

**INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN
2020 – 2024**

FINAL

**LETTERKENNY ARMY DEPOT
PENNSYLVANIA**

November 2019

Prepared for: Letterkenny Army Depot
Chambersburg, PA 17201

Prepared by: Tetra Tech, Inc.
Fairfax, VA 22030

Final
Integrated Natural Resources Management Plan
2020 – 2024

Letterkenny Army Depot
Pennsylvania

Prepared for:

Letterkenny Army Depot
Chambersburg, Pennsylvania

Prepared by:

Tetra Tech, Inc.
Fairfax, Virginia

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PLAN APPROVAL



Gregory K. Gibbons
Colonel, U.S. Army
Commander
Letterkenny Army Depot, Pennsylvania

09 SEP 2020
Date

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LETTERKENNY ARMY DEPOT REVIEW



Director of Public Works
Letterkenny Army Depot
Chambersburg, Pennsylvania

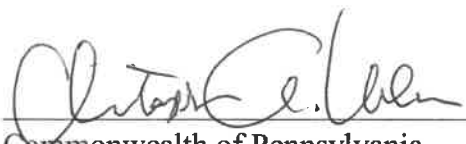
4 AUGUST 2020

Date

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AGENCY AGREEMENT



Commonwealth of Pennsylvania
Pennsylvania Fish and Boat Commission
Harrisburg, Pennsylvania

1-8-2020

Date

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Commonwealth of Pennsylvania
Pennsylvania Game Commission
Harrisburg, Pennsylvania


1/31/2020

Date

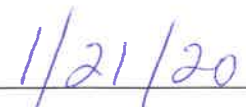
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AGENCY AGREEMENT



U.S. Fish and Wildlife Service
Pennsylvania Field Office
State College, Pennsylvania



Date

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ADP	Area Development Plan
AMC	Army Materiel Command
AMCOM	U.S. Army Aviation and Missile Life Cycle Management Command
AR	Army Regulation
ASA	Ammunition Storage Area
BQFA	Bobwhite Quail Focus Area
BRAC	Base Realignment and Closure
CAAA	Clean Air Act Amendments
CBP	Chesapeake Bay Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DCNR	Department of Conservation and Natural Resources
DES	Directorate of Emergency Services
DoD	Department of Defense
DODI	Department of Defense Instruction
DPW	Directorate of Public Works
DRMO	Defense Reutilization & Marketing Office
EMD	Environmental Management Division
EMS	Environmental Management System
EO	Executive Order
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
FPPA	Farmland Protection Policy Act
FWCO	Fish and Wildlife Conservation Officer
FY	fiscal year
GIS	geographic information system
GPS	global positioning system
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	hazardous air pollutant
HPC	Hunting Program Coordinator
HQDA	Headquarters, Department of the Army
HWA	Hemlock wholly adelgid
ICRMP	Integrated Cultural Resources Management Plan
ICUZ	Installation Compatible Use Zone
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan

ISCO	In-Situ Chemical Oxidation
LCTA	Land Condition Trend Analysis
LEAD	Letterkenny Army Depot
LEMC	Letterkenny Munitions Center
LKOD	Letterkenny Ordnance Depot
MACOM	Major Command
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLEB	Northern long-eared bat
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
OB/OD	open burning/open detonation
OBP	Oil Burn Pit
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PCB	polychlorinated biphenyl
PCPI	per capita personal income
PDO	Property Disposal Office
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PLS	Planning Level Survey
PM	Particulate Matter
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
RCRA	Resource Conservation and Recovery Act
RTE	Rare, Threatened, and Endangered
SAIA	Sikes Act Improvement Act
SGL	State Game Land
SHPO	State Historic Preservation Office
SOP	standard operating procedure
SR	State Route
TRI	Training Requirements Integration
U.S.C.	United States Code
US	United States Highway
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventative Medicine

USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
VOC	volatile organic compound

SECTION 1.0 EXECUTIVE SUMMARY

1.1 PURPOSE

1.1.1 Purpose and Scope

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide the natural resources management program at Letterkenny Army Depot (LEAD) from 2020 through 2024 and to provide a solid foundation on which to build the program beyond 2024.

The INRMP addresses natural resources management on all lands for which LEAD has jurisdiction and control, including lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission.

1.1.2 Support of Army Mission

Maintaining optimal environmental conditions on the military lands is essential for the success of the military mission at LEAD. The management measures have been developed based on the conditions of the resources and the military mission and activities as they are anticipated.

1.1.3 Benefits

The INRMP provides the Army and the installation with one document that describes the state of natural resources and describes natural resources management on the installation. Formerly, individual species management was the norm, and each managed species had a management plan. These plans often had redundant information and did not address the larger context of ecosystem-level natural resources management goals and objectives. The INRMP, however, provides a concise analysis of all levels of the ecosystem, from the interaction of terrestrial and aquatic habitats with each other, to the management methods and goals for individual species. This larger picture provides a broader basis of understanding for planning and budgeting purposes.

1.2 IMPLEMENTATION

1.2.1 Primary Natural Resource Management Goals

The general goals of this INRMP conform to those outlined in the Army Environmental Strategic Plan. Those general goals are the following:

- Ensure the long-term sustainability of the lands to support the military mission.
- Conserve and protect the natural resources.
- Protect cultural resources.
- Accommodate multiple uses of the land.

The goal established by LEAD for the natural resources management program is to maintain ecosystem viability and ensure the sustainability of desired military mission activities. The following management objectives were identified to achieve this goal:

- Manage all resources to support the installation mission.
- Implement a natural resources management program that reflects the principles of ecosystem management.
- Provide special protection and management for listed species.
- Manage wildlife and fisheries resources within the principles and guidelines of ecosystem management to maintain productive habitats and viable populations of native species.
- Provide outdoor recreational opportunities to the extent that they do not conflict with the military mission.
- Use adaptive management techniques to provide the flexibility to alter strategies using increased knowledge and data gained from monitoring programs and scientific literature.
- Seek to maintain or increase the level of biodiversity of native species.
- Protect forest resources from unacceptable damage and degradation resulting from insects and disease, animal damage, invasive species, and wildfire; and manage the resources in a manner that supports the military mission.
- Reduce the fuel load around the munitions disposal site.
- Prevent the degradation of water quality, protect aquatic and riparian habitats, and identify and restore degraded habitats.
- Protect soil resources from erosion and destabilization through prevention and restoration efforts.
- Protect and preserve cultural resources.
- Protect rare and unique plant species identified as state or locally rare but without legal protection status, to the extent practical without restrictions on operations.
- Protect sensitive and ecologically significant habitats on LEAD.

Specific goals identified in this INRMP are the following:

- Maintain and improve vegetation health and diversity.
- Maintain and improve fish and wildlife abundance and diversity.
- Protect and monitor rare, threatened, and endangered species.
- Maintain and improve aquatic, riparian, and wetland habitats.
- Decrease soil erosion and associated stream turbidity.

The ability to achieve these goals depends directly on the health and condition of the natural resources at LEAD. Protecting the ecological and biological integrity of the military lands ensures that the environmental conditions continue to provide the soil and vegetative cover necessary for controlling erosion, reducing fire hazards, and improving overall operational safety and efficiency.

The natural resources management program must remain flexible if it is to achieve long-term success. The natural resources management program will achieve and maintain this flexibility by incorporating adaptive management techniques into the program. Adaptive management is a process by which new information, from monitoring data or scientific literature, is used to evaluate the success of the management measures in place. This information is then used to determine the changes in the management approach necessary to ensure the continued success of the program. The natural resources management program might also be required to adapt to unforeseen changes in military mission and legal requirements.

1.2.2 Impact on Current Management Practices

This INRMP clearly defines the natural resources management goals and objectives at LEAD. These goals and objectives have been designed to reflect the aim of continual improvement of the ecosystem at LEAD and the balance between the ecosystem and military mission.

1.3 ENVIRONMENTAL IMPACTS

As stated in Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, “the Army is committed to environmental stewardship in all actions as an integral part of its mission and to ensure sustainability,” and will “sustain the environment to enable the Army mission and secure the future.” This INRMP has been prepared in accordance with AR 200-1 and the Department of Defense (DoD) manual, *Integrated Natural Resources Management Plan (INRMP) Implementation Manual* (DoD Manual 4715.03-M). In accordance with Title 32 of the *Code of Federal Regulations* (CFR) part 651, *Environmental Effects of Army Actions*, which states that “environmental analyses required by this part will be integrated as much as practicable with other environmental reviews, laws, and Executive Orders,” this document incorporates this requirement by integrating into this single document the installation’s INRMP and the associated National Environmental Policy Act (NEPA) analysis—in this case a Record of Environmental Consideration Form—for implementing the INRMP. NEPA requires that federal agencies consider the environmental consequences of major proposed actions. The expected consequences of implementing the INRMP are summarized in Table 1-1.

Table 1-1. Summary of potential environmental consequences

Resource areas	Potential environmental consequences	
	No action	Proposed action
Climate	No effect	No effect
Land Use	No effect	No effect
Soils, Topography, and Geology	Minor adverse effect	Beneficial effect
Wildlife	Minor adverse effect	Beneficial effect
Threatened and Endangered Species	Minor adverse effect	Beneficial effect
Vegetation	Minor adverse effect	Beneficial effect
Aquatic Resources and Wetlands	Minor adverse effect	Beneficial effect
Water Quality	Minor adverse effect	Beneficial effect
Noise	No effect	No effect
Prime and Unique Farmlands	No effect	No effect
Hazardous, Toxic and Radioactive Substances	No effect	No effect
Cultural Resources	No effect	Beneficial effect
Air Quality	No effect	No effect
Socioeconomic Resources	No effect	No effect
Environmental Justice	No effect	No effect
Cumulative Impacts	No significant effect	No significant effect

LEAD has maintained its commitment to ensure that environmental considerations are integral to the mission in preparing this INRMP and has complied with AR 200-1 and 32 CFR 651 by integrating the INRMP and NEPA compliance documentation. This INRMP provides the guidance necessary for LEAD

to maintain compliance with the DoD Instruction 4715.03 (*Natural Resources Conservation Program*), Executive Order (EO) 11990 (*Protection of Wetlands*), the Clean Water Act (CWA), and the Endangered Species Act (ESA).

SECTION 2.0 GENERAL INFORMATION

2.1 PURPOSE

The purpose of this INRMP is to guide the natural resources management program at LEAD from 2020 through 2024 and to provide a solid foundation on which to build the program beyond the year 2024. Implementing this INRMP will help LEAD to achieve its mission to provide the Army and other Armed Forces with worldwide, reliable, responsive, and cost-effective depot-level maintenance; field support; systems integration; and product support integration for weapon systems, components, and ancillary equipment. Doing so ensures the readiness, sustainability, and safety of these forces during the full spectrum of operational environments.

2.1.1 Use of the INRMP to Guide Natural Resources Management

This INRMP is to serve as an effective installation tool for managing natural resources consistent with mission goals. This INRMP is the adaptive plan for managing natural resources, supporting consistency with the military mission while protecting and enhancing resources for multiple use, sustainable yield, and biological diversity. This INRMP will ensure that natural resources conservation measures activities on mission land are integrated and are consistent with federal stewardship requirements.

2.1.2 Scope of the INRMP

This INRMP is designed to address natural resources and their management throughout the installation. Because most of the existing natural resources occur in the Ammunition Storage Area (ASA) and Buffer Area, most of the topics in this INRMP are directed at those locations. This INRMP does not address managing natural resources on properties that lie “outside the fence” (i.e., adjacent properties and properties that were removed from LEAD’s property inventory under Base Realignment and Closure [BRAC] actions), but it strives to address all those activities occurring within the fence that may benefit or degrade natural resources.

2.1.3 Function of the INRMP

This INRMP represents a review, update, and revision of the previous LEAD INRMP, dated May 2013. This document presents a review of the natural resource activities undertaken at LEAD over the past 5 years, and it proposes a range of new projects and initiatives for implementation in 2020 through 2024.

This INRMP is not intended to be a stand-alone document. Instead, it is designed to document the health and extent of LEAD’s natural resource assets and their management and assist in the full integration of natural resources management into other installation plans and activities across the depot. Of interest is the integration of natural resources management into the larger Environmental Management System (EMS) at LEAD. The EMS at LEAD is focused on the industrial processes at the installation.

The structure of this INRMP is meant to facilitate inclusion of the proposed natural resources goals, objectives, and projects into the larger EMS.

This INRMP should be used in conjunction with installation master plans, range plans, training plans, the Integrated Cultural Resources Management Plan (ICRMP), the Integrated Pest Management Plan (IPMP), installation restoration plans that address contaminants covered by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and related provisions, and other appropriate

plans and offices. It is not intended that this INRMP function as a comprehensive compilation of detailed information on all these related topics. Rather, the INRMP briefly summarizes the key interrelationships with these plans, references where the plans may be obtained, and describes where detailed information can be found.

2.2 AUTHORITY

DoD is considered a leader in natural resources management. The military services have fully embraced an ecosystem management approach since DoD's adoption of ecosystem management in 1994 (US DoD 1994). Although the DoD and the Department of the Army had provided guidance on most of the major natural resources components (forestry; endangered species; game, fish, and wildlife; and related outdoor recreation), the guidance was not integrated and did not incorporate an ecosystem management approach. Mission support, sustained yield, and multiple uses continue to be supported under an ecosystem management approach; however, additional objectives are included. Ecosystem management objectives consider a regional context and emphasize a desired future condition that is anticipated within 10, 20, or more years.

2.2.1 The Sikes Act (Title 16 of the United States Code section 670 et seq.)

Under the Natural Resource Management on Military Lands Act of 1960, commonly known as the Sikes Act,

The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the Secretary of each military department shall prepare and implement an INRMP for each military installation in the United States under the jurisdiction of the Secretary. Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use.

Per Title 16 of the *United States Code* (U.S.C.) section 670a(b) of the Sikes Act Improvement Act (SAIA) of 1997, to the extent appropriate and applicable, this INRMP provides for the following:

- Fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation.
- Fish and wildlife habitat enhancement or modifications.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the plan.
- Establishment of specific natural resource management goals and objectives and time frames for proposed action.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources.
- Public access to the military installation that is necessary or appropriate for the use described above, subject to requirements necessary to ensure safety, military security, and fulfillment of the military mission.

- Enforcement of applicable natural resource laws (including regulations).
- No net loss in the capability of military installation lands to support the military mission of the installation.
- Such other activities as the Secretary of the military department determines appropriate.

2.2.2 Department of Defense Instruction 4715.03: Natural Resources Conservation Program, March 18, 2011

This revised INRMP was prepared in accordance with the SAIA and DoD Instruction (DODI) 4715.03 (Natural Resources Conservation Program). The SAIA states that “the Secretary of each military department shall prepare and implement an INRMP for each military installation in the United States under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate.” DODI 4715.03 prescribes procedures for integrated management of natural and cultural resources, including preparing an INRMP as required by the SAIA. DODI 4715.03 also states that “INRMPs shall be prepared, maintained, and implemented for all installations and ranges that contain significant natural resources for which DoD has authority for or control of natural resources management.”

2.2.3 AR 200-1: Environmental Protection and Enhancement

The Army’s commitment to the conservation of its natural resources is further reflected in AR 200-1, *Environmental Protection and Enhancement*. AR 200-1 requires the preparation of INRMPs and prescribes Army policies, procedures, and standards for the “conservation, management, and restoration of land and the renewable natural resources on it, consistent with and in support of the military mission.”

2.2.4 Sikes Act Policy and Guidance

2.2.4.1 Sikes Act Policy Memorandum, October 10, 2002

The October 10, 2002, memorandum from the Deputy Under Secretary of Defense regarding the *Implementation of Sikes Act Improvement Act: Updated Guidance* defines requirements and expectations associated with U.S. Fish and Wildlife Service (USFWS) and state natural resources agency coordination, DoD reporting, implementation and funding, and other miscellaneous requirements, such as no net loss to military lands and cooperative agreements.

Supplemental guidance (*Supplemental Guidance for Implementation of the Sikes Act Improvement Act: Additional Guidance Concerning INRMP Reviews*, November 1, 2004) was issued in relation to the October 2002 memorandum. It provides additional guidance concerning the scope of INRMP reviews, public comments on INRMP reviews, and ESA consultation on INRMPs. Specifically, the guidance indicates that DoD policy is that, although INRMPs must be reviewed regularly, but not less often than every 5 years, not all INRMPs will require revision upon those reviews and that INRMPs should be reviewed annually by the installation and other parties to the INRMP. With respect to public review of INRMPs, the guidance states that DoD policy is that there is no legal obligation to invite the public either to review or to comment on a mutually agreed upon decision to continue implementing an existing INRMP without revision. Finally, regarding USFWS consultation, the guidance states that DoD policy is that most INRMPs will incorporate by reference the results of previous ESA consultations, and consequently neither a separate biological assessment nor a separate formal consultation should be necessary concerning most INRMPs or INRMP revisions. Informal consultation with the USFWS during the INRMP revision process is, nonetheless, encouraged.

These guidance memorandums were further revised by a memorandum dated May 17, 2005 (*Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands*). The memorandum clarifies that an INRMP must address resource management on all the lands for which an installation has real property accountability, including lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission.

2.2.4.2 INRMP Comprehensive Strategic Action Plan, August 6, 2004

This *Comprehensive Plan for Using Integrated Natural Resource Management Plans at Active Military Installations and Ranges to Sustain Readiness* describes a set of activities related to implementing INRMPs that will ensure the DoD's ability to properly manage the valuable natural resources entrusted to its care and sustain the readiness of its force.

2.2.4.3 Sikes Act Tripartite Memorandum of Understanding, January 2006

This Memorandum of Understanding (MOU) established a cooperative relationship between the DoD, the USFWS, and state fish and wildlife agencies (represented by the International Association of Fish and Wildlife Agencies) for preparing, reviewing, and implementing INRMPs.

2.2.5 Title 32 of the Code of Federal Regulations Part 651

32 CFR Part 651 “implements the National Environmental Policy Act of 1969 (NEPA), setting forth the Army’s policies and responsibilities for the early integration of environmental considerations into planning and decision-making.” In particular, 32 CFR 651.14, *Integration with Army Planning*, states that “environmental analyses required by this part will be integrated as much as practicable with other environmental reviews, laws, and Executive Orders.” Integration with installation management plans, particularly those that deal directly with the environment, is considered important.

2.2.6 Headquarters, Department of the Army INRMP Policy Memorandum, March 21, 1997

The Headquarters, Department of the Army (HQDA) INRMP Policy Memorandum (March 21, 1997) titled *Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and Integrated Natural Resources Management Plan (INRMP)* states that the purpose for completing planning-level surveys and the INRMP is “to ensure that natural resource conservation measures and Army activities on mission land are integrated and are consistent with federal stewardship requirements” (HQDA 1997).

2.3 RESPONSIBILITIES

The success of the management of the natural resources on the grounds of LEAD requires a cooperative effort among the parties directly responsible for implementing this INRMP. The level of success can be enhanced by developing partnerships among the parties that have a vested interest in the responsible management of the natural resources at LEAD. Outside parties and their roles and responsibilities are described in Chapter 7. Brief descriptions of the parties directly responsible for implementing this INRMP are provided below.

2.3.1 Installation Commander

The Commander is directly responsible for operating and maintaining LEAD, including implementing and enforcing this INRMP. The Commander is responsible for outdoor recreation activities at LEAD, including hunting and fishing, and has the authority to delegate all or portions of the management of outdoor recreation activities and fish and wildlife management to members of his command. The Commander retains the exclusive approval authority for use of normally restricted areas for recreational purposes.

2.3.2 Directorate of Public Works

The Directorate of Public Works (DPW) directs, supervises, and coordinates the planning, organizing, staffing, and controlling of all facilities. Divisions under the supervision and management of DPW are the Business and Operations Division, Engineering and Planning Division, Construction and Transportation Division, and Environmental Management Division (EMD). The Engineering and Planning Division directs and coordinates the management, maintenance, repair, modification, and new construction of depot real estate, real property, and utilities systems for LEAD. The EMD is responsible for natural resource management and cultural resources management at the installation and other environmental programs. The EMD also manages compliance with LEAD hunting and fishing regulations and the laws and regulations that govern fish and wildlife. However, law enforcement and security issues, such as access to the ASA, are managed by personnel of the Directorate of Emergency Services (DES).

2.4 MANAGEMENT PHILOSOPHY

2.4.1 How This INRMP Supports the Army Military Mission

Maintaining optimal environmental conditions on the military lands is essential for the success of the military mission at LEAD. The management measures have been developed on the basis of the existing conditions of the resources, and the military mission and activities as they are anticipated. Implementing this INRMP will guide natural resources management at LEAD for the next 5 years (Fiscal Year [FY] 2020 through FY 2024) and provide a solid foundation on which to build the program beyond the year 2024.

2.4.2 How This INRMP Was Developed

This updated INRMP was developed after a thorough review of the 2013 LEAD INRMP by an interdisciplinary team of wildlife biologists, botanists, geographers, and natural resources planners. The information in the 2013 INRMP was augmented by information provided by LEAD environmental staff, natural resources plans that had been developed over the past 5 years, and data that had been collected over the past 5 years.

Once the existing conditions had been established, the study team reviewed management practices to ascertain whether they had been effective over the past 5 years and where they could be improved. The natural resource management goals and objectives have not been altered significantly from the previous INRMP, but they have been more refined to better suit the next 5 years of natural resources management on LEAD (Chapter 8). Projects are proposed that are designed to attain those goals and objectives.

2.4.3 How This INRMP Supports the Environmental Management System

An EMS is the part of an organization's overall management system that integrates environmental concerns and issues in the organization's management processes. An EMS addresses organizational

structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing achieving, reviewing, and maintaining environmental policy. An EMS enables an organization of any size or type to control the impact of its activities, products, or services on the natural environment, allowing it to achieve and maintain compliance with current environmental requirements, and to recognize and proactively manage future issues that might affect mission sustainability.

The EMS follows a “Plan, Do, Check, Act” model. This model leads to continual improvement of the environment by

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

This INRMP supports the EMS at LEAD by providing information on the organizational structure, responsibilities, practices, procedures, and processes already in place for managing natural resources, and providing guidance for the Plan, Do, Check, Act model as it regards natural resources management, to meet the EMS goal of continual improvement.

2.4.4 How This INRMP Implements the Army Principles for Ecosystem Management

This INRMP uses an ecosystem management approach to natural resources management. Each element of the ecosystem is studied and managed in relationship to other parts of the ecosystem, so that natural biological integrity is maintained to the extent feasible. Stewardship of natural resources on an ecosystem scale addresses requirements of water quality, soil productivity, biological diversity of native flora and fauna, and compliance concerns. This INRMP, therefore, emphasizes protection and management of soil and water resources and lower levels of the food chain, which will, in turn, support the sustainability of biological resources and of mission activities.

2.4.5 How This INRMP Supports the Installation Planning Process

This INRMP supports LEAD’s planning process by identifying and prioritizing natural resources management goals, identifying projects to support those goals, and identifying the schedule and resources (labor and funding) required for performing those projects. These functions, then, help guide the larger planning process, including budgeting, hiring, and acquisition.

2.4.6 Integrated Training Area Management Program

Lands that support military missions are valuable assets. The Army recognizes that training to doctrinal standards will affect the environment. The primary goal of land management is to ensure the long-term availability of land and natural resources for mission activities. This goal is compatible with and depends on sound stewardship and conservation practices.

Natural ecosystems play a vital role in a healthy environment, and installations can best maintain ecosystems by giving special consideration to soil and vegetation characteristics, surface and subsurface water, wetlands, archaeological and geological sites, flood plains, and wildlife resources in their operations, development, design, construction, and maintenance activities.

The Army incorporates ecosystem management principles into the Integrated Training Area Management (ITAM) program, the comprehensive approach to land management on Army installations.

ITAM includes four components:

- **Land Condition Trend Analysis (LCTA)**, a management procedure that provides for collecting, inventorying, monitoring, managing, and analyzing tabular and spatial data concerning land conditions on an installation.
- **Training Requirements Integration (TRI)**, a decision-support procedure that integrates training requirements with processes to manage land, training, and natural and cultural resources. TRI also accounts for data derived from LCTA and Army conservation program components.
- **Land Rehabilitation and Maintenance**, a preventive and corrective procedure that reduces the long-term impacts of training and testing on installation lands.
- **Environmental Awareness**, a means to develop and distribute educational materials to land users. Materials relate procedures for sound environmental stewardship of natural and cultural resources and reduce the potential for inflicting avoidable impacts.

An effective installation ITAM program increases training realism, promotes effective land rehabilitation, abates environmental damage, reduces costs for land management and environmental compliance, and enhances the Army's public image as a conscientious land steward.

Objectives, responsibilities, and policies for integrated range and training area management under the ITAM program are set forth in AR 350-19 (*The Army Sustainable Range Program*).

2.5 CONDITIONS FOR IMPLEMENTATION AND REVISION

2.5.1 Implementation

The LEAD EMD has the primary role and responsibility for implementing this INRMP, which is in effect from FY 2020 through FY 2024.

2.5.2 Review and Revisions

LEAD will invite annual feedback from the USFWS and the state fish and wildlife offices participating in the review on the effectiveness of the INRMP. State offices participating in the INRMP review are the Pennsylvania Game Commission (PGC), the Pennsylvania Department of Conservation and Natural Resources (DCNR), and the Pennsylvania Fish and Boat Commission (PFBC).

According to DoD policy (DODI 4715.03, March 18, 2011), reviews of the INRMP for operation and effect must be performed no less frequently than every 5 years by the DoD, USFWS, and state fish and wildlife agencies. The review for operation and effect will determine if the INRMP is being implemented to meet the Sikes Act requirements and if the INRMP needs to be revised. The existing INRMP remains in effect until the USFWS and state fish and wildlife agencies mutually agree on the revision.

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SECTION 3.0 INSTALLATION OVERVIEW

3.1 LOCATION AND AREA

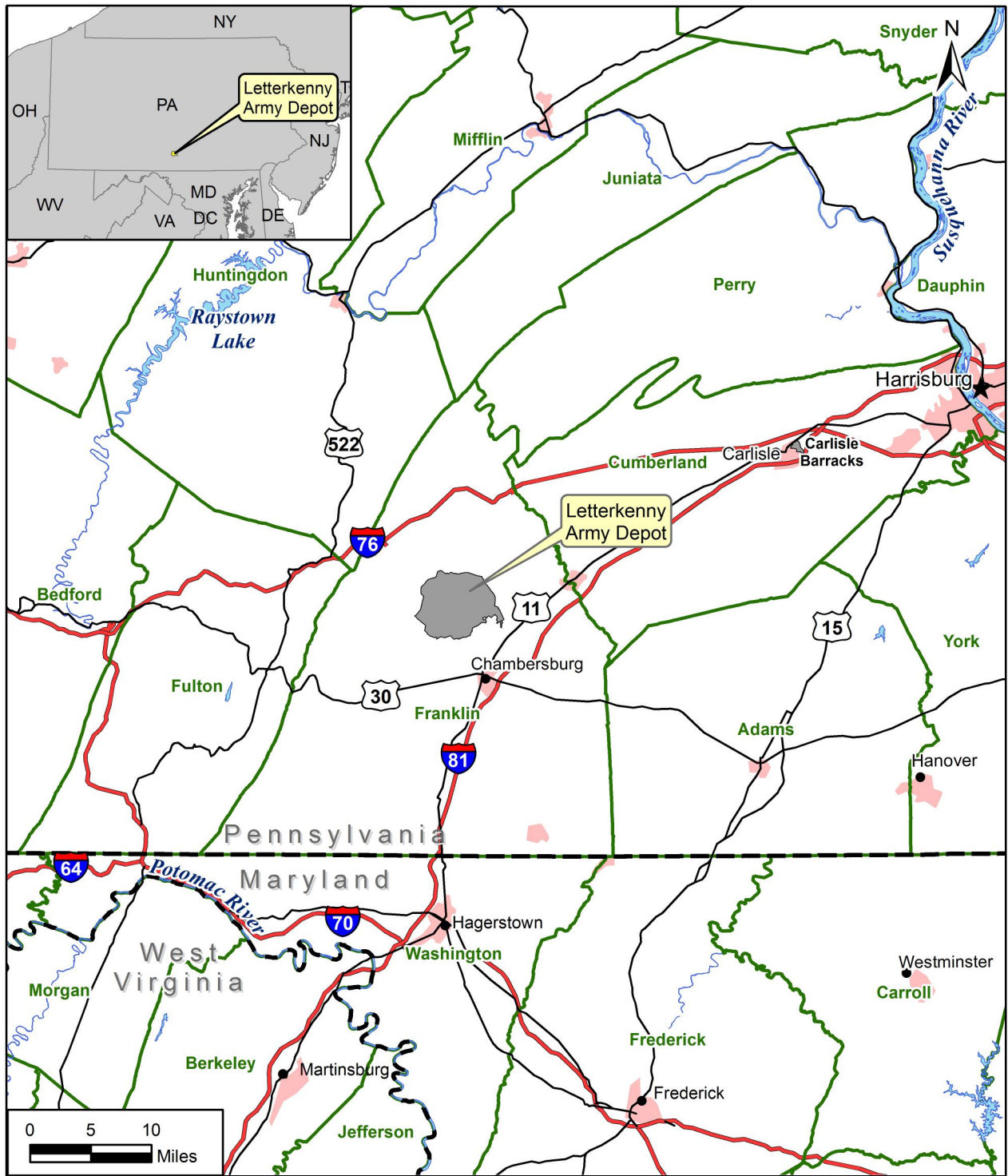
LEAD is an 18,287-acre Army ammunition depot, approximately 5 miles north of Chambersburg, Pennsylvania. Chambersburg, the Franklin County seat, is the nearest community to LEAD. LEAD is in the Cumberland Valley of south-central Pennsylvania, among the metropolitan areas of Pittsburgh, Pennsylvania, 130 miles to the northwest; Philadelphia, Pennsylvania, 135 miles to the east; Washington, DC, 90 miles to the south; and Baltimore, Maryland, 75 miles to the southeast (Figure 3-1) (Tetra Tech 1998). The area around LEAD is served by Interstate 81, U.S. Highway No. 11 (US 11), and US 30. Direct access to LEAD is provided by State Route (SR) 997 and SR 433. The intersection of these two routes is at the primary entrance to LEAD. In addition, the Pennsylvania Turnpike is 14 miles north of the facility via SR 997. The depot boundaries are marked by a non-deer-proof chain-link and wire fence.

3.2 INSTALLATION HISTORY

LEAD was acquired in 1942. In the early 1940s, 380 parcels of land, encompassing approximately 20,508 acres, were purchased for the depot. Acquisition of land for dams and easements and sale of excess land over the years has resulted in 18,287 acres of land available for depot activities. Before LEAD was established, the land was used for grazing and cropland (Shippensburg University 1995).

Before the purchase in 1942 of 20,508 acres in Letterkenny Township and in small portions of Hamilton and Greene Townships, the property of LEAD, formerly known as the Letterkenny Ordnance Depot (LKOD), had been home to generations of farmers. The construction of LKOD began in 1942 with 802 underground igloos, 12 above-ground magazines for ammunition storage, and 17 shed-type warehouses for storing general supplies. Construction of administration buildings and living quarters was also initiated.

During World War II LKOD acted as an ammunition supply dump for the European War Theatre, and in 1944 it became the site of an Italian Prisoner of War camp. With the end of World War II, LKOD acted as a vehicle storage area and motor rebuilding operation site. From 1948 to 1951, 169 petroleum storage tanks were converted to store vehicles, resulting in the “Tin-Can Farm.” In 1957 a reservoir and dam located on 148 acres of recently purchased land in Horse Valley were opened for use. LKOD provided supplies for the Korean War and in 1959 was expanded to provide initial supply and support of guided missiles, ballistic missiles, and rocket material. In 1963 LKOD was reorganized under the U.S. Department of the Army Materiel Development and Readiness Command and renamed the Letterkenny Army Depot (John Milner Associates 1981). Numerous land transfers and sales occurred in the intervening years: in 1965 and 1969, 41 and 40 acres, respectively, were sold as excess; in 1973, 1,100 acres were transferred to Pennsylvania for use as a state forest; ; in 1987, 214.12 acres of land were transferred from LEAD to the PGC; in 1995 the BRAC plan called for the closure of 1,235 acres in the southeast portion of the depot, but as of March 2019, 203 acres still had not been transferred (LEAD 2019). The installation now (2019) consists of 18,287 acres.



LEGEND

-  State Boundary
-  County Boundary
-  Urban Area
-  Surface Water
-  Interstate Highway
-  U.S. Route

LEAD Location

Figure 3-1

3.3 MILITARY MISSION

As stated previously, LEAD’s mission is to provide the Army and other Armed Forces with worldwide, reliable, responsive, and cost-effective depot-level maintenance, field support, systems integration, and product support integration for weapon systems, components, and ancillary equipment to ensure the readiness, sustainability, and safety of these forces during the full spectrum of operational environments.

LEAD is under the command structure of the U.S. Army Aviation and Missile Life Cycle Management Command (AMCOM), which is subordinate to the U.S. Army Materiel Command (AMC). Both commands are headquartered at Redstone Arsenal, Alabama. LEAD is a government-owned, government-operated installation. It serves as the premier DoD Center of Industrial and Technical Excellence for Air Defense and Tactical Missile Ground Support Equipment, Mobile Electric Power Generation Equipment, and PATRIOT Missile Recertification. A large portion of the depot is used to conduct maintenance, modification, storage, and demilitarization operations on a broad array of equipment, vehicles, tactical missiles, and ammunition. LEAD is responsible for tactical missile repair on a variety of DoD missile systems including the PATRIOT Missile and its ground support and radar equipment. LEAD is also responsible for the overhaul of tactical wheeled vehicles, material handling equipment (7.5-ton cranes), Medium Mine Protected Vehicles, Mine-Resistant Ambush Protected vehicles, and Mobile Kitchen Trailers.

Collocated activities at LEAD are CECOM Industrial Logistics System Office; U.S. Army District Test, Measurement, and Diagnostic Equipment Support Center; Defense Information Systems Agency; Letterkenny Munitions Center (LEMC); 99th Reserve Readiness Command; Defense Automated Printing Service; 52nd Military History Detachment; Defense Reutilization & Marketing Office (DRMO); U.S. Army Health Clinic; U.S. Army Material Systems Analysis Act; Lower Tier Project Office, PATRIOT Office; Defense Logistics Agency Document Services; and Computer Science Corporation.

3.4 SURROUNDING COMMUNITIES

The installation is surrounded by agricultural lands, except for the state forest and state game management land to the west. More than 40 percent of the land in Franklin County is wooded. Several scattered unincorporated residential and commercial developments are near LEAD. A commercial strip along US 11 services the residential areas near LEAD and Chambersburg.

LEAD has fostered ties with the surrounding communities by initiating partnerships with Penn State University’s Applied Research Laboratory and the Applied Technology Center at Hagerstown Junior College, and by supporting the growth and development of the local community through its active participation in community planning. Local community planning groups that LEAD is part of are The Chambersburg Area Development Corporation, Franklin County Area Development Corporation, Chambersburg 2000 Partnership, and the Local Reuse Authority.

The Local Reuse Authority is continuing to develop the property in the cantonment area that was transferred to it following the 1995 BRAC Commission recommendations. The community’s reuse plan consists of a mixture of land use activities like the activities performed by the Army. The excess area will consist of several land use *districts* that can accommodate the following types of uses: industrial, office, administrative, community/open space; warehouse/distribution; light industrial; and highway-oriented industrial distribution. The plan has been developed to ensure that future uses of the excess property will be compatible with LEAD’s remaining mission. The build-out for the property is planned to occur over 20 years or more.

Land use immediately bordering LEAD is primarily forest and pasture/grassland (EP&D 2012). LEAD is bordered by Pennsylvania State Game Lands (SGL) to the northwest and the Buchanan State Forest to the west (PGC 1997). Portions of the farmland to the north/northeast of LEAD are permanently protected as agricultural land under the Agricultural Easement program. East of the depot along SR 997 and between SR 433 and US 11 is high-intensity, nonresidential land use (industrial and commercial, including the Cumberland Valley Business Park). Low- and medium-density residential development is to the northeast of the depot along SR 533 at the intersections with SR 997 and 433; east of LEAD along US 11; and to the south toward Chambersburg (EP&D 2012).

For decades to come, it is envisioned that the area around LEAD will continue to serve as a hub of activity including a blend of public military employment, private business ventures, research opportunities, and natural resource management. The county’s 2025 projected land use and housing plan anticipates continued forested and agricultural land use to the north, west, and south of LEAD, with growth in suburban nonresidential (industrial and commercial development, including in the Cumberland Valley Business Park) to the east, and suburban and rural residential to the east/southeast (EP&D 2012).

3.5 REGIONAL LAND USE

3.5.1 Population

Population data for Franklin County are shown in Table 3-1, with data for Pennsylvania and the United States for comparison. To illustrate trends, data are provided for 2000, 2010, and 2017. Franklin County’s 2018 population was 154,835, an increase of 20 percent since 2000.

Franklin County ranked as the 23rd most populous county in the state (out of 67 counties) (U.S. Census Bureau 2019a). The county’s population growth of 20 percent was higher than the state population growth of 4 percent and the national population growth of 16 percent.

Table 3-1.
Population trends

	2000 population ^a	2010 population ^b	2018 population ^c	Change in population, 2000–2017
Franklin County	129,313	149,618	154,835	20%
Pennsylvania	12,281,054	12,702,379	12,807,060	4%
United States	281,421,906	308,745,538	327,167,434	16%

Sources:

a U.S. Census Bureau 2000

b U.S. Census Bureau 2010

c U.S. Census Bureau 2019b

3.5.2 Housing

Franklin County had 65,799 housing units in 2018. Most of the housing units (68 percent) were single-family detached homes. The Franklin County median monthly mortgage was \$1,327 and the median rent was \$833. For comparison, the U.S. median mortgage was \$1,566 and median rent was \$1,058; for Pennsylvania the median mortgage was \$1,451 and median rent was \$927. The Franklin County homeowner vacancy rate was 2 percent, compared to 1.5 percent for the United States and 1.4 percent for Pennsylvania. The county’s renter vacancy rate was 3 percent, compared to the U.S. rate of 6.1 percent and state rate of 5.3 percent (U.S. Census Bureau 2019c).

3.5.3 Industry Earnings and Employment

As of the first quarter of 2019, the top five industries in Franklin County warehousing and storage; restaurants and other eating places; elementary and secondary schools; general medical and surgical hospitals; and agricultural, construction, and mining machinery manufacturing. The top 10 employers in the county (by rank) were the federal government, Chambersburg Hospital, Chambersburg Area School District, Manitowoc Crane Group, Target Corporation, Summit Physician Services, Schenker Inc., Volvo Construction Equipment North America, Bowhead Integrated Support Services, and Whitetail Resort (PA DLI CWIA 2019).

Franklin County's average annual unemployment rate declined from 8.5 percent in 2010 to 3.7 percent in 2018. Franklin County's September 2019 (the most recent available as of this INRMP's publication date) unemployment rate of 3.3 percent was lower than Pennsylvania's unemployment rate of 3.9 percent and the same as the U.S. unemployment rate (BLS 2019).

Franklin County's 2018 per capita personal income (PCPI) levels were lower than state and national levels, but county median household income was about the same as the United States and Pennsylvania. Franklin County's PCPI was \$30,306, which was 89 percent of the state PCPI of \$33,960 and 90 percent of the national PCPI of \$33,831. Franklin County's median household income of \$61,208 was 100 percent of the state median household income of \$60,905 and 99 percent of the national median household income of \$61,937 (U.S. Census Bureau 2019c).

3.6 LOCAL AND REGIONAL NATURAL AREAS

LEAD is in a region of Pennsylvania that has an abundance of state-owned land. On the east side of LEAD, between Chambersburg and Shippensburg, is the 85,000-acre Michaux State Forest, and on the west side is the 71,000-acre Buchanan State Forest. The Buchanan State Forest is generally mixed oak communities with black birch (also called sweet birch) (*Betula lenta*), blackgum (*Nyssa sylvatica*), and white pine (*Pinus strobus*). The Michaux State Forest is also mixed oak with black birch, blackgum, hickory (*Carya* sp.), pine (*Pinus* sp.), red maple (*Acer rubrum*), and tulip poplar (*Liriodendron tulipifera*). Buchanan has populations of the Allegheny woodrat (*Neotoma magister*), a mammal listed as threatened in Pennsylvania (PADCNR 2018). These forests are managed by DCNR for insects and disease, plant and animal habitat, recreation, timber production, and water quality benefits. Management practices include aerial surveys for insects and disease, deer fencing, habitat restoration, herbicide applications, invasive plant treatment, prescribed fire, and timber harvesting. The DCNR is in the process of revising the Buchanan and Michaux forest resource management plans (PADCNR 2019).

On the north and west sides of LEAD are large tracts used as SGLs 76 (4,328 acres) and 235 (6,276 acres). These lands are managed for wildlife, including both game and non-game species of mammals and birds. The primary game species are white-tailed deer (*Odocoileus virginianus*), ruffed grouse (*Bonasa umbellus*), gray squirrel (*Sciurus carolinensis*), and eastern wild turkey (*Meleagris gallopavo*) (PGC 2014a,b). Management methods on these tracts include planting cover and food species and implementing controlled hunting programs. SGL 235 is also actively involved in ring-necked pheasant (*Phasianus colchicus*) production.

Several core habitat areas of the Pennsylvania Natural Heritage Program (PNHP) surround LEAD. Keasey Run Wetlands northeast of LEAD contains several fair-quality populations of brown sedge (*Carex buxbaumii*), a Pennsylvania plant species of concern. Clark's Knob, along the northern border of LEAD and on the southern slope of Broad Mountain and which includes portions of Buchanan State Forest, is where evidence of several populations of the Allegheny woodrat was found in 1992 a survey

(PNHP 2004). The Allegheny woodrat was found on LEAD in 2004 (see section 5.4.2.1). Dunn’s Creek Meadow, along the southwestern border of LEAD, includes private farmland and a portion of SGLs #235, and supports meadow voles (*Microtus pennsylvanicus*).

