul style="list-style-type: none"> Wet areas, including flooded woods, swamps, marshes During the breeding season, bogs, beaver ponds and wet woods in boreal forest
<i>Hylocichla mustelina</i>	Wood thrush	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Mature deciduous and mixed forests
<i>Limnodromus griseus</i>	Short-billed Dowitcher	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> During migration and on the wintering grounds, found in saltmarshes, lagoons, flooded agricultural fields, and costal mudflats
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Woodlots in agricultural areas, dead timber in swamps, and pine savannas
<i>Tringa flavipes</i>	Lesser yellowlegs	MBTA/BCC	--	Present	ABB, 1993 Lockwood, 2009	<ul style="list-style-type: none"> Winters in wide variety of shallow fresh and saltwater habitats
<i>Tringa semipalmata</i>	Willet	BCC	--	Present	USFWS, 2018d	<ul style="list-style-type: none"> Beaches, bay shores, marshes, mudflats, and rocky coastal zones

MBTA: Migratory Bird Protection Act
 BCC: Bird of Conservation Concern
 (Table adapted from US Army, 2018d Table 3-2)

6.5.1. Federally Listed Threatened and Endangered Species

The USFWS has, in recent correspondence with the installation regarding proposed projects, identified two federally listed species as potentially occurring at DRFTA: The Northern Long-Eared Bat (NLEB) and the Small Whorled Pogonia. The management of these species and their respective habitats is regulated under the Endangered Species Act of 1973 (ESA), as amended. The ESA protects federally listed animal and plant species and their habitats and is administered by the USFWS. Section 7 of the ESA requires coordination and consultation with USFWS to ensure that proposed projects will not adversely impact a listed species or critical habitat. Federally listed species are further protected by the Massachusetts Endangered Species Act (MESA-MGL Chapter 131A) and AR 200-1 Environmental Protection and Enhancement.

6.5.1.1. Northern Long-Eared Bat (Federally Threatened, State Endangered)

The NLEB (*Myotis septentrionalis*) is a medium sized bat, characterized by its brown fur and relatively long ears compared with other members of its species. During the summer, NLEBs roost singly or in groups in the cavities and crevices of trees. During the winter, NLEBs migrate to caves and mines to hibernate. Due to white-nosed syndrome, a fungal disease, NLEB populations have significantly declined, and the species is now federally listed as a threatened species. There have been no recent reported sightings of the NLEB on DRFTA and there are no known hibernacula. There is however a known historical presence of the NLEB on DRFTA and the installation's mature forest lands provide ideal summer roosting habitat for the species.

The Informal Conference and Management Guidelines on the NLEB for Ongoing Operations IMCOM Installations Conservation and management provides evaluation, sustainment and enhancement strategies for the protection of the NLEB at IMCOM installations. The USFWS Field Office provided additional information and recommendations for the NLEB. These management guidelines are implemented at DRFTA in the form of care and time of year restrictions during the active season (1-April to 31-October) for actions in or near potential roosting sites for the following activities (US AEC, 2015b):

- Smoke used for military training,
- Construction,
- Bridge repair or maintenance,
- Forest management,
- Prescribed burns,
- Tree removal or forestry actions, and
- Pest control.

The implementation of these management strategies is coordinated by the garrison's Natural Resource Specialist and includes using NEPA processes such as requiring records of environmental consideration (RECs) for military training and construction activities. Management will also include evaluating 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. DRFTA will also explore ways to participate in actions to manage and reduce the impacts of white-nose syndrome on NLEBs (USFWS 2019).

6.5.1.2. Small Whorled Pogonia (Federally Threatened; State Endangered)

The small whorled pogonia (*Isotria medeoloides*) is a member of the orchid family and is characterized by the whorl pattern of the leaves at the top of its stem and beneath its flower. The small whorled pogonia grows to a maximum height on about 14 inches when bearing fruit and has grayish-green leaves. The plant's habitat includes mature hardwood forests, and areas with acidic soils and a thick ground layer of dead leaves. The small whorled pogonia is considered a rare species and is federally listed as threatened due to the threat of habitat destruction. No sightings of the small whorled pogonia have been reported at DRFTA. However, the USFWS's

Information for Planning and Consultations (IPaC) shows that there is potential habitat for the small whorled pogonia on DRFTA.

Protection of the small whorled pogonia at DRFTA currently includes surveying for the species in wooded areas in the planning stage for any development, logging, or construction activities. In the event that small whorled pogonias are discovered, protection zones will be placed around colonies using fencing and signs, and personnel will be trained to recognize and identify the plant to prevent them from being stepped on.

6.5.2. State Listed Species and Species of Concern

In addition to the Northern Long-Eared Bat and Small whorled pogonia which are not only federally threatened but also State endangered species, there are many other State listed species and species of concern that are known to occur on DRFTA. This INRMP complies with all laws and regulations including the MESA and AR 200-1 for the protection of these sensitive species and their habitats. This INRMP prioritizes protecting the sensitive species identified below based on Massachusetts NHESP Priority and Estimated Habitat mapping and the use BioMap2 as well as the input from MassWildlife and the USFWS.

6.5.2.1. Grasshopper Sparrow (State Threatened)

The grasshopper sparrow is a species of small sparrow. The species is characterized by its flat head, dark brown crown, and yellow patch on the side of its head that extends from the front of its bill to the top of the eye. Grasshopper sparrows are found in grasslands and prairies with warm season grasses and sufficient bare ground for them to nest in, hop and run along to escape predators, and forage for invertebrates. The grasshopper sparrow is listed as threatened in Massachusetts due to loss of habitat, agricultural practices, and the natural succession of fields to shrubs and woods. At DRFTA, the grasshopper sparrow is known to occur in the Turner Drop Zone which provides desirable habitat in the regionally unique expansive grassland. Population studies performed from 1998 to 2012 and resumed in 2019 help predict the viability of the grasshopper sparrow population in the Turner Drop Zone.

Management strategies used to conserve the grasshopper population in the Turner Drop Zone include active habitat management and care and time of year restrictions including:

- Controlling invasive knapweed;
- Restricting mowing to outside of the grasshopper sparrows nesting period (May through July);
- Using prescribed burning to improve habitat by removing thatch and promoting the growth of warm season grasses;
- Limiting maintenance, vehicles, and construction disturbance during the nesting period – June through July; and
- Restricting to the greatest extent practical vehicle maneuvers to roads and trails from May through August.

The implementation of these management strategies is coordinated by the garrison's Natural Resource Specialist and includes using NEPA processes such as RECs for military training and construction activities.

6.5.2.2. Blanding's Turtle (State Threatened)

The Blanding's Turtle is a semi-aquatic, medium-sized turtle. Distinguishing characteristics of this species include its bright yellow chin and throat, and dark carapace with yellow flecking. In Massachusetts, the Blanding's Turtle has been observed in a variety of habitats including seasonal pools, marshes, scrub-shrub wetlands, and open uplands. The decline in the species population is a result of loss of habitat due to development as well as road death, and predation. Additionally, late maturation (14-20 years) and low nest survival rate have adversely affected this species population. The Blanding's Turtle is a state-listed threatened species and is under review for federal listing.