Other nearby natural lands are the 1,125-acre Caledonia State Park, which is in Adams and Franklin counties, midway between Chambersburg and Gettysburg on US 30. Caledonia is managed for recreation, including camping, picnicking, fishing, and game hunting.

SECTION 4.0 PHYSICAL ENVIRONMENT

4.1 CLIMATE

LEAD is in the Lower Susquehanna climatic division, and the climate is classified as humid continental, with a mean annual temperature of 54 degrees Fahrenheit (°F) (NOAA 2019). On the average, summers have 19 days above 90 °F, and winters have 21 days below freezing (32 °F). Most days have some cloud cover, with 70 days per year being overcast. Prevailing winds are northwesterly at 6 miles per hour.

A growing season of 160 to 170 days is fairly consistent throughout the valley. Average annual snowfall is 29 inches, with an average of 8 days per winter with 1 inch or more (NOAA 2019). Average total precipitation is 43 inches, with 29 days per year with one-half inch or more. April through October are the wettest months.

4.2 LANDFORMS

LEAD is in the Susquehanna-Potomac Segment of the Middle Section of the Ridge and Valley Province (Fenneman 1938, as cited in John Milner Associates 1981), on a drainage divide between the Susquehanna drainage flowing northward and the Potomac drainage flowing southward (Shippensburg University 1995). The extreme western portion of the depot crosscuts Broad Mountain, and the remainder of LEAD is contained by the Cumberland Valley, where elevations vary between 700 and 730 feet (John Milner Associates 1981).

The Cumberland Valley trends northeast to southwest through central Pennsylvania and is bordered to the west by the Appalachian Mountains. The South Mountain section of the Blue Ridge Province is east of Chambersburg and marks the eastern edge of the Cumberland Valley.

The Cumberland Valley is characterized predominantly by southwest-trending limestone ridges and valleys. Shales, siltstones, and sandstones make up much of the western part of the valley, where the surface is rolling and hilly. Less resistant limestones and dolostones of the eastern part of the valley have eroded to a broad, flat lowland perforated with sinkholes and caves.

Weathering of the folded and faulted underlying geologic formations imparts an overall gently rolling aspect to the local topography. The majority of LEAD is in the Martinsburg Shale terrain, except for bands of carbonate rocks along the eastern and western edges of the depot. Surface elevations throughout LEAD range from approximately 600 to 800 feet above mean sea level, except for the northwest portion of the installation, where the elevation increases abruptly to more than 2,300 feet above mean sea level in the vicinity of Broad Mountain (Weston 1996). A portion of the depot includes 2,900 acres of mountainous, wooded land along Blue or North Mountain with elevations ranging from 700 feet to 2,300 feet above mean sea level; the majority of the area is only about 700 feet to 800 feet above mean sea level. Slopes rising in excess of 40 feet per 100 feet are in the mountainous areas. The mountain ridges west of the depot have some effect on local conditions, tending to shelter the depot from the full effects of northern air in winter. There is also some evidence that precipitation along Broad Mountain, the area generally west of Massachusetts Avenue, may amount to several inches more per year than elsewhere on the depot, but this orographic effect has not been well documented (Shippensburg University 1995).

4.3 GEOLOGY AND SOILS

4.3.1 Geology

LEAD straddles two major geologic structural features: the South Mountain Anticlinorium to the east and the Massanutten Synclinorium to the west. The eastern section of the depot is underlain primarily by carbonate rocks (limestones and dolomites) and is part of the South Mountain Anticlinorium. The western section of the depot is underlain primarily by shales and is part of the Massanutten Synclinorium. These regional geologic structures were formed as a result of folding that occurred during the Paleozoic era (225 million to 570 million years ago). In the eastern section of the depot, high-angle reverse faulting accompanied the folding. As a result, several major faults, which strike north to northeast and dip to the southeast at fairly steep angles, occur on the depot (Weston 1996). The Letterkenny Fault, which dips to the west; the Pinola Fault, which dips to the east and is to the west of the Letterkenny Fault; and an unnamed fault, which occurs between the Pinola and Letterkenny Faults; all occur in the excess area.

The depot is underlain by five Ordovician-aged geologic formations (430 million to 500 million years old) of the Great Valley. The formations underlying the depot include carbonate rocks of the Chambersburg formation, St. Paul Group, Rockdale Run formation, and Pinesburg Station formation and the shales and sandstones of the Martinsburg formation.

The St. Paul Group limestones are middle Ordovician in age and consist of the New Market and the Row Park formations. The formations are made up of dark gray, thin-bedded limestones with some minor interbeds of dolomite. The St. Paul Group is jointed and fractured with the dolomites jointing on the order of feet and the limestones jointing on the order of several feet. A secondary joint system occurs nearly normal to the major joint system in the formations. Solution weathering occurs in the joint systems, with subsequent healing occurring in most of the joints (Weston 1996).

The Chambersburg formation is middle Ordovician in age and consists of a dark gray bedded limestone that weathers into cobbles. The beds of the formation are nearly vertical and are subject to extensive solution weathering (Weston 1996).

As a result of solution weathering, the carbonate rocks of the St. Paul Group and the Chambersburg formation have karst features such as sinkholes and solution channels associated with them (Tetra Tech 1998). These solution features are evidenced by the presence of several sinkholes that occur in the excess area.

The Martinsburg formation is late Ordovician in age and consists of thin-bedded, black, steeply inclined, extensively fractured shales. The formation contains interbedded layers of sandstones, siltstones, and some carbonates. The Martinsburg formation is more resistant to erosion than the limestones and dolomites of the St. Paul Group and Chambersburg formation and forms the gently rolling hills of the depot.

Limited data are available regarding petroleum or mineral resources on the installation. To date, no petroleum or mineral resources have been found on the installation, and no mining activities have occurred.

4.3.2 Soils

4.3.2.1 Soil Associations

According to the Franklin County Soil Survey (USDA NRCS 2019), 30 soil series, some of which are in associations with other soil series, occur on LEAD (see appendix B). Three soil series—Weikert, Berks, and Brinkerton—each cover more than 1,000 acres of LEAD and together account for more than 70 percent of the soils on LEAD. Weikert soils are shallow, well-drained, and moderately to very strongly acidic. Berks soils are moderately deep, well-drained, and extremely to slightly acidic. Both soil series are weathered from shale, siltstone, and acid sandstone. Weikert soils are prevalent in valley bottoms and Berks soils are in upland areas. The Brinkerton series consists of very deep, poorly drained, very strongly to moderately acidic soils. They are derived from shale and siltstone and occur on the footslopes of uplands. Nine other soil series each account 100 to 1,000 acres of the LEAD property and individually account for 1 to 6 percent of installation soils. Information on the soil series found at LEAD, and their major features, can be found in appendix B. Detailed descriptions of soil series occurring on LEAD are in the current Franklin County Soil Survey available on the Web Soil Survey website (USDA NRCS 2019). Figure 4-1 is a generalized soils map for LEAD.

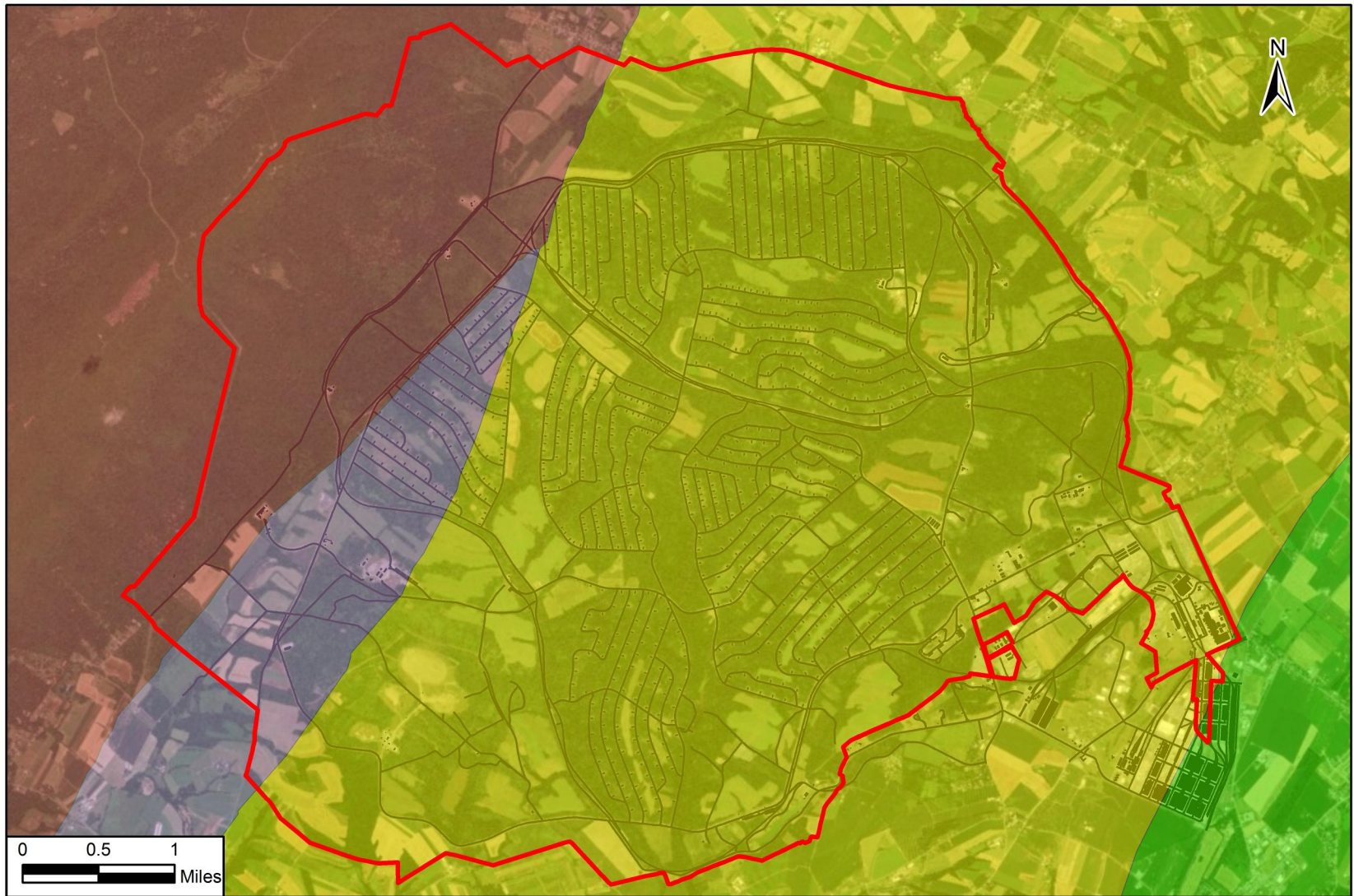
4.3.2.2 Hydric Soils

Hydric soils are soils that are saturated, flooded, or ponded for long enough during the growing season to develop anaerobic (oxygen-deficient) conditions in their upper part. Anaerobic soil conditions are conducive to establishing vegetation that is adapted for growth under oxygen-deficient conditions and is typically found in wetlands (hydrophytic vegetation). The presence of hydric soils is one of three criteria (hydric soils, hydrophytic vegetation, wetland hydrology) used to determine the presence of U.S. Army Corps of Engineers (USACE) jurisdictional wetlands (Environmental Laboratory 1987).

Eight soil types designated as hydric are found on the depot (see appendix B) (USDA NRCS 2019). These soil types account for 2,325 acres on LEAD. Soils with hydric inclusions but that do not qualify as hydric soils account for 10,913 acres, and soils with no hydric rating account for 2,399 acres. Hydric soils on LEAD occur mostly in association with streams. Soils with the least hydric inclusions are concentrated in the cantonment area.

4.3.2.3 Prime Farmland Soils and Soils of Statewide Importance

Prime farmland soils are protected under the Farmland Protection Policy Act (FPPA) of 1981. The intent of the act is to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland soils to nonagricultural uses. The act also ensures that federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementing the act (see 7 CFR Part 658, July 5, 1984). Prime farmland, as defined by the NRCS, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas (USDA NRCS 2000). Although the designation of prime farmland soils and protection measures do not apply to DoD installations, LEAD tries to avoid impacting areas that are designated as being significant when considering sites for development on the depot.



LEGEND

- LEAD Boundary
- Road
- Building

Soil Associations

- | | |
|---------------------------------|--------------------------|
| Laidig-Very Stony Land-Buchanan | Weikert-Berks-Beddington |
| Murrill-Laidig | Hagerstown-Duffield |

Soil Associations

Figure 4-1

Source: LEAD GIS 2013; USDA NRCS 2006.

Several soil series that occur on LEAD are prime farmland soils or farmland soils of statewide importance (USDA NRCS 2019). Prime farmland soils are concentrated at the base of Broad Mountain and in the cantonment area and cover for 936 acres. Farmland soils of statewide importance occupy most other upland areas and cover 9,354.7 acres (see appendix B). Soils that are neither prime farmland or farmland soils of statewide importance are concentrated along streams (Figure 4-2). Prime farmland soils on LEAD include Allegheny, Bedington, Buchanan gravelly loam 3–8 percent slopes, and Jugtown silt loam. Soils of statewide importance include Blairton silt loam, 0 to 3 percent slopes and 3 to 8 percent slopes; Buchanan gravelly loam, 8 to 15 percent slopes; Clearbrook channery silt loam, 0 to 8 percent slopes; Ernest silt loam, 3 to 8 percent slopes; Melvin silt loam; and Penlaw silt loam, 0 to 3 percent slopes. Further discussion and a map of prime and important farmland soils are provided in the soils PLS in appendix B.

4.3.2.4 Erodible soils

None of the soil series at LEAD are highly erodible (USDA NRCS 2019). However, two soil series on LEAD—Brinkerton and Melvin—are moderately erodible. The erodible soils at LEAD are discussed further and mapped in the soils PLS in appendix B.

Generally, these soils are stony or silty, and are on steep slopes. Their erodibility makes them unsuited for many activities, including any activities that would involve intense or repeated use of the erodible area (e.g., footpaths, unpaved roads, earthmoving).

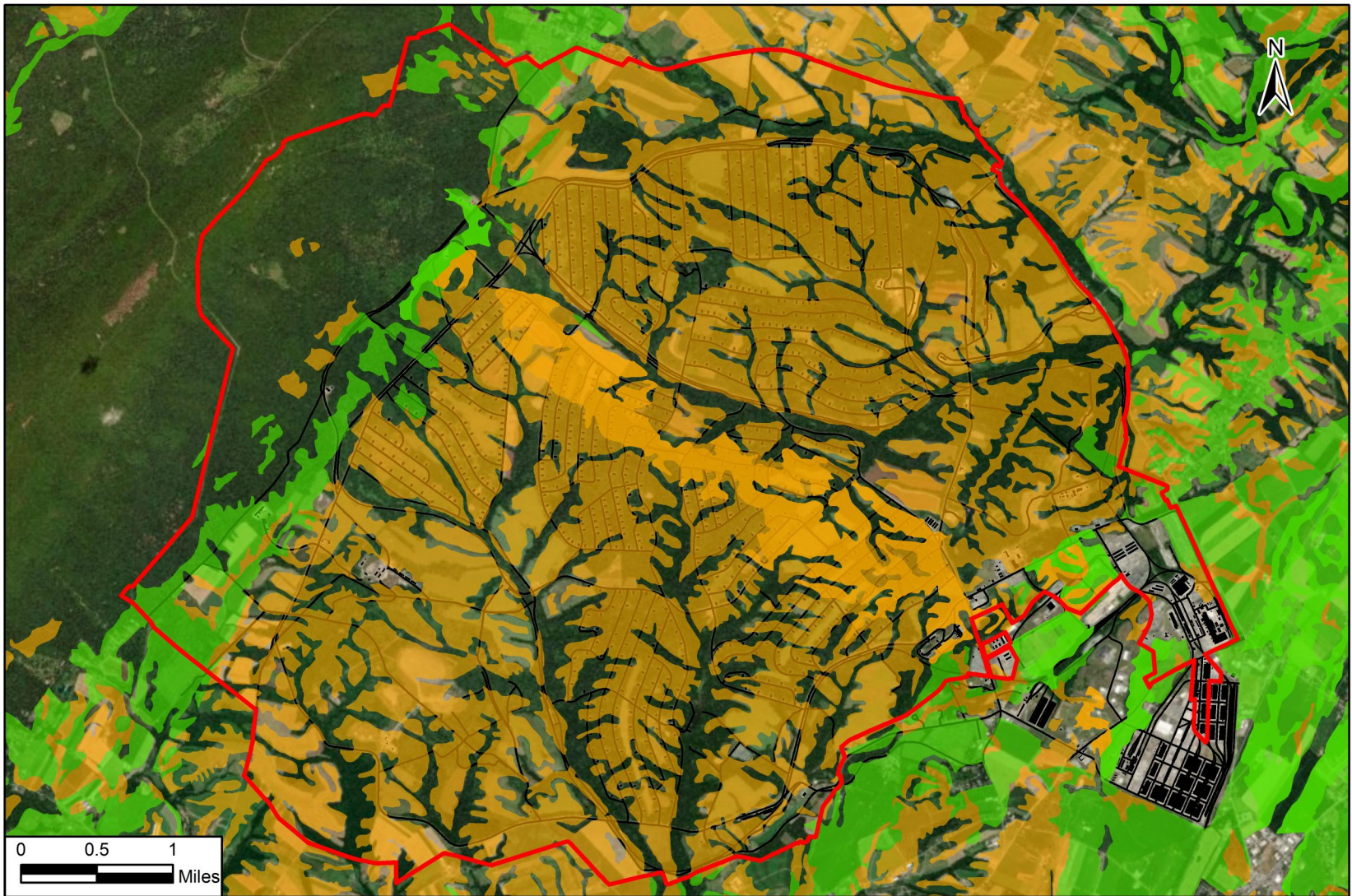
4.4 HYDROLOGY

4.4.1 Groundwater

There is no demand for groundwater on the depot because LEAD's drinking water supply is surface storage from Letterkenny Reservoir, about 4 miles north of the depot. LEAD is largely underlain by shales and some graywacke (Martinsburg formation), although carbonate rocks (limestone) do occur in the Rowe and Conococheague drainages and in a narrow belt along the base of Broad Mountain. The Martinsburg formation is generally a good aquifer yielding water of decent quality, although high iron and manganese concentrations can occur. Hydrogen sulfide gas occasionally occurs and degrades the water quality. Sustained well yields of 100 gallons per minute can be expected, though there is a close relationship between well yield and topography. Wells in the area of low topographic expression have significantly greater yields than wells on upland locations. Geologically, wells along fracture traces also have higher yields.

Yield from the carbonate aquifers also is directly related to topographic expression and fracture trace occurrence. Secondary porosity in the carbonate due to solution activity is important and results in a wide range of yield from 0.01 to 950 gallons per minute. Good locations in the St. Paul group will yield 150 to 200 gallons per minute, but the Chambersburg formation produces only about 40 gallons per minute. Calcium and magnesium deposits can occur from carbonate aquifers, making this water unsuited for certain industrial uses (Shippensburg University 1995).

Several hazardous-waste site investigation and remediation projects have been conducted or are in progress at LEAD. Some projects have involved groundwater contamination investigations and remediation, particularly in the vicinity of the cantonment area. These projects have indicated the presence of volatile organic compound (VOC) contamination in groundwater. Because the installation does not use groundwater as a water resource, the principal issue of concern with respect to natural



LEGEND

- LEAD Boundary
- All areas are prime farmland
- Farmland of statewide importance
- Road
- Building

Prime Farmland and Farmland of Statewide Importance

Figure 4-2

Source: LEAD GIS 2013; USDA NRCS 2006.

resource management at LEAD is recharge of contaminated groundwater to surface water bodies of LEAD. These issues have been investigated as part of ongoing CERCLA and Resource Conservation and Recovery Act (RCRA) studies, and the results indicate that these problems are confined to the immediate vicinity of the industrialized area.

4.4.2 Surface Water

LEAD is directly on the drainage divide between the Susquehanna River to the northeast and Potomac River to the southwest, both of which drain to the Chesapeake Bay. Because of the headwater location, drainages on the depot are short, and streams are small. Streams cutting through the limestone terrain of the Chambersburg formation and St. Paul group on LEAD flow through broad, open valleys and are ephemeral or intermittent, carrying water only in winter and spring, or after heavy rains. In contrast to this, streams cutting through the upper shale units of the Martinsburg formation usually meander in small, steep-walled valleys and are perennial. Natural surface water features at LEAD include seven named streams and numerous unnamed streams. Lehman Run, Keasey Run (a tributary of Lehman Run), Muddy Run, and Rowe Run are in the northeastern portion of LEAD and drain to the Susquehanna River. Dennis Creek, Back Creek, Rocky Spring Branch, and Conococheague Creek are in the southwest portion of the installation and drain to the Potomac River. The main channels on LEAD—Lehman Run, Keasey Run, Muddy Run, and Rocky Spring Branch—are permanent (Shippensburg University 1995). In addition to named streams, a number of small unnamed runs dissect LEAD (Figure 4-3).

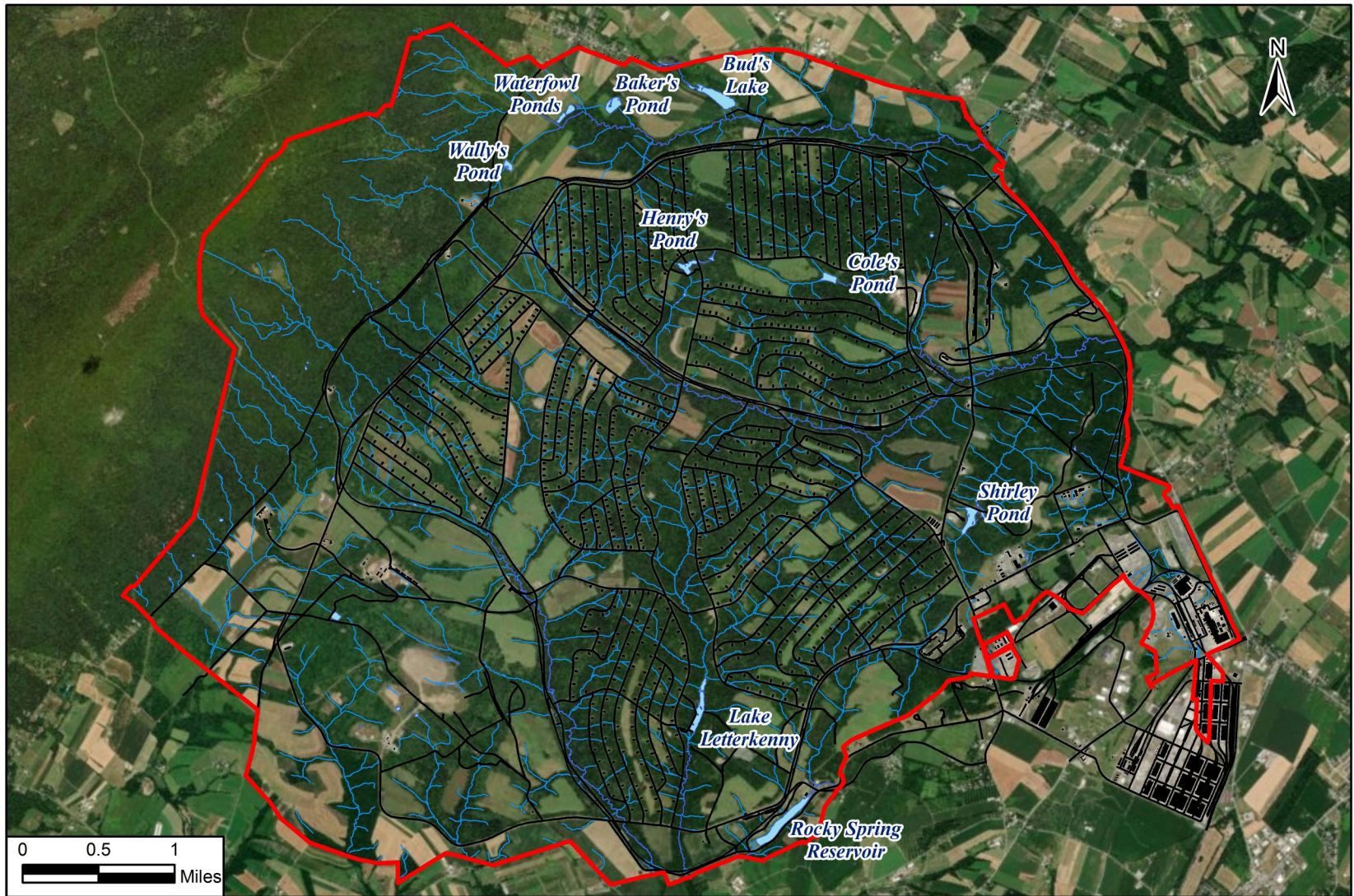
4.4.3 Impoundments

Ten manmade waterbodies, ranging in size from 3 to 17 acres, are on LEAD. Rocky Spring Lake, Lake Letterkenny; Shirley's Pond, Cole's Pond, and Henry's Pond are in Zone I (the ASA). Rocky Spring Lake is the most significant impoundment because it is the center of a developed recreational site. Bud's Lake, Wally's Pond, Baker's Pond, and two waterfowl ponds are in Zone II (the Buffer Zone).

Confirmed contaminated sites have contributed to the contamination of localized soil regimes and the interconnected groundwater and surface water regimes (Arbuckle 1994). Of particular note is the discovery of polychlorinated biphenyl (PCB) contamination in Rocky Spring Lake. In July 1995 silt from Rocky Spring Branch was found to contain PCBs. The source of this PCB contamination is the DRMO salvage yard. PCB soil contamination was confirmed at the DRMO yard during sampling in 1995. A fish advisory has been placed on this water body. In addition, VOC-contaminated groundwater has been found to recharge surface water bodies in the vicinity of the cantonment area (Rocky Spring Lake, Megan-McKenzie Run) (Tetra Tech 1998).

4.4.4 Floodplains

The depot does not lie on any significant floodplains and is above the 100-year flood level of the Conococheague Creek. The result is that serious flooding is not a threat to depot operations (Shippensburg University 1995).



LEGEND

- LEAD Boundary
- ~ Stream
- Road
- Building
- Waterbody

Surface Water Features

Figure 4-3

Source: LEAD GIS 2013.

SECTION 5.0 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 ECOSYSTEM CLASSIFICATION

The U.S. Forest Service (USFS) places LEAD in the Central Appalachian Broadleaf Forest – Coniferous Forest – Meadow Province ecoregion (M221) (USDA USFS 2008). This ecoregion is in the Hot Continental Division of the Humid Temperate Domain and occupies approximately 68,100 square miles. This province is composed of low mountains with valleys with some mountainous topography present. Elevations range from 300 to 6,000 feet and are higher to the south, reaching 6,684 feet at Mount Mitchell, North Carolina. The climate is temperate, with distinct summer and winter. Vertical vegetative zonation is present, with the valleys supporting a mixed oak-pine forest. The next zone consists of northeastern hardwood forest and spruce-fir forest, and meadows are found in the highest zone.

The U.S. Environmental Protection Agency places LEAD in the Ridge and Valley level 3 ecoregion and in the Northern Shale Valleys level 4 ecoregion (Woods et al. 1999). Ecoregions in eastern Pennsylvania were shaped by the same forces that created the Appalachian Mountains. They extend curvilinearly from New Jersey through Pennsylvania, Maryland, Virginia, and Tennessee. The Northern Shale Valleys ecoregion is characterized by rolling valleys and low hills with local relief that varies from about 50 feet to 500 feet.

5.2 VEGETATION

Franklin County originally had a dense cover of trees but cutting and clearing has eliminated all or nearly all the old-growth forests (USDA SCS 1975). Existing forested and wooded stands represent second- and third-growth forests and woody species are primarily of the Oak-Hickory Association, including northern red oak (*Quercus rubra*), black oak (*Q. velutina*), white oak (*Q. alba*), chestnut oak (*Q. prinus*), and various hickory species, with lesser numbers of tulip poplar, white ash (*Fraxinus americana*), and red maple.

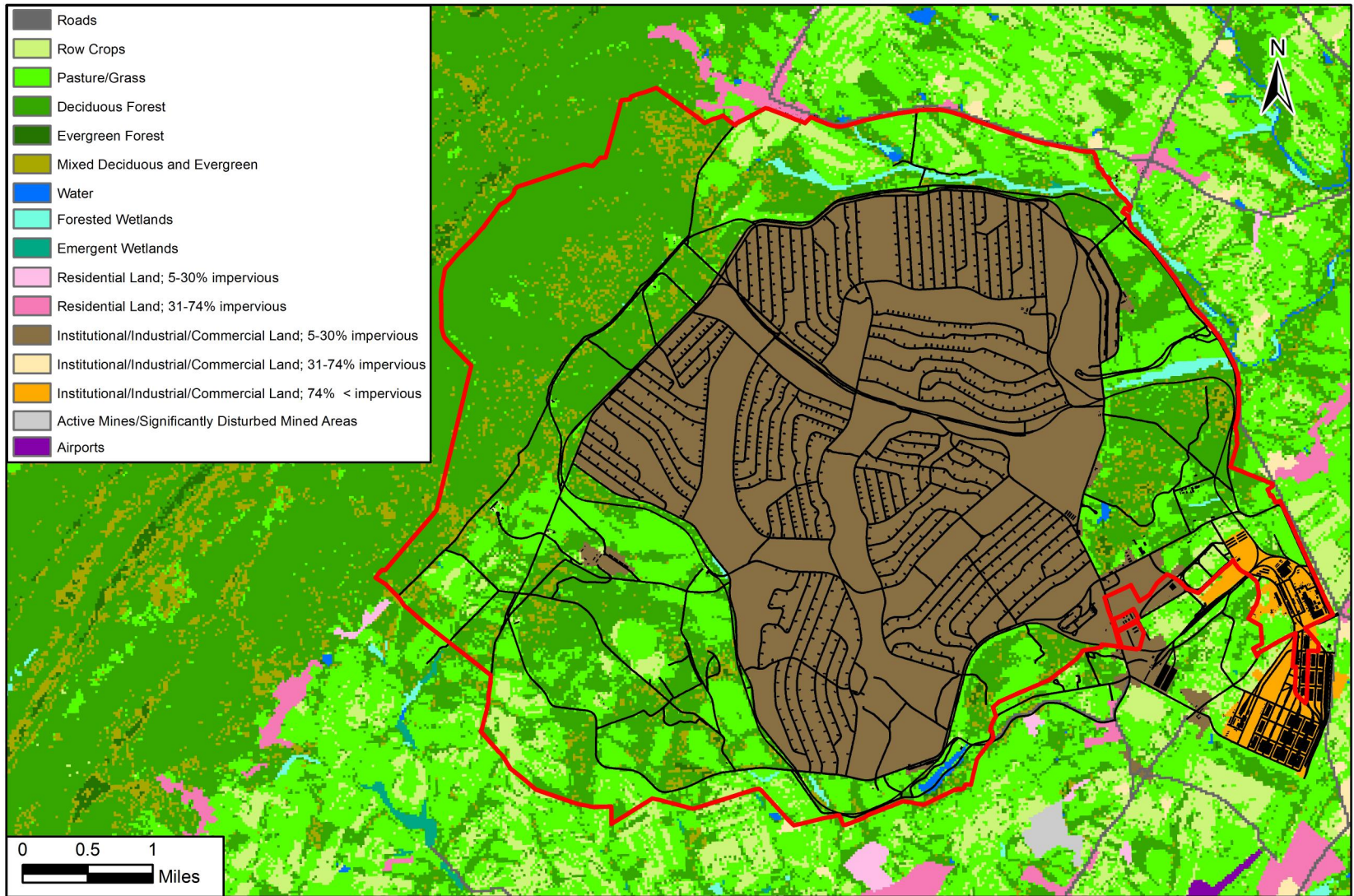
Non-forested areas in the county are principally old-field type successional areas, dominated by grass species. Other species occupying this habitat type are goldenrods (*Solidago* spp.), asters (*Aster* spp.), white clover (*Trifolium repens*), Indian strawberry (*Duchesnea indica*) and lesser numbers of other broad-leaved herbaceous species.

5.2.1 Historic Vegetative Cover

As stated above, before European settlement, the area occupied by LEAD was primarily vegetated with old-growth forest. Forest species included the red, black, white, and chestnut oak, and a large percentage of American chestnut (*Castanea dentata*). Chestnut blight has decimated chestnut populations in North America, and it is no longer a dominant canopy species.

5.2.2 Current Vegetative Cover

Most of the terrestrial habitat on LEAD consists of open fields and second- or third-growth forest. Of the total 18,287 acres on LEAD, approximately 34 percent is forested and 52 percent is open fields, 1 percent is water, and the remaining 13 percent is mostly developed with scattered vegetation. The major land cover types on the installation are presented in Figure 5-1.



Land Use/Land Cover

LEGEND

- LEAD Boundary
- Road
- Building

Figure 5-1

Source: LEAD GIS 2013; PASDA 2005.

5.2.2.1 Forest and Woodland

LEAD has approximately 6,264 acres of forest land. The LEAD Forest Management Plan evaluated approximately 2,610 acres of the forest land on LEAD divided among two compartments, two management zones, and 15 management stands (see Table 5-1) (USACE Baltimore District 2012b). The management stands account for 99.5 percent of the forested land evaluated.

The small unforested areas are classified as developed, vegetative wetlands, and herbaceous openings. Wetland species are discussed in Section 5.5. In the forested acreage, the timber is mostly hardwood with 2,163 acres (83.6 percent) in mixed oak forest, 255 acres (9.8 percent) in mixed regrowth/transition forest, and 170 acres (6.6 percent) mixed regrowth/oak forest. Dominant tree species on the property are mainly of hardwoods, with oaks and hickories being the most abundant. Dominant species in the various management stands are black oak, chestnut oak, northern red oak, pin oak (*Quercus palustris*), white oak, black birch, tulip poplar, white ash, shagbark hickory (*Carya ovata*), mockernut hickory (*C. tomentosa*), bitternut hickory (*C. cordiformis*), black cherry (*Prunus serotina*), black gum, black locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), red maple, eastern hemlock (*Tsuga canadensis*), and Virginia pine (*Pinus virginiana*). Other tree species include sassafras (*Sassafras albidens*), aspen (*Populus* sp.), tree-of-heaven (*Ailanthus altissima*), white pine, apple (*Malus* sp.), elm (*Ulmus* sp.), honey locust (*Gleditsia triacanthos*), sugar maple (*Acer saccharum*), and beech (*Fagus grandifolia*).

Understory species in the forested areas vary according to the dominant trees, and include hawthorn (*Crataegus* sp.), redbud (*Cercis canadensis*), blackhaw (*Viburnum prunifolium*), hackberry (*Celtis* sp.), tatarian honeysuckle (*Lonicera tatarica*), autumn olive (*Eleagnus autumnale*) spicebush (*Lindera benzoin*), and dogwood (*Cornus racemosa*).

Groundcover species vary by shade and hydric regime. Species at LEAD include dogbane (*Apocynum* spp.), hyacinths (*Hyacinthus* spp.), clover (*Trifolium* spp.), goldenrod, sedges (*Carex* spp.), rushes (*Juncus* spp.), wild mustard (*Brassica* spp.), broom sedge (*C. scoparia*), spring beauty (*Claytonia caroliniana*), cattail (*Typha latifolia*), raspberries and blackberries (*Rubus* spp.), wild garlic (*Allium canadense*), various grasses, Japanese barberry (*Berberis thunbergii*), burdock (*Arctium* spp.), mayapple (*Podophyllum peltatum*), and multiflora rose (*Rosa multiflora*).

Vine species at LEAD include greenbriar (*Smilax* spp.), grape (*Vitis* spp.), poison ivy (*Toxicodendron radicans*), and Japanese honeysuckle (*Lonicera japonica*).

Forest habitat health has been declining for various reasons. Hurricane Sandy in 2012 downed large areas of trees on LEAD. Hemlock wholly adelgid (*Adelges tsugae*) (HWA) has removed 85 percent of LEAD's eastern hemlock trees. No eastern hemlock stands are healthy and only a few trees remain in various stages of decline because of HWA. HWA is a true bug native to East Asia that feeds by sucking sap from eastern hemlock and spruce trees. The emerald ash borer (*Agrilus planipennis*) has killed most ash (*Fraxinus* sp.) trees on LEAD; all ash trees are in various stages of decline and most are dead. Dogwood trees are infected by dogwood anthracnose (caused by the fungus *Discula destructiva*) (Hyde et al. 1995). Deer over-browse has also impacted much of the forests on LEAD. European gypsy moth (*Lymantria dispar dispar*) outbreaks have been noted in the past, but they are generally being controlled through cooperative efforts with the USFS.

5.2.2.2 Open Habitat

Approximately 9,250 acres of open habitat are on the installation, consisting principally of grassland fields that are incorporated into the agricultural leasing program at the installation. Open areas also

include buffer strips (roadways, areas surrounding igloos, field borders) that serve as fire breaks, edge habitat, and buffers for the protection of water resources and sensitive habitat.

No comprehensive inventory of flora or vegetative communities has been conducted on LEAD, but some plant species have been recorded with respect to wildlife suitability and wetlands studies (see section 5.5).

5.2.2.3 Turf and Landscaped Areas

LEAD is a predominantly industrial installation. Therefore, very little turf or landscaped area is on LEAD. Areas of grass are generally restricted to roadsides, which are dominated by grasses and mowing-tolerant native and nonnative broadleaved herbs.

5.3 FISH AND WILDLIFE

The fauna discussed in this section represent the common birds, mammals, fish, and reptiles that have been observed at LEAD during various surveys and assessments.

5.3.1 Mammals

Thirty-five species of mammals have been observed at LEAD as part of field observations and wildlife inventories begun in 1987 and conducted periodically since. Spotlight surveys for white-tailed deer are conducted annually. The LEAD Natural Resources Office in conjunction with Shippensburg University conducted small mammal surveys to ascertain the abundance and distribution of species on the installation. Only limited data are available on bats that might be present. A mist netting survey for the federally endangered Indiana bat (*Myotis sodalis*) conducted in 2000 identified several common species of bats, such as the big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), and northern long-eared bat (*Myotis septentrionalis*) (NLEB). Subsequent surveys in 2012 and 2015 identified the eastern small-footed bat (*M. leibii*) and hoary bat (*L. cinereus*) on LEAD. A single NLEB was captured on LEAD during the July 2015 survey. The NLEB was listed as threatened under the ESA by USFWS on April 2, 2015.

5.3.2 Birds

More than 100 avian species have been found at LEAD, identified during a 1987 wildlife inventory, field observations, and subsequent surveys conducted annually by the LEAD Natural Resource Office, PGC, and the Audubon Society. Avian habitats at LEAD are diverse and include riparian areas, forests, and open fields. A wide variety of avian species use LEAD habitats during both the breeding season and winter. Migratory species like warblers and vireos use LEAD as a stopover. Nesting species that have been observed during the spring and summer months include the great blue heron (*Ardea herodias*), Canada geese (*Branta canadensis*), and killdeer (*Charadrius vociferous*). Year-round residents of LEAD include the ring-necked pheasant, eastern wild turkey, and woodpeckers (*Picoides* sp.). Other species found on the installation are the Brown-headed Cowbird (*Molothrus ater*), Eastern Kingbird (*Tyrannus tyrannus*), European Starling (*Sturnus vulgaris*), Osprey (*Pandion haliaetus*), Willow Flycatcher (*Empidonax traillii*), and Yellow-breasted Chat (*Icteria virens*).

The depot contains substantial amounts of hay-dominated fields for grassland-dependent birds (PNHP 2018). A visit to one of the fields in June 2003 found uncommon grassland-dependent species such as Bobolink (*Dolichonyx oryzivorus*), Common Yellowthroat (*Geothlypis trichas*), Eastern Meadowlark (*Sturnella magna*), Field Sparrow (*Spizella pusilla*), Grasshopper Sparrow (*Ammodramus savannarum*), and Song Sparrow (*Melospiza melodia*). There is a good possibility that Henslow's sparrow (*A.*

henslowii), a former animal species of concern that had been confirmed to be on the depot in the past, nests in the area, but no confirmations were made during the June survey. This area also might host a few grassland bird species of concern such as upland sandpiper (*Bartramia longicauda*) and dickcissel (*Spiza americana*).

5.3.3 Reptiles

Nineteen species of reptiles have been identified at LEAD. These species were documented as part of threatened and endangered species inventories conducted in 1992 and 2000, during subsequent annual surveys, or as field observations. Reptile species observed include wood turtle (*Clemmys insculpta*), common snapping turtle (*Chelydra s. serpentina*), eastern box turtle (*Terrapene carolina*), midland painted turtle (*Chrysemys picta marginata*), five-lined skink lizard (*Eumeces fasciatus*), northern water snake (*Nerodia sipedon*), northern copperhead (*Agkistrodon contortrix*), and black rat snake (*Elaphe obsoleta*). The LEAD Natural Resources Office in conjunction with Shippensburg University conducted reptile surveys to ascertain the abundance and distribution of species on the installation and conducted a snake community population biology study at LEAD (Delis 2011, 2012).

5.3.4 Amphibians

Twenty-four species of amphibians have been observed at LEAD during various surveys conducted annually and in field observations. The LEAD Natural Resources Office in conjunction with Shippensburg University conducted amphibian surveys to ascertain the abundance and distribution of species on the installation and have conducted species-specific surveys for marbled salamanders (*Ambystoma opacum*), frogs, and spotted newts (*Notophthalmus* sp.) (Delis 2011, 2012). Amphibian species observed include spotted salamander (*A. maculatum*), red-spotted newt (*N. viridescens*), eastern American toad (*Bufo americanus americanus*), upland chorus frog (*Pseudacris feriarum*), and northern cricket frog (*Acris crepitans*).