At DRFTA, surveys performed from 1992 through 1994 documented more than 75 individual Blanding's Turtles foraging in wetlands and nesting in sandy areas. A 2003 follow-up field survey found an estimated 130 Blanding's Turtles on DRFTA mainly in the eastern portion of South Post. That survey also confirmed that the turtles moved between South Post and Oxbow NWR (Oxbow, 2003). The Blanding's Turtle's continued presence on DRFTA was confirmed in the spring of 2019 by the garrison's Natural Resource Specialist in ponds adjacent to the Nashua River.

Management strategies employed to protect Blanding's Turtles at DRFTA focus on:

- Education and care;
- Avoiding construction and maintenance activities in areas where nests may occur during the nesting period between late May and early June;
- Restricting, to the greatest extent practical, vehicle maneuvers in terrestrial areas where the Blanding's Turtles maybe crossing or nesting; and
- Educating personnel, soldiers and other garrison visitors prior to the nesting season on the importance of awareness to prevent turtle mortality at road crossings.

The implementation of these management strategies is coordinated by the garrison's Natural Resource Specialist and includes using NEPA processes such as RECs for military training and construction activities.

6.5.2.3. Eastern Whip-poor-will (State special concern)

The Eastern Whip-poor-will is a nocturnal bird that thrives in dry, open clearings and woodlands. The species is characterized by a small horizontal body with a flat head and bristle bordered beak. The Eastern Whip-poor-will has complex habitat needs that include dry, open, woodlands with sparse understory vegetation near meadows and shrublands. It thrives in rare, fire-dependent pitch pine-scrub oak communities such as those found on DRFTA. The Eastern Whip-poor-will is a state listed species of special concern. Its habitat can be managed through prescribed burning,

logging to replicate wildfire, and by limiting development in proximity of known habitats. The bird has been documented at the Turner Drop Zone (Lockwood, 2009) and in the pinelands along Trainfire road. Current management strategies for the Eastern Whip-poor-will on DRFTA include cooperation with MassWildlife on both acoustic and bird bandings surveys and the use of NEPA processes such as RECs for military training and construction activities to protect habitat.

6.5.2.4. Monarch Butterfly (under review)

The Monarch Butterfly is an iconic and at one time, a common butterfly characterized by its bright orange colored wings with black veins. Currently, states including Massachusetts are monitoring the Monarch Butterfly populations and its status remains “under review” due to recent and sharp decline of native populations. Breeding and over-wintering habitat loss, climate change, predators, and parasites are all believed to have contributed to the species recent population decline. DRFTA is planning to begin actively managing habitats for Monarch Butterflies by planting native varieties of milkweed and pollinator flowers.

6.5.2.5. New England Blazing Star (State special concern)

The New England Blazing Star is a rare perennial plant that grows to approximately two feet in height. It has narrow, hairless stems and leaves, and purple flower heads that bloom in mid-August through mid-October (NHESP, 2015). DRFTA’s sandy soils, grasslands, and barrens provide opportunities for successful propagation of New England Blazing Star as well as Wild Lupine which is currently on the state watch list.

Sensitive Species Action Items:

- **Consult with the USFWS and MassWildlife on all proposed projects that may impact sensitive species and/or their habitats in compliance with ESA and MESA laws and requirements.**
- **Map natural communities and collect baseline data to improve knowledge of potential habitats for federally and state-listed species on DRFTA. Coordinate mapping efforts with the USFWS and MassWildlife.**
- **Perform acoustic bat surveys to collect baseline data to confirm the presence or absence of northern long-eared bats. Survey for underground structures that may be used as hibernacula.**
- **Continue to survey and monitor Grasshopper Sparrow populations. Use prescribed burning to improve the habitat in the Turner Drop Zone.**
- **Resume survey and monitoring efforts for the Blanding's Turtle.**
- **Coordinate with MassWildlife to find opportunities to identify ways to reduce nest predation and prevent road mortality of the Blanding's Turtle by studying nesting patterns, protecting nesting sites and providing nesting habitat in areas where road crossing is not required. Install fencing and culverts in accordance with the best management practices described in MassDOT's Linking Landscape program.**
- **Continue to provide education and awareness training for protection of Blanding's Turtles, especially along roads. Work with the Oxbow NWR to maintain and improve Blanding's Turtle habitat along the Nashua River floodplain.**
- **Actively manage habitats for Monarch Butterflies by planting native varieties of milkweed and pollinator flowers.**
- **Assess opportunities to expand rare plant habitats.**
- **Annually review and update sensitive species management strategies.**

6.6. Migratory Bird Management

Migratory bird species are protected under the federal Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (Eagle Act). The MBTA provides protection and conservation of specific designated migratory bird species, making it illegal to pursue, hunt, take, capture, kill, or sell these birds or any of their parts. The Eagle Act protects Bald Eagles and Golden Eagles by prohibiting pursuing, shooting, shooting at, poisoning, wounding, liking, capturing, trapping, collecting, molesting, disturbing, purchasing, or selling them.

The Bald Eagle is known to breed and winter in Worcester and Middlesex Counties. According to MassWildlife, the number of bald eagles identified in Massachusetts is rising steadily due to restoration and conservation efforts. In 2015 Breeding Pairs were identified in territories close to DRFTA at Lake Shirley and the Merrimack River (NHESP, 2016d). Although still protected under Federal law, the species is no longer federally listed as endangered. It is however still state listed as a threatened species.

In Massachusetts, the breeding season for Bald Eagles spans from early winter when courtship begins, to early spring when the female bird lays eggs. The chicks hatch after approximately 35 days of incubation and leave the nest in late fall. Current management recommendations and best practices include protection and enhancement of wetland and forest habitats, and preservation of known breeding, roosting, and wintering areas (NHESP, 2016d).

Other protected migratory bird species at DRFTA include the grasshopper sparrow and the Eastern Whip-poor-will, discussed in **Section 6.5.1**, a wide variety of other birds included in **Table 6-6**, and waterfowl including mallard ducks. A 2019 IPaC lists migratory birds that may occur or be impacted by actions at DRFTA (USFWS, 2018d). Migratory grasslands birds and waterfowl are surveyed regularly at DRFTA (Lockwood, various dates, Fort Devens, 2019a). Additionally, migratory hawks and Eastern Whip-poor-wills are periodically banded at DRFTA. Current strategies to manage habitats for migratory birds focus on maintaining grasslands at the Turner Drop Zone. Wetlands and waterbodies are actively conserved and maintained for waterfowl habitats.

Migratory Birds Action Items:

- **Consult with USFWS and MassWildlife on all proposed projects that may impact migratory bird species and/or their habitats and comply with ESA and MESA laws and requirements.**
- **Continue to survey and monitor Grasshopper Sparrow populations.**
- **Continue to work with MassWildlife and other public and private entities on Eastern Whip-poor-will surveys, waterfowl surveys, hawk banding, and other migratory bird studies.**

6.7. Fish and Wildlife Management

DRFTA lands support a diverse mix of migratory birds including waterfowl, wading birds, raptors, shorebirds, passerines, as well as resident mammals, reptiles, amphibians, fish and invertebrates. The primary goal of wildlife management at DRFTA is to maintain wildlife populations at levels compatible with land use objectives while promoting the conservation of non-game species. This section describes the fish and wildlife species known to occur on DRFTA with the exception of those presented in **Section 6.5 Sensitive Species Management** and **Section 6.6 Migratory Bird Management**.

6.7.1. Fish and Wildlife Species Known to Occur on DRFTA

In 1992, a "Biological and Endangered Species Baseline Study of Fort Devens was conducted (ABB, 1993). In conjunction with this study, a database of all flora and fauna known to seasonally or permanently occur on or migrate through DRFTA was developed. Particular emphasis was paid to rare and endangered biota with reference to those species with protected status under the Federal ESA of 1973, as amended in 1988, and the MESA of 1990. Much of the information

provided in this discussion was taken from the 1993 study and from a table compiled at that time of confirmed fauna (Fort Devens, 2010). The table of confirmed fauna is included in **Appendix A.4**. As this data is dated, more current information where available (i.e., updated ecological inventories, MassWildlife BioMap2, USFWS's IPaC, Mass Audubon, Oxbow) was incorporated in the discussion. The most current versions of both state and federal rare and endangered species lists have been included.

6.7.1.1. Fish

Nineteen fish species were identified as occurring on DRFTA in the 1992 Baseline Survey (ABB, 1993). Aquatic surveys conducted by the USFWS in 1998-1999 provide additional information on the occurrence of fish species, mollusks, and other macroinvertebrates in waters on South Post. Fish known to occur on DRFTA are listed in **Appendix A.4**. Of the species known to occur, only one, the bridge shiner (*Notropis bifrenatus*), is listed (state special concern). Other species known to occur include a number of cyprinid (minnow) and centrarchid (sunfish) species and gamefish species including smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), brown bullhead (*Ameiurus nebulosus*), yellow perch (*Perca flavescens*), and chain pickerel (*Esox niger*).

6.7.1.2. Mammals

Numerous mammalian species occur on DRFTA. The 1992 Baseline Survey identified twenty-six species of mammals as being known to or expected to occur on DRFTA (ABB, 1993). Mammals known to occur on DRFTA are listed in **Appendix A.4**. Some of the more common species of mid-to large mammals include white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), and woodchuck (*Marmota monax*). There is also an abundance of voles, mouse, and shrew species. Larger mammals including moose (*Alces alces*), black bear (*Ursus americanus*), and coyote (*Canis latrans*) are also known to occur occasionally on DRFTA. In addition, six species of bats occur on DRFTA. Of the mammals observed on DRFTA, only the Long-eared bat (*Myotis septentrionalis*) and the water shrew (*Sorex palustris*) are designated as high conservation priority species based on Federal or State status. These mammals along with their Federal and State conservation status are listed in **Table 6-6**.

North American beaver (*Castor canadensis*) are known to inhabit wetlands areas in and around DRFTA. Beaver trapping is conducted as needed when damage, e.g. flooding of roadways, is occurring in the training areas. The most recent trapping event occurred in January 2019 in the Turner Drop Zone. The event was permitted through the Lancaster Board of Health in accordance with Massachusetts Law (MGL Chapter 131§ 80A).

6.7.1.3. Birds

DRFTA lands support a diverse mix of migratory and resident birds including waterfowl, wading birds, raptors, shorebirds, and passerines. Non-game birds vary from permanent residents,

summer breeders, winter residents, to Neotropical migratory birds. One hundred fifty-two species of birds have been observed on DRFTA (ABB, 1993). Birds known to occur on DRFTA are listed in **Appendix A.4**. Of the species of birds observed on DRFTA, thirteen are designated as high conservation priority species based on their Federal or State status. These birds along with their Federal and State conservation status are listed in **Table 6-6**. Game birds on the installation include the eastern wild turkey (*Meleagris gallopavo*), ruffed grouse (*Bonasa umbellus*), woodcock (*Scolopax minor*), Canada goose (*Branta canadensis*), and Snow goose (*Chen caerulescens*).

6.7.1.4. Reptiles and Amphibians

Wetlands, vernal pools, ponds and streams, as well as open-fields and forested areas on DRFTA provide aquatic and terrestrial habitat for a variety of herpetofauna. Fifteen amphibian species (six salamanders, two frogs, and seven frogs) and nineteen reptile species (seven turtles and twelve snakes) are known to occur on DRFTA (ABB, 1993). One salamander type and three frog species were identified in the 2019 Vernal Pool Evaluation (Oxbow, 2019). Reptile and amphibian species known to occur on DRFTA are listed in **Appendix A.4**. Of these, six species (4 reptiles and 2 amphibians) are designated as high conservation priority species based on their Federal or State status and are listed in **Table 6-6**.

6.7.1.5. Invertebrates

As part of the 1993 study, an invertebrate survey of DRFTA was conducted. This study found 538 species of Lepidoptera i.e., butterflies and moths, on DRFTA. This same study identified fire-related, pitch pine vegetation types and grasslands as important habitats for lepidoptera. A survey of vernal pools in 1992 identified 30 invertebrate species inhabiting these pools at this time (Mello and Peters, 1992). Also, in 1992, a contractor hired through The Nature Conservancy identified eight species of tiger beetles on the installation (ABB, 1993).

During 1998-2000, macroinvertebrate families (primarily aquatic insects and aquatic snails) inhabiting Slate Rock, Ponakin, and Spectacle brooks were qualitatively surveyed. Results of this study suggest that water quality and stream health increase from Slate Rock Brook to Ponakin Brooke to Spectacle Brook, however, additional studies are needed to verify the results. (Wicklow, 2001). A fishery and mussel survey in 1998-1999 found only two species of mussels within South Post (USFWS 1999). Additional invertebrates were identified were identified in the 2019 Vernal Pool Evaluation (Oxbow, 2019). Invertebrate species known to occur on DRFTA are included in **Appendix A.4**.

6.7.2. Hunting Program

DRFTA allows sustainable multipurpose use of natural resources on South Post via authorized public access in accordance with the Sikes Act (16 USC 670a et seq.) where said access does not conflict with the military mission. Due to the constraints of the military mission at DRFTA, outdoor recreational opportunities on DRFTA are limited to hunting on South Post. On select days during

the state's spring and fall hunting seasons, the installation is open to authorized hunters for deer, turkey, and small game hunting. The installation is not open on all days of the state hunting season and hunters must preregister to participate. Registration for hunting on DRFTA typically opens six weeks to a month in advance of the start of the state hunting season and is advertised on the garrison's webpage and Facebook page. Hunting slots are awarded using a tier preference system for military members, retirees, and veterans with remaining slots awarded to the public on a first-come first-served basis in accordance with *United States Army Fort Devens Standard Operating Procedure Hunting Program* (US Army, 2018e). This SOP, the *Letter of Instruction (LOI)* issued by the Garrison Commander for each hunting season, and other Installation regulations control access to DRFTA for hunting.

The objective of the hunting program is to provide recreational opportunities for the public and manage the populations of game species. The DRFTA Natural Resource Specialist coordinates, implements, and oversees the hunting program with the primary responsibility for ensuring that it is environmentally sound. Every effort is made to provide an adequate amount of access to achieve the objective of a post-harvest herd of 10 to 15 deer per square mile on DRFTA.