LEAD contains a relatively intact area of forest that borders Buchanan State Forest, and that tract of forest contains an ephemeral/fluctuating natural pool community (PNHP 2018). Vernal ponds on the depot and in nearby areas are home to many species of amphibians, including marbled salamanders, spotted salamanders, Jefferson's salamanders (*Ambystoma jeffersonianum*), wood frogs (*Rana sylvatica*), spring peepers (*P. crucifer*), green frogs (*R. clamitans*), pickerel frogs (*R. palustris*), toads (*Bufo* sp.), and red-spotted newts.

5.3.5 Fish

The condition of fisheries on the installation is unknown because of the lack of survey data. Most of the ponds on the installation contain warm-water species such as largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*). Of note is a fishing advisory for Rocky Spring Lake because of PCB contamination. The trout rearing facility at Rocky Spring Lake is closed because of the PCB contamination.

5.4 THREATENED AND ENDANGERED SPECIES

Surveys for listed species have been conducted on LEAD. One federally listed species, the NLEB, has been documented to occur on LEAD. Additionally, four state-listed species have been found on LEAD.

5.4.1 Federally Listed Species

Three targeted surveys were conducted for listed species that might be on the installation. In 1992 The Nature Conservancy conducted a survey that was targeted on state- and federally listed species (TNC 1992). Only one federally listed species was identified during the 1992 survey, the bog turtle (*Clemmys muhlenbergii*). In 2000 Tetra Tech conducted a threatened and endangered species survey for federally listed species that might be on the installation. This survey involved species-specific survey methods, using USFWS protocols for rare, threatened, and endangered species (RTE) for three federally listed species: bog turtle (threatened), Indiana bat (endangered), and northeastern bulrush (*Scirpus ancistrochaetus*) (endangered). No federally listed species were identified on the installation during these surveys. The PNHP and Western Pennsylvania Conservancy conducted a bat survey from July 13–30, 2015 (PNHP 2015). During the survey one NLEB was captured. Basic information on the species is provided below.

5.4.1.1 Northern Long-Eared Bat

The NLEB had been found on LEAD in 2000; surveys conducted by Tetra Tech Inc. in June 2000 documented 10 NLEB at LEAD over a 3-night period. The species was not listed as threatened by the USFWS until April 2015. The species was never considered to be an abundant species, but dramatic declines in its numbers due to white-nose syndrome have made this species exceptionally rare and precipitated the federal listing. In response, LEAD had a survey for the species conducted. One NLEB was captured during the 2015 mist netting survey. As a federally threatened species, the USFWS is now responsible for specific decisions regarding the NLEB and regulating projects that may impact the species. The species is distributed across Pennsylvania during the active summer months and during the winter when it hibernates in caves and mines (PNHP 2015). It is found throughout Pennsylvania in densities that are typically low and occurrences of the species are localized and sporadic.

5.4.1.2 Indiana Bat

No Indiana bats were found on LEAD in the 1992 and 2000 surveys. The PNHP and Western Pennsylvania Conservancy conducted a bat survey from July 13-30, 2015 (PNHP 2015). The mist netting survey targeted the NLEB using USFWS 2015 Indiana bat survey guidelines. No Indiana bats were captured during the effort. It cannot be concluded that Indiana bats are not on the installation, but currently there is no evidence indicating that they do occur on LEAD. State agencies reported the historic occurrence of the Indiana bat in Franklin County based on a 1940s record (PNHP 2018). No evidence exists that mist netting surveys on or near the installation had occurred before the 2000 survey. LEAD would still consult with the USFWS to determine whether additional surveying (mist-netting) would be required before any substantial land-clearing activities would occur in forested habitats.

5.4.1.3 Bog Turtle

A bog turtle survey was conducted in 2000 but found no evidence of bog turtles and no potential bog turtle habitat on the installation. Areas that were most likely to have bog turtles were sampled using the protocols specified under Step 3 of the USFWS protocol (i.e., Phase 2 under the recently revised protocol). The survey results indicated that habitat on LEAD would not pass Steps 2 or 3 of the USFWS sampling protocol (results that would not differ under the newly revised protocol). Because the rainfall events during the sampling period were like the conditions in 1992, when a bog turtle was reportedly found, it is unlikely that subsequent sampling efforts would change the conclusions of the 2000 survey, although the possibility that bog turtles occur on LEAD cannot be ruled out entirely. During these

surveys, researchers observed other turtle species at LEAD that are in the same genus (*Clemmys*) as the bog turtle. Spotted turtles (*C. guttata*) and wood turtles were found in the Keasey Run wetlands north of Bud's Lake, not far from where the bog turtle was observed in 1992. Bog turtles are small and secretive animals that are difficult to survey, and further sampling could be warranted.

5.4.1.4 Northeastern Bulrush

During the 2000 survey, viable habitat for the Northeastern bulrush was found on the installation, but no evidence of this species was observed. Because of the intensity of the survey effort, it is unlikely that the species is present on LEAD. Further monitoring of areas with favorable habitat and consultation with USFWS will be warranted before any disturbance of these wetlands occurs.

5.4.2 State-Listed Species

Some state-listed species have been identified on or near the installation (Figure 5-2). Several species that might be on the installation were identified based on comparisons of the PNHP database assessments and habitats found on the installation (PNHP 2018). The species of special concern that occur or could occur on the installation are listed in Table 5-1.

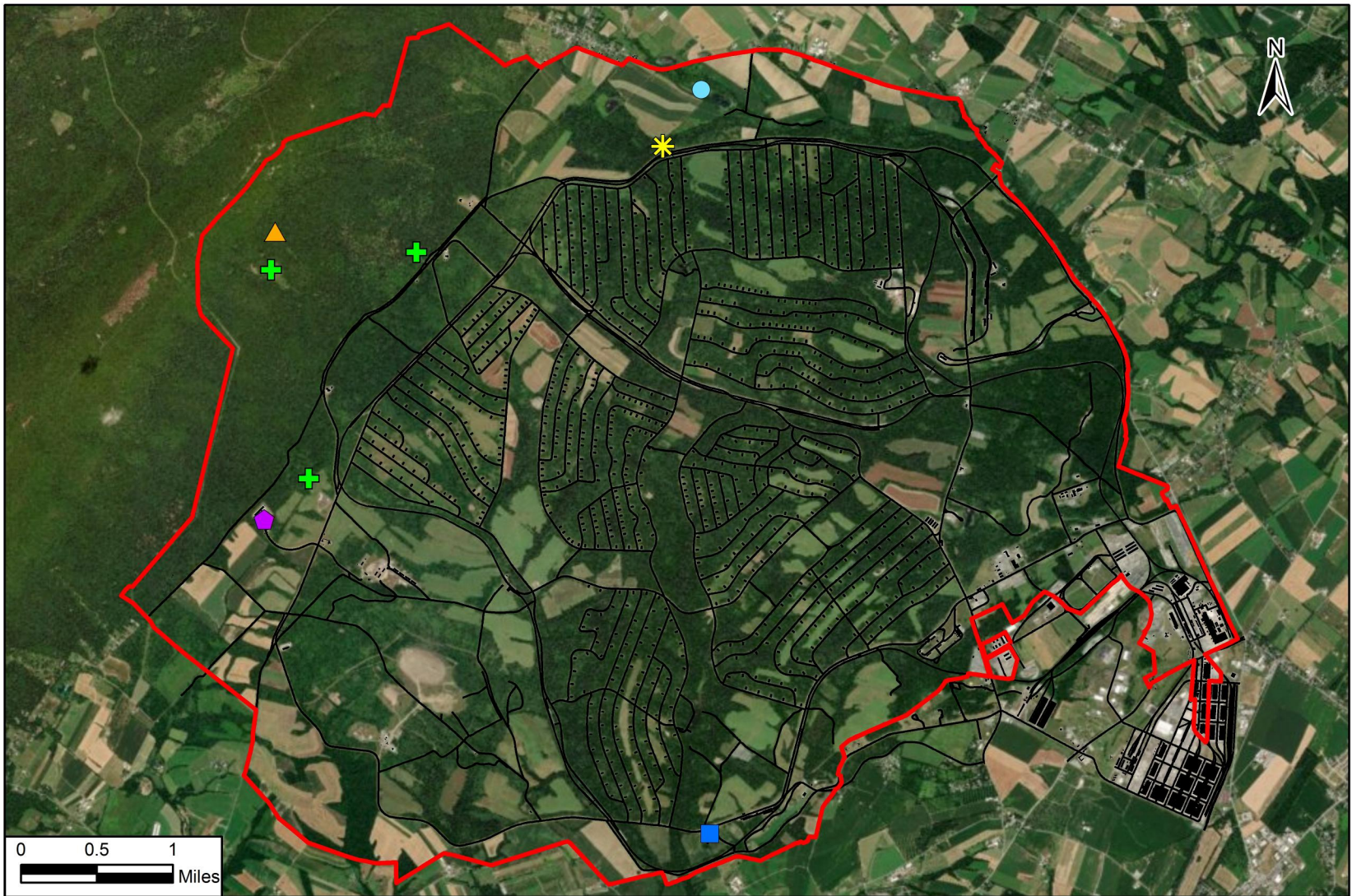
5.4.2.1 Allegheny Woodrat

In 2003 and 2004, the LEAD Natural Resources Office in conjunction with Shippensburg University conducted small mammal surveys with the intention of documenting biodiversity and the potential presence of the Allegheny woodrat, a threatened species in Pennsylvania. Three Allegheny woodrats were trapped during that survey. The general location where Allegheny woodrat has been identified and is expected to occur is presented in Figure 5-2.

The Allegheny woodrat prefers habitat consisting of rock outcrops, caves and talus slopes with a southerly exposure. Surrounding vegetation is usually deciduous forests, although several populations have been noted to occur in areas composed predominately of eastern hemlock. Preferred food consists of common items found throughout the forest, including a variety of leaves, fruit, nuts, seeds, fungi, and twigs (Butchkoski 2010).

It is likely that a variety of factors are responsible for the woodrat's decline. The American chestnut might have been an important food source—until chestnut blight removed all the mature trees of that species. European gypsy moth infestations that damaged oaks affected acorn production. The raccoon roundworm (*Baylisascaris procyonis*) parasite affects a wide range of wildlife species; infected Allegheny woodrats can die in a matter of weeks or succumb to predators as they become disabled. As the interface between forest and agricultural fields spread in Pennsylvania, the number of great horned owls (*Bubo virginianus*) increased, and this might have put Allegheny woodrat populations under greater pressure. Porcupines (*Ezethizon dorsatum*), which also den in rock crevices and caves, are becoming more abundant and might preempt favorable den sites. Timbering, road building, utility lines, ridge-top telecommunications towers and wind farms, and conversion of land to agricultural or residential use have all affected forests surrounding rock habitat and created barriers that reduce the Allegheny woodrat's ability to travel between rock patches, increasing isolation and reducing recolonization (Butchkoski 2010).

The PNHP notes the presence of a natural community, Clark's Knob, in Letterkenny Township near the depot. The site contains an ephemeral fluctuating pool natural community and good grassland bird



LEGEND

- | | | |
|---------------|---------------------------|------------------------|
| LEAD Boundary | Allegheny Woodrat | Eastern Spadefoot Toad |
| Road | Black-crowned Night Heron | Short-eared Owl |
| Building | Dickcissel | Timber Rattlesnake |

Observed Rare, Threatened, or Endangered Species

Figure 5-2

Source: LEAD GIS 2013.

Table 5-1. Threatened and endangered species observed at LEAD or in Franklin County with potential to occur at LEAD

Common name	Scientific name	Federal status	State status
Observed at LEAD			
Allegheny woodrat ^a	<i>Neotoma magister</i>	—	PT
Brown sedge	<i>Carex buxbaumii</i>	—	TU
Eastern small-footed bat	<i>Myotis leibii</i>	—	PT
Eastern spadefoot	<i>Scaphiopus holbrookii</i>	—	PT
Lance-leaf loosestrife ^b	<i>Lysimachia lanceolata</i>	—	N
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	—
Timber rattlesnake	<i>Crotalus horridus</i>	—	DL
Observed in Franklin County with potential to occur at LEAD			
Cat's-paw ragwort	<i>Packera antennariifolia</i>	—	PE
Fringe-leaved petunia	<i>Ruellia humilis</i>	—	PE
Indiana bat ^c	<i>Myotis sodalis</i>	LE	PE
Least shrew	<i>Cryptotis parva</i>	—	PE
Lupine	<i>Lupinus perennis</i>	—	PR
Northeastern bulrush ^c	<i>Scirpus ancistrochaetus</i>	LE	PE
Prickly-pear cactus	<i>Opuntia humifusa</i>	—	PR
Upland sandpiper	<i>Bartramia longicauda</i>	—	PE

Sources: PNHP (2018) database searches for Franklin County and planning-level surveys.

Notes:

Status abbreviations:

DL Delisted. Species which were once listed but are now cited for delisting.

LE Listed Endangered—A species that is in danger of extinction throughout all or a significant portion of its range.

N No current legal status exists but is under review for future listing.

PC Animals that could become endangered or threatened in the future. All these are uncommon, have restricted distribution, or are at risk because of certain aspects of their biology.

PE Pennsylvania Endangered—Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are (1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extinction from the commonwealth; (2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; (3) species that have been classified as *Pennsylvania Extirpated* but that are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or (4) species determined to be *endangered* pursuant to the Endangered Species Act of 1973, Public Law 93-205 (87 Stat. 884), as amended.

PR Pennsylvania Rare—Plant species that are uncommon in Pennsylvania. All species of the native wild plants classified as disjunct, endemic, limit of range, and restricted are in the Pennsylvania Rare classification (disjunct—significantly separated from their main area of distribution; endemic—confined to a specialized habitat; limit of range—at or near the periphery of their natural distribution; restricted—found in specialized habitats or habitats infrequent in Pennsylvania).

PT Pennsylvania Threatened—Species that could become endangered in the foreseeable future throughout their range in Pennsylvania unless the causal factors affecting the organism are abated. These are (1) species whose populations in the commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; (2) species whose populations could be relatively abundant in the commonwealth but are under severe threat from serious adverse factors that have been identified and documented; (3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or (4) species determined to be *threatened* pursuant to the Endangered Species Act of 1973, Public Law 93-205 (87 Stat. 884), as amended, that are not listed as *Pennsylvania Endangered*.

TU Tentatively Undetermined—A classification of plant species that are believed to be in danger of population decline but cannot be included in another classification because of taxonomic uncertainties, limited evidence in historical records, or insufficient data.

^a A 1992 survey found woodrat signs in talus slopes below Clarks Knob (The Nature Conservancy, 1992). Three female individuals were trapped during surveys conducted 2003–2004 by Shippensburg University.

^b Considered vulnerable to becoming endangered in the foreseeable future.

^c Planning-level surveys in 2000 for bog turtle, northeastern bulrush, and Indiana bat did not locate these species at LEAD.

habitat, and evidence of several populations of the Allegheny woodrat was found at the site during a site survey in 1992 (PNHP 2018).

5.4.2.2 Lance-leaf Loosestrife

The health and extent of lance-leaf loosestrife (*Lysimachia lanceolata*) has not been formally surveyed at LEAD. Tetra Tech identified the plant on LEAD in the 2000 endangered species survey and mapped its location but not its extent.

5.4.2.3 Eastern Small-Footed Bat

The eastern small-footed bat, also known as the small-footed Myotis, is listed as threatened and protected under the Pennsylvania Game and Wildlife Code (Butchkoski 2014). It is a priority species in the state's Wildlife Action Plan. The species has no federal protected status. It was proposed for federal endangered or threatened listing due to losses to white-nose syndrome, but in October 2013 after reviewing the best available scientific and commercial information the USFWS found that listing was not warranted.

The eastern small-footed bat is widespread within its range but spottily distributed and rarely found in large numbers. Most occurrences and the largest known populations of the species are in Pennsylvania, New York, Virginia and West Virginia. Winter hibernation sites were reported in 1989 in eight counties in central, south-central and southwestern Pennsylvania and recent surveys added 23 counties to its known distribution. However, it is no longer found in many caves where it was observed in the 1930s and 1940s.

The species is most threatened by destruction and disturbance of hibernation sites and possibly by destruction and development of habitat. White-nose syndrome is also a threat and is a leading cause of the decline of cave bat populations.

5.4.2.4 Timber Rattlesnake

In Pennsylvania timber rattlesnakes spend about 6 months hibernating in rocky outcrops or holes in the ground, emerging in late April or early May (PADCNr Undated e). Individual snakes inhabit forested areas, and the largest populations occur in remote, heavily forested regions, which are generally state forests in Pennsylvania. Male snakes actively seek mates in July and August and will travel up to 6 miles to intersect the scent trails of receptive females. It is during this time that the species is most often encountered.

5.4.2.5 Eastern Spadefoot

Eastern spadefoots (*Scaphiopus holbrookii*) inhabit sandy soils along the floodplains of streams and rivers, in agricultural areas, and near seasonal ponds in woods and forests (Criswell 2012, PAHERPS 2016). They have been found in Pennsylvania in southcentral counties (including Franklin County), central counties, and eastern counties. Spadefoots have specialized hind feet that allow them to burrow deep into the ground. Eastern spadefoots will burrow as deep as 8 feet below the surface and can stay buried for 7 months or longer (Criswell 2012). They emerge at night but sporadically, generally remaining within 5 to 10 yards of their burrow. They mate between April and September after a heavy rain. Females lay 1,000 to 2,500 eggs on submerged vegetation. Threats to the species include habitat loss to development, barriers to travel, and climate change.

5.4.2.6 Brown Sedge

Brown sedge has no legal status at the federal or state level, but it is considered a species of special concern in Pennsylvania and is, therefore, tracked by the Pennsylvania Natural Diversity Inventory (PNDI). Limited, case-by-case sampling for brown sedge has occurred on LEAD. No brown sedge has identified on the installation.

The PNHP lists a site, the Keasey Run wetlands, that contains several fair-quality populations of brown sedge at the northern and eastern boundary of the depot (PNHP 2004). The area has little disturbance except for the presence of rough bluegrass (*Poa trivialis*), an exotic plant species. A population of a sedge (*Carex shortiana*), another Pennsylvania plant species of concern, was also found in a poorly drained area in an old field along a tributary of Keasey Run.

5.5 WETLANDS

Seven wetland types are present at LEAD: lacustrine, palustrine aquatic bottom, palustrine emergent, palustrine forested, palustrine open water, palustrine scrub shrub, palustrine unconsolidated bottom, and riverine. Approximately 300 acres of wetlands are on LEAD (Figure 5-3), predominantly in the ASA and Buffer Area along streambeds and pond or lake sides. A reevaluation of potential wetland areas based on hydric soils and limited field reconnaissance by USACE indicates that more acres of wetlands might on LEAD than previously calculated (Figure 5-4).

USACE completed wetland delineations in 2005, 2006 and 2007 (Figure 5-5). An unnamed perennial stream runs through study area A, and four wetlands drain into this stream. These wetlands are palustrine emergent wetlands that are dominated by soft rush (*Juncus effusus*), sensitive fern (*Onoclea sensibilis*), sedge species (*C. stipata*, *C. lurida*), poison ivy, rough bluegrass, and touch-me-not (*Impatiens capensis*). An unnamed perennial stream also flows through study area B that eventually flows into Muddy Run. There are five wetlands associated with this reach of stream and two wetlands that continue outside the study boundary across the fence for the ASA. These wetlands are palustrine forested and palustrine emergent. The dominant plant species are rough bluegrass, box elder maple (*Acer negundo*), touch-me-not, sensitive fern, arrow-leaved tearthumb (*Polygonum sagittatum*), sweetflag (*Acorus calamus*), green bulrush (*Scirpus atrovirens*), and yellow rocket (*Brassica rapa*). Five isolated wetlands were identified in study area C, which are palustrine forested and palustrine emergent. Dominant species are silver maple (*Acer saccharinum*), black gum, box elder maple, sweet woodreed (*Cinna arundinacea*), common reed (*Phragmites australis*), and Indianhemp (*Apocynum cannabinum*).

Wetland habitat supports a wide diversity of vegetation, invertebrates, amphibians, reptiles, and mammals. The wetland habitat at LEAD is in good condition because these areas have been conserved from development. However, invasive species, particularly reed canary grass (*Phalaris arundinacea*), have been found throughout the wetlands of LEAD and have been noted as a problem in several wetlands. Reed canary grass has been encroaching on native wetland species and becoming a dominant plant in several areas.

5.6 OTHER SENSITIVE HABITAT AREAS

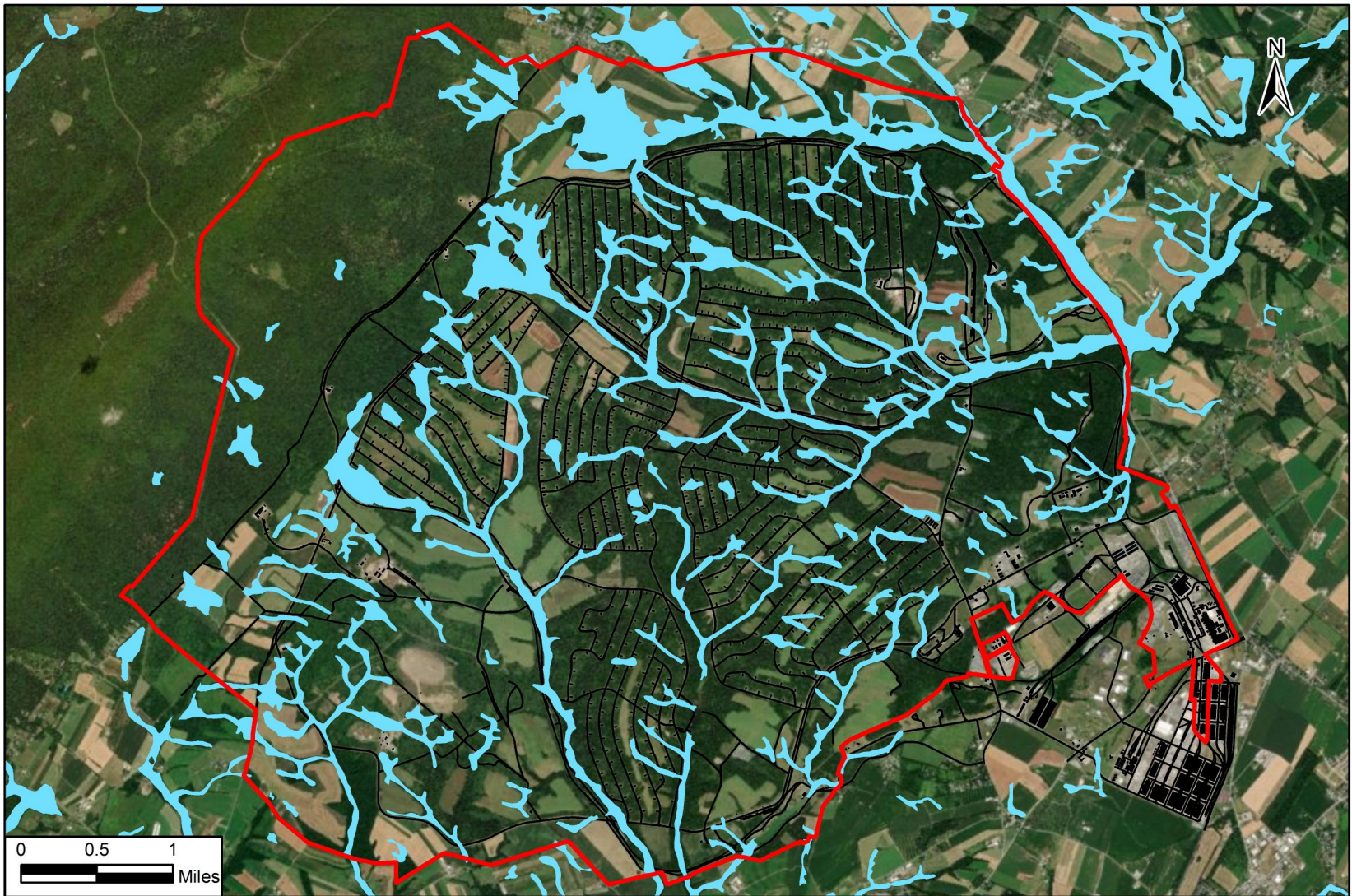
A small number of vernal pool habitats have been identified through surveys conducted as a joint effort by LEAD Natural Resources Office and Shippensburg University, and were mapped by LEAD (Figure 5-6). The university's study of vernal pools at LEAD is still in the early stages, but it is possible that additional vernal pools are on the installation. Vernal pools are, as the name suggests, small, discrete







NWI Wetlands

Figure 5-3

Source: LEAD GIS 2013; USFWS NWI 2011.



LEGEND

-  LEAD Boundary
-  Hydric Soil
-  Road
-  Building

**Potential Wetland Areas
Based on Soil Analysis**

Figure 5-4

Source: LEAD GIS 2013; USDA NRCS 2006.



LEGEND

- ▭ LEAD Boundary
- ▭ Wetland
- ~ Stream

Delineated Wetlands

Figure 5-5

Source: LEAD GIS 2013.



Vernal Pools

Figure 5-6

- LEGEND**
- LEAD Boundary
 - Road
 - Building
 - Excavated
 - Natural

Source: LEAD GIS 2013.

areas that are wet in the spring. They are special aquatic sites and are generally higher in the landscape and not directly tied to a source of hydrology like typical wetland areas are. Vernal pools provide critical breeding habitat for amphibians, which use them as egg-laying locations free of fish and bird predators and dangerous currents. The worldwide decline in amphibian populations has recently brought vernal pools to the forefront of scientific research and conservation effort. The PNHP recommends that any habitat management activities around vernal pond communities be carefully reviewed and that undisturbed forested buffers remain around each pond to minimize disturbance to the ponds and the species that depend on them (PNHP 2004).

SECTION 6.0

MISSION IMPACTS ON NATURAL RESOURCES

6.1 LAND USE

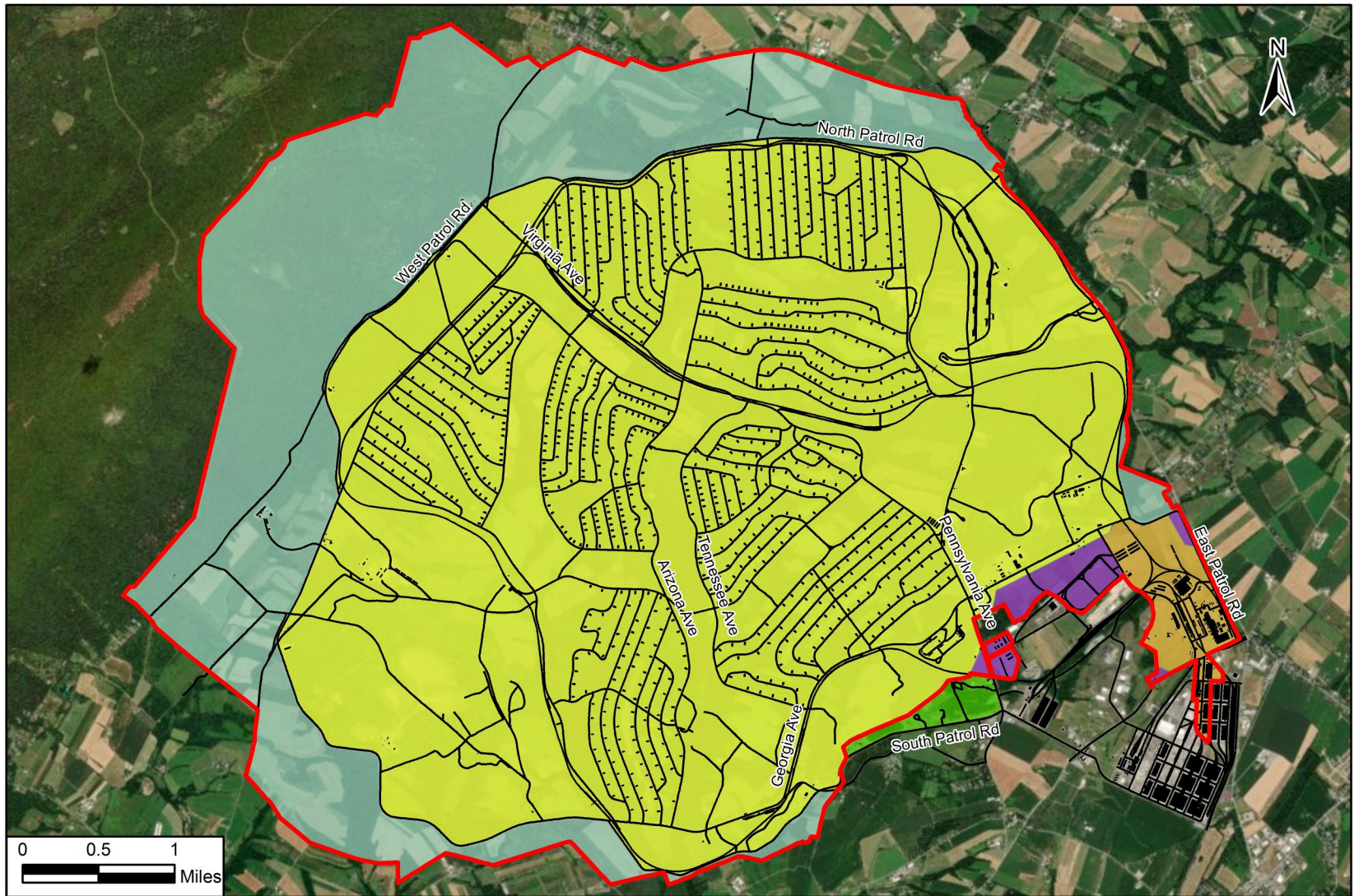
Approximately 700 of LEAD's 18,287 acres are dedicated to industrial operations and 12,335 acres are used for ammunition storage (Figure 6-1). Facilities for the maintenance mission occupy a total of approximately 30 acres of floor space. More than 60 buildings are in the maintenance area and more than 1,000 buildings are in LEAD's ASA. A demolition area is used for munitions detonation.

The depot provides supply and maintenance support to the U.S. Army, Navy, Air Force, and Marine Corps. LEAD is a nondistribution depot for supplying major end items, a distribution depot for ammunition, and a storage depot for strategic materials. In addition to providing equipment, vehicles, and fielding services, LEAD provides extensive hands-on training for the Army National Guard, U.S. Army Reserve, and foreign militaries. Field training related to field artillery storage procedures is conducted by the Army Reserve.









The installation is divided into three areas—the ASA (Zone I), Buffer Area (Zone II), and the Cantonment (or industrial) Area (Figure 6-1). Administrative and maintenance functions are in the Cantonment Area. Agricultural outleasing and outdoor recreation areas are in both Zones I and II. Descriptions of each land use type are provided below. Table 6-1 provides a breakdown of land use activities at LEAD and the associated acreage. Land cover types for LEAD and the surrounding area are shown in Figure 5-1.

Table 6-1. Land use areas, activities, and acreages

Land use areas	Associated activities	Acreage	Percent of total
Cantonment (Improved Land)	Light industrial activities, maintenance activities, administrative functions, tenant organizations, wildlife management (archery hunting)	1,179	6.45%
ASA (Semi-Improved and Unimproved Land)	Conventional ammunition storage, tactical missile storage & assembly, open burning/open detonation (OB/OD) area, functional firing range, agricultural outleasing, wildlife management, recreation (hunting and fishing)	12,335	67.45%
Buffer Area (Unimproved and Semi-Improved Land)	Agricultural outleasing, forestry management, wildlife management, recreation (hunting and fishing)	4,570	24.99%
Non-conveyed BRAC Parcel (Semi-Improved Land)	Old storage lots, housing, an old campground	203	1.11%
TOTAL ACREAGE		18,287	100.0%



LEGEND

	Buffer Area
	Ammunition Storage Area
	LEAD Boundary
	Road
	BRAC Parcel
	Building
	Cantonment Area
	Non-Conveyed BRAC Property

LEAD Layout

Figure 6-1

Source: LEAD GIS 2013.

6.1.1 Ammunition Storage Area

The ASA contains more than 900 storage igloos and is served by an extensive road network and railway. The ASA is completely secured and access is strictly controlled. The ASA occupies about 12,335 acres.

6.1.2 Buffer Area

The Buffer Area is a safety zone between the ASA and the neighboring landowners. It is a mix of open fields and woodlands. Controlled hunting and fishing and agricultural outleasing activities occur in the Buffer Area. The Buffer Area occupies about 4,570 acres. The buffer area also contains the small-arms range for the Directorate of Emergency Services.

6.1.3 Cantonment Area

The Cantonment Area is in the southeastern portion of LEAD. It occupies 1,179 acres and is used for administrative and maintenance activities.

6.1.4 BRAC Parcel

Approximately 203 acres of the land originally to be conveyed to the LRA from BRAC '95 have not been conveyed. The area is south of the ASA and west of the Cantonment Area.

6.1.5 Agricultural Outleases

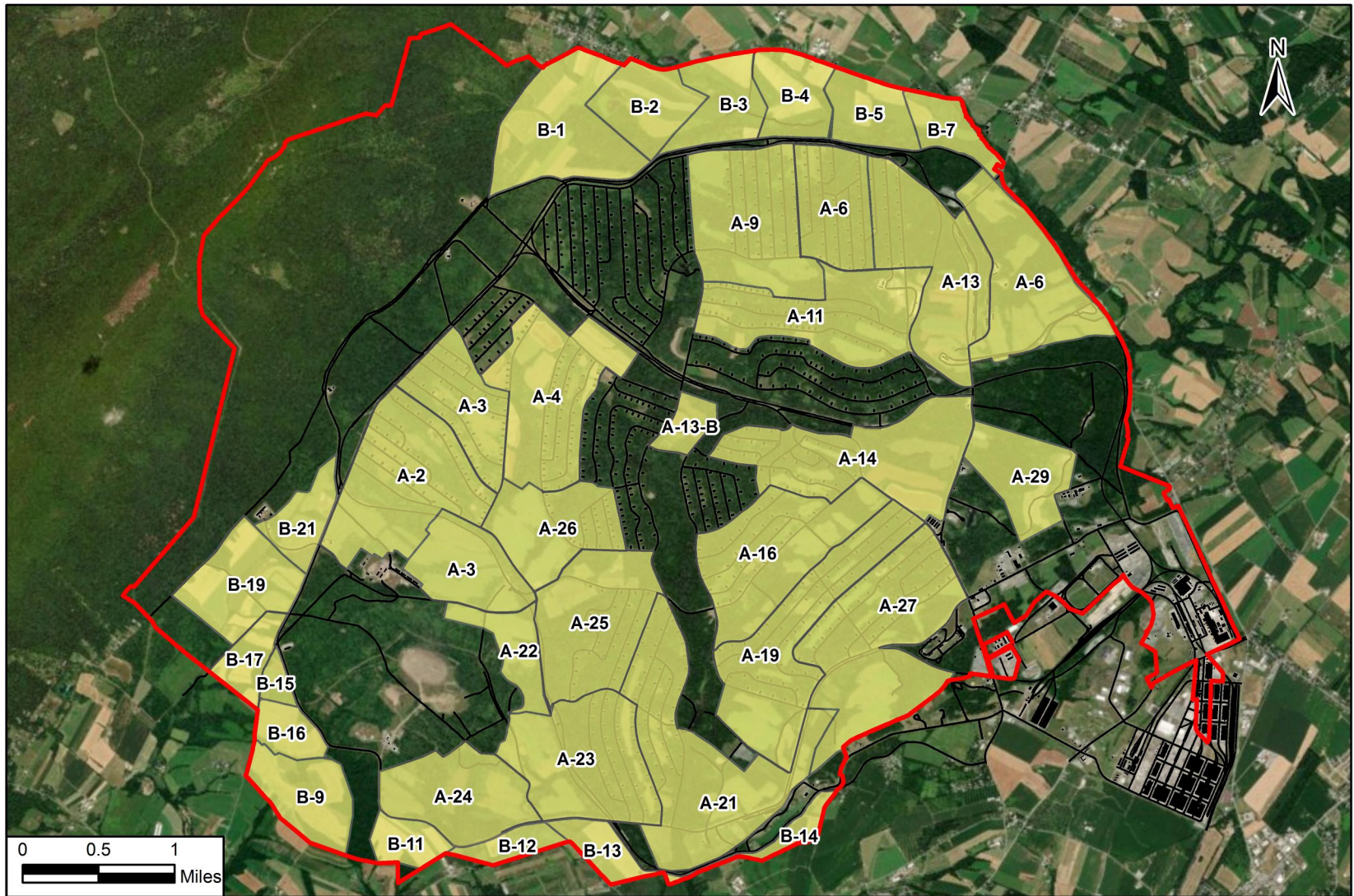
LEAD has approximately 9,600 acres of land in the ASA and Buffer Area that are leased to area farmers for crop production (see Figure 6-2).

6.2 CURRENT IMPACTS





NEPA requires review of federally supported activities or actions to assess their potential impacts on the environment. The NEPA process is designed to identify potential environmental problems early in the planning process so the proponent of the action can resolve problems in the early stages of project development. The regulations at 32 CFR Part 651 (*Environmental Analysis of Army Actions (AR 200-2)*) set forth policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision making. The following sections discuss the greatest impacts the mission has on natural resources.

6.2.1 Air Emissions

The main sources of air pollution at LEAD are open detonation (which produces primarily particulate matter [PM]), boilers, painting activities, and open burning. LEAD's total air emissions for 2018 were 190.8 tons, which includes both criteria pollutants and hazardous air pollutants (HAP). LEAD paid \$91.32 per ton to Pennsylvania for these emissions. According to the 2018 LEAD emissions summary of the criteria pollutants, in 2018 LEAD emitted 116.2 tons of PM₁₀, 5.9 tons of sulfur oxides, 19.5 tons of carbon monoxide, 0.4 ton of lead, 28.1 tons of nitrogen oxides, 34.9 tons of VOCs (which are ozone precursors), and 0.0 ton of ammonia. HAP emissions in 2018 totaled 6.8 tons.



LEGEND

-  LEAD Boundary
-  Active Agricultural Tracts
-  Road
-  Building

Agricultural Outleases

Figure 6-2

Source: LEAD GIS 2013.

LEAD is categorized as a major source or Title V facility under the Clean Air Act Amendments (CAAA) of 1990. Title V established a new federal operating permit program for all major stationary air pollution sources. Major sources include facilities with the potential to emit criteria pollutants or HAPs at or above the major source thresholds specified in Title I of the CAAA. LEAD operates under a Title V permit (permit number 28-05002) effective December 1, 2018 through May 31, 2023 (LEAD 2019, February 6).

6.2.2 Point-Source Water Discharges

LEAD has six water discharge points permitted under the National Pollutant Discharge Elimination System (NPDES) (Table 6-2). Three NPDES permits are associated with these discharge points: Permit PA0010502 (issued December 27, 2016 and expiring December 31, 2021), Permit PA0087378 (issued January 26, 2012; expired January 31, 2017; active and under review as of November 2019), and Permit PA0246891 (issued April 19, 2013; expired April 30, 2018; active and under review as of November 2019) (LEAD 2019, February 4; PADEP 2019).

Table 6-2. NPDES permits at LEAD

Outfall	Location	Type	Permit #
001	Industrial Wastewater Treatment Plant	Wastewater	PA0010502
S01	Substation Area	Stormwater	PA0010502
S02	Building 360	Stormwater	PA0010502
S03	ASA	Stormwater	PA0010502
003	Groundwater Treatment Plant	Wastewater	PA0087378
006	OB/OD Retention Pond	Stormwater	PA0246891

6.2.3 Noise

An Installation Compatible Use Zone (ICUZ) analysis was performed for LEAD to identify noise levels generated on the facility. An ICUZ analysis evaluates noise conditions produced by activities at a military installation and identifies incompatible land uses on or adjacent to the installation because of those noise conditions. These analyses provide noise contours, which are spatial graphic representations of noise levels around a noise-emitting source. The contours are defined by noise zones, which correspond to exposure guidelines. The descriptions in this document of noise sources and events at LEAD are drawn from the ICUZ analysis (Tetra Tech 1998).

The sources of noise originating from LEAD include demolition activities, firing ranges, vehicular traffic, rail equipment operations, the combat vehicle test track, the helipad, and miscellaneous equipment operations. The helipad is used infrequently, and the combat vehicle test track is considered a Noise Zone II (normally unacceptable) noise zone, which does not affect the noise environment outside LEAD. The ICUZ analysis identifies three Noise Zone II noise zones at LEAD: the functional firing range, inactive demolition ground on the mountain, and demolition ground. The annual number of detonations at the demolition ground is approximately 2,100 (Tetra Tech 1998).

6.2.4 Hazardous Materials Storage and Waste

LEAD is a RCRA-permitted treatment, storage, and disposal facility and is considered a large quantity generator based on the volume of hazardous waste generated. The installation had a RCRA Part B permit

for storage of hazardous waste for more than 90 days that expired March 3, 2006. This permit was not renewed because hazardous waste is not stored for more than 90 days.

Hazardous materials used or stored on the installation include pesticides, fuels, gasoline, PCBs, radioactive materials, solvents, paints, waste batteries, oils, grease, and antifreeze. Waste is generated from a wide variety of activities, including vehicle maintenance and equipment repair. LEAD also uses several types of radioactive materials. Pesticides and herbicides are used for grass and weed control along roadways. The disposal of hazardous waste is the responsibility of the DRMO. DRMO is also responsible for collecting the waste from the hazardous waste storage areas and removing it from the installation for off-site treatment and disposal by a RCRA-permitted facility.

6.2.5 Contaminated Site Restoration

Under the requirements of CERCLA, two areas at LEAD are listed on the National Priorities List (NPL): the Property Disposal Office (PDO) Area and the Southeastern Area. The NPL sites are broken down into Operable Units (OUs), which are potentially contaminated subsections that have been identified for focused study and investigation if necessary. Most of the OUs are in the BRAC excess area, with the exception of those below.

6.2.5.1 Property Disposal Office Area

Soil, groundwater, and surface water in the PDO area have been shown to be contaminated with chlorinated solvents that are consistent with those used at LEAD for degreasing and cleaning operations. OUs 2, 3, and 5 are the only PDO OUs out of six that are partially or completely outside the excess area (LEAD 2019, February 6).