Fish and Wildlife Management Action Items:

- **Conduct flora and fauna surveys at established intervals (every 5 years) to evaluate if any changes are occurring to state of federally listed plants/animals known to occur on the installation.**
- **Develop and incorporate management actions into this INRMP during annual reviews if any new candidate, threatened, or endangered species are discovered on DRFTA, or if species already known on the installation become listed.**
- **Document all nongame species incidentally observed during species of concern surveys.**
- **Maintain an updated inventory of plants and animals present on DRFTA.**
- **Ensure access to focused training for natural resource management staff regarding management of fish and wildlife resources on military installations.**
- **Cooperate with state and federal agencies on issues of wildlife management.**
- **Explore collaborative opportunities with local organizations such as the Massachusetts Audubon Society, Boy Scout troops, Girl Scout troops, and other community organizations to complete specific tasks both on and off DRFTA for the benefit of fish and wildlife.**

6.8. Vegetation Management

Vegetation at DRFTA consists of forests, grasslands, riparian areas, wetlands, and urbanized lands. Diverse vegetation is found throughout South Post and parts of the 3400 Area that provides high quality habitat for plant and animal species. Historically, vegetation was categorized by habitats into five categories at DRFTA using mapping from aerial photography in 1980 and ground truthing in 1993.

The DRFTA DPW has developed spatial data depicting vegetation classifications at the installation as shown in **Figure 6**. The data was based on the 2011 National Land Cover Database, which was refined using aerial imagery of DRFTA taken in 2011. This data set grouped vegetation at DRFTA into seven land classification categories with some areas without vegetation or unmapped. **Table 6-7** shows the 2011 vegetative cover at DRFTA with approximate acreages and corresponds to **Figure 6**.

Table 6-7: Vegetation at DRFTA	
Land Classification	Approximate Area (Acres)
Deciduous Forest	1,173
Mixed Forest	1,128
Evergreen Forest	607
Woody Wetlands	783
Shrub/Scrub	178
Emergent Herbaceous Wetlands	89
Herbaceous	46
Turner Drop Zone Grassland (extent is approximate)	182

6.8.1. Grasslands

Expansive grasslands are some of the most important and unique vegetative cover types on DRFTA. Grasslands comprise about 300 acres of DRFTA (Fort Devens, 2010). The Turner Drop Zone and other large grasslands also provide habitat for game and non-game species (Fort Devens, 2010). The grasslands consist of meadows surrounded by mature forest and training in these areas depends on the level of woody encroachment as well as density of vegetation growth (RTLA, 2016). Upland grasslands habitats are in danger of decreasing when unmaintained open areas of grasses convert to woodland successional growth. The Turner Drop Zone is the largest of DRFTA’s grassland training areas located and is within the South Post Range Complex.

Currently, the Turner Drop Zone is rapidly shifting from a warm-season grassland toward a cool-season grassland dominated by cool-season grasses, clonal forbs and low woody vegetation (MassWildlife, 2019). As the Drop Zone currently supports warm-season grassland obligates such as the grasshopper sparrow a state endangered species discussed in **Section 6.5**. It is expected that these species will decline if the shift toward a cool season grassland community continues. Restoration and expansion of the warm-season grassland habitat in the Drop Zone using prescribed fire and herbicide application into grassland habitat management was discussed recently with MassWildlife. Herbicide application, coupled with prescribed fire, for long-term warm season grassland restoration grassland maintenance, would likely reduce the frequency and extent of mowing without compromising the utility of the Drop Zone for training needs.

Warm season grasses mature later than cool season grasses and with rapid growth delayed until late June or early July (MassWildlife, 2019). This would allow mowing to be delayed until after the peak nesting periods for the grasshopper sparrow.

Grasslands on DRFTA support a variety of rare and state-listed plant species as discussed in **Section 6.5**. MassWildlife recommends the collection of baseline data to improve knowledge about the distribution and relative abundance of these plants. Rare plant species known to occur include wild lupine and New England blazing star which would also likely benefit from improved grassland management. Grasslands also support many flowering plants that provide critical nectar feeding resources for pollinators. Pollinators include mainly insects (e.g. honeybees) but also birds and animals. Pollinators fertilize plants, resulting in the formation of seeds and the fruit surrounding seeds which is necessary for agriculture but also aids in maintaining the diversity of plant species. Efforts will be made at DRFTA to integrate pollinator species considerations into grassland management strategies.

6.8.2. Forests

Forests are the dominant vegetation type on DRFTA occupying approximately 4,000 acres of the installation. Hardwood forests are the native climax community of the region and also the most common forest type at DRFTA. Previous studies have reported nine types of hardwood communities at DRFTA, along with three types of mixed forest communities and three types of softwood forest communities. Forest cover also includes wooded swamp areas (Fort Devens, 2010). In the early 1990s, the Army conducted intensive inventories for vascular plants, identifying 756 species on South Post. Numerous oak (*Quercus* spp.), maple (*Acer* spp.), pine (*Pinus* spp.), and other hard- and softwoods occur. Surveys have also documented numerous lichens, macrofungi, bryophytes, and microalgae species associated with forest habitats (Fort Devens, 2010).

Two unique forest habitats occur on DRFTA: the Nashua River floodplain alluvial red maple swamp and pitch pine-scrub oak forest described in **Section 6.4**. The pitch pine-scrub oak forest on DRFTA support a robust population of the rare Eastern Whip-poor-will. The most important factor affecting the Whip-poor-will population is to preserve this habitat. This habitat also supports several species of state-listed Lepidoptera.

Large scale timbering does not currently occur at DRFTA. The cutting or thinning of forest stands are currently handled on a project by project basis. A Woodland Management Plan was approved in 1968 and revised in 1983. A forest classification of South Post was performed in 1998 and stand exams occurred in 2006. In order for forest management to be consistent with training needs, the RTLA addresses forest maintenance features in the inspection checklists such as: tree mortality, canopy cover, vehicle damage, invasive flora (RTLA, 2016).

Forests on DRFTA may support the federally endangered NLEBs and occasional bat surveys are completed (US AEC, 2015b). Summer roosting habitat is available and there is a historical presence of this species on the installation. DRFTA uses on Installation Management Command

(IMCOM) Guidelines for tree removal procedures in order to protect the species, which roosts in these trees. Tree species that may provide roosting habitat include black and red oak, silver and sugar maples, hickories, American beech, short-leaf pine, hemlock, birch, and spruce. If single, multiple, or a cluster of trees will be removed during the active roosting season in areas where there are potential roost trees, then trees that do not pose a risk to human life or property will be analyzed for signs of bats being present (emergence surveys) prior to removal according to USFWS NLEB summer survey protocols (US AEC, 2015b).

6.8.3. Invasive Plants

Several noxious and invasive plants occur at DRFTA. These species, as well as suggested control activities, are listed in **Table 6-8** below (Fort Devens, 2018e).