PDO OU 2: Lower PDO Onpost and Offpost VOC Contaminated Groundwater. VOC-contaminated groundwater originated from the DRMO salvage yard and migrates downgradient to the Rocky Spring Lake. A Record of Decision was signed in July 2014 with a selected remedy of Monitored Natural Attenuation.

PDO OU 3: Mercury Detections in Rocky Spring Lake. Elevated levels of mercury were detected in Rocky Spring Lake in 1991. Site investigations, however, determined that mercury levels were well within water quality criteria and the maximum allowable concentration for fish and aquatic life (LEAD 1997, USACPPWC 1997).

PDO OU 4: Oil Burn Pit VOC Contaminated Soil and Groundwater. An Oil Burn Pit (OBP) located at the intersection of Georgia Avenue and Scale House Road was used by Letterkenny Fire Department for training purposes. As part of training exercises VOC-contaminated used oil was placed in the OBP, set ablaze, and extinguished. VOC-contaminated used oil subsequently contaminated the soil and underlying groundwater. VOC-contaminated groundwater migrates both north and south of the OBP. A pending Record of Decision has a proposed remedy of electrical resistance heating.

PDO OU 5: PCB Investigation of the Rocky Spring System. In July 1995 silt from Rocky Spring was found to contain PCBs. The source of this PCB contamination was determined to be the DRMO salvage yard 1.5 miles upgradient from Rocky Spring. PCB soil contamination was confirmed at the DRMO yard during sampling in 1995. This OU is partially outside the BRAC excess area. A Record of Decision signed in July 2014 with a selected remedy of Monitored Natural Recovery.

6.2.5.2 Southeastern Area

The Southeastern Area includes the following OUs.

SE OU 1: K Area Contaminated Soils. The VOC groundwater contamination at this site has been remediated.

SE OU 3: VOC Contaminated Groundwater, Disposal Area. A disposal area located north of Building 370 contains former landfills and disposal pits (Areas A & K). Disposal operations in the disposal area resulted in VOC contaminated groundwater. A Record of Decision signed in September 2017 with a selected remedy of In-Situ Chemical Oxidation (ISCO). Round One of ISCO injections was completed in June 2019.

SE OU 5: Area A and Area B Contaminated Soils. These areas are former waste disposal trenches and oil burning pits, respectively. Area A had a small amount of VOC-contaminated soils, which were remediated. Area B was originally deemed contaminated enough for removal action, but further tests indicated that problem levels of metals and VOCs were not in the soil. A Record of Decision was signed in June 2019. The proposed remedy for Area A is soil cover plus soil amendment to address dioxins in soil. Area B will have a remedy of Land Use Controls restricting Area B to commercial/industrial use.

SE OU 11: VOC Contaminated Groundwater, Former Industrial Waste Treatment Plant Lagoon. An Industrial Waste Treatment Plant Lagoon located along East Patrol Road leaked resulting in VOC-contaminated groundwater. A Record of Decision was signed in September 2017 with a selected remedy of ISCO. Round One of ISCO injections was completed in June 2019.

6.2.6 Obsolete Munitions Disposal

LEAD destroys all obsolete or unstable munitions at the OB/OD site, which is in the ASA. Munitions in storage that are scheduled for demolition are removed from storage, taken to the demo grounds, and destroyed. OB/OD is covered under RCRA Subpart X. LEAD is operating the OB/OD site under interim status. The Pennsylvania Department of Environmental Protection (PADEP) has received the Subpart X permit application, but it has not acted on the permit application or issued a permit.

6.3 POTENTIAL FUTURE IMPACTS

LEAD is an Army installation responsible to DoD to serve the citizens of the United States in peacetime and war, and is subject to sometimes rapid changes in mission, staffing, and budget priorities. These priority shifts often result in construction, demolition, and operational changes on the installation. Indiscriminate site selection, careless construction and development practices, and changes in environmental staffing levels can cause direct and indirect negative impacts on natural resources. LEAD is well positioned to implement and demonstrate environmentally sound land use planning and development through its land planning and NEPA processes, interagency coordination, adherence to Department of the Army guidance and regulations, and timely review and revision of its installation plans and regulations. The EMS, which has been in place since 2004, provides a framework for implementing good stewardship at all levels at LEAD.

The LEAD Industrial Core District Area Development Plan (ADP), finalized in November 2018, identifies the installation's capacity for future growth, development, and improvement within the installation's industrial foundation (LEAD 2018a). The ADP, along with the installation's Vision Plan

(LEAD 2015) and Area Development Execution Plan (LEAD 2019) are critical steps LEAD has taken towards creating an overall, comprehensive and flexible master plan. Within the framework of the Installation Master Planning process as defined in Unified Facilities Criteria 2-100-01, dated 15 May 2012, these plans are the foundation of the Real Property Master Plan. The Vision Plan identifies the planning vision, specific goals that support that vision, and measurable planning objectives that support the goals, while the ADP and execution plan provide a comprehensive strategy for future development on the installation. The plans for LEAD and their execution will comply with applicable Army planning, space, and environmental policies and standards. Programmed future projects at LEAD include constructing new and renovating or replacing existing facilities, improving infrastructure and landscape elements, and realigning facilities for improved efficiency (Figure 6-3).

Direct environmental impacts from activities on LEAD are expected to include the generation of air emissions from ongoing activities (e.g., use of paints, thinners, and degreasers; component rebuilding; facility heating) and conversion of open land to developed land from any construction that occurs and the creation of storage areas for equipment returning from overseas. Indirect impacts on the environment attributable to activities at LEAD are primarily related to employee commuting.

This INRMP strives to integrate natural resources management with other installation plans and activities, particularly the aspects and impacts sections of the EMS. It also establishes planning goals that represent a long-term vision for the health and quality of LEAD's natural resources. INRMP goals may be revised over time to reflect changing missions and environmental conditions. Any future changes in mission, training activity, or technology will be analyzed to assess their impact on natural resources. As new installation plans and Department of the Army guidance and regulations are developed, they will be integrated with the goals and management actions of this INRMP. The INRMP will be reviewed, assessed, and modified as needed regularly to ensure continued integration with other management plans or changes in military mission.

6.4 NATURAL RESOURCES NEEDED TO SUPPORT THE MILITARY MISSION

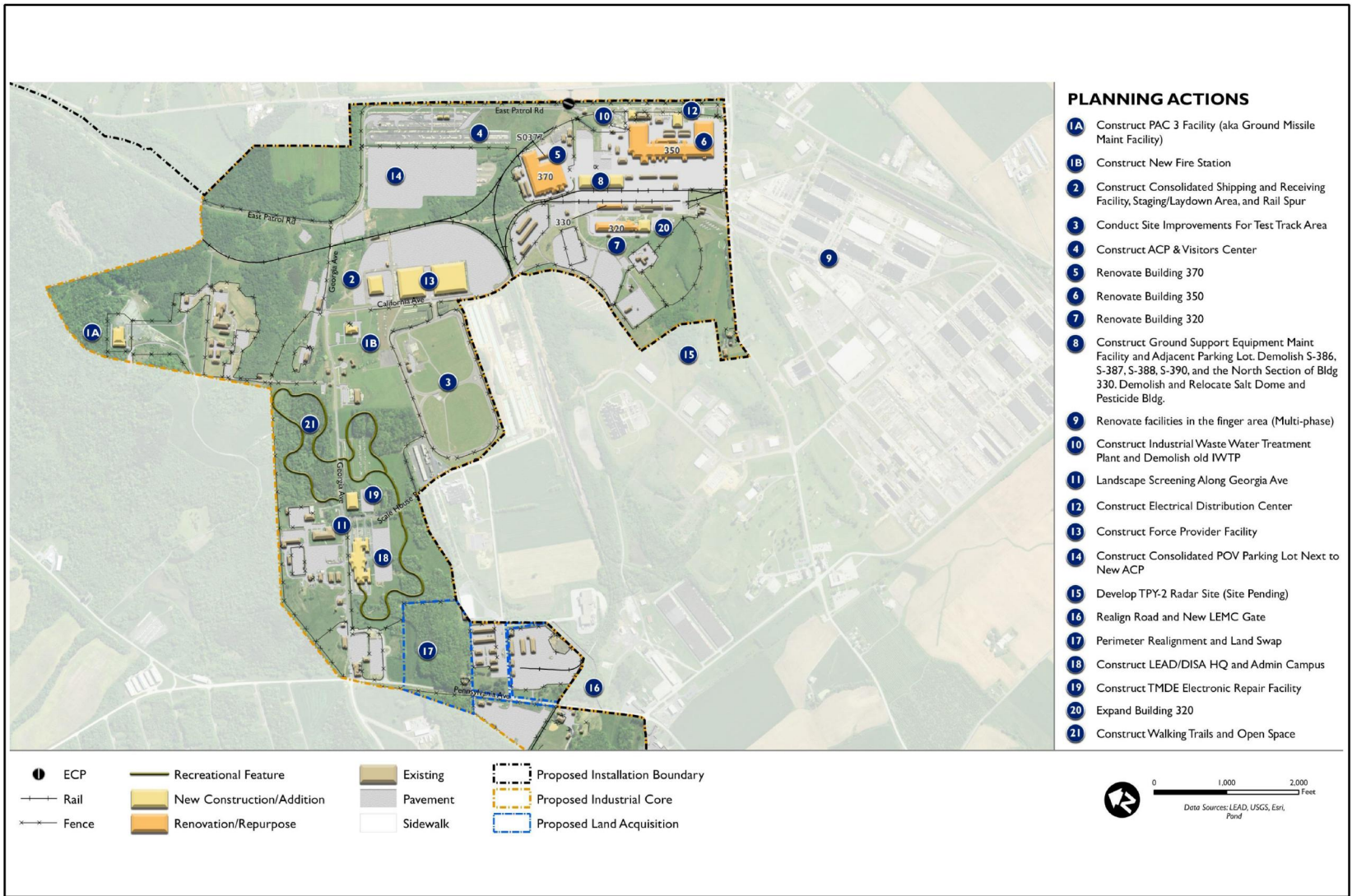
The Army recognizes that a healthy and viable natural resource base is required to support the military mission. At LEAD, ongoing mission-related activities are confined to existing facilities and roads, and most of the natural areas are outside the cantonment area. These natural resources support the mission at LEAD by providing adequate buffer zones around military activities. The natural resources of LEAD indirectly support the mission by providing an environment for recreational opportunities for installation personnel. The natural resources supporting the military mission at LEAD are discussed below.

6.4.1 Forested Land

Forests and woodlands at LEAD support outdoor recreation (hunting) and have the potential to absorb the spread of debris from an explosion in the ASA, although no explosions have ever occurred at LEAD.

6.4.2 Non-Forested Land

Undeveloped and semi-developed lands at LEAD provide a high-quality setting and environmental infrastructure for LEAD's missions. Non-forested, non-paved land at LEAD supports a wide variety of mission elements at LEAD, including conventional ammunition storage, the OB/OD areas, outdoor recreation (hunting and fishing), and agricultural outleasing. The OB/OD areas depend on the availability of soil and vegetation to absorb the impact of burning and detonation activities. Open habitat for wildlife, particularly northern bobwhite quail (*Colinus virginianus*) and pheasants (*Phasianus colchicus*), complements the hunting program by providing game species diversity.



Future Development

Figure 6-3

6.4.3 Developed Land

Developed land at LEAD supports the installation's missions, including light industrial activities, maintenance activities, administrative functions, tenant organizations, conventional ammunition storage, and tactical missile storage and assembly. The environmental infrastructure on undeveloped and semi-developed lands provides services that contribute to LEAD's efforts to manage stormwater, conserve soil, maintain and enhance air and water quality, provide comfortable indoor and outdoor temperatures, and maintain an aesthetically pleasing place to live and work. Installation natural resources also contribute to the positive quality of life for military and civilian personnel who work on-post and those who reside nearby.

6.4.4 Streams and Impoundments

Streams and impoundments on LEAD provide fishing opportunities and passive stormwater management functions that benefit the entire installation.

Implementing this INRMP helps to ensure that environmental considerations will continue to be an integral part of planning activities at LEAD and that natural resources will be protected in accordance with ARs and policies. Implementing appropriate management measures and considering alternatives to these measures as they are developed limits the potential for serious alterations to natural resources and will result in an effective, long-term approach to natural resource protection and conservation. The resource-specific management measures that will be employed to protect, conserve, and enhance the natural resources and to minimize or prevent environmental degradation at LEAD are discussed in detail in Section 7.

6.5 NATURAL RESOURCES CONSTRAINTS TO MISSIONS AND MISSION PLANNING

6.5.1 Habitat for Rare, Threatened, and Endangered Species

Habitat areas suitable for the federally listed Indiana bat (endangered), NLEB (threatened), and northeastern bulrush (endangered) have been identified on LEAD. The NLEB has been captured on the installation and the potential exists that one or both of the other species resides at LEAD. The suitable habitat areas could create a constraint to missions that would otherwise use these areas, although no mission use of these areas is planned in the foreseeable future. USFWS consultation and site-specific survey work would be required before conducting missions affecting forested habitats (Indiana bat and NLEB) or wetlands (northeastern bulrush) in the ASA.

The state-listed eastern spadefoot (endangered), Allegheny woodrat (threatened), and brown sedge (species of special concern) have been identified at LEAD, as has habitat suitable for each species. Consultation with the PGC or PNDI and site-specific survey work would be required before conducting missions in flood-prone areas (where the eastern spadefoot could occur), wetland areas (where brown sedge could occur), and in rock outcrops, talus slopes, caves, or oak forest (where the Allegheny woodrat could occur).

6.5.2 Wetlands

Because of the size and habitat complexity of LEAD, no comprehensive wetland delineation has been performed. Wetland delineations are done as needed for construction or operational changes that might

have impacts on wetlands. The presence of wetlands could limit certain mission activities or proposed actions because of federal, state, and local compliance requirements.

6.5.3 Other Sensitive Habitat Areas

A small number of vernal pool habitats have been identified and mapped at LEAD through joint surveys conducted by LEAD and by Shippensburg University, and it is possible that additional vernal pools exist on the installation. These habitats are not specifically regulated by federal or state laws or regulations (although they could fall under regulation as wetland areas) but are habitats of concern among naturalists and biologists. Potential impacts on these areas would be considered if missions were to be conducted in these areas.

6.5.4 Highly Erodible Soils

None of the soil series at LEAD are highly erodible (USDA NRCS 2019). However, two soil series on LEAD—Brinkerton and Melvin—are moderately erodible.

6.5.5 Steep Slopes

Steep slopes are present at LEAD in the Buffer Area at the northwest side of the installation. These slopes, which are often also stony, would present a constraint on construction and on any military mission that requires more level terrain. No active military use of the Buffer Area is planned in the foreseeable future.

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SECTION 7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1.1 Letterkenny Army Depot

As presented in Chapter 2, LEAD is ultimately responsible for INRMP implementation. The roles of the organizations at LEAD that are directly responsible for or are providing assistance in this INRMP implementation are described below.

7.1.1.1 Installation Commander

The Commander is directly responsible for operating and maintaining LEAD, including implementing and enforcing this INRMP. The Commander is responsible for outdoor recreation activities at LEAD, including hunting and fishing, and has the authority to delegate to members of his command all or portions of the management of outdoor recreation activities and fish and wildlife management. The Commander retains the exclusive approval authority for use of normally restricted areas for wildlife management control.

7.1.1.2 Directorate of Public Works

DPW directs, supervises, and coordinates the planning, organizing, staffing, and controlling of all facilities. Divisions under the supervision and management of DPW are Engineering and Planning Division, Construction and Transportation Division, Business Operations Division, and the EMD. The Engineering and Planning Division directs and coordinates the management, maintenance, repair, modification, and new construction of depot real estate, real property, and utilities systems for LEAD. The EMD is responsible for natural resource management and cultural resources management at the installation and other environmental programs. The EMD also manages compliance with LEAD hunting and fishing regulations. However, law enforcement and security issues, such as access to the ASA, are managed by personnel of the DES.

The Natural Resources Office is staffed by two personnel, the Natural Resources Manager and a technician.

7.1.1.3 Human Resources

The Human Resources office at LEAD provides staffing assistance for the EMD, in support of programs and projects designed to implement this INRMP.

7.1.2 Other Defense Organizations

7.1.2.1 U.S. Army Aviation and Missile Life Cycle Management Command

AMCOM, as LEAD's Major Command (MACOM), is responsible for requesting and distributing budget for all organizations and installations under its command. The MACOM is the decision-making authority tasked with prioritizing the operational, organizational, material, and environmental needs of these organizations and providing the funds and higher-level support for required equipment and activities. Other defense organizations and proponents will assist with the INRMP implementation (such as the Fire Management Program).

7.1.2.2 U.S. Army Materiel Command

AMC is the MACOM assisting LEAD in developing and implementing conservation programs and reviewing and providing final signatory approval for this INRMP. In addition, AMC reviews budget requests and disburses funding to the installation to administer and implement many of the projects and programs described in this INRMP.

7.1.2.3 Letterkenny Munitions Center

LEMC, a tenant of LEAD, receives, stores, issues, renovates, and demilitarizes conventional ammunition. LEMC assembles, disassembles, and tests various Air Force and Navy missile systems. LEMC also maintains/modifies missiles and their components and has the capability to build certain missiles. LEMC oversees OB/OD grounds, including construction projects on these grounds.

7.1.2.4 U.S. Army Corps of Engineers, Baltimore and Norfolk

USACE Baltimore District provides environmental, planning, and engineering support for LEAD. The Baltimore District is also the regulatory district for LEAD and provides technical support and jurisdictional determinations for wetlands and waterways on the installation. This support can include wetland identification, special area management plans, mitigation assistance, and interpretation of both federal and state laws. In addition, the USACE Norfolk District, Real Estate Division, provides environmental planning support for timber operations occurring at LEAD.

7.1.3 Other Federal Agencies

Several federal agencies, in addition to the DoD and LEAD, have an interest or a role in the management of the natural resources at LEAD. The involvement of these agencies is based on signatory responsibilities, cooperative agreements, regulatory authority, and technical assistance as required by federal laws and regulations. The agencies and their roles and responsibilities are described below.

7.1.3.1 U.S. Department of the Interior, U.S. Fish and Wildlife Service

USFWS is a signatory to the INRMP and has a vested interest in the conservation, protection, and management of the fish and wildlife resources at LEAD. USFWS is the primary federal agency for issues regarding fish and wildlife management and the regulatory authority for the ESA and the Migratory Bird Treaty Act (16 U.S.C. 703-711).

7.1.3.2 U.S. Department of Agriculture, Natural Resources Conservation Service

NRCS works in cooperation with LEAD to prevent soil erosion and restore eroded areas on the installation by assisting through planned conservation treatments and the agricultural outleasing program. NRCS, formerly the Soil Conservation Service, helped develop leasing terms for the agricultural outleasing program. LEAD also coordinates with USDA, APHIS for conducting non-native invasive species surveys, including the spotted lantern fly (*Lycorma delicatula*) and Asian gypsy moth (including *Lymantria dispar asiatica*, *L. d. japonica*, *L. albescens*, *L. umbrosa*, and *L. postalba*) (to date none of the species have been detected at LEAD).

7.1.3.3 U.S. Department of Agriculture, U.S. Forest Service

USDA has delegated to the USFS responsibility for carrying out the provisions of the Cooperative Forestry Assistance Act of 1978 (16 U.S.C. 2101) by providing technical assistance and funding to meet

specific pest management objectives. The DoD has a written interagency agreement with the USFS for cooperative assistance for forest insect suppression, including population monitoring, surveys, biological evaluations, trends, and projected damage for the control of gypsy moths. The USFS conducts a Forest Health Monitoring Program in cooperation with other federal and state agencies and some academic institutions. The program's objective is to develop national monitoring and reporting procedures for the status and trends of forest ecosystem health. LEAD regularly receives USFS technical assistance in areas of gypsy moth monitoring and control.

7.1.3.4 U.S. Army Center for Health Promotion and Preventative Medicine

The mission of the U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM) is to provide preventative medicine and health promotion leadership, direction, and services for the Army. Assistance from USACHPPM is important for monitoring and controlling diseases that can be contracted from tick bites (e.g., lyme disease) and other parasites.

7.1.4 State Agencies

7.1.4.1 Pennsylvania Game Commission

PGC is a signatory to this INRMP. PGC has a vested interest in the conservation, protection, and management of the game and non-game wildlife at LEAD. PGC is the primary state agency in Pennsylvania for issues regarding wildlife management and the regulatory authority behind the rules and regulations for hunting and trapping. Ongoing informal and formal dialog occurs among PGC offices and the LEAD EMD.

7.1.4.2 Pennsylvania Fish and Boat Commission

PFBC is the primary Pennsylvania agency for issues regarding fish management, water recreation, and the regulatory authority behind the rules and regulations for fishing and boating in surface waters. Ongoing informal and formal dialog occurs among PFBC offices and the LEAD EMD.

7.1.4.3 Pennsylvania Department of Conservation and Natural Resources

DCNR is the primary Pennsylvania agency for issues regarding flora habitat and conservation. Ongoing informal and formal dialog occurs among DCNR offices and the LEAD EMD.

7.1.4.4 Pennsylvania Department of Environmental Protection

PADEP is one of the primary agencies approving LEAD's prescribed burn plan and LEAD also coordinates with PADEP in monitoring tick biology and diseases....

7.1.5 Universities

LEAD works on a limited, project-by-project basis with Shippensburg State University for wildlife and plant research on LEAD, including Allegheny woodrat trapping, bog turtle habitat assessments, tick biology and disease vectoring, and vernal pool studies. LEAD has also sought technical support from nearby universities, including Harrisburg University, Pennsylvania State University, Shippensburg University, and West Virginia University, on a limited basis to assist in conservation projects at the installation. Pennsylvania State University was responsible for preparing the Fish and Wildlife Management Plan that was prepared in 1988 and revised in 1991.

7.1.6 Contractors

Contractors provide LEAD with technical support for natural resources and environmental management projects. This technical support includes preparing the INRMP, conducting NEPA analyses and preparing documentation, and conducting cultural and biological resource surveys.

7.1.7 Other Interested Parties

The LEAD Rod and Gun Club actively supports fish and wildlife conservation efforts at LEAD. More than 12,000 volunteer hours are donated each year in support of fish and wildlife. LEAD employees, retired LEAD employees, and retired military may donate a minimum of 10 hours per year to obtain additional fishing or hunting privileges at the installation. This time is used to support a wide array of conservation projects, including stocking fish, planting trees and shrubs, maintaining food plots, running check stations, conducting deer surveys, constructing and maintaining nest boxes, managing game bird rearing, maintaining archery ranges, and conducting hunter safety courses.

The local chapter of the National Audubon Society has organized bird surveys on the installation and supported conservation efforts on behalf of rare and uncommon species of birds.

Pheasant Forever, Inc. has one full-time habitat biologist and one part-time technician on staff at LEAD to support the Bobwhite Quail Focus Area (BQFA) (see section 7.4.1.2) restoration efforts. The local Cumberland Valley Chapter of Pheasant Forever also supports LEAD in quail restoration efforts.

7.2 GEOGRAPHIC INFORMATION SYSTEMS

LEAD's geographic information system (GIS) assists the natural resources management staff in effective natural resources management planning and decision making.

7.2.1 Coverages

GIS layers that are, or will be, included in the database that are important for natural resources management are agricultural leases, forestry management zones, invasive species, hunting management areas, wetlands, and stream buffer zones, creeks and streams, vegetation mapping, habitat improvement project sites, and such. Some other specific coverages are food plots, reptile and amphibian surveys, fruit trees, critical habitat of threatened and endangered species, and deer survey maps. As new natural resources projects develop and as the mission at LEAD changes, this list will grow.

7.2.2 Equipment Availability

The Natural Resources Office is equipped with a Trimble global positioning system (GPS), GeoExplorer software, and ArcGIS 9 (ArcMap Version 9.3) software. This equipment and computer software is shared with other groups in the Environmental Office at LEAD. The Natural Resources Office has three Garmin handheld GPS device for field use and that are compatible with the ArcGIS software.

7.2.3 Resources Mapping Status

The natural resources GIS database is regularly updated with additional information for existing layers and new layers relating to natural resources management. As needed and as time allows, some natural resources items, such as selected threatened and endangered or invasive species, are mapped more thoroughly. Layers are also updated as geographical, environmental, or regulatory changes take place.

7.2.4 Interface with Other Planning Processes

The GIS layers that are important for natural resources management are often used in other planning processes. Viewing the coverages allows for a rapid assessment of a site’s potential when considering construction, changes in agricultural leases, utility lines, and such. For this reason, it is imperative to keep layers such as wetlands, threatened and endangered critical habitats, streams, and agricultural leases as current and accurate as possible.

7.3 FISH AND WILDLIFE COOPERATIVE PLAN

The Fish and Wildlife Cooperative Plan is that component of the INRMP that describes how the fish and wildlife resources at an installation will be managed. The following management methods and policies collectively constitute the Fish and Wildlife Cooperative Plan in accordance with AR 200-1 and 16 U.S.C. 670a.

7.4 FISH AND WILDLIFE MANAGEMENT

The goals of the wildlife management program at LEAD are to restore and maintain indigenous wildlife species through the use of integrated ecosystem management principles while accommodating military needs. Furthermore, wildlife resources and habitats for consumptive and nonconsumptive uses are to be managed in compliance with federal and state laws (e.g., Sikes Act, ESA, CWA, and state laws) and ARs (e.g., AR 200-1) and guidance.

7.4.1 Non-Game Fish and Wildlife Management

7.4.1.1 Species Surveys

The LEAD Natural Resources Office in conjunction with Shippensburg University have conducted small mammal, reptile, and amphibian surveys to ascertain the abundance and distribution of species on the installation, and these studies continue in the form of graduate student work conducted on LEAD. Survey methods used include night spotlight surveys, live trapping and marking, trap and funnel pit fall arrays, and bat mist-netting.

7.4.1.2 Bobwhite Quail Management

The PGC and LEAD entered a MOU to create a BQFA on approximately 3,680 acres of land on LEAD with 1,500 acres of the BQFA established as year-round quail habitat (PGC and LEAD 2017). The agreement is permitted under DoDI 4715.03, Natural Resources Conservation Program, which allows DoD installations to enter into cooperative agreements with states, local governments, non-governmental organizations and individuals to provide for the maintenance and improvement of natural resources or conservation research on or off DoD installations.

The Northern Bobwhite Quail (*Colinus virginianus*) is a native bird of Pennsylvania and has been declared to be extirpated (no known existing wild populations) in Pennsylvania by the PGC. LEAD was one of the last known locations to have had a wild native bobwhite quail population. The partnership between LEAD and PGC will create a 3,680-acre BQFA that includes a variety of habitat types with diverse wildlife and plant species. Year-round quail habitat will be established on 1,500 acres of the area. The focus area is on the western portion of LEAD at the base of the North Mountain. It encompasses a variety of habitat types including reverted agricultural lease fields, woodlands, open areas, ponds and watercourses, and some buildings.

The MOU, which became effective June 12, 2017, specifies the provisions to which LEAD and PGC individually and jointly agree (see appendix J). The MOU expires 9 years from its effective date (June 11, 2026). LEAD and PGC will review and evaluate the MOU annually, it is open to amendments upon agreement of both LEAD and PGC, and both LEAD and PGC have the right to cancel the MOU with or without cause with 30-days' written notice to the other party.

LEAD developed a BQFA Management Plan that provides details on how the BQFA and the quail population will be managed (Keller 2017). Of note are the following prohibitions within the BQFA: releases of wildlife species other than wild bobwhite quail, dog training, and quail and pheasant hunting.

The BQFA will be managed using a variety of habitat management practices and techniques. Prescribed fire will be used as a habitat management tool to control invasive vegetation and to thin and maintain native grass stands and perennial and annual forb stands. Prescribed fire will also reduce coarse woody debris left over from tree clearing. Disking will be used to thin stands of native grasses and promote forb growth within fields or along border edges. Herbicide applications will be done to control undesirable plants while establishing native forbs and grasses. Mechanical means other than disking (i.e., heavy machinery and hand tools) will be used to remove overstory, maintain shrub cover, and control non-native vegetation. Finally, both planting and allowing natural regeneration will be used to establish annual and perennial forbs, native warm-season grasses, and shrubs.

These management techniques will be used to establish, manage, and maintain a mixed mosaic of early successional habitats that incorporate the three primary habitat needs of bobwhite quail: nesting cover, brood habitat, and protective habitat. Each habitat need is summarized below.

- **Nesting Cover:** a variety of habitats are suitable for Northern Bobwhite Quail nesting. Typically, quail nesting habitat consists of clump or bunch grasses where females can burrow underneath and use the grass for overhead protection. Native warm-season grass varieties generally are considered ideal for this cover.
- **Brood Habitat:** brood habitat supports a diversity of native forbs that provide food throughout the year for quail and an abundance (25–75 percent) of bare ground that allows for quail chick movement while still providing overhead concealment.
- **Protective Habitat (“Headquarters”):** shrubs are important and provide many benefits to bobwhite quail throughout the year, such as escape cover from predators, cool resting areas during the summer, and cover to avoid snow and ice in the winter.

The BQFA management plan also specifies different habitat goals for different types of habitat—forestland, shrubland, and herbaceous openings. The overall goal for forestland is to maintain and enhance mature forest stand structure and long-term integrity of forest ecosystem processes. Two primary forested habitats are desired within the focus area. First, an Oak Savannah type system where basal area is reduced and a strong herbaceous component is allowed to grow within the understory to provide a hard-mast food source as well as nesting and brood habitat in the understory. Second, stream corridors and riparian areas to protect water temperatures that support a variety of aquatic life. Forestland management will affect only a small amount of acreage within the focus area.

Shrubland habitat provides escape cover, thermal cover, and resting areas for quail throughout the year. Existing shrub habitat beneath the current canopy will be used and shrubland acreage along forested stand edges, surrounding agricultural fields, and throughout both native warm-season grass and forb stands will be increased and enhanced.

Herbaceous Openings will be created and maintained to provide a mosaic of both nesting and brood rearing habitat. The two primary herbaceous cover types are native warm-season grasses and annual and perennial forbs. Food plots (including agricultural lease areas) qualify as herbaceous openings and will be managed to provide annual winter forage.

7.4.2 Enforcement of Fish and Wildlife Laws

The enforcement of fish and wildlife laws is performed in conjunction with the commanding officer at LEAD. For major hunt days, the DPW appoints a Hunting Program Coordinator(s) (HPC) who has operational control over the major hunt day activities in conjunction with the LEAD Natural Resources Manager. All volunteers, staff, and the Fish and Wildlife Conservation Officers (FWCOs) work under the operational control of the HPC or the Natural Resources Manager.

DES provides a minimum of one fully trained officer to serve as a full-time FWCO. All nonsupervisory uniformed law enforcement personnel may volunteer to serve as FWCOs. These officers must receive appropriate state and applicable federal fish and wildlife conservation training and receive annual training in fish and wildlife law enforcement. Full-time is understood to mean that on the day of the hunt, the trained officer is assigned to enforce fish and wildlife laws as his/her sole duty. If an FWCO is needed to assist with a security emergency, and no other security officer is available, the appropriate security supervisor must obtain the concurrence of the HPC or Natural Resources Manager, if possible, before pulling an FWCO from his/her FWCO duties.

FWCOs are solely responsible for enforcing fish and wildlife laws. Thus, if a security officer encounters a situation that is or could be an infraction of fish and wildlife laws, he or she must immediately request assistance from the FWCOs. The security officers deal with all other non-wildlife, security-related issues as they normally do.

DES provides routine patrols and staffing to include manning the ASA gate at the Recreation Area on major hunt days. The extent of staffing for normal security issues is decided by DES. If DES decides that extra manning is required to enforce security measures inside the hunting zones, he or she must inform the HPC or Natural Resources Manager of how many officers will be added since they are responsible for knowing who is in the hunting area. If the HPC feels that he or she needs assistance, he or she can and should make that request to the appropriate security supervisor. If staffing permits, every effort is made to grant the request for assistance.

The HPC briefs volunteers and ensures that all volunteers are signed into the hunting area. All comments on alleged violations of federal, state, or LEAD hunting regulations or the hunting program are to be made in writing, signed, and given to the HPC at the recreation area before departing the hunting site. A form is available for such comments. No other comments or complaints are accepted. The HPC, in conjunction with the depot's Natural Resources Manager and DPW, makes a recommendation to the Commander on actions to be taken in regard to each comment or allegation received.

7.4.3 Hunting, Fishing, Trapping Program Organization and Management.

The Natural Resources Office biological technician serves normally as the HPC. LEAD sells permits for fishing, hunting, and trapping to interested people yearly in accordance with all applicable federal and state hunting, fishing, and trapping laws and regulations. Personnel who work at or are retired from LEAD and retired military may perform 10 hours of voluntary conservation work projects to receive additional benefits and access to hunt, fish, or trap on the installation. The Natural Resources Office holds a general public meeting in mid-June to provide hunting applications and to inform the public on hunting,

fishing, and trapping opportunities at LEAD. Hunting permit applications are available mid-June, and hunting is open to the public. All hunting permit applications and associated fees must be returned to the Natural Resources Office by the end of July. Fishing permits are sold throughout the year as requested to individuals with the appropriate licenses and who have completed the required work projects. Trapping permits are sold in the fall before the trapping season.

7.4.4 Hunting, Fishing, Trapping Programs

All hunting and fishing activities on LEAD must comply with Hunting and Fishing Regulations 420-16 and 420-5 (see appendix C). Trapping activities must comply with the Trapping Program at LEAD (appendix C). Rules and regulations for the hunting and trapping programs were developed by the EMD. All hunters and fishers are subject to Pennsylvania hunting, fishing, and trapping laws and regulations.

7.4.4.1 Hunting Program

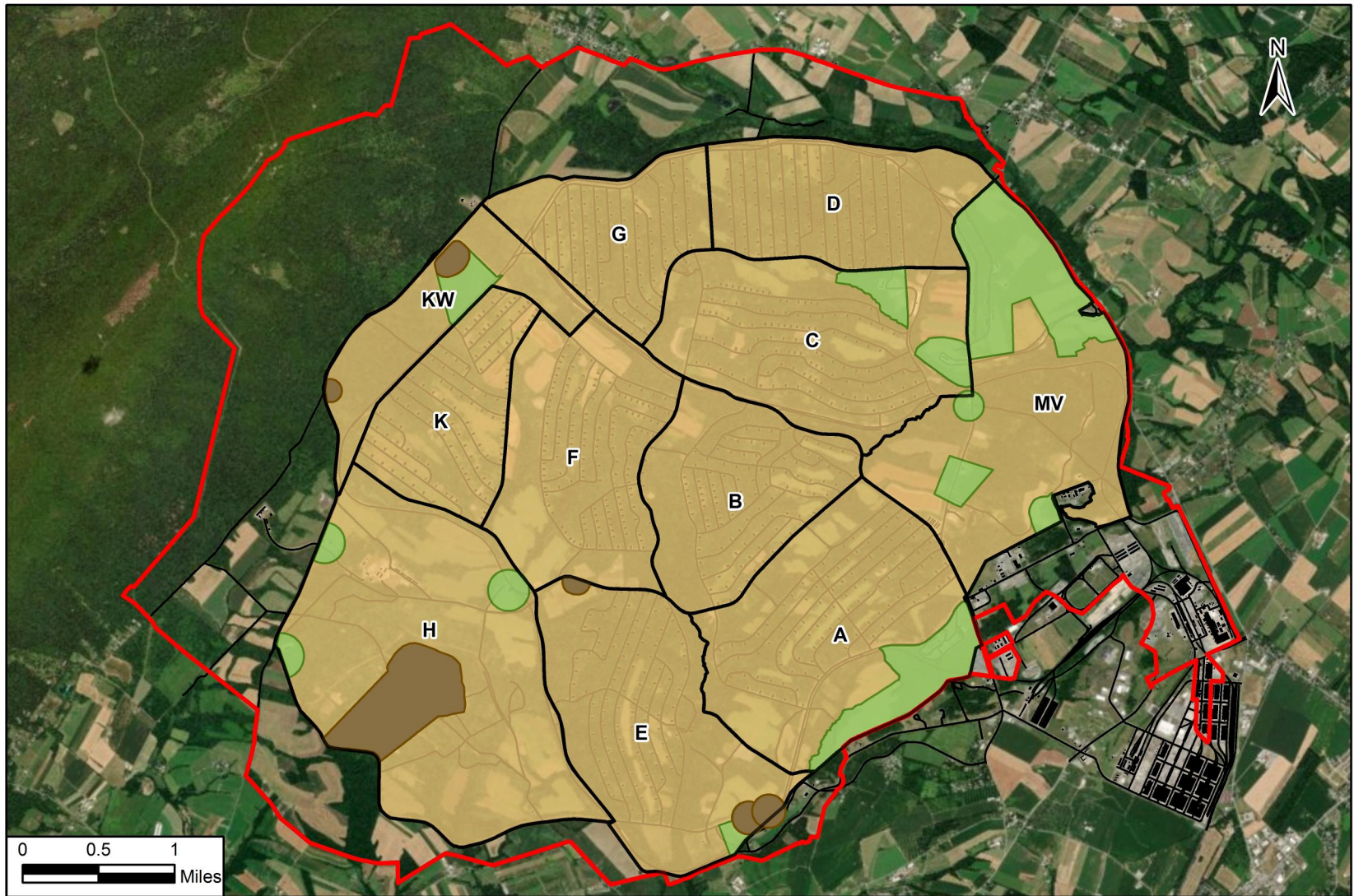
White-tailed Deer Hunting

The overall goal of the deer hunting program at LEAD is to maintain a sustainable population of white-tailed deer and prevent the herd from causing severe crop damage and habitat degradation. The EMD tracks white-tailed deer because they are the main hunted species on the installation. White-tailed deer management studies are used to determine population characteristics and habitat carrying capacity, and provide a basis on which to make annual harvest decisions. This tracking indicates that hunting pressure and control measures are sufficient to control the deer population, and the deer harvest data indicate that the deer are relatively healthy. Deer hunting statistics are presented in appendix D.

Two zones were created to aid in managing the hunting program. Zone I (the ASA) is a 12,335-acre restricted area, divided into 11 hunting areas (Figure 7-1) and Zone II is a 4,570-acre Buffer Area. Both zones are open to the public with restrictions. Eligible hunters may sponsor two guests during certain hunting seasons. For the antlered deer (shotgun) season, all general public are randomly drawn to hunt. A summary of LEAD hunting regulations is in appendix C. Limited archery hunting also occurs within the Industrial Area or cantonment on weekends in designated hunting locations to reduce the deer population. The maximum daily number of hunters allowed in Zone I is 430 during shotgun season and 550 during archery season; the maximum daily number of hunters allowed in Zone II is 250 during shotgun season; the maximum number of hunters in the Industrial Area depends on the number of designated hunting locations available but generally approximately 30.

The amount of hunting and fishing at LEAD depends on species populations and state laws. Antlered deer hunting is restricted to holidays and Saturdays during the regular Pennsylvania hunting season in Zone I. LEAD requests a special PGC waiver each year allowing it to establish its own antlerless deer season to achieve harvest objectives in Zone I. In Zone II, hunters follow all state season and bag limits.

All hunters desiring to hunt deer at LEAD are required to show proof of attendance at any state, National Rifle Association, or hunter safety course. In addition, all hunters must have valid applicable federal and state licenses. During the firearms season, hunters can use muzzle loaders or shotguns, 20 gauge and higher, plugged to a three-shot maximum. The shotguns may be manually operated or semi-automatic, and the gun must have front and rear rifled sights or scope. Center-fire rifles or shotgun-rifle combos are not permitted.



LEGEND

-  LEAD Boundary
-  Road
-  Building
-  Hunting Area
-  No Hunting
-  Archery Only (No Gun)

Hunting Areas

Figure 7-1

Source: LEAD GIS 2013.

Big Game Hunting

Other big game species known to live in the area and the hunting of which is regulated by state and federal hunting regulations are the black bear (*Ursus americana*) and eastern wild turkey.

Small Game Hunting and Trapping

Small game species in the area are waterfowl, ring-necked pheasant, ruffed grouse, gray squirrel, red squirrel (*Tamiasciurus hudsonicus*), eastern cottontail (*Sylvilagus floridanus*), American crow (*Corvus brachyrhynchos*), and fish crow (*C. ossifragus*). These animals are regulated by PGC and have specific dates for hunting. Small game species that have open hunting periods all year long are the coyote (*Canis latrans*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), woodchuck (*Marmota monax*), and long-tailed weasel (*Mustela frenata*).

LEAD trapping regulations are presented in appendix C. All trappers must sign a release form to be considered for trapping on LEAD. Species regulated by PGC for trapping are the beaver (*Castor canadensis*), bobcat (*Lynx rufus*), coyote, gray fox (*V. cinereoargenteus*), long-tailed weasel, mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), striped skunk, and Virginia opossum.

7.4.4.2 Fishing Program

Per AR 200-1, the fisheries management program on Army installations must provide for the management of the fish populations and their habitats consistent with accepted scientific principles, in compliance with the ESA and other applicable laws and regulations. The program emphasizes the maintenance and restoration of habitat favorable to the production of indigenous fish, particularly federally listed species protected under the ESA, although no federally listed fish species are found on or in the immediate vicinity of LEAD. In addition, the fisheries are managed to conserve both game and non-game species.

The goal of fisheries management at LEAD is to enhance quality recreational fishing opportunities for anglers while maintaining a balanced and diverse aquatic ecosystem. The waters at LEAD offer a variety of angling opportunities for both coldwater and warmwater species. The water bodies principally used for fishing are Shirley's Pond, Coles Pond, Henry's Pond, Bud's Lake, Lake Letterkenny, Rocky Spring's Lake, Muddy Run, and Keasey Run (see Figure 4-3). A fish advisory is in place for Rocky Spring's Lake because of PCB contamination. A now idle fish rearing facility was once used to rear trout for release in lakes and streams at LEAD. Rocky Springs Lake was closed to fishing on September 9, 1995, but it reopened to catch and release fishing in April 2000. The EMD tracks angler success and effort using survey forms provided to anglers (Figure 7-2).