Table 6-8: Invasive Plants and Control Activities at DRFTA	
Species	Control Activities
Purple Loosestrife	<ul style="list-style-type: none"> • Hand-pull and cut small infestations • Herbicide treatment
Spotted Knapweed	<ul style="list-style-type: none"> • Biocontrol (weevils) • Hand pull small infestations • Herbicide application
Autumn Olive	<ul style="list-style-type: none"> • Prescribed fire • Cutting • Chemical control
<i>Phragmites</i> spp.	<ul style="list-style-type: none"> • Cutting • Chemical control
Buckthorn	<ul style="list-style-type: none"> • Cutting • Chemical control

Studies have been conducted on the effect of the invasive species spotted knapweed on the grasshopper sparrow at DRFTA noting that herbicide treatments and controlled burn were used historically for invasive species control (Lockwood et al, 2002, Lockwood 2009). Currently, DRFTA monitors the occurrence of invasive species through RTLA inspections. Lists of prohibited or recommended plant species have not been developed for nor identified on the installation. General recommendations have been made to plant native species, warm season grasses, and to control invasive species such as knapweed.

6.8.4. Urban Landscapes

The Main Cantonment and 3400 Areas of DRFTA are urbanized areas vegetated primarily with turf grasses and ornamental plantings. Grounds maintenance at DRFTA is integrated with the natural resource management program and will continue to work to improve habitat for

pollinator species, remove invasive species historically planted as ornamentals such as autumn olive, and develop sustainable landscapes in response to climate change and other threats.

Vegetation Action Items:

- **Collect baseline data to better understand existence of rare plants, core habitat areas, and natural communities.**
- **Assess opportunities to improve grassland habitat quality in the Drop Zone. Remove trees and shrubs, particularly those associated with Ponakin Brook and other streams/wetlands that encroach into the Turner Drop Zone to improve habitat for state-listed grassland birds. Clear low-lying vegetation to increase line of sight. Plant warm season grasses.**
- **Use herbicide for initial warm season grassland restoration, coupled with use of prescribed fire for restoration and long-term grassland maintenance.**
- **Plant and preserve areas with milkweed and native nectar plants to encourage pollinators such as butterflies and moths. Apply pesticides and fertilizers, and control pests only when needed.**
- **Repair selected improved grounds and landscaped areas damaged by vehicles, people, weather, nature, or overgrowth. Remove encroaching vegetation and re-seed/re-vegetate bare spots in training areas.**
- **Expand the extent and quality of pitch-pine-scrub oak habitat to improve habitat for the rare bird, Eastern Whip-poor-will by:**
 - **Conducting an initial timber harvest to reset the community's structure and species composition.**
 - **Following the timber harvest, maintain the community with regular disturbance via prescribed burns and mowing between burns.**
- **Identify and map invasive and noxious plant species. Plan for removal and control. Update invasive species survey and management plan.**

6.9. Integrated Pest Management

Invasive, non-indigenous pests, diseases, and invasive species have competitive advantage due to the absence of predators, native disease resistance, and competitors that they evolved with in other, non-native ecosystems or because of more efficient mechanisms of reproduction, dispersal, or use of resources. These non-native pests and invasive plants threaten species diversity, composition, and structure of aquatic and terrestrial habitats. In accordance with DoDI 4150.07, Pest Management Program and AR 200-1, DRFTA operates under an Integrated Pest Management Plan (IPMP) which is carried out by the designated Installation Pest Management Coordinator.

6.9.1. Forest Pests

The following noxious forest insects occur or have the potential to occur on DRFTA:

- **White Pine Weevil**, *Pissodes strobi*: The White Pine Weevil has the greatest potential to cause economic damage. It kills terminal leaders of white pine and causes low quality, crooked, multi-boled trees. As the insect prefers relatively pure stands of young white pine with little cover, its impact should be minimal.
- **Pales Weevil**, *Hylebius pales*: The Pales Weevil feeds on tender branches and buds of white pine, red pine, and spruce. Loss of seedlings to this pest will likely result in little economic or ecological impact.
- **Pine Needle Scale**, *Phenacaspis pinifoliae*: Pine Needle Scale attacks white pine, red pine, and spruce. It causes yellowing of needles on large trees and may kill seedlings. It is not considered a significant threat to forest resources.
- **Pine Bark Aphid**, *Pineus strobi*: The Pine Bark Aphid, a sapsucking insect, attacks the bole of white pines and may weaken it. The insect is not considered a significant economic or ecological threat.
- **Elm Bark Beetle**, *Scolytus multistriatus*: The Elm Bark Beetle feeds on the bark of elm trees and carries spores of Dutch elm disease. Many elm trees on DRFTA have been infected as a result of this insect. However; it is not a significant threat, and control is not planned.
- **Saw Fly**, *Neodiprion* spp: The Saw Fly feeds on, and may damage, white and red pine. It is not considered a significant threat.
- **Gypsy Moth**, *Porthetria dispar*: Gypsy Moths, when occurring in large numbers, have potential to destroy trees by enveloping and attacking green vegetation. Fluctuations in gypsy moth populations are cyclical. Potential effects on DRFTA are limited to the cantonment area and weaker forest stands on South Post. Central Massachusetts has experienced a severe outbreak in 2016 and 2017, which is expected to abate in 2018. General guidance recommends that heavily impacted stands should not be harvested for several years following a gypsy moth outbreak (Fort Devens 1968, 1983).
- **Hemlock Woolly Adelgids**, Adelgids are an introduced pest which feeds on the base of hemlock needles and can kill affected hemlock. It is widely established in Massachusetts. At this time no practical control methods are available, although individual trees may be protected through application of systemic pesticides. Several potential biological control agents are being investigated.
- **Emerald Ash Borer**, Emerald Ash Borer (ELB) is an invasive insect pest which has recently become established in MA and will likely decimate ash populations in the state. It is not currently known to occur at DRFTA. At this time no practical control methods are available, although individual trees may be protected through application of systemic pesticides. Several potential biological control agents are being investigated.
- **Asian Longhorned Beetle**, Asian Longhorned Beetle is an invasive insect pest which has recently become established in Worcester, County MA. It has the potential to decimate New England maple populations and is the focus of an intensive USDA eradication program.

Control measures focus on removal of host trees in the vicinity of known beetle colonies. It is not currently known to occur at DRFTA.

6.9.2. Forest Diseases

The following forest diseases occur or have the potential to occur on DRFTA:

- **Ignarius heart rot**, *Fomes ignarius*: Heart rot affects hardwoods, particularly red maple, and destroys trees by causing decomposition of heartwood. Infected trees will be targeted for timber stand improvement (TSI) as needed.
- **White pine blister rust**, *Cronartium ribicola*: White pine blister rust affects white pine, but its occurrence on DRFTA is rare.
- **Nectria canker**, *Nectria galligena*: Nectria canker attacks all hardwood species, causing cankers. Infected trees will be targeted for TSI as needed.
- **Strumella canker**, *Strumella coryneoides*: Strumella canker attacks red oak, causing cankers. Infected trees will be targeted for TSI as needed.
- **Dutch elm disease**, *Ceratocystis ulmi*: Dutch elm disease targets elm trees and has greatest effects within floodplains. It is endemic in MA and elms generally succumb to the disease prior to reaching 6" in diameter (Fort Devens 1968, 1983).
- **Beech Bark Disease**, Beech bark disease (BBD) is caused by both a sap-feeding scale insect and a fungus. American beech trees are first infested with beech scale. Scale feeding allows infection by the *Neonectria* fungus. The fungus kills the cambium, and the tree. The disease is a major killer of beech trees in the northeastern US.