7.4.4.3 Fees

Hunting participants are charged a nominal fee to use the designated hunting locations on the facility. In accordance with the Sikes Act and AR 200-1, which stipulates that 10 percent or less of the revenue from hunting and fishing permits may be used for administrative support, and the other 90 percent must be used to support the fish and wildlife programs at the installation. Fees are used to offset the cost of managing natural resources for outdoor recreational areas and to improve the natural environment in the base. Public participation is allowed and regulated by the Natural Resource Manager. However, restrictions on public participation in the harvesting of fish and game are required to ensure safety while efficiently accomplishing the depot's mission.

LEAD Fishing Register								
PLEASE READ AND SIGN THIS REGISTER AND COMPLETE THE FISHING LOG.								
Authorized personnel desiring to fish at LEAD must complete this form. This form must be in your possession while fishing. Complete this form whether or not you catch fish. After your fishing trip, please deposit at the Main Gate or Post 2:								
I agree to abide by all LEAD Fishing Season Controls and Pa. Fish and Boat Commission laws. I understand that violations will result in revocation of my LEAD Fishing Permit.								
Angler Signature:			LEAD Permit No.			Date:		
Security Officer:								
Fishing Log								
LOCATION 1: HOURS FISHED:								
SPECIES	NUMBERS		SIZES (INCHES)					
	CAUGHT	KEPT	< 6"	6-9"	9-12"	12-15"	>	15"
RAINBOW TROUT								
BROOK TROUT								
BROWN TROUT								
BASS								
BLUEGILL								
CRAPPIE								
CATFISH								
CARP								
OTHER								
LOCATION 2: HOURS FISHED:								
SPECIES	NUMBERS		SIZES (INCHES)					
	CAUGHT	KEPT	< 6"	6-9"	9-12"	12-15"	>	15"
RAINBOW TROUT								
BROOK TROUT								
BROWN TROUT								
BASS								
BLUEGILL								
CRAPPIE								
CATFISH								
CARP								
OTHER								
PLEASE RATE THE OVERALL QUALITY OF YOUR FISHING TRIP ON LEAD. (circle a number)								
1 (poor)		2		3		4		5 (good)
AMSAM Form 2809 (Rev. 12 Feb 02)								

THANK YOU FOR PROVIDING THE INFORMATION.

Figure 7-2. LEAD fishing register and log

All persons who hunt, fish, and trap on LEAD are subject to Pennsylvania hunting, fishing, and trapping laws and regulations. These laws and regulations are strictly enforced at LEAD.

7.4.5 Demand for Hunting and Fishing

Although LEAD does not track annual demand numbers, the demand for hunting, particularly deer hunting, is very high. Both LEAD employees and persons in the surrounding area come to LEAD during the fall for the deer harvest. To meet the demand, LEAD applies to PGC annually for a waiver to allow the hunting of antlerless deer.

There is very little demand for fishing at LEAD. Fishermen occasionally come in for recreational fishing in the lakes and ponds.

7.4.6 Wildlife Education and Interpretation Programs

LEAD is active in the community in educating youth about wildlife and the natural world. The Environmental staff takes mounted wildlife specimens to schools, at their request, to teach the children about wildlife and species habitat.

7.4.7 Wildlife Problems and Techniques Used for Wildlife Control

The wildlife considered to be pests at LEAD include mice, rats, woodchuck, and pigeons (*Columbidae*) and other birds that nest in or on buildings. Mice and rats can occur in buildings throughout the cantonment area and ASA. Much of the pest management workload in the cantonment area involves surveillance and control of mice. Hunters have extensive opportunities to hunt woodchuck during the appropriate seasons. Woodchucks are also removed by the installation Pest Control Manager through trapping. Pigeons and other birds invade and nest in open storage areas and large buildings where garage doors remain open for periods throughout the day. They are controlled by used of exclusionary devices, physical barriers, trapping, and physical removal. The Natural Resources Office mainly relies on the installation hunting program to control the populations of white-tailed deer, Canada goose, and woodchucks. Hunters can hunt Canada geese during the appropriate season. With a well-managed and active deer hunting season, in addition to continuous surveys, the deer herd is maintained to stay in balance with the available habitat and to avoid conflict with LEAD mission requirements.

7.4.8 Requirements for Fish and Wildlife Habitat Improvement

Although no specific installation requirements are in place to guide fish and wildlife habitat improvement at LEAD, federal and ARs require that the habitat and fish and wildlife populations be managed and sustained on the installation. Many projects occur on the installation to improve the fish and wildlife habitat. Annual programs include planting and maintaining food plots, harvesting timber, planting trees, removing nonnative invasive plants, creating browse, planting and promoting warm season grasses (e.g., switchgrass [*Panicum virgatum*] and big bluestem [*Andropogon gerardi*]), and day-lighting and fertilizing fruit and nut-bearing trees. Other improvements are installing bluebird and wood duck boxes, maintaining access to lakes, and creating fish cover by placing woody debris in lakes and ponds. Most of these projects are completed by volunteers through conservation work project hours that are required for hunting and fishing privileges.

7.4.9 Introduction of Exotic Species

LEAD has no intent to introduce exotic species.

7.4.10 Diseases Affecting Fish, Wildlife, and Domestic Animals

According to AR 200-1, installation natural resource managers should consult with appropriate Veterinary Corps personnel regarding fish, wildlife, and domestic animal die-offs and unnatural animal behavior occurring on their installation. Similarly, the responsible Army veterinarian, natural resource manager, or command element should contact local, state, and federal officials whenever necessary.

7.5 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS

The management goals for threatened and endangered species at LEAD are to comply with ESA and Army policies with respect to listed species, continue to monitor for federally listed species, and conserve and protect state-listed species that have been identified on LEAD. The ESA requires all federal agencies to conserve listed species. *Conservation*, as defined by the ESA, means the use of all methods and procedures necessary to bring any listed species to the point where protections pursuant to the ESA are no longer necessary. The act specifically requires agencies to not *take* or *jeopardize* the continued existence of any endangered or threatened species, or to destroy or adversely modify habitat critical to any endangered or threatened species. Under section 9 of the act, *take* means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect”; under section 7, *jeopardize* means to engage in any action that would be expected to “reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution.”

On September 28, 1994, the Acting Assistant Secretary of the Army (Civil Works) signed a multiagency MOU on implementing the ESA. The purpose of the MOU was to establish a general framework for greater cooperation and participation among the agencies exercising their responsibilities under the ESA. The MOU states that the departments will work together to achieve the common goals of (1) conserving listed species, (2) using existing federal authorities and programs to further the purposes of the ESA, and (3) improving the efficiency and effectiveness of interagency consultations conducted pursuant to section 7(a) of the ESA. Each signatory agreed to (1) use its authorities to further the purposes of the ESA by carrying out programs for the conservation of federally listed species, including implementing appropriate recovery actions that are identified in recovery plans; (2) identify opportunities to conserve federally listed species and the ecosystems on which they depend within existing programs and authorities; (3) determine whether its planning processes effectively help conserve threatened or endangered species; (4) use existing programs, or establish a program, to evaluate and reward the performance of personnel who are responsible for planning or implementing programs to conserve or recover listed species or the ecosystems on which they depend.

Army policy on listed species is guided by AR 200-1 and includes the following elements: balancing mission requirements with endangered species protection, cooperating with regulatory agencies, and conserving biological diversity within the context of the military mission. As required by AR 200-1, the Army must ensure that it carries out mission requirements in harmony with requirements of the ESA. All Army land uses, including military training and testing, timber harvesting, recreation, and grazing, are subject to ESA requirements for the protection of listed species and critical habitat. In fulfilling its conservation responsibilities, the Army is required to work closely and cooperatively with the USFWS and National Marine Fisheries Service (NMFS), the two federal agencies responsible for enforcing the act. Installations are encouraged to engage in informal consultation with USFWS and NMFS during the planning of projects or activities to ensure ESA compliance. In conserving biological diversity, installation commanders and Army natural resource managers are required to develop and implement policies and strategies to maintain viable populations of native plants and animals, maintain natural

genetic variability within and among populations, maintain functioning representations of the full spectrum of ecosystems and biological communities, and integrate human activities with the conservation of biological diversity.

AR 200-1 requires installations to prepare Endangered Species Management Plans (ESMPs) for each listed and proposed species and critical habitat present on the installation, including areas used by tenant organizations. Installations requiring more than one ESMP (i.e., more than one listed or proposed species present) are permitted to prepare a combined ESMP, provided the combined plans satisfy the substantive requirements detailed in AR 200-1, Chapter 4-3(d)(5). Installation ESMPs must prescribe area-specific measures necessary to meet the installation's conservation goals for the subject species and critical habitats. In March 1995, the U.S. Army Environmental Center published *Manual for the Preparation of Installation Endangered Species Management Plans* to provide a standard and comprehensive format for preparing ESMPs (USAEC 1995).

Species that are candidates for federal listing or that are state-listed as threatened, endangered, or of special concern are not protected under the ESA. Because candidate species might be listed in the future, installations are required to avoid taking actions that result in the need to list candidates as threatened or endangered and are encouraged to participate in conservation agreements with the USFWS. Although not required, installations are encouraged to develop ESMPs for candidate species. At a minimum, installations are required to document the distribution of candidate species on the installation and monitor their status. For state-listed species, installations are encouraged to cooperate with state authorities in efforts to conserve these species.

7.5.1 The Status of Threatened and Endangered Inventories

Observed federal and state threatened and endangered species at LEAD are discussed in section 5.4 and listed in Table 5-1

As mentioned, no evidence of bog turtles and no potential bog turtle habitat were found on the installation according to the results of the bog turtle survey conducted in 2000. However, basic reconnaissance surveys are done regularly to confirm the nonexistence of this species at LEAD. In addition, surveys for spotted, box, and wood turtles, and potential habitat for these species, will continue to assess population dynamics and habitat use on the installation.

Indiana bats were not found during a limited bat survey that was conducted at the installation in June 2000. The PNHP and Western Pennsylvania Conservancy conducted additional mist net surveys over 2 weeks at LEAD in the summer of 2015 (PNHP 2015). No Indiana bats were captured. Because it cannot be concluded that this species does not exist at LEAD, additional mist netting surveys might take place in the future to determine whether the species is present.

Other bat species captured during the 2015 mist netting survey were the red bat, hoary bat, and NLEB (PNHP 2015). The hoary bat is common in North America and much of South America, but the 2015 survey was the first record of the species' occurrence on LEAD. The NLEB is now a federally listed threatened species, and the USFWS is now responsible for decisions regarding the species, including regulating projects that may impact the species. LEAD has developed an ESMP for the NLEB (see appendix K).

As stated above, viable habitat for the northeastern bulrush was found on the installation, but no evidence of this species has been observed. The Natural Resources Office will attempt to collaborate with Shippensburg University to conduct an intensive plant inventory of the installation. This survey will also

focus on other important species such as lance-leaf loosestrife (state listed species previously found at LEAD), and brown sedge (state species of concern).

7.5.2 Ongoing Threatened and Endangered Monitoring Programs

A monitoring program for the NLEB will be designed in conjunction with USFWS and the appropriate state agency (PGC, PFBC, or PNDI) to determine what actions the installation will take, if any, for the conservation of the species. A suggested monitoring program for the NLEB is in the ESMP for the NLEB (see appendix K).

7.6 WATER RESOURCE PROTECTION

The ecological and human health importance of maintaining healthy water bodies at LEAD is reinforced by several federal and state laws and regulations. In addition, AR 200-1 promotes the importance of maintaining healthy water resource systems on the installation. The primary goal of water resources management at LEAD is to protect and enhance the water quality of the installation's streams, lakes, and ponds.

7.6.1 Regional Programs

LEAD is in the Chesapeake Bay region and is subject to the *Chesapeake Bay Watershed Agreement* (CBP 2014) and must comply with the *Pennsylvania Chesapeake Watershed Implementation Plan Phase 2* (PADEP 2012) for meeting the pollution reduction goals in the Chesapeake Bay Total Maximum Daily Load, which EPA established in 2010 (CBP 2000). LEAD, through the Department of the Army, is represented on the Federal Agency Committee of EPA's Chesapeake Bay Program (CBP). The USACE supports the bay restoration effort by regulating and enforcing wetland regulations. Watershed management practices at LEAD include the following:

- Implementing surface water monitoring program for lakes and pond management
- Assessing nonpoint source pollution and impacts of land-use, particularly agriculture, on water quality
- Developing management plans for each water bodies on the basis of water quality, habitat assessment, fish population sampling and fishing program goals

General management measures to be implemented for controlling pollutant impacts include establishing 100-foot vegetative buffers (stream bank and shoreline vegetation) around water bodies to minimize the flow of nonpoint source pollution, particularly sediments and nutrients, into lakes and streams. They also include limiting activities in the buffers to those causing little or no impact on water quality and aquatic habitats.

7.6.2 Nonpoint Source Pollution Issues

The CBP recognizes nutrient pollution as one of the most serious threats to the health of the Chesapeake Bay and identifies nitrogen and phosphorus as the major pollutants of concern. Elevated concentrations of nitrogen and phosphorus change the structure and impair the function of the Chesapeake Bay ecosystem.

Nutrient loadings can be reduced through developing and implementing a nutrient management plan. A nutrient management plan incorporates best management practices to manage the use of plant nutrients for crop production and water quality protection. Nutrients loadings result from the use of livestock and

poultry manures, compost as fertilizer, commercially manufactured chemical fertilizers, and sewage sludge.

The U.S. Army Environmental Center developed a nutrient management plan for LEAD in 2004 in accordance with section 319 of the CWA, guidance from the 1995 Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds, and the LEAD INRMP.

Section 319 of the CWA directs states to assess their waters and identify those that are affected by nonpoint sources of pollution, including nutrients. The regulation also requires states to develop management programs to control nonpoint source pollution.

In May 1993 Pennsylvania passed the Pennsylvania Nutrient Management Act, which directs the PADEP to protect the waters of the state from nutrient pollution. The act, administered by the state Conservation Service, regulates only farms with more than two animal units, although all farms must comply with Pennsylvania's Clean Streams Law, which requires farms to keep manure out of streams and to apply the proper rate of manure on the basis of crop nutrient needs. Any farm that causes pollution to ground or surface waters may be required to develop and implement a nutrient management plan. The state's *Manure Management Manual* (PADEP 2011) provides guidelines for farmers to follow for proper manure handling. State regulations require farmers to either follow the general guidelines in the manual or obtain a permit from the PADEP.

7.6.3 Water Quality Monitoring Programs and Sampling Points

LEAD performs water quality monitoring throughout the year in compliance with the requirements of its NPDES permits. This sampling is performed at the outfalls identified in Section 6.2.2.

Additionally, LEAD tests water quality in streams and ponds in support of their fisheries program. Dissolved oxygen and acidity data are collected and recorded twice a year, in the summer months.

7.7 WETLAND PROTECTION

Wetlands are of critical importance to the protection and maintenance of living resources because they provide essential breeding, spawning, nesting, and wintering habitats for many fish and wildlife species. Wetlands also enhance the quality of surface waters by impeding erosive forces of moving water and trapping waterborne sediment and associated pollutants, providing a natural means of flood control and storm damage protection through the absorption and storage of water during high-runoff periods, and maintaining baseflow to surface waters through the gradual release of stored floodwaters and groundwater.

DoD natural resources policy states that wetlands will be protected to the extent possible. All activities that affect wetlands require an environmental analysis in accordance with AR 200-1, 32 CFR Part 651, and applicable federal and state laws and regulations. USACE permits are required under section 10 of the Rivers and Harbors Act of 1899 before beginning any work or building any structures in a navigable water of the United States. Also, USACE permits are required under section 404 of the CWA for the discharge of dredge or fill material into waters of the United States, including wetlands. The regulations established at 33 CFR Parts 320–330 prescribe the statutory authorities and general and special policies and procedures applicable to the review of applications for USACE permits. Before commencing any new work in waters of the United States, the USACE must be contacted and a permit obtained, as appropriate.

EO 11990 requires that federal agencies minimize any significant action that contributes to the loss or degradation of wetlands and that action be initiated to enhance their natural value. Department of the Army policy is to avoid adverse impacts on existing aquatic resources and to offset those adverse impacts that are unavoidable. Additionally, the Army strives to achieve a goal of no net loss of the value and functions of existing wetlands and permits no overall net loss of wetlands on Army-controlled lands. The Department of the Army also takes a progressive approach toward protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands to increase the quality and quantity of the nation's wetland resources. As a signatory member of the North American Waterfowl Management Plan Cooperative Agreement with USFWS, the Secretary of the Army underscores the importance of participating in the international effort to restore declining waterfowl populations through wetland protection. The plan provides the framework for a waterfowl conservation and management effort by describing population and habitat goals and suggesting recommendations that will resolve problems of international concern. Army water resources projects are making important contributions to this effort.

LEAD's goal for managing wetlands is to delineate, assess the condition, develop GIS wetland mapping capabilities, protect and restore existing wetlands, create new wetlands when appropriate, maintain buffer zones, and monitor for invasive species.

7.7.1 Health of Existing Wetlands

Wetlands present at LEAD supports a wide diversity of vegetation, invertebrates, amphibians, reptiles, and mammals. The wetland habitat at LEAD is considered to be in good condition because these areas have been conserved from development. However, invasive species, particularly reed canary grass, have been found throughout the wetlands of LEAD and have been noted as a problem in several wetlands. Reed canary grass has been encroaching on native wetland species and becoming a dominant plant in several areas.

7.7.2 Status of Wetland Inventories and Delineations

Because of the size of the installation, wetland inventories and delineations are performed as needed for construction, or as a planning-level investigation to aid decision making.

7.8 GROUNDS MAINTENANCE

The land at LEAD is primarily industrial, with very little in the way of grounds to be maintained. There is no program at LEAD for planting or maintaining ornamental flowers, trees, or gardens. The major grounds maintenance activity at LEAD is the control of vegetation on and around the igloos in the ASA. This control is achieved through a combination of mowing and applying herbicides in compliance with the IPMP. Note that a mowing restriction is in effect from 15 May to 15 July in the buffer areas surrounding the igloos (or earth covered magazines), road edges around the igloos, the agricultural lease areas, and all unimproved grounds. This restriction protects ground-nesting birds protected by the Migratory Bird Treaty Act, wild turkey nests, all turtle species, white-tailed deer fawns, eastern cottontail rabbits, and other small mammals. Alternatives to mowing could consist of disking and prescribed fire to maintain firebreaks.

7.9 FOREST MANAGEMENT

Forest management involves exercising influence over the ecological processes of a forest in an effort to provide specific sustainable products and amenities from the forest while maintaining its long-term health

and vigor. The Army forest management program is required to support and enhance the immediate and long-term military mission and to meet natural resource stewardship requirements set forth in AR 200-1. Army policy further stipulates that forest resources must be managed for multiple uses, using an ecosystem management approach to optimize the benefits to an installation's natural resources. Ecosystem management provides a framework for holistic management of the resource rather than focusing emphasis on a single aspect or activity such as commercial timber production or game species management.

The objective of forest management at LEAD is to manage the depot's forestland for multiple uses: to provide a sustainable yield of wood products, maintain wildlife habitat, improve aesthetics, protect streams and springs, provide forested areas for military training, and to enhance recreational value (e.g., bird watching, hunting, horseback riding, and hiking).

Practices such as forest inventorying, forest product sales, timber stand improvement, forest access road management, encouragement and protection of natural (or artificial) regeneration, support for cultural and other natural resource surveys, and protection from wildfire, insects, and disease sustain the forested environment. Forest management activities do not conflict with the military mission at LEAD.

The forest management program at LEAD also must fully comply with all applicable federal laws, policies, and regulations pertaining to forest management. Federal laws, policies, and regulations that could affect forest management at LEAD include AR 200-1; Public Law 86-797, the Sikes Act, as amended (16 U.S.C. 670); 10 U.S.C. 2665 (Sale of certain interest in land: logs); DoD Inst 7310.5 (Accounting for production and sale of lumber and timber products); EO 11990 (Protection of Wetlands), ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*); and the National Forest Management Act of 1976 (16 U.S.C. 1601 *et seq.*).

7.9.1 Forest Management Program and Initiatives

LEAD has a Forest Management Plan (USACE Baltimore District 2012b) (appendix E). The plan covers approximately 2,609 acres of forestland on LEAD, divided into two zones. Forest Management Zone 1 is on the western side of the ASA and Forest Management Zone 2 is west of Forest Management Zone 1 in the Buffer Area at the foot and on the eastern slope of Broad Mountain. Forest Management Zone 1 is approximately 418 acres, and Forest Management Zone 2 is approximately 2,191 acres. Forest Management Zone 1 is a single compartment with three management stands. Forest Management Zone 2 comprises seven compartments that each have from one to three management stands, giving Forest Management Zone 2 a total of 12 management stands. Management stands are based on timber type and are designed to be tracked and operated individually for timber production. Three timber harvests were conducted from 2008 to 2012. A new timber harvest began in 2017 and continued through 2019. The purpose of the 2017–2019 harvest is to create early successional habitat in the newly designated BQFA. The harvest will remove 1,100 acres of overstory trees and create 20 acres of oak savanna, leaving approximately 40 square feet of basal area per acre consisting primarily of white and northern red oak intermixed with some table mountain pine (*Pinus pungens*) and shortleaf pine (*P. echinata*), species that are rare in Pennsylvania. It is hoped that with the harvest the pines left on the site will promote growth of more of the two species.

7.9.2 Forest Types

In the forested acreage, the timber is primarily hardwood. The forests in both forest management zones are composed mainly of hardwood with oak and hickory species being dominant. Small areas of pine are

scattered throughout the site, which provide good winter shelter for wildlife. Dominant tree species on the property are red oak, black oak, white oak, chestnut oak, tulip poplar, white ash, hickories, and red maple.

Information about the forest management zones and stands is presented in Table 7-1 below.

7.9.3 Timber Harvesting Practices and Volumes

No commercial forestry operations occur at LEAD. All forestry operations conducted at LEAD are for wildlife habitat enhancement.

Harvestable timber is relatively low in Forest Management Zone 1. Several compartments in Forest Management Zone 2 have more harvestable timber.

Table 7-1. Timber stand information

Zone	Compartment	Stand	Type	Acres	Dominant species
1	1	1	Mixed regrowth/transition	85	White ash, pin oak, black oak, black locust, black cherry, shagbark hickory, red maple, white oak, black walnut
1	1	2	Mixed regrowth/oak	170	Red maple, white ash, black oak, black locust, black cherry, shagbark hickory, white oak, black walnut
1	1	3	Mixed oak	148	White oak, red maple, black oak, black locust, black gum, shagbark hickory, mockernut hickory, black walnut
2	1	1	Mixed regrowth/transition	170	Tulip poplar, white oak, black oak, red maple, shagbark hickory, black locust, Virginia pine, red oak
2	1	2	Mixed oak	131	Chestnut oak, white oak, northern red oak, black oak, small amounts of Virginia pine
2	1	3	Mixed oak	75	White oak, chestnut oak, tulip poplar, black oak, shagbark hickory
2	2	1	Mixed oak	186	White oak, northern red oak, black oak, chestnut oak
2	2	2	Mixed oak	240	White oak, chestnut oak, northern red oak, eastern hemlock, black oak
2	2	3	Mixed oak	131	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
2	3	1	Mixed oak	260	Chestnut oak, black oak, eastern hemlock, tulip poplar, black birch, white oak, northern red oak
2	4	1	Mixed oak	228	Chestnut oak, black oak, tulip poplar, eastern hemlock, white oak, white ash, northern red oak
2	4	2	Mixed oak	55	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
2	5	1	Mixed oak	193	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
2	6	1	Mixed oak	126	Tulip poplar, black cherry, bitternut hickory, black oak, black birch, white oak, chestnut oak
2	7	1	Mixed oak	390	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak

Source: USACE Baltimore District 2012b.

7.9.4 Forest Management Issues and Concerns

Forest management issues and concerns are focused on the general health and biological diversity of the forest resources at LEAD and protecting sensitive habitats and the military mission. Invasive species and pests threaten the health and biological integrity and diversity of forested areas. Invasive species at LEAD include tree of heaven, reed canary grass, mile-a-minute weed (*Persicaria perfoliata*), Japanese barberry, wineberry (*Rubus phoenicolasius*), multiflora rose, common privet (*Ligustrum vulgare*), Japanese stilt grass (*Microstegium vimineum*), common reed, garlic mustard (*Alliaria petiolata*), field garlic (*Allium oleraceum*), sericea lespedeza (*Lespedeza cuneata*), and vine- and shrub-form honeysuckles (Japanese and tatarian honeysuckle). These rapidly growing species crowd out native vines and shrubs and do not provide the same quality of habitat as the native species.

Pests of concern in Pennsylvania include gypsy moth, hemlock wooly adelgid, dogwood anthracnose, and emerald ash borers. These species have been identified as causing catastrophic deforestation in other parts of the country and are intensively monitored in the region. The emerald ash borer has decimated the white ash population on LEAD. The spotted lanternfly could spread to Franklin County and LEAD by 2020. It is an Asian species that can damage fruit trees and hardwood trees. Additionally, the actions of native wildlife, such as browsing by deer and tree downing and dam building by beavers, can harm forest stands.

Sensitive habitats occurring in forested areas at LEAD are wetlands (Section 5.5) and vernal pools (Section 5.6), Allegheny woodrat habitat (Section 5.4.2), and NLEB and potential Indiana bat habitat (Section 5.4.1).

Wildfires are also an issue of forest management concern on LEAD, as discussed in Section 7.10 below.

7.9.5 How Forest Management Practices are Used to Achieve INRMP Goals

Forests and woodland provide the largest percentage of natural habitat at LEAD. Forest stands at LEAD are managed in a sensitive and timely manner to prevent soil erosion, absorb runoff, reduce pest species, increase biodiversity, provide habitat for migratory songbirds, and increase productivity.

7.10 FIRE MANAGEMENT

The primary goal of the fire management program at LEAD is to prevent fire to the extent possible and, if a fire occurs, to protect human health and safety and to prevent unacceptable damage to natural resources. Because of the materiel storage mission of LEAD, fire management consists of preventing uncontrolled wildfires. Regular mowing is done, some by lessees in the agricultural lease program, around igloos, and along roads. (As noted in section 7.8 mowing is restricted from 15 May to 15 July in these areas to protect ground-nesting birds and other wildlife.) Any fire at the installation could pose a serious risk to both installation personnel and the public in the surrounding area. Prescribed fire is not used as a management measure for the forest management program, but prescribed burns are used as a habitat management technique within the BQFA. In the future, LEAD plans to expand use of prescribed burns to encompass a large portion of the installation, including Zone 2 and wooded areas, to reduce invasive and undesirable species, promote oak regeneration, and reduce available fuel load in the event of a wildfire.

The management measures discussed below are components of the fire management program at the installation.

7.10.1 The History and Frequency of Wildfires on the Installation

Small brush fires have occurred at LEAD, but no major wildfires have been reported on the installation.

7.10.2 The Threat of Wildfire to the Mission and Natural Resources

Because of the material storage mission of LEAD, fire management consists of preventing fires. Regular mowing is done, some by lessees in the agricultural lease program, around igloos and along roads. Any fire at the installation could pose a serious risk to both installation personnel and the public in the surrounding area. A mowing restriction is in effect from 15 May to 15 July in the buffer areas surrounding the igloos (or earth-covered magazines), road edges around the igloos, the agricultural lease areas, and all unimproved grounds. This restriction protects ground-nesting birds.

7.10.3 The Organizational Structure for Fire Protection and Wildfire Response Protocols

LEAD has an Integrated Wildland Fire Management Plan that is administered by the Natural Resources Office (appendix F). The following sections highlight those parts of the plan that can affect natural resources management. Wildfires are controlled aggressively using all the personnel that can be summoned. Slow-moving ground fires are contained using backpack water tanks. High-intensity fires are controlled using a bulldozer equipped with a fire plow, which is usually at the nearest Bureau of Forestry office. Helicopters supplied with drop buckets are used as necessary on larger wildfires. Also, campfires are not permitted in Zone II (the Buffer Area) when the fire danger rating (as indicated on the sign in Zone I near Gate 1) is moderate to high.

7.10.4 The Use of Prescribed Fire on the Installation

Because of the materiel storage mission, prescribed fire has not been used previously as a management measure at LEAD. LEAD began using prescribed fire as a habitat management tool in 2017 in the BQFA. Prescribed fire will be conducted in accordance with the Pennsylvania Prescribed Burning Practices Act (2009) and follow the guidance provided by DCNR. As part of this compliance, LEAD prepared a burn plan in 2017 that directs burn operations for 3 years. Per the requirement of the Pennsylvania Prescribed Fire Standards, LEAD will submit three copies of the burn plan to DCNR 25 days prior to the first burn for review by the Bureau of Forestry and DEP Bureau of Air Quality, and again no more than 5 working days after the prescribed burn has been completed. The LEAD Public Affairs Office will complete a press release before each burn season.

The area on LEAD where prescribed burns will be conducted is a mix of agricultural lands and wooded areas. Invasive shrubs are abundant in the woods understory. Magazines (munition bunkers) line the roads in much of the burn area. The magazines are covered with dirt and vegetated with grass that is mowed outside of the restriction time of 15 May to 15 July. Topography is gently rolling hills with some steep slopes along stream drainages.

For safety reasons, prescribed burns will not be conducted if the wind speed is higher or lower than allowed by local ordinance requirements or is less than 5 miles per hour or exceeds 15 miles per hour, whichever is more restrictive. It is expected that low to moderate fires will be adequate for achieving most burn objectives.

The installation is divided into management compartments that are themselves divided into multiple burn units by road infrastructure. Prescribed burns will be conducted to achieve different objectives, depending on the compartment and burn unit in which the burn is conducted. In the BQFA the objective is to create

suitable habitat for quail that will be released on site in the next few years. Areas not being farmed will be put on a 3- to 5-year fire-return interval. The general objectives of prescribed burning use on LEAD are:

- To target wood encroachment and reduce thatch.
- To manage fuel loading on the installation—specifically around the munitions disposal site—to improve safety and ease of suppression in the event of a wildfire.
- To regenerate remnant shortleaf pine.

Full details of prescribed burning implementation at LEAD are found in the Prescribed Burn Project Plan (LEAD 2017) on file in the Natural Resources office.

7.11 AGRICULTURAL OUTLEASING

7.11.1 How Agricultural Outgrants Support INRMP Goals

The agricultural lease program at LEAD enhances the long-term conservation of agricultural resources on the installation, supports ecosystem management goals, generates revenue for natural resources programs (the program will generate \$462,559 in 2019), reduces land management costs by more than \$275,000 annually through mowing performed by lessees, and supports the military mission by reducing fuel loads in the ASA. The EMD manages the Agricultural Outleasing Program, under the DPW. Tracts are leased for 5 years on a recurring basis. Leasing the land frees the installation from having to maintain the leased land. Leases for tracts in hunting areas include provisions requiring that the lessee support the habitat maintenance and conservation practices established for those tracts. The program also helps reduce the risk of wildfire on LEAD.

7.11.2 Location of Agricultural Outgrants

LEAD has approximately 9,600 acres of land in the ASA and Buffer Area that are leased to area farmers for crop production (see Figure 6-1).

7.11.3 Prime and Unique Farmland Soils

LEAD has approximately 1,000 acres of federally listed Prime Farmland Soils and 9,760 acres of Farmland Soil of Statewide Importance throughout the installation (LEAD GIS 2013) (see Figure 4-2).

7.11.4 Livestock Grazing

No grazing occurs on any of the agricultural lease tracts at LEAD.

7.11.5 A Discussion of the Outgrant Land Use Regulations for Outgrantees, and How Compliance with the Land Use Regulations is Monitored

Each leased tract of land has a tract management plan developed by the NRCS. Lessees must comply with the tract management plans and all LEAD land use regulations. These requirements and regulations include farming in accordance with soil conservation plans; conducting all land preparation, applications of lime, fertilizer, and chemicals, and other operations in accordance with recognized and approved practices; and using the tracts for crop and hay production purposes only (livestock are not permitted on leased lands). The Natural Resources personnel enforce the regulations. Noncompliance of the policies set forth by the program is handled directly with the lessee, and blatant violations may be cause for revocation of the lease by the Commander through the USACE Baltimore District.

7.12 INTEGRATED PEST MANAGEMENT PROGRAM

The goal of the installation pest management program is to protect human health and suppress or prevent damage to real estate and natural resources caused by pests. Use of integrated pest management techniques to eliminate, suppress, and control pests, with the judicious use of both chemical (when necessary) and non-chemical control techniques, is encouraged. LEAD has an Integrated Pest Management Program. The following sections highlight aspects of that program and pest issues that relate to natural resources management.

7.12.1 Pest Species that Interrelate to and Potentially Affect Natural Resources Management on the Installation

European gypsy moth infestations have occurred periodically in the mixed hardwood forestlands in the western portion of the Buffer Area. This area contains valuable stands of timber that provide good to excellent wildlife habitat. Occasionally, gypsy moth populations reach levels that could threaten ecosystem integrity, result in economic loss, and warrant chemical control measures. The USFS conducts annual surveys on LEAD for defoliation (June) and gypsy moth egg masses (October) throughout this area. The USFS prepares an annual report that summarizes the survey results, treatment alternatives, and management recommendations. If chemical control is warranted, aerial pesticide application would be planned, reviewed, coordinated, and conducted in accordance with the requirements of AR 200-1.

Ornamental pests include pests of ornamental shrubs and treescale insects, elm leaf beetles (*Xanthogaleruca luteola*), leaf roller moths (*Tortricidae*), bag worm moths (*Psychidae*), eastern tent caterpillars (*Malacosoma americanum*), fungi, and diseases. Chemical control of ornamental pests is rarely required, and infestations are typically avoided by mechanical controls such as sanitation pruning. Very rarely do insect populations or disease threaten the life of a shrub or tree in the cantonment area to the point where chemical control is warranted.

7.12.2 Invasive Species and Ongoing Control Initiatives

The most problematic invasive plant species on the installation are autumn olive, Russian olive (*E. angustifolia*), Japanese barberry, mile-a-minute weed, and tree of heaven. As resources are available, management techniques appropriate for controlling the species are used. Both autumn and Russian olive grow rapidly and produce plentiful fruit as early as three years of age. They are spread by birds and other wildlife that feed on the fruit. The following control methods are recommended for autumn and Russian olive (PADCNr Undated c):

- Mechanical: Young seedlings can be pulled by hand when the soil is moist enough to ensure complete removal of the root system. Small saplings can be pulled sufficiently with a weed wrench. Larger individuals can be cut at ground level or girdled. Cutting is an initial control measure and should be followed by herbicidal treatment to prevent re-sprouting.
- Chemical: U.S. Army Environmental Command-approved herbicides (glyphosate, for instance) can be used and can be effective where there is no concern for damage to native species. Glyphosate, a systemic herbicide, should be applied immediately to cut stumps to prevent regeneration. It can also be applied to girdle wounds or directly to the lower bark using the basal bark method. Large thickets, where risk to non-target species is minimal, can be controlled by the foliar spray method.
- Monitoring: Return to monitor reoccurrence of the species in the area.

Japanese barberry is native to Japan and is used as an ornamental shrub. It can form dense thickets and is not browsed by deer, so it can out-compete and displace native species that are browsed, which reduces wildlife habitat and forage and increases pressure on remaining natives by white-tailed deer. It propagates by extensive rhizomes and produces a large number of seeds that have a high germination rate. Seeds are dispersed by birds and small mammals, which feed on the berries. The following control methods are recommended for Japanese barberry (PADCNr Undated a):

- **Mechanical:** Remove barberry stands where they interfere with activities or inhibit the growth of native species. Small plants can be pulled by hand, and larger plants should be dug up. It is important to remove the entire root system and to bag and dispose of any plant material, including fallen fruits. Mowing or cutting is not advisable except to make removal easier. The plant is sensitive to fire; so prescribed burns and weed torches are good options.
- **Chemical:** Apply herbicides selectively to stands as they are found. A systemic herbicide such as glyphosate is effective in managing Japanese barberry. The herbicide can be applied as a basal bark or cut stump application. Late summer during fruiting may be the best time to apply herbicide, but early spring applications may avoid non-target impacts. Large thickets of barberry can be controlled with foliar spray applications. Apply herbicides to the plants at timber harvest sites to prevent spreading to sites disturbed by the harvest.
- **Monitoring:** Return to monitor growth of the rhizomes.

Mile-a-minute weed readily colonizes disturbed areas along forest edges, wetlands, stream banks and roadsides. It spreads primarily by seed, but also by its fast growth (up to six inches a day). Birds and other wildlife eat the fruits and spread the seeds in their droppings. Seeds are also buoyant for up to nine days in water and can be spread by streams and floods. It can quickly smother native vegetation and climb into the tree canopy where it restricts light availability to plants below. It can be a pest plant on tree farms and for horticultural crops where the soil is not regularly tilled. The following control methods are recommended for mile-a-minute weed (PADCNr Undated b):

- **Mechanical:** Hand-pulling of vines is possible, especially when the soil is wet but before fruit formation. Repeated mowing will prevent the plant from flowering and thus reduce or eliminate fruit and seed production. Sites should be monitored for several years to ensure no seeds germinate.
- **Chemical:** A systemic herbicide like glyphosate will work on mile-a-minute weed, especially when used with a surfactant that will help to penetrate the leaves' waxy coating. It should be applied in the summer before fruits appear.
- **Biocontrol:** A weevil, *Rhinocominus latipes*, is being used on various test plots in Pennsylvania and elsewhere to control mile-a-minute weed. The small insects feed on the leaves and bore into the stems, helping keep it in check and reducing fruit production.
- **Monitoring:** Monitor sites for several years to ensure no seeds germinate.

Tree of heaven is an Asian deciduous tree that spreads by underground propagation. It grows very rapidly and, once established, can be extremely difficult to eradicate. The following control methods are recommended for tree of heaven (PADCNr Undated d):

- **Mechanical:** Although young seedlings could be pulled or dug up, the chance of getting all root fragments is difficult and can lead to re-sprouts. Cutting is not recommended because the trees will send up many root sprouts and suckers, creating an even larger problem.

- **Chemical:** Apply herbicides to the trees where it interferes with native plant growth and regeneration. The most effective way to treat tree of heaven is with herbicides. Foliar application of glyphosate mixed with water is effective on smaller trees when applied between June and late August. For larger trees, application with the basal bark, hack and squirt, injection or cut stump method should work effectively.
- **Monitoring:** Follow-up monitoring and treatment are very important. Regardless of the control method used, treated areas should be checked one or more times a year.

Prescribed fire can be used for controlling invasive plants but its use must take into account the life histories of the invasive plants to be controlled and the surrounding native plants (PADCNr undated a). Long-term suppression for all types of invasive plants requires reduction or depletion of the seed bank. Controlling annuals effectively requires that a fire destroy the seeds before they germinate or the plant before the seeds mature. Prescribed burning is generally not successful for control of biennials. Only plants that have flowered in the second year of growth are susceptible to fire mortality; 1-year-old plants are protected from fire damage and survive to produce seeds the second year. Multiple-year burns can be used to eventually deplete the seed bank. Sequential burns under dry conditions can be effective to control garlic mustard. Successful control of perennial forbs requires a combination of prescribed burning and herbicide applications. Caution must be used, however, because typically controlled fires or wildfires promote invasive perennial forbs. Most woody species are difficult to control with prescribed burning. Japanese honeysuckle, tree-of-heaven, and Russian olive benefit from fire because they readily re-sprout from the base following fire or mechanical damage. Other shrub and tree species can be controlled using prescribed burns.

The spotted lanternfly, an invasive planthopper native to China, India, Vietnam, was first discovered in Pennsylvania in the southeast portion of the state and could spread to Franklin County and LEAD by 2020. The insect can heavily damage hardwood trees. If it does become established on LEAD it could pose a threat to willows, maples, poplars, tulip poplars, birch, ash, and other tree species.

7.13 OUTDOOR RECREATION

7.13.1 Areas Suitable for Outdoor Recreation Activities

LEAD operates recreational facilities for use by LEAD personnel. Hunting and fishing are permitted on the depot, and Bud's Lake and various streams at LEAD are periodically stocked with fish. The Letterkenny Recreation Area, adjacent to Rocky Spring Lake, has picnic facilities and catch-and-release fishing. However, because of LEAD's mission, outdoor recreation (such as hiking, camping, and mountain biking) is not permitted.

7.14 CULTURAL RESOURCES PROTECTION

Cultural resources is defined as historic properties as defined by the National Historic Preservation Act (NHPA), cultural items as defined by the Native American Graves Protection and Repatriation Act (NAGPRA), archaeological resources as defined by the Archaeological Resources Protection Act, sacred sites as defined in EO 13007 (Indian Sacred Sites) to which access is afforded under the American Indian Religious Freedom Act, and collections and associated records as defined in 36 CFR 79 (*Curation of Federally Owned and Administered Archaeological Collections*).

No federally recognized American Indian tribes reside in Pennsylvania. However, 15 federally recognized tribes have interest in the lands in Pennsylvania. These tribes include:

- Absentee-Shawnee Tribe of Indians of Oklahoma (OK)

- Delaware Tribe (OK)
- Delaware Trust (OK)
- The Cayuga Nation (New York [NY])
- Eastern Shawnee Tribe of Oklahoma (OK)
- Oneida Nation (NY)
- Oneida Tribe (Wisconsin)
- Onondaga Nation (NY)
- Saint Regis Band of Mohawk Indians (NY)
- Seneca – Cayuga Tribe (OK)
- Seneca Nation of Indians (NY)
- Shawnee Tribe (OK)
- Stockbridge Munsee Community (Wisconsin)
- Tonawanda Band of Seneca (NY)
- Tuscarora Nation (NY)

LEAD's ICRMP was updated in 2019. Archaeological field work was not conducted for the latest updates to the ICRMP; however, summaries of field investigations conducted at LEAD are included in this document. A comprehensive Phase I investigation has not been conducted at LEAD. Phase I investigations are conducted at LEAD on a project-specific, case-by-case basis. During these investigations, several archaeological sites have been identified at LEAD, but they have not been evaluated for NRHP eligibility. In addition, no known archaeological sites at LEAD are eligible for or listed in the NRHP.

Management of natural resources on LEAD has no impact on cultural resources on the installation. If a discovery is made, LEAD would follow standard operating procedure (SOP) #5 for inadvertent discovery in the LEAD ICRMP.

7.14.1 Cultural and Historic Resources Program

The EMD manages cultural resources at LEAD. If any proposed work might affect significant or potentially significant cultural resources, EMD is notified. EMD, in turn, contacts the Pennsylvania State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation, as required.

7.14.2 Natural Resources Management Implications

Before any soil disturbance or modifications of structures, archaeological surveys to satisfy NHPA section 106 are conducted to determine the likelihood of disturbing any archaeological sites or historic structures that might be eligible for listing on the NRHP or might be of significance to federally listed Native American tribes or groups.

LEAD has consulted with the SHPO in cases when presented with cultural resource projects. LEAD has an Installation Planning Board that meets regularly to review proposed projects at the installation and can assist in establishing a preservation program at LEAD.

This case-by-case basis should be addressed and as evidenced in the ICRMP, LEAD should implement internal SOPs among the Engineering and Planning Branch and the EMD in the DPW to ensure section 106 coordination is conducted when necessary (USACE, Baltimore District 1999).

Information regarding the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) study is available through the Internet at this Library of Congress address: http://memory.loc.gov/ammem/collections/habs_haer/. The National Park Service (NPS) HABS/HAER Internet address is <http://www.nps.gov/history/hdp/>.

To comply with NAGPRA and the American Religious Freedom Act, federally listed tribes or groups must be notified early in the process. A list of tribes or groups in Pennsylvania is available from the NPS or the Pennsylvania SHPO. In addition, the NPS, including NAGPRA services, can be accessed on the Internet at <http://www.nps.gov/history/nagpra/>. This address is the NPS site index, which has links to NAGPRA, HABS/HAER, NRHP, and other sites.

7.15 PUBLIC OUTREACH

The Sikes Act requires that military installations provide for public awareness of natural resource use to the extent that public access is appropriate and consistent with the military mission. Although increasing community involvement in activities at LEAD could serve to increase public awareness of the natural resources on the installation, the military mission requires that public access be controlled, particularly in the ASA. In consideration of the mission, the opportunity to involve community members in activities on the installation is limited. LEAD does, however, conduct several activities on the installation in which community members are invited to participate. These activities include fish rodeos, habitat enhancement, hunting, fishing, and bird conservation efforts. Also, LEAD EMD advertises and invites the public to obtain hunting applications annually through local public announcements in newspapers and on TV and radio stations.

7.15.1 Organizations Involved in Public Affairs and Outreach for Natural Resources Programs

The EMD initiates and implements outreach for natural resources awareness and programs. This office works with groups and organizations such as Boy Scouts, Eagle Scouts, Shippensburg University, and volunteer groups. The EMD manages programs and activities concerning hunting, fishing, and trapping. Most of these programs and activities are learned of by word of mouth.

7.15.2 Natural Resources Awareness Programs on the Installation

Volunteer Program

The natural resources public volunteer program brings in more than 12,000 hours of service each year. Volunteer hours are accomplished by LEAD civilians, retired LEAD civilians, and retired military to give them preference in the hunting drawing and allowing more access to the installation to hunt and fish. Some of the volunteer projects include building wood duck boxes, removing invasive plants, planting food plots, and helping with the Major Hunt Days.

Hunt of a Lifetime

Children with a terminal illness are brought onto the grounds to hunt.

US Army Wounded Warriors

Disabled veterans and soldiers enrolled in the U.S. Army Wounded Warrior Program are provided hunting and fishing opportunities.

Eagle Scouts

Troops engage in projects dealing with natural resources including building wood duck and bluebird boxes and constructing turtle traps to look for spotted turtles.

Shippensburg University

Undergraduate students conduct a site visit of natural resources and are then required to do lab work on campus. Graduate students perform research on invasive species, box turtles, and deer.

7.15.3 Brochures, Posters, Videos and Other Natural Resources Program Educational Materials

One of the projects set forth by this INRMP is to develop a website about the natural resources program on LEAD to aid in education, outreach, and enhance the natural resources program.

SECTION 8.0

MANAGEMENT GOALS AND OBJECTIVES

The emphasis of an INRMP is to achieve certain goals for maintaining and improving the natural environment at the installation. This chapter lists the goals and objectives for future natural resources management on the installation, and in cases where adjacent land uses could jeopardize Army missions, specific goals and objectives aimed at eliminating, reducing or mitigating the effects of encroachment on military missions. Preparing these goals and objectives involved the review and analysis of past natural resource management practices as detailed in Section 7, ongoing programs, and the current conditions of the existing resources as detailed in Section 5. The review process included interviewing LEAD personnel and key persons from state and federal agencies; conducting written correspondence with state and federal agencies; collecting existing environmental documentation; and conducting field reconnaissance of the installation.

Consecutively numbered goals are accompanied by supporting objectives and projects in a tiered format. The relationship between goals, objectives, and projects is as follows:

Goals. Goals are the primary focal points for the implementation of the INRMP over the 5 years covered by the plan. A goal reflects the values of the installation by expressing a vision of a desired condition for the installation's natural resources in the foreseeable future. Each goal is supported by one or more objectives.

The overarching goal established by LEAD for the natural resources management program is to maintain ecosystem viability and ensure the sustainability of desired military mission activities. The 5-year goals are presented in the specific planning subsections below.

Objectives. Each goal is supported by objectives that indicate a management initiative or strategy that will be used to achieve the stated goal. An objective specifically states what will be done and how it will be done. An objective must be time-bound and measurable. Each objective statement, therefore, includes timelines for completion and quantifiable units for measuring results (e.g., acres treated), so that one can determine exactly when the objective is completed.

Projects. Projects are the individual component actions required to achieve an objective. Project statements describe the specific methods and procedures that will be used to achieve the objective supported. Projects are actions that become line items in the proposed budgets for INRMP implementation. All projects identified in this INRMP have been placed into three priority-based categories: high-priority projects, medium-priority projects, and low-priority projects (see Table 9-1). The prioritization of the projects is based on need, and need is based on the importance of a project in moving the natural resources management program toward successfully achieving its goal.

The goals in this section are presented in the order the topics are presented in Section 5, not in order of importance. Objectives below each goal are presented in order of importance, and the projects are listed in the order they should occur, chronologically.

GOAL 1: MAINTAIN AND IMPROVE VEGETATION HEALTH AND DIVERSITY

OBJECTIVE 1.1: Manage Forests for Biodiversity and Timber

PROJECT 1.1.1: Implement the 2012 Forest Management Plan.

OBJECTIVE 1.2: Protect Natural Areas from Invasive Species, Pests, Disease, and Wildfire

PROJECT 1.2.1: Implement the 2012 Fire Management Plan, including Integrated Wildland Fire Management.

PROJECT 1.2.2: Continue to implement the 2018 Integrated Pest Management Plan.

PROJECT 1.2.3: Conduct invasive species surveys and implement control measures as needed.

PROJECT 1.2.4: Continue to implement the prescribed burn plan and expand burn operations on the installation to control invasive species and undesirable species, promote oak regeneration, and reduce available fuel load.

GOAL 2: MAINTAIN AND IMPROVE FISH AND WILDLIFE ABUNDANCE AND DIVERSITY

OBJECTIVE 2.1: Create and Enhance Meadow and Grassland Habitat

PROJECT 2.1.1: Identify potential meadow and grassland habitat.

PROJECT 2.1.2: Annually monitor and conduct habitat enhancement measures on identified meadow and grassland habitat.

OBJECTIVE 2.2: Monitor and Maintain Healthy Bird Populations

PROJECT 2.2.1: Continue to implement mowing restrictions.

PROJECT 2.2.2: Conduct long-term monitoring of grassland bird populations with respect to the mowing schedule.

OBJECTIVE 2.3: Balance Population Levels of Game Species

PROJECT 2.3.1: Create and implement a Bobwhite Quail Management Plan.

PROJECT 2.3.2: Establish a self-sustaining wild Northern Bobwhite Quail population at Letterkenny Army Depot.

PROJECT 2.3.3: Continue population studies for game species

PROJECT 2.3.4: Conduct Forward Looking Infrared analysis for white-tailed deer populations.

PROJECT 2.3.5: Continue population studies for non-game species

OBJECTIVE 2.4: Map and Manage Vegetative Communities and Wildlife Habitat

PROJECT 2.4.1: Create a map and management measures for vegetative communities and wildlife habitats on the installation to enhance wildlife populations.

OBJECTIVE 2.5: Evaluate and Track Fisheries Diversity and Populations

PROJECT 2.5.1: Conduct annual fish sampling in each water body and evaluate fisheries management activities to determine the status of fishery resources.

OBJECTIVE 2.6: Annually Update Wildlife Inventories on the Installation

PROJECT 2.6.1: Continue inventory surveys for small mammals.

PROJECT 2.6.2: Continue inventory surveys for reptiles and amphibians.

PROJECT 2.6.3: Continue inventory surveys for birds.

OBJECTIVE 2.7: Improve Public Awareness and Outreach for the LEAD Natural Resources Program

PROJECT 2.7.1: Develop a website for the LEAD Natural Resources Program to foster awareness of the program, goals, regulations, and activities.

GOAL 3: PROTECT AND MONITOR RARE, THREATENED, AND ENDANGERED (RTE) SPECIES

OBJECTIVE 3.1: Identify RTE Species

PROJECT 3.1.1: Conduct an Indiana bat inventory.

OBJECTIVE 3.2: Monitor RTE Species and Habitat

PROJECT 3.2.1: Monitor Allegheny woodrat periodically.

PROJECT 3.2.2: Monitor northeastern bulrush, brown sedge, and lance-leaved loosestrife habitat periodically.

GOAL 4: MAINTAIN, IMPROVE, AND PROTECT AQUATIC, RIPARIAN, AND WETLAND HABITATS

OBJECTIVE 4.1: Identify Aquatic, Riparian, and Wetland Habitats

PROJECT 4.1.1: Continue to inventory, monitor, and protect forested wetland habitat, including vernal pools, on the depot.

PROJECT 4.1.2: Conduct habitat enhancement measures to improve aquatic and wetland function and biodiversity.

GOAL 5: DECREASE SOIL EROSION AND ASSOCIATED STREAM TURBIDITY

OBJECTIVE 5.1: Minimize Erosion on Highly and Moderately Erodible Soils

PROJECT 5.1.1: Continue to follow federal and state guidelines for soil disturbing activities by monitoring these activities and pursuing necessary soil management actions.

OBJECTIVE 5.2: Reduce Sediment Load to Streams and Other Surface Waters

PROJECT 5.2.1: Establish and/or maintain existing 100-foot vegetative buffers around permanent lakes, streams, and ponds. Continue to follow federal and state guidelines for sediment loading and nutrient management.

PROJECT 5.2.2: Continue to implement soil erosion BMPs in the design and implementation of future forestry initiatives to prevent soil erosion.

PROJECT 5.2.3: Continue to monitor and update/upgrade erosion control measures for the demolition ground (OB/OD) in compliance with NPDES permits.

OBJECTIVE 5.3: Bring Agricultural Outlease Land into Compliance with the INRMP

PROJECT 5.3.1: Monitor agricultural tracts for compliance with the INRMP mowing schedule (Project 2.2.1) and lease stipulations, and assess the need for conservation measures.

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SECTION 9.0

IMPLEMENTATION

The Office of the Secretary of Defense considers funding for preparing and implementing this INRMP, as required by the Sikes Act and the associated NEPA documentation, to be a high priority. However, the economic reality is that not all the projects and programs identified in this INRMP will receive immediate funding. Therefore, the programs and projects identified in this INRMP and shown in Table 9-1 (at the end of this section) have been placed into three priority-based categories: high priority, medium priority, and low priority. The prioritization of the projects is based on need, and need is based on the importance of a project in moving the natural resources management program toward successfully achieving its goal.

Successful implementation of this INRMP requires an organizational structure that identifies roles and responsibilities, human resources, prioritization of projects and program objectives, funding, command support, and constant review of the progress made in program implementation. This section describes those elements of the program.

9.1 WORK PLANS

The proposed projects are presented in Table 9-1. Specific work plans for projects to be implemented during the period covered by this INRMP are in Appendix H.

9.2 FUNDING

Funding for the natural resources program at LEAD comes from the Conservation Reimbursable Program. Funds generated from the forestry program and agricultural outleasing are deposited to the Army Forestry Account and the Army Agricultural/Grazing Account. Projects that involve land and forestry management can be funded with money from this account. The EMD submits annual funding requirements to Army HQ, which supplies LEAD with funds from the Forestry and Agricultural/Grazing Accounts. Revenue generated from the hunting and fishing program can be used at LEAD for the wildlife management program.

Several projects have a cost of \$0 because they are considered duties of the Natural Resources Manager that are covered by salary and have minimal to no cost.

The projects identified in this INRMP are classified into two categories: recurring and nonrecurring requirements. Nonrecurring requirements are further classified as current compliance, maintenance requirements, and enhancement actions beyond compliance. *Must fund* requirements are those projects and activities in the recurring and current compliance categories.

Detailed explanations of the funding categories are in Enclosure 4 to DoD Instruction 4715.03, *Natural Resources Conservation Program*, March 18, 2011. These categories are descriptively summarized as the following:

- Recurring Natural Resources Conservation Management Requirements: Administrative, personnel, and other costs associated with managing the DoD Natural Resources Conservation Program that are necessary to meet applicable compliance requirements in federal and state laws, regulations, EOs, and DoD policies, or in direct support of the military mission, with priority given to recurring natural resources conservation management requirements associated with the operation of facilities, installations, and deployed weapons systems.

- Nonrecurring Natural Resources Conservation Management Requirements:
 - Current Compliance: Includes installation projects and activities to support (1) installations out of compliance (e.g., received an enforcement action from an authorized federal or state agency or local authority), (2) signed compliance agreement or consent order, (3) meeting requirements with applicable federal or state laws, regulations, standards, EOs, or DoD policies, (4) immediate and essential maintenance of operational integrity or military mission sustainment, and (5) projects or activities that will be out of compliance if not implemented in the program year.
 - Maintenance Requirements: Includes those projects and activities needed to meet an established deadline beyond the program year and maintain compliance. Examples include (1) compliance with future deadlines, (2) conservation, GIS mapping, and data management to comply with federal, state, and local regulations, EOs, and DoD policy, (3) efforts undertaken in accordance with non-deadline-specific compliance requirements of leadership initiatives, (4) wetlands enhancement to minimize wetlands loss and enhance existing degraded wetlands, and (5) conservation recommendations in biological opinions issued pursuant to the ESA.
 - Enhancement Actions beyond Compliance: Includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives but are not specifically required by law, regulation, or EO, and are not of an immediate nature. Examples include (1) community outreach activities, (2) educational or public awareness projects, (3) restoration or enhancement of natural resources when no specific compliance requirement dictates a course or timing of action, and (4) management and execution of volunteer and partnership programs.

Must fund projects and actions include those required to (1) meet the USFWS special management criteria for threatened and endangered species management, (2) provide for qualified NR personnel, and (3) prevent resource loss or degradation (e.g., soil loss, other maintenance activities) that could affect military readiness.

Not all projects listed in an INRMP are *must funds*. INRMPs include valid maintenance requirements and enhancement actions beyond compliance.

9.3 NATURAL RESOURCES MANAGEMENT STAFFING

The Natural Resources Management staff at LEAD falls under the EMD. This staff consists of two employees: the Natural Resources Manager and a Technician. These employees oversee the programs identified in this INRMP and their implementation. This staff will also oversee the projects identified in this INRMP.

To resolve staff deficiencies, the Natural Resources Management program would benefit from a forestry/habitat technician and a GIS specialist. A forestry technician would help with the forestry program, fish and wildlife program in terms of habitat enhancement, and provide extra support to all the LEAD natural resource programs. A GIS specialist would maintain natural resources geographic information that would assist in planning and executing projects from maintenance and habitat enhancement activities to master planning and new development.

Outside Assistance. Implementing some projects discussed in the INRMP will require active outside assistance. Outside assistance might come from state and federal agencies, universities, and contractors. The use of these resources is the most efficient and cost-effective method for temporarily acquiring expertise. Some parties will be reimbursed for their assistance according to the terms in MOUs and contractual agreements, whereas others will supply their assistance according to cooperative agreements and volunteer efforts with LEAD.

9.4 ANNUAL COORDINATION REQUIREMENTS

Section 101(a)(2) of the Sikes Act states that the INRMP must reflect the *mutual agreement* of the USFWS and state “concerning conservation, protection, and management of fish and wildlife resources.” In response, the DoD issued the following guidance (DUSD memorandum, October 10, 2002):

Each DOD installation shall establish and maintain regular communications with the appropriate USFWS and State fish and wildlife agency offices to address issues concerning natural resources management that are not addressed in the INRMP. At a minimum, this shall include annual coordination with all cooperating offices.

The purpose of this coordination is to facilitate annual review by the USFWS and the PGC. In accordance with DoD guidance, these annual reviews must verify that

- Current information on all conservation metrics is available.
- All *must fund* projects and activities have been budgeted for and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate revising the INRMP.
- All required coordination has occurred.
- All significant changes to the installation’s mission requirements or its natural resources have been identified.

9.5 MONITORING INRMP IMPLEMENTATION

According to DoD guidance, implementation anticipates the execution of all *must-fund* projects and activities in accordance with specific timeframes identified in the INRMP.

An INRMP is considered to be implemented if an installation

- Actively requests, receives, and uses funds for *must fund* projects and activities.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Coordinates annually with all cooperating offices.
- Documents specific INRMP actions accomplished each year.

Table 9-1. Summary of Monitoring Measures

PROJECT TIME FRAME	PRIORITY	CLASS	PROJECTED COST	IMPLEMENTATION	RESPONSIBLE OFFICE
Manage Forests for Biodiversity and Timber					
<i>Implement the 2012 Forest Management Plan</i>	Medium	1	\$20K		Env. Mgt. Div + Contractor
Protect Natural Areas from Invasive Species, Pests, Disease And Wildfire					
<i>Implement the 2012 Fire Management Plan including Integrated Wildland Fire Management</i>	High	1	\$95K		Env. Mgt. Div, LEAD Fire Dept., DES, , Contractor
<i>Continue to implement the 2019 Integrated Pest Management Plan</i>	Medium	2	\$1K		Env. Mgt. Div.
<i>Conduct invasive species surveys and implement control measures as needed</i>	Medium	2	\$8–12K/year	Annually	Env. Mgt. Div.
Create and Enhance Meadow and Grassland Habitat					
<i>Identify potential meadow and grassland habitat</i>	Medium	1	\$1K		Env. Mgt. Div.
<i>Annually monitor and conduct habitat enhancement measures on identified meadow and grassland habitat</i>	Medium	1	\$1,250/year	Annually	Env. Mgt. Div.
Increase the Population of Turkey, Quail and Pheasant					
<i>Continue to implement mowing restrictions from 15 May–15 July for agricultural leases, buffer areas, ECM road edges, and unimproved grounds</i>	Medium	2	\$0	Ongoing	Env. Mgt. Div.
<i>Conduct long-term monitoring of grassland bird populations with respect to the mowing schedule</i>	High	0	\$2K/year	Ongoing	Env. Mgt. Div.
Balance Population Levels of Game Species					
<i>Create and implement a Gamebird Monitoring Plan</i>	High	0	\$1–3K + \$500/year	Ongoing	Env. Mgt. Div.
<i>Continue population studies for white-tailed deer management. Also monitor turkey populations.</i>	High	0	\$300/year	Annually	Env. Mgt. Div.

Table 9-1. Summary of Monitoring Measures (cont.)

PROJECT TIME FRAME	PRIORITY	CLASS	PROJECTED COST	IMPLEMENTATION	RESPONSIBLE OFFICE
<i>Conduct Forward Looking Infrared analysis for white-tailed deer populations</i>	Low	3	\$10K		Env. Mgt. Div. + Contractor
Map and Manage Vegetative Communities and Wildlife Habitat					
<i>Create a map and management measures for vegetative communities and wildlife habitats on the installation to enhance wildlife populations</i>	Medium	3	\$40–60K + \$1K/year for management		Env. Mgt. Div. + Contractor
Evaluate and Track Fisheries Diversity and Populations					
<i>Conduct annual fish sampling in each water body and evaluate fisheries management activities to determine the status of fishery resources</i>	Low	0	\$200/year	Annually	Env. Mgt. Div.
Annually Update Wildlife Inventories on the Installation					
<i>Continue inventory surveys for small mammals</i>	High	1	\$0	Annually	Env. Mgt. Div.
<i>Continue inventory surveys for reptiles and amphibians</i>	High	1	\$0	Annually	Env. Mgt. Div.
<i>Continue inventory surveys for birds</i>	High	1	\$0	Annually	Env. Mgt. Div.
Improve Public Awareness and Outreach for the LEAD Natural Resources Program					
<i>Develop a website for the LEAD Natural Resources Program to foster awareness of the program goals, regulations, and activities</i>	High	3	\$15–20K		Env. Mgt. Div. + Dept. of Info Mgt.
Identify RTE Species					
<i>Conduct an Indiana bat inventory</i>	Low	1	\$30–45K		Env. Mgt. Div. Shippensburg Contractor
Monitor RTE Species					
<i>Monitor Allegheny woodrat periodically</i>	High	1	\$2K/year	Annually	Env. Mgt. Div. + volunteers
<i>Monitoring northeastern bulrush, brown sedge, and lance-leaved loosestrife habitat periodically</i>	Medium	1	\$0	Annually	Env. Mgt. Div.

Table 9-1. Summary of Monitoring Measures (cont.)

PROJECT TIME FRAME	PRIORITY	CLASS	PROJECTED COST	IMPLEMENTATION	RESPONSIBLE OFFICE
Identify Aquatic, Riparian, and Wetland Habitats					
<i>Continue to inventory, monitor, and protect forested wetland habitat, including vernal pools, on the depot</i>	Medium	0	\$0	Ongoing Every Spring	Env. Mgt. Div.
<i>Conduct habitat enhancement measures to improve aquatic and wetland function and biodiversity</i>	Medium	Must fund	\$2K/year	Annually	Env. Mgt. Div.
Minimize Erosion on Highly and Moderately Erodible Soils					
<i>Continue to follow federal and state guidelines for soil disturbing activities by monitoring these activities and pursuing necessary soil management actions</i>	High	0	\$1K	Ongoing	Env. Mgt. Div.
Reduce Sediment Load to Streams and Other Surface Waters					
<i>Establish and/or maintain existing 100-foot vegetative buffers around permanent lakes, streams, and ponds. Continue to follow Federal and State guidelines for sediment loading and nutrient management.</i>	High	0	\$1K	Ongoing	Env. Mgt. Div.
<i>Continue to implement soil erosion BMPs in the design and implementation of future forestry initiatives to prevent soil erosion</i>	High	0	\$8–15K	Ongoing	Env. Mgt. Div.
<i>Continue to monitor and update/upgrade erosion control measures for the demolition ground (OB/OD) in compliance with NPDES permits</i>	High	0	\$20–40K	Ongoing	Env. Mgt. Div. + Letterkenny Munitions Center
Bring Agricultural Outlease Land Into Compliance with the INRMP					
<i>Monitor agricultural tracts for compliance with the INRMP mowing schedule (Project 2.2.1) and lease stipulations, and assess the need for conservation measures</i>	High	0	\$0	Ongoing	Env. Mgt. Div.

SECTION 10.0

RECORD OF ENVIRONMENTAL CONSIDERATION

Under the National Environmental Policy Act of 1969 (NEPA), federal agencies are required to analyze and document the environmental consequences of proposed major actions. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. The act is premised on the assumption that providing timely information to the decision maker and the public concerning the potential environmental consequences of proposed actions will improve the quality of federal decisions. Thus, the NEPA process includes the systematic, interdisciplinary evaluation of the potential environmental consequences expected to result from implementing a proposed action.

As stated in Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, “the Army is committed to environmental stewardship in all actions as an integral part of its mission and to ensure sustainability” and will “[f]oster an ethic within the Army that takes us beyond environmental compliance to sustainability.” This Integrated Natural Resources Management Plan (INRMP) has been prepared in accordance with AR 200-1. To meet the requirements of title 32 of the *Code of Federal Regulations*, part 651, which states that “environmental analyses required by this part will be integrated as much as practicable with other environmental reviews, laws, and Executive Orders,” this document combines the Letterkenny Army Depot (LEAD) INRMP and the associated NEPA analysis—in this case, a Record of Environmental Consideration for implementing the INRMP.

LEAD prepared an Environmental Assessment (EA) in 2001 to document the foreseeable impacts on the natural and human environment of implementing the 2001 INRMP. The analysis performed for the EA found that no significant environmental impacts would result from implementation of the INRMP and therefore an Environmental Impact Statement was not required. A Finding of No Significant Impact was prepared and signed in February 2001.

The current Proposed Action is the implementation of the updated INRMP. The purpose of the Proposed Action is to carry out resource-specific management measures that will enable LEAD to effectively manage the use and condition of the natural resources on the installation. Implementation of the Proposed Action would protect and conserve the natural setting of LEAD while also meeting other mission and community support requirements and complying with environmental regulations and policies.

The Record of Environmental Consideration is provided on the following pages.

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RECORD OF ENVIRONMENTAL CONSIDERATION

Project Title: Implementation of the *Integrated Natural Resources Management Plan 2020–2024 Letterkenny Army Depot*.

Description of the Proposed Action: Letterkenny Army Depot (LEAD) plans to implement its Integrated Natural Resources Management Plan (INRMP) through the year 2024 to continue to manage natural resources on the installation in an integrated and comprehensive manner. The INRMP defines the roles and responsibilities of those involved in natural resources management within the installation; provides the basis for addressing all applicable legal requirements related to natural resources management; and provides for the implementation of best management practices consistent with achieving the goals, objectives, and projects of the installation’s military mission.

Duration of the Proposed Action: The INRMP will take effect when signed by LEAD’s installation commander and will remain in effect until it is superseded by a new or revised INRMP signed by LEAD’s installation commander.

Reason for Using Record of Environmental Consideration: The Proposed Action qualifies for a categorical exclusion from preparing National Environmental Policy Act (NEPA) documentation in accordance with title 32 of the *Code of Federal Regulations*, part 651 (1 July 2011), appendix B, section II (b)(3), “Preparation of regulations, procedures, manuals, and other guidance documents that implement, without substantive change, the applicable Department of the Army or other federal agency regulations, procedures, manuals, and other guidance documents that have been environmentally evaluated (subject to previous NEPA review).” The Environmental Assessment (EA) prepared in 2001 to document the foreseeable impacts on the natural and human environment of implementing the 2001 INRMP found that no significant environmental impacts would result from INRMP implementation. A Finding of No Significant Impact was prepared and signed in February 2001. In accordance with the above categorical exclusion, this Record of Environmental Consideration is being prepared to update the existing EA.

Impacts of the Proposed Action: For the purpose of evaluating the potential impacts of implementing the INRMP at LEAD, the project area is defined as the area within LEAD’s boundaries.

The following key environmental resource issues were considered in preparing this record:

- a. Climate: No effects on climate would be expected.
- b. Land Use: Under the Proposed Action, no changes to on-site land uses or land use patterns would occur. Because land uses on-site would not be expected to change, land use patterns in the surrounding area would not be affected.
- c. Soils, Topography, and Geology: Beneficial effects would be expected. By continuing to implement a soil management program, adverse effects on microtopography associated with erosion would be minimized. In addition, adverse effects on soils associated with erosion would be minimized. As part of the Proposed Action, monitoring soil conditions on the installation to identify potential problem areas, implementing conservation measures in areas where exposure of soils is necessary, and minimizing activities likely to result in erosion would minimize potential impacts on the soil resources at LEAD.

- d. **Wildlife:** Beneficial effects would be expected. Implementation of the Proposed Action would result in improved habitat conditions for game and non-game species. In addition, implementation of a Bobwhite Quail Focus Area Management Plan and adaptive management techniques would enhance the health and condition of quail populations on the installation. Implementation of the Proposed Action would also provide additional baseline information, as well as a foundation for determining future habitat management strategies to maintain and enhance biodiversity.
- e. **Threatened and Endangered Species:** Beneficial effects on all state-listed species at LEAD would be expected. Implementation of the Proposed Action would provide protection and management for these species. Furthermore, the species would be treated with added importance and valued for their contributions to the unique natural heritage of LEAD. With respect to federally listed species, the additional inventory and monitoring efforts recommended in this plan will provide further information to ensure that threatened and endangered species on LEAD are protected and others are identified if they are present.
- f. **Vegetation:** Beneficial effects would be expected. Implementation of the Proposed Action, including implementation of an Integrated Wildland Fire Management Plan, would result in improved habitat conditions and control of nonnative invasive species at LEAD. Supplemental, periodic monitoring for floral species and vegetative communities would provide the information needed to assess the status of native and invasive species and to update baseline information on vegetative communities. This information would form a foundation for properly managing, maintaining, and enhancing the habitat quality on the installation. Implementation of the Proposed Action would result in improved habitat conditions through control of nonnative invasive species (e.g., reed canary grass, autumn olive, Russian olive, Japanese barberry, mile-a-minute weed, and tree of heaven) at LEAD.
- g. **Aquatic Resources and Wetlands:** Beneficial effects would be expected. Long-term beneficial effects on aquatic fauna are expected from improved aquatic and wetland habitat, water quality, and population monitoring. Under the Proposed Action, the continued expansion of a wetland database for LEAD would protect wetlands by providing a basis on which to evaluate and monitor habitat conditions. The establishment of riparian buffers would minimize potential impacts on aquatic and wetland habitat associated with adjacent activities. Additional efforts would be made to reduce impacts on wetlands by planning mission activities, when possible, in a manner consistent with wetland protection objectives. In addition, habitat enhancement measures would be put in place to improve wetland function and biodiversity (e.g., invasive species control).
- h. **Water Quality:** Minor beneficial effects would be expected. By continued implementation of pollution prevention and watershed protection measures at LEAD, the potential for adverse effects on surface water or groundwater systems resulting from the conveyance of pollutants during periods of flow would be minimized. In addition, implementing soil management measures and nuisance aquatic plant control measures would enhance water quality conditions and protect aquatic life.
- i. **Noise:** No effects on noise levels would be expected. The major concerns regarding noise and potential environmental effects pertain to increases in sound levels, exceedances of acceptable land use compatibility guidelines, and changes in public acceptance (noise complaints). Potential effects are precluded by the fact that the Proposed Action does not

- involve any activities that would affect noise conditions, such as changes in military equipment, increases in the number or location of personnel, construction of new facilities or modification of existing facilities, or increases or changes in military operations.
- j. Prime and Unique Farmlands: No effects on prime and unique farmlands would be expected.
 - k. Hazardous, Toxic, and Radioactive Substances: No effects would be expected. All hazardous and toxic materials would continue to be handled in accordance with federal laws and Army regulations, including the Resource Conservation and Recovery Act; Federal Insecticide, Fungicide, and Rodenticide Act; Toxic Substances Control Act; and Army Regulation 200-1.
 - l. Cultural Resources: Beneficial effects on the cultural resources at LEAD would be expected. The primary concern regarding cultural resources is the protection of prehistoric and historic sites located within LEAD's boundaries. Implementation of the Proposed Action would provide for added consideration of cultural resource issues when making management decisions about projects on the installation. Under the Proposed Action, the probability of disturbing potential cultural resource sites would be greatly reduced.
 - m. Air Quality: No effects would be expected. The major concerns regarding air quality and potential environmental effects pertain to increases in pollutant emissions; exceedances of National Ambient Air Quality Standards and other federal, state, and local limits; and impacts on existing air permits. Examples of activities that would result in potential adverse changes in air quality conditions include changes in military equipment, increases in the number or location of personnel, construction of new facilities or modification of existing facilities, and increases or changes in military operations. Potential effects on existing pollutant emissions are precluded by the fact that the Proposed Action does not involve any such activities that would contribute to changes in existing air quality conditions.
 - n. Socioeconomic Resources. No effects would be expected. The primary concern regarding potential effects on socioeconomic resources pertains to changes in population, housing, and economic conditions. Potential effects are precluded by the fact that the Proposed Action does not involve any activities that would contribute to changes in socioeconomic resources.
 - o. Environmental Justice (Executive Order 12898) and Protection of Children (Executive Order 13045): No effects would be expected. The primary concern regarding environmental justice and protection of children is the potential for a Proposed Action to result in disproportionate adverse environmental or health effects on low-income communities, minority populations, or children. Implementation of the Proposed Action in itself would not create any advantage or disadvantage for any group or individual. Implementing the INRMP would not be expected to create disproportionately high or adverse human health or environmental effects on low-income or minority populations or communities or children in the area surrounding LEAD. However, should any project-specific issues regarding disproportionate adverse health or environmental effects on low-income groups, minority populations, or children arise, LEAD would use best environmental management practices to ensure compliance with applicable regulatory requirements.
 - p. Cumulative Impacts: Based on a review of the Proposed Action and resource issues described above, it has been determined that the Proposed Action would have no significant impacts on existing environmental conditions. The Proposed Action was previously examined and found to have no significant environmental impacts. Therefore, LEAD plans to

implement the *Integrated Natural Resources Management Plan 2020–2024 Letterkenny Army Depot* upon signature of this Record of Environmental Consideration.

Reviewed by: _____

Approved by: _____

Table 10-1. Regulatory Compliance Requirements

<u>Federal Statutes</u>	<u>Level of Compliance</u>
Anadromous Fish Conservation Act	FULL
Archeological and Historic Preservation Act	FULL
Clean Air Act	FULL
Clean Water Act	FULL
Coastal Barrier Resources Act	FULL
Coastal Zone Management Act	FULL
Comprehensive Environmental Response, Compensation, and Liability Act	FULL
Endangered Species Act	FULL
Estuary Protection Act	FULL
Federal Water Project Recreation Act	FULL
Fish and Wildlife Coordination Act	FULL
Land and Water Conservation Fund Act	FULL
Marine Mammal Protection Act	FULL
National Historic Preservation Act	FULL
National Environmental Policy Act	FULL
Resource Conservation and Recovery Act	FULL
Rivers and Harbors Act	FULL
Watershed Protection and Flood Prevention Act	FULL
Wild and Scenic Rivers Act	FULL
<u>Executive Orders, Memoranda, etc.</u>	
Protection and Enhancement of Cultural Environment (E.O. 11593)	FULL
Floodplain Management (E.O. 11988)	FULL
Protection of Wetlands (E.O. 11990)	FULL
Prime and Unique Farmlands (CEQ Memorandum, 11 Aug. 1980)	FULL
Environmental Justice in Minority and Low-Income Populations (E.O. 12898)	FULL
Protection of Children (E.O. 13045)	FULL

Note:

Full Compliance (Full): Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning.

Partial Compliance (Partial): Not having met some of the requirements that normally are met in the current stage of planning.

Non-Compliance (NC): Violation of a requirement of the statute, E.O., or other environmental requirement.

Not Applicable (N/A): No requirements for the statute, E.O., or other environmental requirement for the current stage of planning.

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APPENDICES

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APPENDIX A
AGENCY COORDINATION LETTERS

(Agency coordination letters will be inserted by LEAD when completed.)

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APPENDIX B
PLANNING LEVEL SURVEYS

Flora PLS

Fauna PLS

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PLANNING LEVEL SURVEYS (PLSs)

Flora PLS

Fauna PLS

Threatened and Endangered Species (T&E Species) PLS

Vegetation Communities PLS

Wetlands PLS

Surface Water PLS

Topography PLS

Soils PLS

FLORA PLS

According to the 2001 INRMP, no comprehensive inventory of flora or vegetative communities has been conducted on LEAD, although some floral data has since been generated for specific wetland and wildlife studies. The following is a listing of vascular plant species observed at LEAD over the course of other studies.

NATIVE AND WILD, NON-NATIVE PLANTS IDENTIFIED AT LETTERKENNY ARMY DEPOT

Common Name	Scientific Name
Trees	
Box Elder	<i>Acer negundo</i>
Red Maple	<i>Acer rubrum</i>
Silver Maple	<i>Acer saccharinum</i>
Sugar Maple	<i>Acer saccharum</i>
Tree-of-heaven	<i>Ailanthus altissima</i>
Black Birch	<i>Betula lenta</i>
Hornbeam	<i>Carpinus caroliniana</i>
Shagbark Hickory	<i>Carya ovata</i>
Hickory	<i>Carya sp.</i>
Hackberry	<i>Celtis occidentalis</i>
Redbud	<i>Cercis canadensis</i>
Dogwood	<i>Cornus spp.</i>
Hawthorn	<i>Creataegus spp.</i>
Beech	<i>Fagus grandifolia</i>
White Ash	<i>Fraxinus americana</i>
Green Ash*	<i>Fraxinus pennsylvanica</i>
Honey Locust	<i>Gleditsia triacanthos</i>
Witch-hazel	<i>Hamamelis virginiana</i>
Black Walnut	<i>Juglan nigra</i>
Butternut	<i>Juglans cinerea</i>
Eastern Red Cedar	<i>Juniperus virginiana</i>
Larch	<i>Larix spp.</i>
Tulip Poplar (Yellow Poplar)	<i>Liriodendron tulipifera</i>
Apple	<i>Malus spp.</i>
Black Gum	<i>Nyssa sylvatica</i>
Spruce	<i>Picea spp.</i>
White Pine	<i>Pinus strobus</i>
Scotch Pine	<i>Pinus sylvestris</i>
Virginia Pine	<i>Pinus virginiana</i>
Sycamore	<i>Platanus occidentalis</i>
Aspen	<i>Populus spp.</i>
Black Cherry	<i>Prunus serotina</i>

Common Name	Scientific Name
Choke Cherry	<i>Prunus virginiana</i>
Pear	<i>Pyrus spp.</i>
White Oak	<i>Quercus alba</i>
Pin Oak	<i>Quercus palustris</i>
Chestnut Oak	<i>Quercus prinus</i>
Red Oak	<i>Quercus rubra</i>
Black Oak	<i>Quercus velutina</i>
Sumac	<i>Rhus spp.</i>
Black Locust	<i>Robinia pseudoacacia</i>
Willow	<i>Salix spp.</i>
Slippery Elm	<i>Ulmus rubra</i>
Sassafras	<i>Sassafras albidum</i>
Basswood	<i>Tilia americana</i>
Eastern Hemlock	<i>Tsuga canadensis</i>
Shrubs and Vines	
Japanese Barberry	<i>Berberis thunbergii</i>
Russian Olive	<i>Eleagnus angustifolia</i>
Autumn Olive	<i>Elaeagnus umbellata</i>
Huckleberry	<i>Gaylussacia spp.</i>
Privet	<i>Ligustrum obtusifolium</i>
Spicebush	<i>Lindera benzoin</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>
Tatarian Honeysuckle	<i>Lonicera tatarica</i>
Multiflora Rose	<i>Rosa multiflora</i>
Wild Rose	<i>Rosa pranticola</i>
Blackberry (Allegheny)	<i>Rubus allegheniensis</i>
Raspberry	<i>Rubus spp.</i>
Dewberry	<i>Rubus spp.</i>
Common Elderberry	<i>Sambucus canadensis</i>
Greenbrier	<i>Smilax spp.</i>
Poison Ivy	<i>Toxicodendron radicans</i>
Blueberry	<i>Vaccinium spp.</i>
Blackhaw	<i>Viburnum prunifolium</i>
Grape	<i>Vitis spp.</i>
Herbaceous Plants	
White Snakeroot	<i>Ageratina altissima</i>
Small-Flowered Agrimony	<i>Agrimonia parviflora</i>
Wheat Grass	<i>Agropyron spp.</i>
Red Top	<i>Agrostis stolonifera</i>
Wild Garlic	<i>Allium canadense</i>
Foxtail	<i>Alopecurus pratensis</i>
Ragweed	<i>Ambrosia spp.</i>
Beardgrass	<i>Andropogon glomeratus</i>
Broomsedge	<i>Andropogon virginicus</i>

Common Name	Scientific Name
Field Pussytoes	<i>Antennaria plantaginifolia</i>
Dogbane	<i>Apocynum spp.</i>
Burdock	<i>Arctium spp.</i>
Milkweed	<i>Asclepias spp.</i>
Brushy Aster	<i>Aster dumosus</i>
False Nettle	<i>Boehmeria cylindrica</i>
Cutleaf Grapefern	<i>Botrychium dissectum</i>
Mustard	<i>Brassica spp.</i>
Mosses	Division <i>Bryophyta</i>
Bluejoint Grass	<i>Calamagrostis canadensis</i>
Brown Sedge	<i>Carex buxbaumii</i>
Fringe Sedge	<i>Carex crinita</i>
Hop Sedge	<i>Carex lupulina</i>
Shallow Sedge	<i>Carex lurida</i>
Upright Sedge	<i>Carex stricta</i>
Blunt Broomsedge	<i>Carex tribuloides</i>
Blister Sedge	<i>Carex vesicaria</i>
Spotted Knap Weed	<i>Centaurea maculosa</i>
Turtlehead	<i>Chelone glabra</i>
Daisy (Ox-eye)	<i>Chrysanthemum leucanthemum</i>
Thistle	<i>Cirsium spp.</i>
Spring Beauty	<i>Claytonia caroliniana</i>
Tarweed	<i>Cuphea petiolata</i>
Dodder	<i>Cuscuta sp.</i>
Sedges	Family <i>Cyperaceae</i>
Galingale	<i>Cyperus strigosus</i>
Orchard Grass	<i>Dactylis glomerata</i>
Common Teasel	<i>Dipsacus sylvestris</i>
Viper's Bugloss	<i>Echium vulgare</i>
Purple-Leaved Willow-Herb	<i>Epilobium coloratum</i>
Boneset	<i>Eupatorium perfoliatum</i>
Ground Ivy	<i>Glechoma hederacea</i>
Creeping Mannagrass	<i>Glyceria acutiflora</i>
Fowl Mannagrass	<i>Glyceria striata</i>
Sneezeweed	<i>Helenium autumnale</i>
Rattlesnake Weed	<i>Hieracium venosum</i>
Hyacinth	<i>Hyacinthus spp.</i>
Small-Flowered St. Johns Wort	<i>Hypericum mutilum</i>
Bottlebrush Grass	<i>Hystrix patula</i>
Spotted Touch-Me-Not	<i>Impatiens capensis</i>
Soft Rush	<i>Juncus effusus</i>
Rice Cutgrass	<i>Leersia oryzoides</i>
Lichens	Division <i>Lichenes</i>
Butter-and-Eggs	<i>Linaria vulgaris</i>
Marsh Seedbox	<i>Ludwigia palustris</i>

Common Name	Scientific Name
Lance-Leaved Loosestrife	<i>Lysimachia hybrida</i>
Sensitive Fern	<i>Onoclea sensibilis</i>
Switchgrass	<i>Panicum virgatum</i>
English Plantain	<i>Plantago lanceolata</i>
Mayapple	<i>Podophyllum peltatum</i>
False Water-Pepper	<i>Polygonum hydropiperoides</i>
Lady's Thumb	<i>Polygonum persicaria</i>
Dotted Smartweed	<i>Polygonum punctatum</i>
Arrowleaf Tear-Thumb	<i>Polygonum sagittatum</i>
False Climbing Buckwheat	<i>Polygonum scandens</i>
Virginia Knotweed	<i>Polygonum virginianum</i>
Ferns	Division <i>Pteridophyta</i>
Mountain Mint	<i>Pycnanthemum sp.</i>
Woolgrass	<i>Scirpus cyperinus</i>
Sedge	<i>Carex sp.</i>
Horse Nettle	<i>Solanum carolinense</i>
Tall Goldenrod	<i>Solidago canadensis</i>
Wrinkle-Leaf Goldenrod	<i>Solidago rugosa</i>
Clover	<i>Trifolium spp.</i>
Cattail	<i>Typha latifolia</i>
Moth Mullein	<i>Verbascum blattaria</i>
Common Mullein	<i>Verbascum thapsus</i>
Blue Vervain	<i>Verbena hastata</i>
Wingstem	<i>Verbesina alternifolia</i>
New York Ironweed	<i>Vernonia noveboracensis</i>
Source: LEAD Natural Resources Office, ongoing	

FAUNA PLS

No comprehensive list of fauna has been compiled for LEAD. The following is a listing of species identified on LEAD in the course of wildlife and natural resources studies.