6.9.3. Invasive Plant Species

Invasive plant species known to occur on DRFTA include common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), Autumn olive (*Elaeagnus umbellata*), black locust (*Robinia pseudoacacia*), Japanese knotweed (*Fallopia japonica*) and others as discussed in **Section 6.8.3**.

Integrated Pest and Invasive Species Management Action Items:

- **Ensure compliance with all environmental laws, regulations, and guidelines.**
- **Implement DoD Technical Guide No. 37 Integrated Management of Stray Animals on Military Installations (DoD 2012).**
- **Coordinate with local animal control offices to remove feral animals from the installation.**
- **Implement pest management controls from the IPMP and other pest-related guidance and plans.**
- **Update the existing IPMP to ensure that the plan reflects changes in populations and current management issues.**
- **Identify areas where invasive species occur and develop specific management actions to target the populations of these species.**
- **Use integrated pest management methods that include non-chemical control to reduce the amount of herbicide applied on the installation in accordance with the DoD Pest Management Measures of Merit stipulated in DoDI 4150.07 (DoD 2008) and the Presidential Memorandum, Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators (June 2014).**
- **Use native plants and plants that provide nectar for pollinator species for landscaping to the greatest extent possible per the Presidential Memorandum that directs DoD to use pollinator-friendly native landscaping and minimize use of pesticides harmful to pollinators.**
- **If necessary, coordinate with state and local regulators to obtain appropriate permits for nonnative and nuisance plant species eradication in wetland area.**

6.10. Wildland Fire Management

In accordance with DoDI 4715.03 which states that “all DoD Components shall manage fuel loads, and provide adequate planning for wildland fire management,” and AR 200-1 which states that “installations with unimproved grounds that present a wildfire hazard and/or installations that use prescribed burns as a land management tool will develop and implement an Integrated Wildland Fire Management Plan (IWFMP) that is compliant and integral with the INRMP.” The plan establishes roles and responsibilities, procedures, and requirements for planning and controlling wildland fires on DRFTA. It contains installation-specific information on interagency cooperation, cultural resource considerations, the history of the installation’s wildland fires, and wildland firefighting equipment. The Department of the Army Wildland Fire Policy Guidance (US Army, 2002) requires that the IWFMP be reviewed annually and revised at least every five years.

Wildland Fire Management Action Items:

- **Prepare Wildland Fire Management Plan in compliance with the *Army Wildland Fire Policy Guidance* (US Army, 2002).**
- **Coordinate Plan development with cooperating agencies, the MassDEP, local fire departments and emergency agencies.**

7. Implementation

The legal authority for DoD conservation actions at DRFTA is provided under the provisions of the Sikes Act. The stated purpose of this act is to “*promote effectual planning, development, maintenance and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations.*” All conservation actions and measures, projects, management practices, and tasks outlined in this INRMP are pursuant to this overarching requirement. Toward this end, this INRMP program ensures the implementation of year-round, cost-effective management activities and projects that meet the requirements.

The implementation of this INRMP will be supported by the DRFTA Command Group. The DRFTA DPW Natural Resource Specialist is responsible for implementing this INRMP. The Natural Resource Specialist will coordinate with all garrison directorates and departments to ensure that natural resource management is fully integrated into daily operations and long term planning efforts. The recommendations of this INRMP will be integrated with master planning at DRFTA, as well as the RCMP, the ITAM program and the LRAM.

All communication and sharing of data with stakeholders will be coordinated by Natural Resource Specialist and DPW Environmental Division staff.

As projects requiring NEPA review are planned and executed, this INRMP will be used as a guide to ensure proper and effective management of natural resources. As required by the Sikes Act, this INRMP will be integrated with the conservation and natural resource management objectives of the USFWS and MassWildlife.

In accordance with AR 200-1 and DoDI 4715.03, this INRMP will be reviewed and revised on a regular basis. This INRMP will take effect upon signature of the DRFTA Commander. It is anticipated that this INRMP will cover the period from FY 2020 through FY 2024. DRFTA will invite the USFWS and MassWildlife to participate in annual reviews to discuss action items and accomplishments. The results of the annual reviews will be incorporated into the INRMP as updates. A comprehensive review of this INRMP will be conducted every five years.

In addition to annual reviews, the *Sikes Act* requires each installation with significant natural resources to report annually on the status of its INRMP implementation. Natural Resources Conservation Metrics (NRCMs) are developed and used to assess the status of the implementation of the conservation goals and objectives identified in the INRMP. These metrics

evaluate the effectiveness of ecosystem-based management while ensuring that there is no net loss of military training lands. These metrics also provide for an indication of the success of the installation's partnerships with the USFWS, MassWildlife, and others. To address this requirement, DRFTA is in the process of developing a metric system that will provide a transparent evaluation of the effectiveness of DRFTA's natural resource management in relation to the installation's military mission.

7.1. Conservation Awareness

Conservation awareness is instrumental in creating the conditions needed to effectively manage natural resources. The objective of the conservation awareness program is to improve the general natural resources program knowledge of all persons associated with DRFTA, including tenants, stakeholder agencies (e.g., USFWS, MassWildlife), and the general public. Actions that will be taken to meet this objective include:

- Continue to use the garrison's social medial pages, website, and special displays to share information with all persons associated with DRFTA on matters of importance to DRFTA's natural resources program.
- Participate in existing organized events such as Army Earth Day and evaluate opportunities to organize other special events for promoting DRFTA's stewardship image and conservation commitment.
- Continue to engage directly with stakeholders and provide education about DRFTA's natural resources program.

7.2. Natural Resources Staffing

To successfully implement the INRMP, a combination of government staff, contract labor, and partners (including volunteers) will be required. Execution of DRFTA's natural resources management program currently employs one full time Natural Resource Specialist to oversee the program. Other natural resource support is provided by qualified contractors as well as government agencies (e.g., USFWS and MassWildlife) and by partners and volunteers from the community.

7.3. Funding

This INRMP provides long-term natural resources management direction in the form of recurring and non-recurring projects and supporting actions that are incorporated into annual budget proposals. Funds are allocated annually based on budget proposals and congressional intent. Projects and supporting actions may occur on an annual basis or may occur at specific times. They may have short (five years or less) or long (up to 15 year) timeframes. To fully implement the goals, objectives, and strategies of the INRMP, annual budgets are programmed into the US Army's Conservation Budgets and Conservation Program Objective Memorandum. US Army Headquarters policies and resources direct installation level conservation programming and budgeting. All requirements set forth in this INRMP requiring the expenditure of DRFTA funds are

expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 USC Section 1341). No obligation undertaken by DRFTA under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose. DRFTA continues the management philosophy, as well as the program management goals and objectives from the previous INRMP (Fort Devens, 2010). As such, there has not been a major change to the installation's natural resources management program between the 2010 INRMP and this INRMP.