BIRDS

BIRDS IDENTIFIED AT LEAD

Common Name	Scientific Name (Family Name Underlined and Bold)
	<u>Accipitridae</u>
	<u>Accipitrinae*</u>
Cooper's hawk	<i>Accipiter cooperii</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
	<u>Buteoninae</u>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Broad-winged hawk	<i>Buteo platypterus</i>
	<u>Circinae</u>
Northern harrier	<i>Circus cyaneus</i>
	<u>Alcedinidae</u>
Belted kingfisher	<i>Ceryle alcyon</i>
	<u>Anatidae</u>
	<u>Anserinae</u>
Canada goose	<i>Branta canadensis</i>
	<u>Anatinae</u>
American black duck	<i>Anas rubripes</i>
Northern pintail	<i>Anas acuta</i>
American wigeon	<i>Anas americana</i>
Mallard	<i>Anas platyrhynchos</i>
Wood duck	<i>Aix sponsa</i>
Blue-winged teal	<i>Anas discors</i>
Green-winged teal	<i>Anas crecca</i>
	<u>Aythiinae</u>
Common Goldeneye	<i>Bucephala clangula</i>
Ring-necked duck	<i>Aythya collaris</i>
Redhead	<i>Aythya americana</i>
	<u>Merginae</u>
Hooded merganser	<i>Lophodytes cucullatus</i>
	<u>Apodidae</u>
Chimney swift	<i>Chaetura pelagica</i>
	<u>Ardeidae</u>
Great blue heron	<i>Ardea herodias</i>
Green-backed heron	<i>Butorides striatus</i>
Great egret	<i>Casmerodrus albus</i>

Common Name	Scientific Name (Family Name <u>Underlined and Bold</u>)
Cedar waxwing	<u>Bombycillidae</u> <i>Bombycilla cedrorum</i>
Common nighthawk Whip-poor-will	<u>Caprimulgidae</u> <i>Chordeiles minor</i> <i>Caprimulgus vociferus</i>
Black vulture Turkey vulture	<u>Cathartidae</u> <i>Coragyps atratus</i> <i>Cathartes aura</i>
Brown creeper	<u>Certhiidae</u> <i>Certhis americana</i>
Killdeer	<u>Charadriidae</u> <i>Charadrius vociferus</i>
Rock dove Mourning dove	<u>Columbidae</u> <i>Columba livia</i> <i>Zenaida macroura</i>
Black-billed cuckoo Yellow-billed cuckoo	<u>Cuculidae</u> <i>Coccyzus erythrophthalmus</i> <i>Coccyzus americanus</i>
Blue jay American crow Fish crow Northern raven	<u>Corvidae</u> <i>Cyanocitta cristata</i> <i>Corvus brachyrhynchos</i> <i>Corvus ossifragus</i> <i>Corvus corax</i>
American kestrel	<u>Falconidae</u> <u>Falconinae</u> <i>Falco sparverius</i>
Rose-breasted grosbeak Indigo bunting Northern cardinal Purple finch House finch American goldfinch Rufous-sided towhee Chipping sparrow Field sparrow Vesper sparrow Grasshopper sparrow Henslow's sparrow Savannah sparrow Fox sparrow White-throated sparrow White-crowned sparrow Song sparrow Swamp sparrow Dark-eyed junco Dickcissel	<u>Fringillidae</u> <i>Pheucticus ludovicianus</i> <i>Passerina cyanea</i> <i>Cardinalis cardinalis</i> <i>Carpodacus purpureus</i> <i>Carpodacus mexicanus</i> <i>Carduelis tristis</i> <i>Pipilo erythrophthalmus</i> <i>Spizella passerina</i> <i>Spizella pusilla</i> <i>Pooecetes gramineus</i> <i>Ammodramus savannarum</i> <i>Ammodramus henslowii</i> <i>Passerculus sandwichensis</i> <i>Passerella iliaca</i> <i>Zonotrichia albicollis</i> <i>Zonotrichia leucophrys</i> <i>Melospiza melodia</i> <i>Melospiza georgiana</i> <i>Junco hyemalis</i> <i>Spiza americana</i>

Common Name	Scientific Name (Family Name <u>Underlined and Bold</u>)
Blue grosbeak Snow bunting	<i>Fringillidae (cont'd)</i> <i>Guiraca caerulea</i> <i>Plectrophenax nivalis</i>
Common loon	<i>Gaviidae</i> <i>Gavia immer</i>
Tree swallow Northern rough-winged swallow Bank swallow Cliff swallow Barn swallow	<i>Hirundininae</i> <i>Tachycineta bicolor</i> <i>Stelgidopteryx serripennis</i> <i>Riparia riparia</i> <i>Hirundo pyrrhonota</i> <i>Hirundo rustica</i>
Red-winged blackbird Eastern meadowlark Common grackle Brown-headed cowbird Northern oriole Orchard oriole	<i>Icterinae</i> <i>Agelaius phoeniceus</i> <i>Sturnella magna</i> <i>Quiscalus quiscula</i> <i>Molothrus ater</i> <i>Icterus galula</i> <i>Icterus spurius</i>
Terns	<i>Laridae</i> <i>Sterninae</i> <i>Sterninae spp.</i>
Eastern wild turkey	<i>Meleagridinae</i> <i>Meleagris gallopavo</i>
Gray catbird Northern mockingbird Brown thrasher	<i>Mimidae</i> <i>Dumetella corolinensis</i> <i>Mimus polyglottos</i> <i>Toxostoma rufum</i>
Osprey	<i>Pandionidae</i> <i>Pandion haliaetus</i>
Black-capped chickadee Tufted titmouse	<i>Paridae</i> <i>Parus atricapillus</i> <i>Parus bicolor</i>
Blue-winged warbler Yellow warbler Cerulean warbler Chestnut-sided warbler Yellow-rumped warbler Black-and-white warbler American redstart Northern parula Worm-eating warbler Ovenbird Northern waterthrush Kentucky warbler Common yellowthroat	<i>Parulidae</i> <i>Vermivora pinus</i> <i>Dendroica petchia</i> <i>Dendroica cerulea</i> <i>Dendroica pennsylvanica</i> <i>Dendroica coronata</i> <i>Mniotilta varia</i> <i>Setophaga ruticilla</i> <i>Parula americana</i> <i>Helmitheros vermivorus</i> <i>Seiurus aurocapillus</i> <i>Seiurus noveboracensis</i> <i>Oporornis formosus</i> <i>Geothlypis trichas</i>

Common Name	Scientific Name (Family Name Underlined and Bold)
	<i>Parulidae (cont'd)</i>
Hooded warbler	<i>Wilsonia citrina</i>
Yellow-breasted chat	<i>Icteria virens</i>
Pine warbler	<i>Dendroica pinus</i>
Palm warbler	<i>Dendroica palmarum</i>
Golden winged warbler	<i>Vermivora chrysoptera</i>
	<i>Passeridae</i>
House sparrow	<i>Passer domesticus</i>
	<i>Phalacrocoracidae</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
	<i>Phasianidae</i>
Northern bobwhite quail	<i>Colinus virginianus</i>
Ring-necked pheasant	<i>Phasianus colchius</i>
	<i>Picidae</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
	<i>Podicipedidae</i>
Pied-billed grebe	<i>Podilymbus</i>
	<i>Rallidae</i>
American coot	<i>Fulica americana</i>
	<i>Scolopacidae</i>
Spotted sandpiper	<i>Actitis macularia</i>
American woodcock	<i>Scolopax minor</i>
	<i>Sittidae</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
	<i>Strigidae</i>
Great horned owl	<i>Bubo virginianus</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Northern screech-owl	<i>Otus asio</i>
	<i>Sturnidae</i>
European starling	<i>Sturnus vulgaris</i>
	<i>Sylviidae</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>
	<i>Tetraoninae</i>
Ruffed grouse	<i>Bonasa umbellus</i>
	<i>Thraupinae</i>
Scarlet tanager	<i>Piranga olivacea</i>
	<i>Trochilidae</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
	<i>Troglodytidae</i>
Carolina wren	<i>Thryothorus ludovicianus</i>

Common Name	Scientific Name (Family Name <u>Underlined and Bold</u>)
House wren Winter wren	<u>Troglodytidae</u> (<i>cont'd</i>) <i>Troglodytes aedon</i> <i>Troglodytes troglodytes</i>
Eastern bluebird Veery Wood thrush Hermit thrush American robin	<u>Turdidae</u> <i>Sialia sialis</i> <i>Catharus fuscescens</i> <i>Hylocichla mustelina</i> <i>Catharus fuscescens</i> <i>Turdus migratorius</i>
Eastern Wood-pewee Acadian flycatcher Alder flycatcher Least flycatcher Eastern phoebe Great crested flycatcher Eastern kingbird	<u>Tyrannidae</u> <i>Contopus borealis</i> <i>Empidonax virescens</i> <i>Empidonax alnorum</i> <i>Empidonax minimum</i> <i>Sayornis phoebe</i> <i>Myiarchus crinitus</i> <i>Tyrannus tyrannus</i>
White-eyed vireo Solitary vireo Yellow-throated vireo Warbling vireo Red-eyed vireo	<u>Vireonidae</u> <i>Vireo griseus</i> <i>Vireo solitarius</i> <i>Vireo flavifrons</i> <i>Vireo gilvus</i> <i>Vireo olivaceus</i>
*Bolded names listed under bolded underlined names are subfamilies.	
SOURCE: LEAD Natural Resources Office, ongoing	

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Mammals

MAMMALS OBSERVED AT LEAD

Common Name	Scientific Name
Marsupialia	
<i>Didelphidae</i>	
Virginia opossum	<i>Didelphis virginiana</i>
Insectivora	
<i>Soricidae</i>	
Masked shrew	<i>Sorex cinereus</i>
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Smoky shrew	<i>Sorex fumeus</i>
Pygmy shrew	<i>Microsorex hoyi</i>
<i>Talpiae</i>	
Eastern mole	<i>Scalopus aquaticus</i>
Star nose mole	<i>Condylura cristata</i>
Hairy-tailed mole	<i>Parascalops breweri</i>
Lagomorpha	
<i>Leporidae</i>	
Eastern cottontail	<i>Sylvilagus floridanus</i>
Rodentia	
<i>Sciuridae</i>	
Eastern chipmunk	<i>Tamias striatus</i>
Woodchuck	<i>Marmota monax</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Eastern Fox squirrel	<i>Sciurus niger</i>
Pine squirrel	<i>Tamiasciurus hudsonicus</i>
Southern Flying squirrel	<i>Glaucomys volans</i>
<i>Castoridae</i>	
Beaver	<i>Castor canadensis</i>
<i>Cricetidae</i>	
Deer mouse	<i>Peromyscus maniculatus</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Muskrat	<i>Ondatra zibethicus</i>
Allegheny woodrat	<i>Neotoma magister</i>
Norway rat	<i>Rattus norvegicus</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Southern bog lemming	<i>Synaptomys cooperi</i>
<i>Zapodidae</i>	
Meadow jumping mouse	<i>Zapus hudsonius</i>
<i>Erithizontidae</i>	
American Porcupine	<i>Erethizon dorsatum</i>
Carnivora	
<i>Canidae</i>	
Red fox	<i>Vulpes vulpes</i>
Gray fox	<i>Vulpes cinereoargenteus</i>
Coyote	<i>Canis latrans</i>

Common Name	Scientific Name
<i>Ursidae</i>	
Black bear	<i>Ursus americanus</i>
<i>Procyonidae</i>	
Raccoon	<i>Procyon lotor</i>
<i>Mustelidae</i>	
Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
Striped skunk	<i>Mephitis mephitis</i>
<i>Felidae</i>	
Bobcat	<i>Lynx rufus</i>
Artiodactyla	
<i>Cervidae</i>	
White-tailed deer	<i>Odocoileus virginianus</i>
Chiroptera	
<i>Vespertilionidae</i>	
Big brown bat	<i>Eptesicus fuscus</i>
Red bat	<i>Lasiurus borealis</i>
Northern long-eared bat	<i>Myotis septentrionalis</i>
Little brown myotis	<i>Myotis lucifugus</i>
Source: LEAD Natural Resources Office, ongoing	

Note:

Since the 2008 Fauna PLS, two additional species of bat have been identified on LEAD:

Hoary bat (*Lasiurus cinereus*), found in 2015

Eastern Small-footed Bat (*Myotis leibii*), found in 2012

Reptiles and Amphibians

REPTILES OBSERVED AT LEAD

Common Name	Scientific Name
Turtles	
Common snapping	<i>Chelydra serpentina serpentina</i>
Stinkpot	<i>Sternotherus odoratus</i>
Wood	<i>Clemmys insculpta</i>
Eastern box	<i>Terrapene carolina</i>
Midland painted	<i>Chrysemys picta marginata</i>
Spotted	<i>Clemmys guttata</i>
Lizards	
Five-lined skink	<i>Eumeces fasciatus</i>
Northern fence	<i>Sceloporus undulatus hyacinthius</i>
Snakes	
Northern water	<i>Nerodia sipedon</i>
Northern red-bellied	<i>Storeria occipitomaculata</i>
Eastern ribbon	<i>Thamnophis sauritus</i>
Eastern garter	<i>Thamnophis sauritus sirtalis</i>
Northern ringneck	<i>Diadophis punctatus edwardsi</i>
Northern black racer	<i>Coluber constrictor</i>
Black rat	<i>Elaphe obsoleta</i>
Eastern milk	<i>Lampropeltis triangulum</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Eastern hognose	<i>Heterodon platyrhinos</i>
Northern copperhead	<i>Agkistrodon contortrix mokasen</i>
Queen	<i>Regina septemvittata</i>
Note: This list is not comprehensive but reflects existing available data.	
Source: LEAD Natural Resources Office, ongoing.	

REPTILES PRESENT IN FRANKLIN COUNTY THAT MAY BE FOUND ON LEAD¹

Common Name	Scientific Name
Turtles	
Bog	<i>Clemmys muhlenbergi</i> ²
Map	<i>Graptemys geographica</i>
Red-bellied	<i>Pseudemys rubriventris</i> ³
Lizards	
Northern coal skink	<i>Eumeces anthracinus</i> ⁴
Snakes	
Northern brown	<i>Storeria dekayi</i>
Eastern smooth green	<i>Opheodrys vernalis</i>
<p>1 This is a limited list based on historical data and only provides an indication of the reptile species that may be found in the area. No recent survey results are currently available.</p> <p>2 Extreme western edge of range comes into The Great Valley. (The Great Valley is in Franklin and Cumberland counties.)</p> <p>3 One account in Franklin County on West Branch of Conocheague Creek in 1968 by Pennsylvania Fish Commission.</p> <p>4 Scattered and extremely localized; uncertain locality given by S.F. Baird in 1850 in western Franklin County on easternmost ridge of the Valley and Ridge section.</p>	
Source: LEAD Natural Resources Office, ongoing.	

AMPHIBIANS OBSERVED AT LEAD

Common Name	Scientific Name
Salamanders	
Jefferson	<i>Ambystoma jeffersonianum</i>
Spotted	<i>Ambystoma maculatum</i>
Marbled	<i>Ambystoma opacum</i>
Red-spotted newt	<i>Notophthalmus viridescens</i>
Northern dusky	<i>Desmognathus fuscus</i>
Mountain dusky	<i>Desmognathus ochrophaeus</i> ²
Redbacked	<i>Plethodon cinereus</i>
Slimy	<i>Plethodon glutinosus</i>
Northern red	<i>Pseudotriton ruber</i>
Northern spring	<i>Gyrinophilus porphyriticus</i>
Northern two-lined	<i>Eurycea bislineata</i>
Long-tailed	<i>Eurycea longicauda</i>
Toads and Frogs	
Eastern American toad	<i>Bufo americanus americanus</i>
Fowler's toad	<i>Bufo woodhousei fowleri</i>
Northern cricket frog	<i>Acris crepitans</i>
Gray treefrog	<i>Hyla versicolor</i>
Bullfrog	<i>Rana catesbeiana</i>
Green frog	<i>Rana clamitans melanota</i>
Pickerel frog	<i>Rana palustris</i>
Wood frog	<i>Rana sylvatica</i>
Northern leopard frog	<i>Rana pipiens</i>
Eastern spadefoot	<i>Scaphiopus holbrookii</i> ⁵
Northern spring peeper	<i>Pseudacris triseriata</i>
Upland chorus frog	<i>Pseudacris feriarum</i>
Note: This list is not comprehensive but reflects existing available data	
Source: LEAD Natural Resources Office, ongoing.	

**AMPHIBIANS PRESENT IN FRANKLIN COUNTY THAT MAY BE FOUND ON
LEAD¹**

Common Name	Scientific Name
Salamanders	
Valley and Ridge	<i>Plethodon hoffmani</i> ²
Four-toed	<i>Hemidactylum scutatum</i> ³
Toads and Frogs	
Striped chorus frog	<i>Hyla crucifer</i>
¹ This is a limited list based on historical data and only provides an indication of the amphibian species that may be found in the area. No recent survey results are currently available. ² In the Letterkenny area would be restricted to the Valley and Ridge mountains. ³ Special habitat requirements of forest pools and bogs.	
Source: LEAD Natural Resources Office, ongoing.	

Fish

The condition of fisheries on the installation is currently unknown given the lack of recent survey data.

FISH SPECIES OBSERVED AT LEAD

Common Name	Scientific Name
Rocky Spring Run	
<i>Oncorhynchus mykiss</i>	Rainbow Trout
<i>Salmo trutta</i>	Brown Trout
<i>Salvelinus fontinalis</i>	Brook Trout
<i>Semotilus atromaculatus</i>	Creek Chub
Muddy Run	
<i>Exos americanus vermiculatus</i>	Grass Pickerel
<i>Notropis chrysocephalus</i>	Striped Shiner
<i>Notropis hudsonicus</i>	Spottail Shiner
<i>Pimephales notatus</i>	Bluntnose Minnow
<i>Semotilus atromaculatus</i>	Creek Chub
<i>Catostomus commersoni</i>	White sucker
<i>Ambloplites rupestris</i>	Rockbass
<i>Lepomis spp.</i>	Sunfish
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Estheostoma olmstedii</i>	Tessellated Darter
<i>Cottus bairdi</i>	Mottled Sculpin
Keasey Run	
<i>Anguilla rostrata</i>	American Eel
<i>Pimephales notatus</i>	Bluntnose Minnow
<i>Notemigonus crysoleucas</i>	Golden Shiner
<i>Semotilus atromaculatus</i>	Creek Chub
<i>Rhinichthys cataractae</i>	Longnose Dace
<i>Rhinichthys atratulus</i>	Blacknose Dace
<i>Catostomus commersoni</i>	White sucker
<i>Ictalurus natalis</i>	Yellow Bullhead
<i>Ambloplites rupestris</i>	Rockbass
<i>Lepomis spp.</i>	Sunfish
<i>Estheostoma olmstedii</i>	Tessellated Darter
<i>Cottus bairdi</i>	Mottled Sculpin
<i>Notropis chrysocephalus</i>	Striped Shiner
<i>Semotilus corporalis</i>	Fall Fish
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Estheostoma flabellare</i>	Fantail Darter
<i>Oncorhynchus mykiss</i>	Rainbow Trout
<i>Pimephales vigilax</i>	Bullhead Minnow
Bud's Lake	
<i>Catostomus commersoni</i>	White sucker
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Ictalurus punctatus</i>	Channel Catfish
<i>Oncorhynchus mykiss</i>	Rainbow Trout

Common Name	Scientific Name
Henry's Pond	
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
Lake Letterkenny	
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Ictalurus punctatus</i>	Channel Catfish
Rocky Spring Reservoir	
<i>Oncorhynchus mykiss</i>	Rainbow Trout
<i>Notemigonus crysoleucas</i>	Golden Shiner
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Ictalurus punctatus</i>	Channel Catfish
<i>Cyprinus carpio</i>	Carp
<i>Pomoxis nigromaculatus</i>	Black Crappie
Shirley's Pond	
<i>Notemigonus crysoleucas</i>	Golden Shiner
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Notemigonus crysoleucas</i>	Golden Shiner
Don Cole Lake	
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
Source: LEAD Natural Resources Office, ongoing.	

THREATENED AND ENDANGERED SPECIES (T&E SPECIES) PLS

1.0 INTRODUCTION

Under Contract Number DACA01-96-D-0011, Delivery Order 0074, Tetra Tech, Inc. conducted a Planning Level Survey (PLS) for threatened and endangered species (TES) at the Letterkenny Army Depot (LEAD), Pennsylvania.

1.1 Objective

The Secretary of Defense has directed that ecosystem management be the tool used by military installations to achieve the goal of effective natural resources management. The overall objective of the TES is to assist the installation in complying with the requirements of the Endangered Species Act of 1973 (ESA), as amended, and Army Regulation (AR) 200-3. The TES survey will provide additional information to be used by LEAD for the protection of identified federally listed TES and habitats used by such species. It was not within the scope of this effort to survey state-listed species, although they were documented when found. Furthermore, it was not within the scope of this survey to conduct a detailed, site-specific or comprehensive survey. Rather, the objective of the survey was to collect data that would be suitable for planning efforts at the installation. To the extent practical, however, survey protocols developed for detailed, site-specific purposes were used for conducting the survey efforts.

1.2 Agency Correspondence

Conducting the PLS and preparing the reports for LEAD involved coordination with several state and federal agencies. Sources of information and consultation for this effort included personnel from LEAD; U.S. Army Corps of Engineers (USACE) Mobile District; U.S. Army Materiel Command (AMC); the U.S. Fish and Wildlife Service (USFWS); the Pennsylvania Game Commission, Bureau of Wildlife Management (PAGC); the Pennsylvania Natural Diversity Inventory (PNDI); the Pennsylvania Fish and Boat Commission; and Tetra Tech, Inc. and their consultants and subcontractors. State and federal agencies were initially contacted to determine the specific species that should be targeted for this survey effort. In addition, the PNDI database was searched to identify federally listed species that have been found within Franklin County that also might be located on LEAD.

1.3 Scope of Work

1.3.1 Targeted Species

To date, only one federally listed species, the threatened bog turtle (*Clemmys muhlenbergii*, referred to simply as bog turtle throughout this report), has been identified on the installation. A survey conducted by The Nature Conservancy (TNC) in 1991 identified a bog turtle, collected from a pitfall trap north of Bud's Lake (located just within the northern installation boundary). The species was identified by a field person, although no photographs or detailed records of the

account were found. At the time of the survey, the bog turtle was not federally listed. Bud's Lake is an artificial water body that was created by the impounding of Keasey Run.

Only one other bog turtle study has been conducted since the 1991 TNC survey. In 1998 and 1999, the USACE, Baltimore District, conducted bog turtle surveys for two wetlands located in parcels that were being transferred under the Base Realignment and Closure (BRAC) action at LEAD (USACE, 1999). These surveys were conducted in accordance with the USFWS Guidelines for Bog Turtle Surveys, 11 May 1998 revision (see Attachment 1). No bog turtles were discovered at either site investigated within the BRAC parcel. Generally, the wetlands were found to be only marginally suitable for bog turtles because of their small size, shallow mucky layer, and isolated location.

Correspondence with state and federal agencies, including PNDI database searches, identified two other federally listed species that have been found in Franklin County: the Indiana bat (*Myotis sodalis*) and the Northeastern bulrush (*Scirpus ancistrochaetus*). A preliminary survey for the Northeastern bulrush had been conducted by TNC in 1991; however, no individuals were found. The TNC report recommended additional studies for the bulrush in wetlands with suitable habitat attributes.

With respect to the Indiana bat, a bat survey has never been conducted on the installation. During the site visit, suitable bat foraging and roosting habitats were identified on the installation. Therefore, the need for a bat survey was identified. Approximately 20 kilometers of streams were identified on LEAD; most are in wooded areas that may provide foraging areas for the Indiana bat. Also, an important tree species used by the Indiana bat for roosting shagbark hickory (*Carya ovata*) was observed on the installation.

1.3.2 Scope of Surveys

In general, the TES effort focused on the bog turtle rather than on the other two species because it has been identified on the installation and little is known about this species. An overview of the scope of the TES effort is provided below.

- *Bog turtle*. Tetra Tech, Inc. was tasked to conduct a reconnaissance-level survey using USFWS methods outlined for Step 2 (see Attachment 1) for wetlands on the installation in order to identify and assess habitat that might support bog turtles. It should be noted that this survey was conducted in accordance with the protocols established by USFWS that were available at the time (dated May 11, 1998). Subsequently, USFWS updated their protocols (see Attachment 1) after the survey was completed (survey was conducted in the spring of 2000, while the revised protocols were released in August 2000) (USFWS, 2000). Essentially, the survey methods used for this survey are the same as those required under the revised protocol.

One of the objectives of the bog turtle survey was to identify and rank habitat as unsuitable, poor/marginal, fair, good, or excellent for supporting bog turtles. Based on this habitat assessment, Tetra Tech, Inc. was tasked to conduct a detailed survey using methods similar to those for Step 3 (see Attachment 1) on approximately 6 acres of habitat that was representative of the suitable habitat identified on the installation. As part of this effort, Tetra Tech, Inc. was to

assess population levels, health, and habitat conditions. These data would be used to extrapolate to other areas with similar habitat conditions. If the turtle was found, the information collected from this effort would be used to support the preparation of an Endangered Species Management Plan (ESMP).

- *Indiana Bat*. Tetra Tech, Inc. was tasked to conduct a reconnaissance level-survey (6 net nights) using the USFWS protocol (see Attachment 2) for selected locations on the installation that would be most likely to support Indiana bats. If the bat was found, the information collected from this effort would be used to support preparation of an ESMP.
- *Northeastern Bulrush*. Tetra Tech, Inc. was tasked to conduct a comprehensive survey for the bulrush in wetlands with habitat attributes characteristic of its habitat. If the bulrush was found, the information collected from this effort would be used to support preparation of an ESMP.

Qualified TES experts were used to lead field survey efforts for the bog turtle (Mr. Tim Hoen, Principal Investigator), Indiana bat (Mr. William Hendricks, Principal Investigator), and Northeastern bulrush (Dr. Larry Klotz, Principal Investigator). Mr. Hoen is a reptile expert and is recognized by USFWS as a qualified bog turtle surveyor. Mr. Hendricks is an Indiana bat expert who has conducted mist netting surveys in support of AMC projects and for other clients throughout the United States. Dr. Klotz is a professor from Shippensburg University and has direct local experience surveying for the Northeastern bulrush. Dr. Klotz came by recommendation of TNC, Pennsylvania Office and is recognized by UFWS as a qualified Northeastern bulrush expert. In addition to these experts, Tetra Tech, Inc. provided five field personnel to assist in the effort. Personnel from LEAD also assisted in the surveys when their schedules permitted.

2.0 BOG TURTLE SURVEY

This section presents the methods and results of the bog turtle survey. General background information on this species is presented in Section 2.1.

2.1 Species Information

This section provides an overview of what is currently known about the biological and ecological characteristics of the bog turtle, including its physical description, distribution, habitat requirements, and life history. Reasons for the turtle's decline and conservation measures taken by various agencies and organizations also are provided. In general, additional study is needed to further delineate the species' distribution and habitat requirements, as well as the reasons for its decline. A summary of the bog turtle's current known status at LEAD is presented below.

The bog turtle is the smallest member of the genus *Clemmys* and is generally considered to be the smallest turtle native to the United States. The carapace (upper shell) of the adult turtle measures from 7.5 to 11.4 centimeters (3.0 to 4.5 inches) in length. The carapace is domed and weakly keeled and ranges in color from light brown to ebony. The scutes of the shell often have lighter-colored centers that resemble starburst patterns with contrasting yellow or cream areas along the midline. The bog turtle is easily distinguished from other turtles by the large,

conspicuous bright orange, yellow, or red patch on each side of the head, which often extends onto the neck. The patch is occasionally split into two parts. The limbs of the turtle can have red, orange, or yellow mottling. The species is sexually dimorphic. Males have concave plastrons and long, thick tails. The vent of the male is located beyond the posterior carapace margin. Females have proportionately higher carapaces, flat plastrons, and relatively short tails. The vent of the female is located beneath the carapace edge (USFWS, 1997).

The bog turtle is sparsely distributed over a discontinuous geographic range extending from New England south to northern Georgia. It has a discontinuous distribution with a 250-mile separation between distinct northern and southern populations. The northern population extends from Maryland and Delaware through Pennsylvania, New Jersey, New York, Connecticut, and Massachusetts. In Pennsylvania, bog turtles occur in counties located in the southeastern section of the commonwealth. Disjunct populations previously occurred in western Pennsylvania and in the Lake George and Finger Lakes regions of New York. The western Pennsylvania and Lake George populations have been extirpated, and only a remnant population existed at one remaining site in the Finger Lakes region in 1997 (USFWS, 1997).

The southern population of bog turtles occurs in the Appalachian Mountains from southwestern Virginia southward through western North Carolina, eastern Tennessee, northwestern South Carolina, and northern Georgia. The southern population also occurs in the Upper Piedmont physiographic province of North Carolina (USFWS, 1997).

Preferred habitats for bog turtles include open wet meadows, shallow water marshes, spring seeps, floodplain wetlands, fens, bogs, and wet pastures with muddy bottoms, slow-flowing water, and open canopies (USFWS, 1997). The turtles are found at elevations ranging from near sea level in the north to 4,500 feet in the south.

Bog turtles are usually found in small, discrete populations in mosaic-type wetland consisting of micro-habitats including dry pockets, saturated areas, and areas that are periodically flooded. Deep, soft, mucky soils are required and enable bog turtles to avoid predators and to escape climatic extremes such as hot and cold temperatures. The turtles depend on a diversity of hydrologic conditions and use shallow water in the spring and deeper water in the winter (USFWS, 1997). Groundwater springs, seeps, and subsurface flow provide areas where the turtles can overwinter without the threat of freezing to death (Shiels, 1998).

Plant species associated with bog turtle habitat typically include willows (*Salix* spp.), alders (*Alnus* spp.), red maple (*Acer rubrum*), sedges (*Carex* spp.), sphagnum moss (*Sphagnum* spp.), jewelweed (*Impatiens* spp.), rice cut grass (*Leersia oryzoides*), tearthumb (*Polygonum* spp.), arrow arum (*Peltandra virginica*), skunk cabbage (*Symplocarpus foetidus*), and bulrushes (*Juncus* spp. and *Scirpus* spp.). Pedestal vegetation, such as tussock sedge (*Carex stricta*) and sphagnum moss, is used for nesting and basking (USFWS, 1997).

Table C-1 summarizes hydrologic, soil, and vegetative characteristics typically associated with potential bog turtle habitat.

Habitats used by bog turtles are transitional and without disturbances such as fire, beaver activity, grazing, or occasional wet years; they are typically eventually invaded by woody vegetation. Canopy closure eventually occurs as woody vegetation becomes established and matures, creating habitat unsuitable for bog turtles. Historically, bog turtles probably moved from one open emergent wetland to another, as succession closed canopies in one wetland and natural processes opened canopies in other wetlands (USFWS, 1997).

Table C-1. Potential Bog Turtle Habitat

Criteria	Discussion
Hydrology	The area is typically spring fed with shallow surface water or saturated soils present year round, although in summer the wet areas may be restricted to near spring heads. Typically the wetlands are interspersed with dry and wet pockets. There is often subsurface flow.
Soils	The potential habitat has a bottom substrate of soft muck. In the summer of dry years, the extent of suitable substrate may be restricted to areas near spring heads. A bottom substrate of soft muck is the critical criterion for bog turtle habitat.
Vegetation	The dominant vegetation should be typical of emergent wetlands and consist of low grasses and sedges. There is often a scrub shrub component of the wetland. Common vegetation in the emergent component of the wetland typically include tussock sedge (<i>Carex stricta</i>); soft rush (<i>Juncus effusus</i>); rice cut grass (<i>Leersia oryzoides</i>); sensitive fern (<i>Onoclea sensibilis</i>); tearthumbs (<i>Polygonum</i> spp.); jewelweeds (<i>Impatiens</i> spp.); arrowheads (<i>Sagittaria</i> spp.); skunk cabbage (<i>Symplocarpus foetidus</i>); Panic grasses (<i>Panicum</i> spp.); other sedges (<i>Carex</i> spp.); and in disturbed sites, reed canary grass (<i>Phalaris arundinacea</i>). Common scrub shrub vegetative species include alder (<i>Alnus</i> spp.) and red maple (<i>Acer rubrum</i>). In disturbed areas, multiflora rose (<i>Rosa multiflora</i>) may be common.

Source: USFWS, 1997

Several of the wetlands known to be occupied by bog turtles are in agricultural areas subject to grazing. Light to moderate grazing may help to maintain an intermediate stage of succession by preventing or minimizing the encroachment of invasive native and exotic plant species (USFWS, 1997). Bog turtles also are known to inhabit calcareous fens. Fens are primarily shrub/herb communities formed in low-lying areas where groundwater percolates over and through limestone bedrock. Groundwater in calcareous fens tends to be alkaline. The alkaline water may retard the growth of canopy-closing trees, enabling the shrub/herb community to persist over time.

According to documented losses of bog turtles and their habitat, the northern population has declined by 50 percent over the last 20 years (USFWS, 1997). Habitat loss and illegal collecting for the pet trade pose the greatest threats to the bog turtle. Section 4(a)(1) of the ESA states that a species may be determined to be threatened (or endangered) due to one or more of five factors, including present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; or other natural or manmade factors that affect continued existence. Applicability of some of the factors to the decline of the bog turtle are discussed below.

Present or threatened destruction, modification, or curtailment of habitat or range. Loss of habitat is the primary factor responsible for the decline of the bog turtle across its range. Widespread alteration of bog turtle habitat has resulted from the draining, ditching, dredging, flooding, and filling of wetlands for development, road construction, agricultural activities, and pond and reservoir construction. These activities, in addition to directly destroying habitat, fragment remaining habitat and create barriers to movement, thus isolating existing bog turtle populations from other suitable habitats. Development and agricultural activities adjacent to wetlands can cause additional impacts on bog turtle habitat by modifying hydrology as a result of changes to surface water flows into or out of wetland habitats. Development adjacent to wetlands also can affect bog turtle habitat by lowering water tables as a result of the placement and use of groundwater wells or by diverting water away from wetlands as a result of the placement of roads or other obstructions to natural flow.

Urban and commercial development also affects bog turtle habitat by increasing traffic, surface water pollution, and the accelerated succession of vegetative communities, often including the introduction of invasive species. Bog turtle habitats occurring in or adjacent to agricultural areas also can be degraded as a result of untimely mowing or the use of herbicides or pesticides. Light to moderate grazing can enhance bog turtle habitat by slowing plant succession and minimizing encroachment by invasive plant species. Overgrazing can have adverse effects on bog turtle habitat resulting from the cropping and trampling of vegetation that is necessary for turtle nesting, basking, foraging, and cover.

Overutilization for commercial, recreational, scientific, or educational purposes. The bog turtle is a target for pet collectors and the black market pet trade. The turtle is prized by both domestic and overseas collectors because of its rarity, distinctive coloration, small size, and other attractive qualities. Collecting is a significant factor for the species' decline and is an ongoing threat to its continued existence in the wild. Remaining bog turtle populations cannot usually

withstand the removal of even a few individuals because the turtles are slow to mature, have low reproduction rates, and are continually declining because of habitat loss and alteration (Shiels, 1998).

2.2 Methods

Field surveys for the bog turtle were conducted in accordance with the USFWS Guidelines for Bog Turtle Surveys, 11 May 1998 revision, as presented in Attachment 1. As previously discussed, the survey was conducted in accordance with the protocols established by USFWS that were available at the time (dated May 11, 1998). Subsequently, USFWS updated their protocols (see Attachment 1) after the survey was completed (survey was conducted in the spring of 2000, while the revised protocols were released in August 2000) (USFWS, 2000). Essentially, the survey methods used for this survey are the same as those required under the revised protocol. Tetra Tech implemented both Phase 1 and Phase 2 of the revised protocol as part of this effort. One difference between the protocols with respect to this survey effort is that the revised protocol uses different field terminology (e.g., Step 3 in the old protocol is referred to as Phase 2 in the revised protocol). Furthermore, the revised protocol requires additional follow-up surveys in the event that bog turtles are not found during Phase 2. The terminology used in this document adheres to the terminology for the protocol available during the time of the survey effort. The survey was conducted in three phases.

- *Phase 1.* Before conducting field surveys, Mr. Hoen and the field team reviewed available information on the site, including aerial photos, U.S. Geological survey (USGS) topographic maps, the Franklin County Soil Survey, National Wetland Inventory (NWI) wetlands map data for LEAD, information compiled during previously conducted studies on LEAD, and any other pertinent information.

According to NWI and site reconnaissance surveys conducted on LEAD, approximately 300 acres of wetlands are located within the boundaries of the Depot. USGS topographic maps, aerial photos, and wetlands Geographic Information Systems (GIS) data were used to identify areas in which to conduct the field investigation.

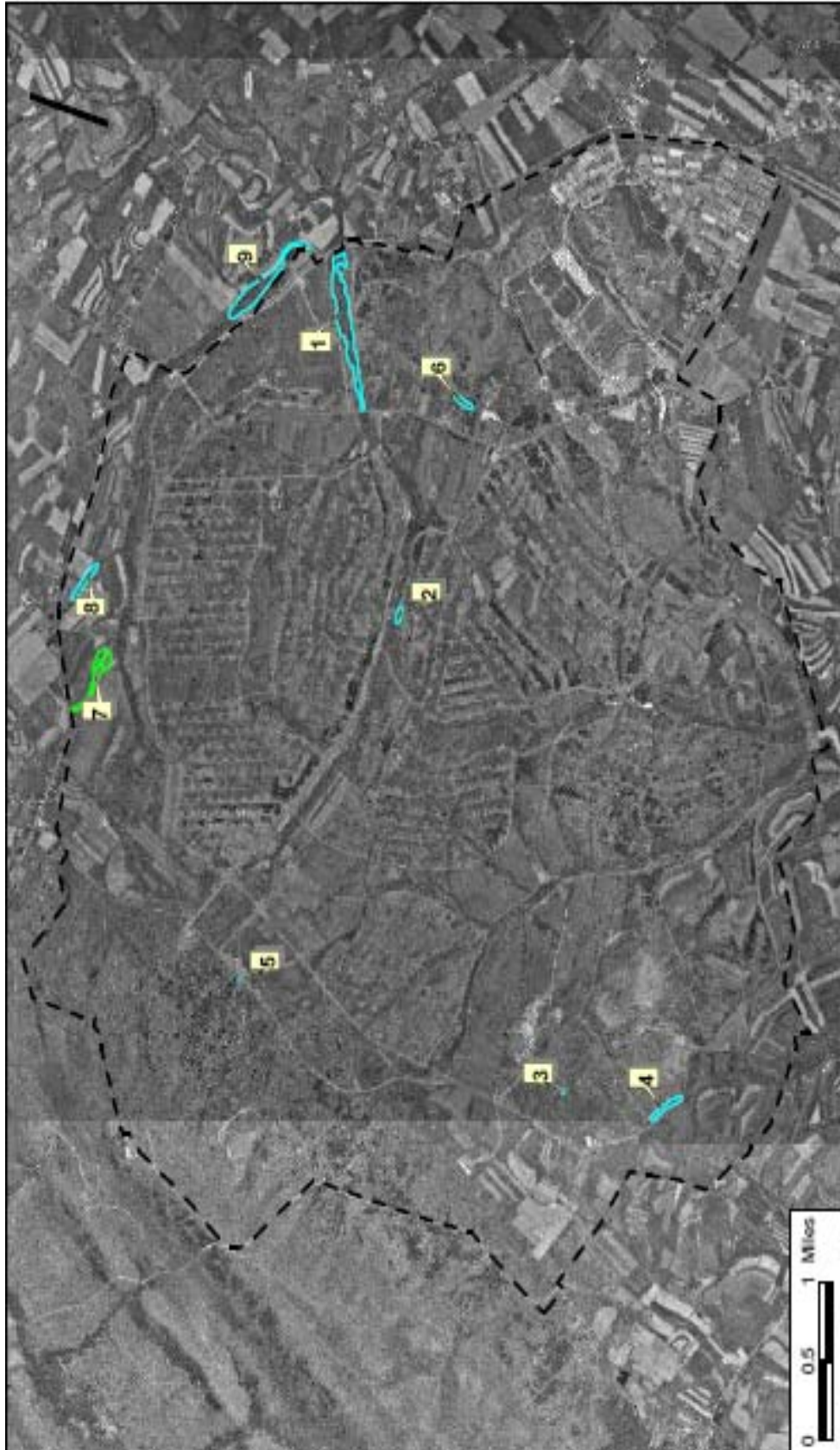
- *Phase 2.* Phase 2 involved conducting a series of site reconnaissance studies to identify and assess potential bog turtle habitat across the entire installation, using the criteria established in Step 2 of the USFWS sampling protocol. The bog turtle habitat assessment started on 20 March 2000 at LEAD. Additional site visits were conducted on 4 April, and 4, 5, 11, 12, 18, and 26 May. The earlier site visits focused on conducting the initial habitat assessments; the subsequent surveys focused on conducting the detailed surveys discussed in Phase 3. The weather conditions were very good to excellent for surveying during all of May. There were no temperatures below 63 degrees Fahrenheit during the surveys, and many days were in the mid-70s to mid-80s.