INRMP Implementation Action Items

- **Actively request and use funds for natural resources management projects, activities and other requirements in support of goals, and objectives identified in the INRMP.**
- **Ensure that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.**
- **Invite annual feedback from the appropriate USFWS and MassWildlife agency offices on the effectiveness of its INRMP.**
- **Document specific INRMP action accomplishments undertaken each year.**
- **Evaluate the effectiveness of past and current management activities and adapt those activities as needed to implement future actions.**

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8. Five-Year Implementation Plan

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
6.1. Geographic Information System Development							
Use a structured, iterative process of adaptive ecosystem management to protect, conserve, and enhance native fauna and flora, sensitive species, habitats, and wetlands on DRFTA.	Develop, update, and maintain the GIS data layers need to support DRFTA’s natural resource program.	X					
	Regularly replace or upgrade GIS and imagery hardware and software to maintain the capability to use developing GIS technology.	X					
	Use remote imagery for improved decision-making for natural resource management.			X			X
<i>Ensure the coordination of DRFTA’s natural resource management program with installation personnel, soldiers and all other visitors.</i>	Ensure continued coordination between the Natural Resource Specialist, Range Control, the DPW and Environmental Division staff, and the ITAM Coordinator for successful use of GIS data in planning and decision-making.	X					
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Continue to share GIS data with local, state and federal agencies as appropriate for the management of natural resources.	X					
6.2. Climate Change Management							
• <i>Implement this INRMP within the framework of US Army policies and regulations.</i>	Manage natural resources in a manner consistent with best available science to provide resilience to climate change.	X					

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<ul style="list-style-type: none"> Implement natural resource management programs that are on a scale compatible with natural processes, are cognizant of nature's timeframes, recognize social and economic constraints, and are adaptable to complex and changing requirements. 	Perform Phase I: Climate Awareness Module and Phase II: Vulnerability Assessment Module using the Army Climate Assessment Tool Website to use as a planning framework.				X		
	Perform Phase III: Follow-on Actions using the Army Climate Assessment Tool Website.					X	
6.3. Soil Conservation and Erosion and Sedimentation Control							
<i>Use range monitoring, damage minimization, mitigation, and rehabilitation to maintain and enhance the training value of DRFTA lands in support of current and future military training and operations.</i>	Repair damaged soils and manage military activities, protect soil stability, preserve training lands, and conserve wildlife habitat.	X					
	Use GIS soils data to make decisions regarding land use, rehabilitation options, and habitat management options.	X					
	Stabilize roads, maneuver trails and training areas using native grasses, gravel, and woodchips, and by filling and grading ruts.	X					
<i>Employ the procedures of the National Environmental Policy Act (NEPA) to make informed decisions on all proposed Army actions in a manner that includes consideration of natural resource management goals.</i>	Minimize new construction in previously undisturbed areas and, when necessary, obtain required permits for land disturbing activities.	X					

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Monitor and manage soils, water, vegetation, and wildlife on DRFTA with consideration for the value of all natural communities and for the human values associated with those resources.</i>	Manage soils to preclude or reduce the establishment of invasive plant species.	X					
	Maintain grasslands through regular mowing, prescribed burning and removal of underbrush edges and maintenance of ground cover.	X					
	Identify and control vegetation to prevent wind and maneuver erosion, prevent growth of invasive species, prevent successional growth, and prevent tick habitats through planting native species and grass cutting.	X					
6.4. Water Resource Management							
<i>Use range monitoring, damage minimization, mitigation, and rehabilitation to maintain and enhance the training value of DRFTA lands in support of current and future military training and operations.</i>	Prevent and minimize erosion and sediment entering surface water bodies.	X					
<i>Use a structured, iterative process of adaptive ecosystem management to protect, conserve, and enhance native fauna and flora, sensitive species, habitats, and wetlands on DRFTA.</i>	Continue to update wetland data layers in GIS as wetlands are surveyed.			X			X
	Perform wetlands delineations for proposed projects near streams and wetlands. Consult with agencies and adhere to applicable wetland regulations.			X			X
	Manage wetlands to ensure no net loss (EO 11990).	X					

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
	Inventory and certify vernal pools and avoid and minimize impacts to these areas.						X
	Inventory culverts and assess culvert impacts on the connectivity of aquatic habitat. Upgrade deficient culverts.					X	
	Inventory dams and evaluate opportunities for habitat restoration by dam removal.			X			
<i>Monitor and manage soils, water, vegetation, and wildlife on DRFTA with consideration for the value of all natural communities and for the human values associated with those resources.</i>	Develop and implement a Phragmites management plan that includes an inventory of Phragmites stands, control plans for stands posing a risk to nearby sensitive communities or rare species habitat through containment or herbicide use, and prevention of impacts to native Phragmites (<i>Phragmites australis americanus</i>) which may occur.				X		
6.5. Sensitive Species Management							
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Consult with the USFWS and MassWildlife on all proposed projects that may impact sensitive species and/or their habitats in compliance with ESA and MESA laws and requirements.	X					

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Protect and manage threatened and endangered species and critical habitat in accordance with the Endangered Species Act (ESA), the Massachusetts Endangered Species Act (MESA), NEPA, AR 200-3, DoDI 4715.3, USFWS regulations and agreements, and all other applicable laws or guidance from headquarters.</i>	Map natural communities and collect baseline data to improve knowledge of potential habitats for federally and state-listed species on DRFTA. Coordinate mapping efforts with the USFWS and MassWildlife.				X		
	Perform acoustic bat surveys to collect baseline data to confirm the presence or absence of northern long-eared bats. Survey for underground structures that may be used as hibernacula.				X		
	Continue to survey and monitor Grasshopper Sparrow populations. Use prescribed burning to improve the habitat in the Turner Drop Zone.		X	X	X	X	X
	Resume survey and monitoring efforts for the Blanding’s Turtle.			X			

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
	Coordinate with MassWildlife to find opportunities to identify ways to reduce nest predation and prevent road mortality of the Blanding’s Turtle by studying nesting patterns, protecting nesting sites and providing nesting habitat in areas where road crossing is not required. Install fencing and culverts in accordance with the best management practices described in MassDOT’s Linking Landscape program.		X				
<i>Ensure the coordination of DRFTA’s natural resource management program with installation personnel, soldiers and all other visitors.</i>	Continue to provide education and awareness training for protection of Blanding’s Turtles, especially along roads. Work with the Oxbow NWR to maintain and improve Blanding’s Turtle habitat along the Nashua River floodplain.		X			X	
<i>Protect and manage threatened and endangered species and critical habitat in accordance with the Endangered Species Act (ESA), the Massachusetts Endangered Species Act (MESA), NEPA, AR 200-3, DoDI 4715.3, USFWS regulations and agreements, and all other applicable laws or guidance from headquarters.</i>	Actively manage habitats for Monarch Butterflies by planting native varieties of milkweed and pollinator flowers.				X		
	Assess opportunities to expand rare plant habitats.					X	

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Manage natural resources within the spirit and letter of State and Federal environmental laws, particularly the Sikes Act upon which this INRMP is predicated.</i>	Annually review and update sensitive species management strategies.	X					
6.6. Migratory Bird Management							
<i>Protect and manage threatened and endangered species and critical habitat in accordance with the Endangered Species Act (ESA), the Massachusetts Endangered Species Act (MESA), NEPA, AR 200-3, DoDI 4715.3, USFWS regulations and agreements, and all other applicable laws or guidance from headquarters.</i>	Consult with USFWS and MassWildlife on all proposed projects that may impact migratory bird species and/or their habitats and comply with ESA and MESA laws and requirements.	X					
	Continue to survey and monitor Grasshopper Sparrow populations.		X	X	X	X	X
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Continue to work with MassWildlife and other public and private entities on Eastern Whip-poor-will surveys, waterfowl surveys, hawk banding, and other migratory bird studies.		X			X	
6.7. Fish and Wildlife Management							
<i>Use a structured, iterative process of adaptive ecosystem management to protect, conserve, and enhance native fauna and flora, sensitive species, habitats, and wetlands on DRFTA.</i>	Conduct flora and fauna surveys at established intervals (every 5 years) to evaluate if any changes are occurring to state of federally listed plants/animals known to occur on the installation.						X

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Manage natural resources within the spirit and letter of State and Federal environmental laws, particularly the Sikes Act upon which this INRMP is predicated.</i>	Develop and incorporate management actions into this INRMP during annual reviews if any new candidate, threatened, or endangered species are discovered on DRFTA, or if species already known on the installation become listed.	X					
<i>Implement this INRMP within the framework of US Army policies and regulations.</i>	Document all nongame species incidentally observed during species of concern surveys.						X
	Maintain an updated inventory of plants and animals present on DRFTA.						X
<i>Ensure the coordination of DRFTA’s natural resource management program with installation personnel, soldiers and all other visitors.</i>	Ensure access to focused training for natural resource management staff regarding management of fish and wildlife resources on military installations.			X			
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Cooperate with state and federal agencies on issues of wildlife management.	X					
	Explore collaborative opportunities with local organizations such as the Massachusetts Audubon Society, Boy Scout troops, Girl Scout troops, and other community organizations to complete specific tasks both on and off DRFTA for the benefit of fish and wildlife.					X	

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
6.8. Vegetation Management							
<i>Monitor and manage soils, water, vegetation, and wildlife on DRFTA with consideration for the value of all natural communities and for the human values associated with those resources.</i>	Collect baseline data to better understand existence of rare plants, core habitat areas, and natural communities.				X		
	Assess opportunities to improve grassland habitat quality in the Drop Zone. Remove trees and shrubs, particularly those associated with Ponakin Brook and other streams/wetlands that encroach into the Turner Drop Zone to improve habitat for state-listed grassland birds. Clear low-lying vegetation to increase line of sight. Plant warm season grasses.			X			
<i>Implement natural resource management programs that are on a scale compatible with natural processes, are cognizant of nature’s timeframes, recognize social and economic constraints, and are adaptable to complex and changing requirements.</i>	Use herbicide for initial warm season grassland restoration, coupled with use of prescribed fire for restoration and long-term grassland maintenance.					X	
	Plant and preserve areas with milkweed and native nectar plants to encourage pollinators such as butterflies and moths. Apply pesticides and fertilizers, and control pests only when needed.				X		

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Use range monitoring, damage minimization, mitigation, and rehabilitation to maintain and enhance the training value of DRFTA lands in support of current and future military training and operations.</i>	Repair selected improved grounds and landscaped areas damaged by vehicles, people, weather, nature, or overgrowth. Remove encroaching vegetation and re-seed/re-vegetate bare spots in training areas.	X					
<i>Provide for human use of products generated from renewable natural resources when those products can be produced in a sustainable manner without significant negative impacts on the military mission or other natural resources.</i>	Expand the extent and quality of pitch-pine-scrub oak habitat to improve habitat for the rare bird, Eastern Whip-poor-will by: -Conducting an initial timber harvest to reset the community's structure and species composition. -Following the timber harvest, maintain the community with regular disturbance via prescribed burns and mowing between burns.					X	
<i>Monitor and manage soils, water, vegetation, and wildlife on DRFTA with consideration for the value of all natural communities and for the human values associated with those resources.</i>	Identify and map invasive and noxious plant species. Plan for removal and control. Update invasive species survey and management plan.			X		X	
6.9. Integrated Pest Management							
<i>Coordinate the enforcement of natural resources-related laws on DRFTA, including Massachusetts General Law (MGL) Chapter 131§ 80A.</i>	Ensure compliance with all environmental laws, regulations, and guidelines.	X					
	Implement DoD Technical Guide No. 37 Integrated Management of Stray Animals on Military Installations (DoD 2012).			X			

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Coordinate with local animal control offices to remove feral animals from the installation.	X					
<i>Ensure the coordination of DRFTA’s natural resource management program with installation personnel, soldiers and all other visitors.</i>	Implement pest management controls from the IPMP and other pest-related guidance and plans.				X		
<i>Use a structured, iterative process of adaptive ecosystem management to protect, conserve, and enhance native fauna and flora, sensitive species, habitats, and wetlands on DRFTA.</i>	Update the existing IPMP to ensure that the plan reflects changes in populations and current management issues.					X	
	Identify areas where invasive species occur and develop specific management actions to target the populations of these species.				X		
<i>Implement this INRMP within the framework of US Army policies and regulations.</i>	Use integrated pest management methods that include non-chemical control to reduce the amount of herbicide applied on the installation in accordance with the DoD Pest Management Measures of Merit stipulated in DoDI 4150.07 (DoD 2008) and the Presidential Memorandum, Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators (June 2014).				X		

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
	Use native plants and plants that provide nectar for pollinator species for landscaping to the greatest extent possible per the Presidential Memorandum that directs DoD to use pollinator-friendly native landscaping and minimize use of pesticides harmful to pollinators.				X		
<i>Coordinate the enforcement of natural resources-related laws on DRFTA, including Massachusetts General Law (MGL) Chapter 131§ 80A.</i>	If necessary, coordinate with state and local regulators to obtain appropriate permits for nonnative and nuisance plant species eradication in wetland area.					X	
6.10. Wildland Fire Management							
<i>Implement this INRMP within the framework of US Army policies and regulations.</i>	Prepare Wildland Fire Management Plan in compliance with the Army Wildland Fire Policy Guidance (US Army, 2002).			X			
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Coordinate Plan development with cooperating agencies, the MassDEP, local fire departments and emergency agencies.				X		

Table 8-1: DRFTA INRMP Five-Year Implementation Plan

INRMP Program Element/Section and Objective/Driver from Table 2-1	Proposed Action Item Project(s)	Execution Timeframe					
		On-Going	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
7. Implementation							
<i>Manage natural resources within the spirit and letter of State and Federal environmental laws, particularly the Sikes Act upon which this INRMP is predicated.</i>	Actively request and use funds for natural resources management projects, activities and other requirements in support of goals, and objectives identified in the INRMP.	X					
<i>Ensure the coordination of DRFTA’s natural resource management program with installation personnel, soldiers and all other visitors.</i>	Ensure that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.		X	X	X	X	X
<i>Create effective partnerships with private, local, State, and Federal entities for the conservation of natural resources and the sustainment of the military mission.</i>	Invite annual feedback from the appropriate USFWS and MassWildlife agency offices on the effectiveness of its INRMP.		X	X	X	X	X
<i>Manage natural resources within the spirit and letter of State and Federal environmental laws, particularly the Sikes Act upon which this INRMP is predicated.</i>	Document specific INRMP action accomplishments undertaken each year.		X	X	X	X	X
	Evaluate the effectiveness of past and current management activities and adapt those activities as needed to implement future actions.		X	X	X	X	X

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