Wetlands that could potentially possess the basic attributes of bog turtle habitat were visited and the hydrology, soils, and vegetation assessed. All lakes (inlet and discharge areas) and major stream corridors were scrutinized as well. Specifically, of Bud's, Shirley, Rocky Springs, Coal, and Henry lakes and Letterkenny Reservoir were visited. Wetlands that had the vegetation and basic attributes of bog turtle habitat (open wetlands with the potential to have proper substrate

and hydrology) were identified and plotted on a map. Once these wetlands were identified, a more detailed survey was conducted to determine if the sites indeed possessed suitable hydrology, soils, and vegetation. The results of this investigation were used to rank the quality of different wetlands on the installation. Overall, approximately 70 acres of the wetlands were visited at the installation.

Wetlands numbered 1 through 9, as presented in Figure C-1, were visited and surveyed as part of Phase 2

- *Phase 3.* Habitats considered to be “potential” bog turtle habitat as identified in Phase 2 were considered for further surveying efforts as part of Phase 3. As discussed in Section 2.3, no habitat was considered to pass all the criteria set forth in Step 2 of the protocols; therefore, no specific areas were sampled repeatedly as outlined for Step 3. However, given the past identification of a bog turtle north of Bud’s Lake, it was decided that the most intensive survey efforts would be conducted in this area. Wetlands investigated north of Bud’s Lake were searched with a minimum of three surveyors, on three separate visits (11, 18, and 26 May), as required in the bog turtle survey guidelines. The Principal Investigator was Mr. Hoen, whose credentials were discussed previously. The field crew from Tetra Tech, Inc. included Mr. Edward Christopher, Ms. Terry Haas, Ms. Kemp Luck, and Mr. Collin Nolan. As previously noted, the weather conditions were very good to excellent.



Bog Turtle Sampling Locations
 Letterkenny Army Depot
 Chambersburg, Pennsylvania
 Figure C-1

Numbers indicate survey site #

Source: Tetra Tech, 2000.

LEGEND
 Bog Turtle Sampling Sites
 Bog Turtle Sampling Locations Using Step 2
 Bog Turtle Sampling Locations Using Step 2 and 3 (Attempted)
 Installation Boundary

It was not practical to conduct repeated, intensive sampling within a few select areas at Bud's Lake because the hydrology changed dramatically between survey events and no areas were identified to pass Step 2 of the protocol. For example, areas searched during the first visit that were thought to be marginal habitat at best were observed to be too dry during subsequent visits. Therefore, intensive sampling of these areas was abandoned during subsequent visits, with the effort better spent sampling more suitable areas. This was done to maximize the possibility that turtles would be found. Thus, repeated, intensive sampling was conducted throughout the 14 acres north of Bud's Lake and Keasey Run during each of the three site visits in habitat that was most likely to support bog turtles. Intensive searches for bog turtles also were conducted along portions of 40 acres of wetlands along Muddy Run. Only small pockets of open wetland habitat were identified along Muddy Run. Intensive surveys were conducted within these pockets of wetlands, although repeated site visits were abandoned after it was determined that the areas had unsuitable hydrology. During these visits, various search techniques were used, including crawling and hand digging along rivulets.

2.3 Findings

No bog turtles were found during the bog turtle survey. In addition, no suitable habitat was identified on or near LEAD that would have passed Step 2 of the USFWS protocol (as shown in Figure C-2 and Table C 2). This finding is primarily a result of a lack of suitable hydrology. Probing the substrate revealed that the mucky substrate was too shallow to support bog turtles. Each subsequent visit to wetlands in the area had substantially decreased habitat quality compared to the previous visit, as the areas became drier. Preliminary surveys during the months of March and April gave some indication that there might be viable habitat at LEAD (approximately 20 acres north of Bud's Lake and along Muddy Run), but the hard-packed ground in most of the wetlands identified during subsequent visits proved to be insufficient for bog turtles.

There are some noteworthy mucky, muddy areas around Bud's Lake, but these areas became increasingly more dry at each successive visit. To support bog turtles, there must be an ample mud substrate for a brumating bog turtle or at least a gentle subterranean water flow that never freezes. The north end and northeast side of Bud's Lake (Site #7), Muddy Run corridor (Site #1), and Site #9 outside the perimeter are the only three habitats that are noteworthy. (See Figure C-3 for photos of these locations.) These habitats at best receive a rating of poor. The other wetlands investigated were considered unsuitable.

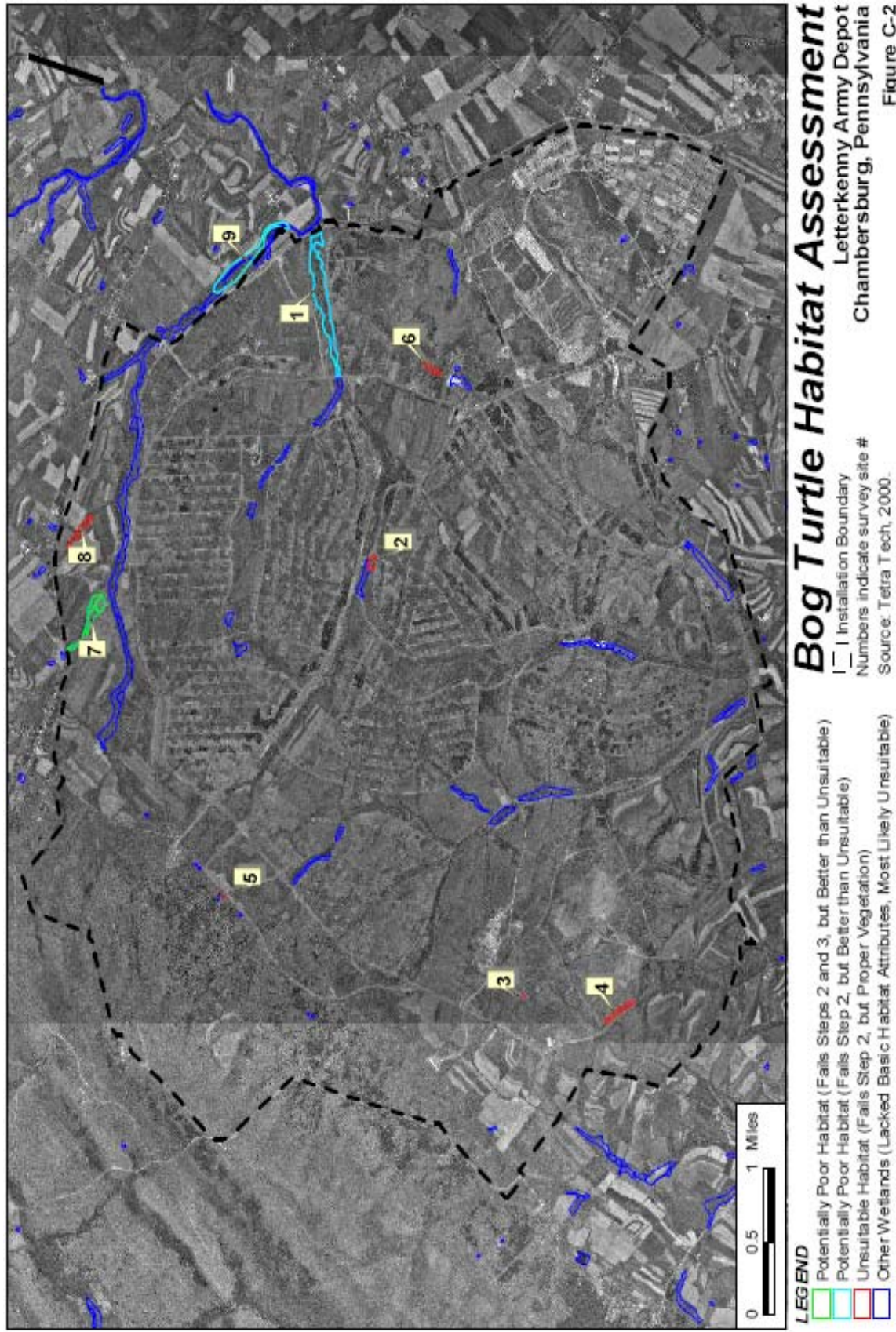


Table C-2. Results of the Bog Turtle Survey at LEAD

Site No.	Known Bog Turtle Site?	Survey Approach		Survey Results					Habitat Assessment Conclusions
		Survey Approach	No. of Site Visits	Suitable Hydrology and Soil?	Suitable Vegetation?	Wetlands Vegetation	<i>Clemmys</i> Genus Found?	Bog Turtle Found?	
1. Muddy Run Marsh	No	Step 2	1	No, but potential	Yes	Brown sedge	Yes (wood, spotted)	No	Potentially poor; further monitoring recommended
2. Muddy Run	No	Step 2	1	No	Yes	Tussock sedge Lurid sedge	No	No	Unsuitable
3. Dudd Road	No	Step 2	1	No	Yes	Lurid sedge Spikerush Soft rush Dark green bulrush	No	No	Unsuitable
4. Dudd Road	No	Step 2	1	No	Yes	Broad-leaved cattail Soft rush Lurid sedge Stalk-grain sedge Hop sedge	No	No	Unsuitable
5. Buffer Perimeter	No	Step 2	1	No	Yes	Soft rush Various sedges Broad-leaved cattail	No	No	Unsuitable
6. North Shirley's Lake	No	Step 2	1	No	Yes	Lurid sedge Green bulrush	No	No	Unsuitable
7. North Kensey Run	Yes, based on 1991 TNC Survey	Step 2, Step 3 attempted	3	No, but potential	Yes	Soft rush	Yes (wood, spotted)	No	Potentially poor; further monitoring recommended
8. Kensey Run Marsh	No	Step 2	1	No	Yes	Brown sedge	No	No	Unsuitable
9. South Kensey Run	No	Step 2	1	No, but potential	Yes	Broad leaved cattail, Various sedges	Yes (spotted)	No	Potentially poor; further monitoring recommended



Muddy Run (Site #1)



Muddy Run (Site #1)



Canary Grass on Muddy Run (Site #1)



Keasey Run (Site #7)



Keasey Run (Site #7)



Wetlands North of Bud's Lake (Site #7)

Northern Bog Turtle Sampling Site Photos

Letterkenny Army Depot
Chambersburg, Pennsylvania

Figure C-3



Wetlands North of Bud's Lake (Site #7)



Northern Shore of Bud's Lake (Site #7)



Northern Shore of Bud's Lake (Site #7)



Southern Shore of Bud's Lake (Site #7)



Off-Base Wetlands (Site #9)



Spotted Turtle (Site #9)

Northern Bog Turtle Sampling Site Photos

Letterkenny Army Depot
Chambersburg, Pennsylvania
Figure C-3 (cont.)

The hydrology of a bog is the essential element for sustaining the viability of a bog turtle colony. The average yearly rainfall for Franklin County in 1992 was 41 inches to 42 inches and there have been similar average amounts of rainfall during the 2000 field season. Therefore, obvious differences in rainfall or water levels between when the bog turtle was found in 1992 and this year's annual rainfall could not be found. There were, however, extreme heat occurrences in July of 1993 and July of 1995, as well as a regional drought in 1999, which most probably lowered surface water levels in the bogs. These results do not explain the identified bog turtle found in 1992 north of Bud's Lake. Tetra Tech, Inc. has not received any confirmation that a bog turtle was in fact found at LEAD, other than the TNC reported finding. No photographs or descriptions of the turtle were available. An isolated turtle that happened to be at Bud's Lake is possible, but a viable colony of bog turtles at LEAD is unlikely.

This survey identified five wood turtles (*Clemmys insculpta*), four spotted turtles (*Clemmys guttata*) (see photo in Figure C-3, Site #9), eight box turtles (*Terrapene carolina*), two painted turtles (*Chrysemys picta*), four snapping turtles (*Chelydra serpentina*), two northern water snakes (Nerodia sipedon), green frogs (*Rana clamitans*), pickerel frogs (*Rana palustris*), American toad tadpoles (*Bufo americanus*), and one spring salamander (*Gyrinophilus porphyriticus*). No nighttime searches were done, which would reveal more amphibians at LEAD. One of the wood turtles and one of the spotted turtles were recaptures within the same area from a previous week, indicating relatively little movement at that time of year. It is worth noting that most of the various turtle species were in excellent condition; some specimens appeared to be more than 50 years old. Overall, turtle shell growth and overall health seemed optimal, as compared to previous surveys in Maryland and Pennsylvania. Since LEAD is home to diverse groups of reptiles, plants, and other animals, there is a unique opportunity to study these animals because of the protection and isolation that the base provides. An example would be a wood turtle study for graduate students to study possible summer and winter movements, mating behavior, and effect and importance within microhabitats.

Recommendations for further bog turtle surveys would be to conduct reconnaissance visits in the wetland areas north of Bud's Lake (site #7) and in open wetland areas along Muddy Run (site #1). These areas should be conserved because they support diverse reptile habitat (as well as amphibians, most likely) and a state-listed plant (brown sedge, *Carex buxbaumii*), and the presence of bog turtles in these areas cannot be ruled out altogether. It is recommended that subsequent reconnaissance and detailed surveys be conducted in accordance with USFWS protocol (Phase 2 monitoring at Bud's Lake and Muddy Run, and trapping surveys at Bud's Lake). Furthermore, the identified wetlands around Bud's Lake and Muddy Run need to be managed for the preservation of bog turtles that may occur in these areas, until such a time as it is determined, with concurrence with USFWS, that bog turtles are not using this habitat.

3.0 INDIANA BAT SURVEY

This section presents the methods and results of the Indiana bat survey. General background information on this species is presented in Section 3.1.

3.1 Species Information

The Indiana bat was officially listed as an endangered species by USFWS on 15 October 1966. Subsequently, the species was protected by the ESA. During the winter the species congregates (approximately 85 percent) in seven major hibernacula (Brady et al., 1983). Since the Indiana bat was officially listed, these hibernacula have been of prime concern in the management of the species. Kentucky and Missouri harbor approximately 90 percent of the known winter population of the species (Barbour and Davis, 1969).

Although much is known of winter habitats of the Indiana bat, little is known of habitat use and distribution of the species during the summer (Brady et al., 1983). Until recently, the summer habitat of the species was thought to be limited to the northern portions of Missouri, Illinois, and Indiana and the southern portions of Iowa and Michigan (Brady et al., 1983). Including both recent and ongoing research, the summer range of the Indiana bat has been expanded to include northern Arkansas (Gardner, 1978), southern Illinois (Brack et al., 1991), northern Kentucky (Brack and Tyrell, 1990, 1991; Bryan and MacGregor, 1991; Gardner et al., 1991 ongoing; Harvey and Kennedy, 1981), and western Kentucky (Hendricks et al., 1992).

The Indiana bat is a medium-sized bat with weights ranging from 4.5 to 9.5 grams. Females are generally larger than males. Wingspan ranges from 241.3 to 266.7 cm. The Indiana bat has a distinctly keeled calcar (a small cartilaginous projection on the interfemoral membrane side of the feet in bats). The feet tend to have short hairs that do not extend beyond the toenails (as in little brown bat [*Myotis lucifugus*]). The teeth are indistinguishable from those of little brown bat. There is, however, a slight sagittal ridge evident in the skull. The tragus, a fleshy structure extending vertically from the base of the ear in bats, is short and relatively rounded in Indiana bat.

The range of the Indiana bat includes the eastern United States, from Vermont west to Oklahoma, Iowa, and Wisconsin, south to northwestern Florida (Barbour and Davis, 1969). Further information can be obtained from the Indiana Bat (*Myotis sodalis*) Revised Recovery Plan (USFWS, 1999).

3.2 Methods

Specific locations for sampling were chosen based on habitat, vegetative canopy coverage (corridor), and experience of the principal investigator (Mr. Hendricks). A nylon low-visibility mist net setup, with nets of the number, length, and height required to cover the corridor, was used to capture bats. Two mist net setups were operated each night of netting for each sampling site. The design of the sampling equipment closely followed that developed by Gardner (1989). Species, reproductive status, age, sex, and weight were recorded for each bat captured.

No previous bat surveys had been conducted on LEAD. It was the purpose of this investigation to conduct a reconnaissance sampling effort for the Indiana bat, as well as to briefly assess the chiropteran fauna within the Depot. Initial investigation of the project area revealed several areas suitable for mist netting bats. One night of netting was conducted over two separate stream corridors. Low bat usage of the stream corridors (as indicated by both captures and low bat

detector activity) necessitated the move to upland corridors (waypoints 198-201; see Figure C-4), where results were much improved.

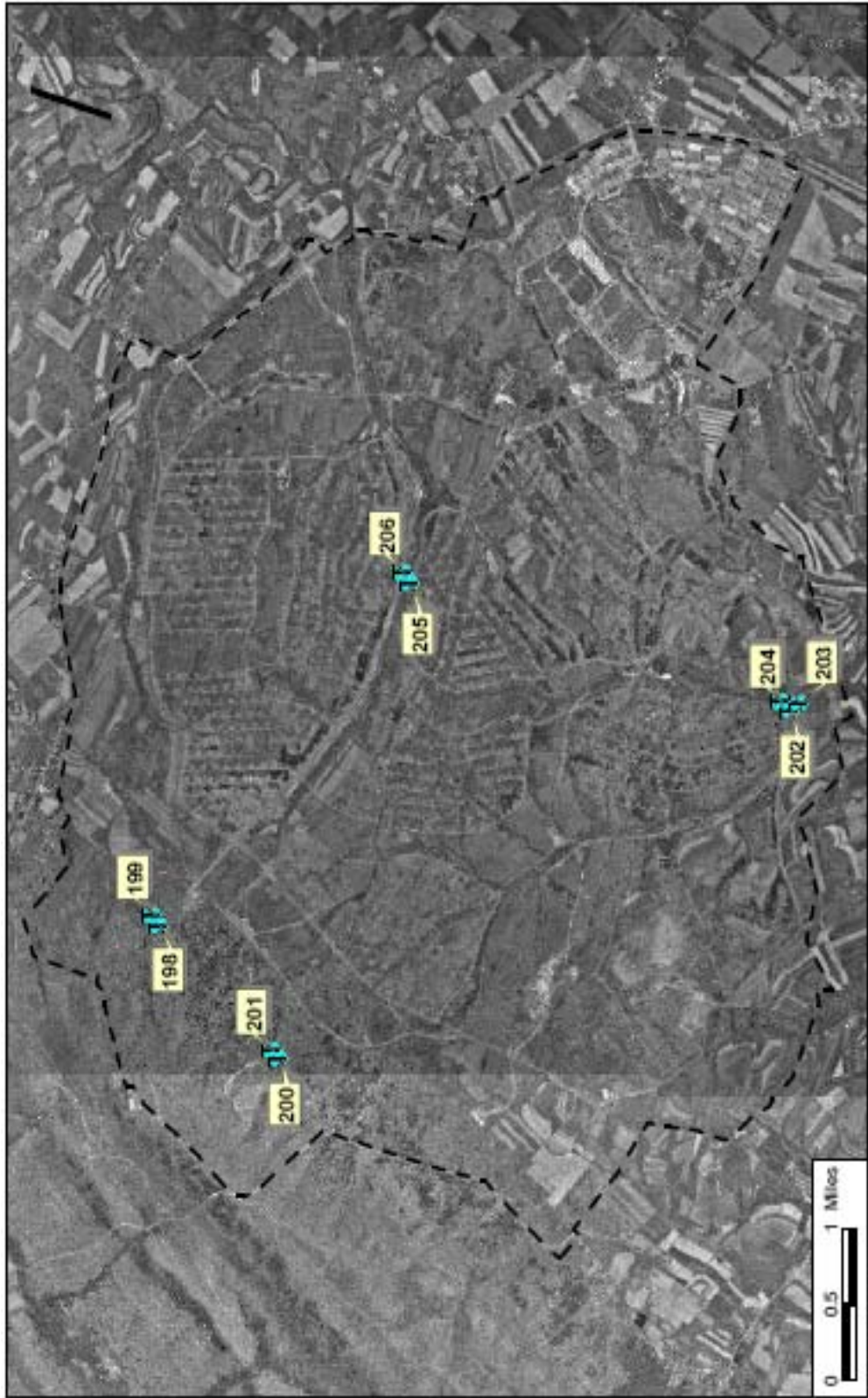
Mist netting was conducted over a three-night period from 20 through 22 June 2000 using mist netting techniques outlined in the USFWS Indiana bat sampling protocol, contained in the Draft Revised Recovery Plan (USFWS, 1996, see Attachment 2). Conditions were suitable for mist netting as recommended by the USFWS mist netting guidelines. The first night, stream corridors were netted (waypoints 203-206; see Figure C-4). The second night, due to the low number of bats trapped along the stream corridors, the nets were moved to upland corridors over old roads with excellent canopy. The nets were maintained at the upland sites for two consecutive nights. Sampling sites were selected to attempt to sample representative habitats and to document as many species of bats as possible. Photographs of the sampling locations are provided in Figure C-5.

The principal investigator was Mr. Hendricks. He was assisted by Mr. John Beckman, Ms. Terry Haas, and Ms. Kemp Luck of Tetra Tech, Inc.

3.3 Findings

No Indiana bats were found during the three nights of trapping with two mist nets (six net-nights total). Mist netting efforts documented 16 individual bats representing three species using LEAD: big brown bat (*Eptesicus fuscus*), Northern long-eared bat (*Myotis septentrionalis*), and red bat (*Lasiurus borealis*) (see bat photographs presented in Figure C-6). The stream corridor sites accounted for only a single bat, a lactating female Northern long-eared bat (*Myotis septentrionalis*). The upland corridors, however, accounted for 16 of the 17 bats captured during this study. A total of five big brown bats, nine Northern long-eared bats, and two red bats were captured in the upland areas. Descriptions of sampling equipment, environmental conditions, and results are provided in Table C-3.

Further investigations could likely identify additional bat species at LEAD. It is likely, through additional survey work, that the small footed myotis, *Myotis leibii* (listed in Pennsylvania as a threatened species), could be documented from the area. Additionally, suitable habitat does exist for the Indiana bat. Additional field work would likely shed more light on its status at LEAD.



Mist Netting Locations
 Letterkenny Army Depot
 Chambersburg, Pennsylvania

Figure C-4

LEGEND
 T Indiana Bat Sampling Site
 - - - Installation Boundary
 Numbers indicate survey site #
 Source: Tetra Tech, 2000.



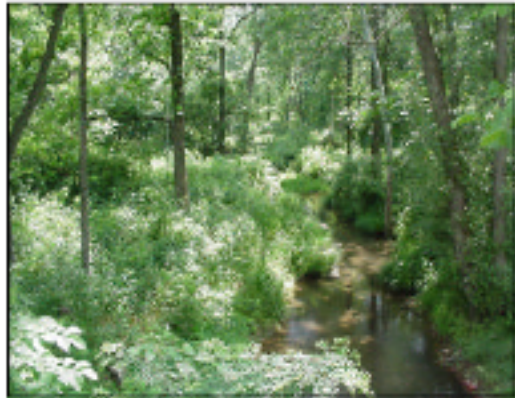
Sampling Site 198



Sampling Site 200



Sampling Site 201



Sampling Site 203



Sampling Site 204



Sampling Site 205

Indiana Bat Sampling Site Photos

Letterkenny Army Depot
Chambersburg, Pennsylvania
Figure C-5



Northern Long Eared Bat (*Myotis Septentrionalis*)



Red Bat (*Lasiurus Borealis*)

Bat Species Photos

Letterkenny Army Depot
Chambersburg, Pennsylvania

Figure C-6

Table C-3. Results of Mist Netting Activities at LEAD.

Site	Site/ Net sizes	Waypoint	Time	Species	Sex	Weight (gms)
First Night: 6/20/00 Start Temperature: 63.7 °F; End Temperature: 61.5 °F; Start Time: 8:30 pm; End Time: 2:00 am						
Site #1	A 30 x 20, b 18 x 20		1:30	<i>Myotis septentrionalis</i>	Lactating female	6.0
Site #2	A 18 x 20, b 18 x 20		--	no captures	--	--
Second Night: 6/21/2000 Start Temperature: 72.1 °F; End Temperature: 66.5 °F Start Time: 8:30 pm; End Time: 2:00 am						
Site #3	A 18 x 20 wpt 198 B 18 x 20 wpt 199	199	9:40	<i>Eptesicus fuscus</i>	Male	15.5
		199	10:12	<i>Myotis septentrionalis</i>	Female	7.0
		199	11:28	<i>Eptesicus fuscus</i>	Lactating female	19.0
			11:30	<i>Myotis septentrionalis</i>	Lactating female	7.5
Site #4	A 18 x 20 wpt 200 B 18 x 20 wpt 201	201	10:12	<i>Myotis septentrionalis</i>	Female	7.0
		201	12:45	<i>Lasiurus borealis</i>	Lactating female	14.5
		200	1:20	<i>Myotis septentrionalis</i>	Lactating female	8.0
		201	1:30	<i>Lasiurus borealis</i>	Lactating female	16.0
		200	1:53	<i>Myotis septentrionalis</i>	Lactating female	8.0
		198	2:00	<i>Myotis septentrionalis</i>	Male	6.5
		199	2:00	<i>Myotis septentrionalis</i>	Gravid female	8.0
		199	2:00	<i>Myotis septentrionalis</i>	Male	7.0
Third Night: 6/22/2000 Start Temperature: 70.9 °F; End Temperature: 65.5 °F Start Time: 8:45 pm; End Time: 2:00 am						
Site #3	A 18 x 20 wpt 198 B 18 x 20 wpt 199	200	11:05	<i>Eptesicus fuscus</i>	Male	16.0
		200	1:10	<i>Myotis septentrionalis</i>	Lactating female	6.5
		200	1:10	<i>Eptesicus fuscus</i>	Lactating female	19.0
Site #4	A 18 x 20 wpt 200 B 18 x 20 wpt 201	200	11:05	<i>Eptesicus fuscus</i>	Male	16.0

4.0 NORTHEASTERN BULRUSH SURVEY

This section presents the methods and results of the Northeastern bulrush survey. General background information on this species is presented in Section 4.1.

4.1 Species Information

The Northeastern bulrush is a member of the sedge family (Cyperaceae) native to the northeastern United States. The species was listed as endangered under provisions of the ESA. Twenty of the 33 known extant populations occur on private land and are subject to habitat loss, modification, and degradation caused by residential and agricultural development (USFWS, 1993).

The Northeastern bulrush, first described as a new species by A.E. Schuyler in 1962, is a leafy, perennial herb approximately 80 to 120 cm in height. The lowermost leaves are up to 8 mm wide and 40 to 60 times as long as wide, while the uppermost leaves are 3 to 5 mm wide and 30 to 50 times as long as wide (Schuyler 1962). Flowering culms (stems) are produced from short, woody, underground rhizomes. The northeastern bulrush is one of 18 members in North America of a natural group of “leafy bulrushes” in the genus *Scirpus* (USFWS, 1993).

In general, the northeastern bulrush tends to grow in acidic to circumneutral natural ponds, shallow sinkholes, or wet depressions (wet meadows and marshes) found in hilly country. It has not been found in artificial or human-disturbed habitats, such as ditches, borrow pits, or natural ponds that have been altered by ditching, draining, or dredging. Bulrush sites vary geographically, from sinkhole ponds in the southern part of the range to a variety of wetland types, including beaver ponds (marshes), wet depressions, emergent wetlands, and woodland ponds, in the northern part of its range. Common to all of the ponds occupied by the bulrush are water levels that fluctuate seasonally or annually, from inundation (in late winter and spring) to saturation (in summer and late fall). The ponds supporting the bulrush are usually part of relatively small (usually less than 1 acre) wetland complexes of clustered ponds in which each pond is separated from the others by a few hundred feet or yards or less. The bulrush can be found growing at the water’s edge of the emergent zone or can be found several feet away from water, in a few centimeters of water or in deep water, depending on seasonal fluctuations in water level (USFWS, 1993).

4.2 Methods

A botanical inventory of 17 wetlands was conducted at LEAD on 17-18 July 2000 to determine the presence of the Northeastern bulrush. Available background data on LEAD (e.g., soils data, topographic maps, aerial photos, wetlands inventory, and the TNC survey for the bulrush) were used to identify wetlands to be targeted for this survey effort. The wetlands surveyed in detail are numbered and presented in Figure C-7. Photographs of noteworthy wetlands are presented in Figure C-8. Wetlands 1, 2, and 11 are located in the Great Valley (Sevon, 1995), while the other 14 wetlands are on the forested southeast-facing slope of Broad Mountain, mostly along its base. Wetlands 3 through 7 and 12 through 17 are vegetated, natural “vernal ponds.” Their

upland/wetland ecotone was discerned on the basis of topography, vegetation, and leaf litter oxidation color (Falkenstein, 1999). The plant nomenclature follows Rhoads and Block (2000).

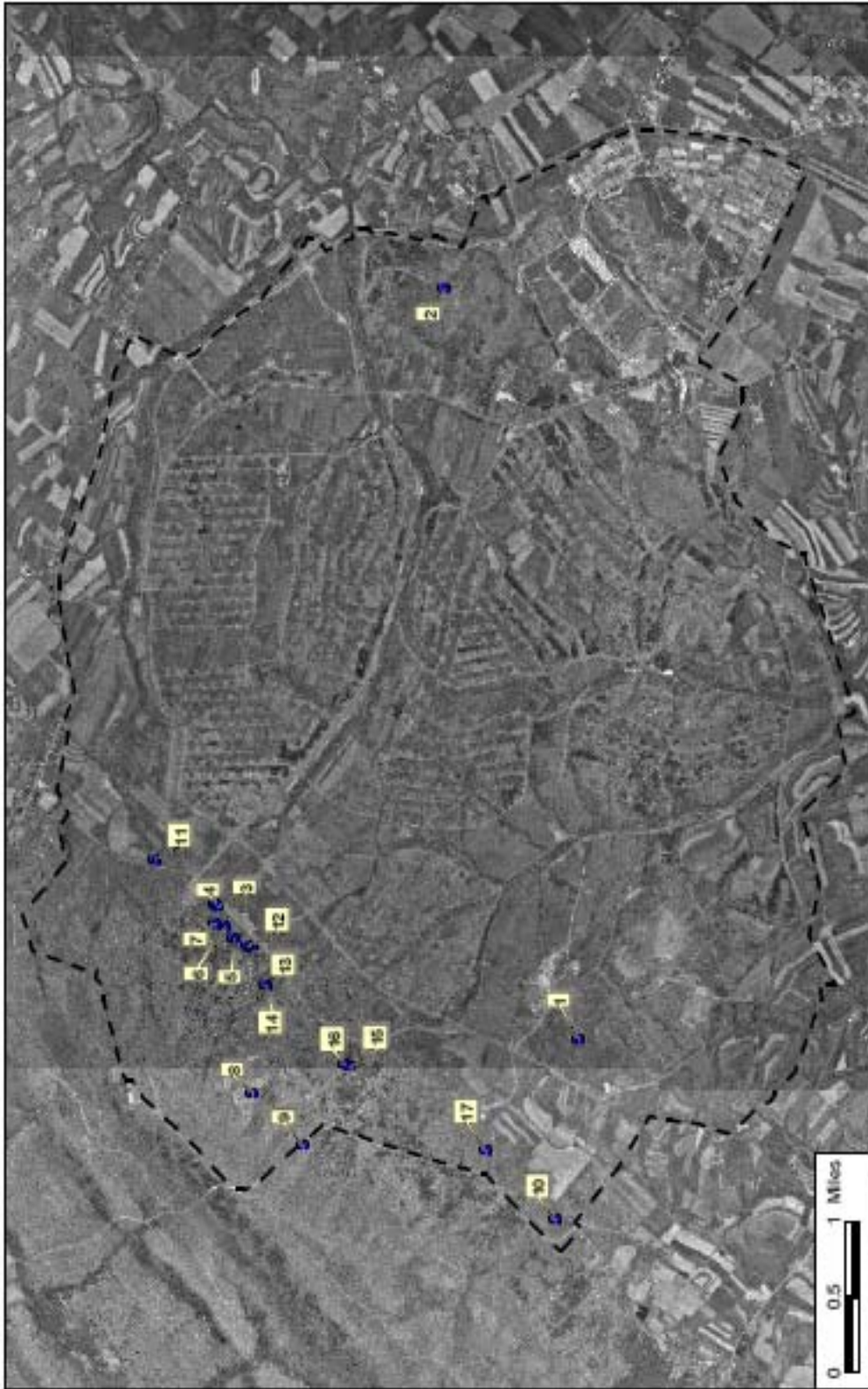
4.3 Findings

No occurrences of Northeastern bulrush were found during the survey. Even without inflorescences, it is possible to distinguish this species vegetatively (Schuyler, 1993). The characteristics and floristics of the wetlands investigated are presented in Attachment 3. Four of the wetlands (5, 14, 15, 16) contain typical vegetation for this species in central and south-central Pennsylvania (Fike, 1999; Klotz, 1999; Klotz 1990s; Klotz and Freese, 1995) plus adjoining Maryland and West Virginia (Bartgis, 1992) (See Figure C-9.) These four ponds held abundant standing water. The vegetation corresponds to three palustrine community types (Fike, 1999): red maple-black gum (*Acer rubrum-Nyssa sylvatica*) palustrine forest, buttonbush (*Cephalanthus occidentalis*) wetland, and herbaceous vernal pond. The first of these occupies the peripheral zone of these ponds, while the latter two (along with open water) occupy the central zone. Northeastern bulrush would occur in either of the two community types in the central zone. In addition to buttonbush, the typical associates of Northeastern bulrush present include mild water-pepper (*Polygonum hydropiperoides*), hop sedge (*Carex lupulina*), inflated sedge (*Carex vesicaria*), bullrush (*Scirpus cyperinus*), sharp-scaled manna-grass (*Glyceria acutiflora*), and rice cutgrass (*Leersia oryzoides*). The peripheral zone of wetland 5 has an unusually diverse flora, which includes saplings of several upland tree species. The south to southeastern part of this same area also contains a small population of *Lysimachia hybrida* (24 plants in 10 m²), listed by Pennsylvania as a threatened species (PNDI, 2000).

The other 13 wetlands do not contain suitable community types for Northeastern bulrush. Wetland 17 comprises mixed forb marsh and herbaceous vernal pond (with a few trees), plus open water (see Attachment 3). The vegetation is dense and relatively tall (0.5 to 1 m), and its composition suggests a more nutrient-rich soil than is characteristic for Northeastern bulrush. This wetland is located in an area of second-growth woods with a dense, brambly understory of wild rose (*Rosa*), blackberry (*Rubus*), barberry (*Berberis*), greenbriar (*Smilax*), etc., which contrasts with the more open, patchy, largely herbaceous understory (e.g. hay-scented fern [*Dennstaedtia*], japanese stilt grass [*Microstegium*]) surrounding most of the other wetlands examined on Broad Mountain.

Wetlands 3, 4, 6, 7, 12, and 13 are also herbaceous vernal ponds, with or without a peripheral zone of palustrine forest. They are shallower and drier than the previous examples, and the herbaceous vegetation is lower, sparser, and much different in composition.

Wetlands 1 and 2 correspond to the categories of “cat-tail marsh” and/or “wet meadow” (Fike, 1999). Their species include *Typha latifolia*, *Leersia oryzoides*, *Carex tribuloides*, *Juncus effusus*, and many others.



Northeastern Bulrush Sampling Locations

Letterkenny Army Depot
Chambersburg, Pennsylvania

Figure C-7

LEGEND
 S Northeastern Bulrush Sampling Sites
 - - - Installation Boundary

Numbers indicate survey site #

Source: Tetra Tech, 2000.



Pond #5 Facing Northeast



Pond #15 Facing South-Southeast



Pond #15 Facing North-Northwest



Pond #16 Facing South-Southwest



Pond #16 Facing West-Northwest

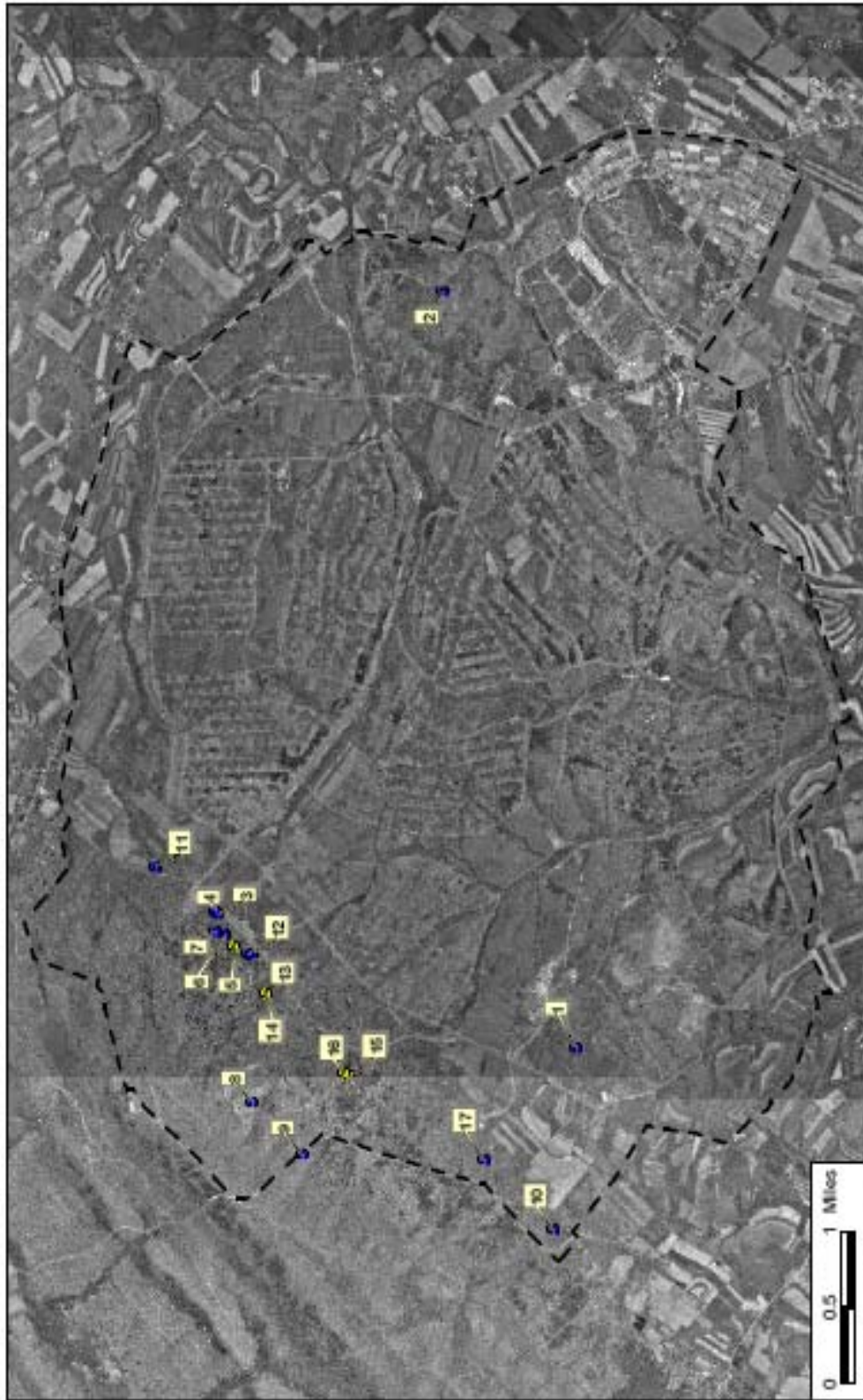


Pond #17 Facing East

Northeastern Bulrush Sampling Site Photos

Letterkenny Army Depot
Chambersburg, Pennsylvania

Figure C-8



Northeastern Bulrush Habitat Assessment
 Letterkenny Army Depot
 Chambersburg, Pennsylvania
 Figure C-9

LEGEND
 Northeastern Bulrush Sampling Sites
 S Suitable Habitat (Bulrush not found)
 U Unsuitable Habitat (Bulrush not found)
 - - - Installation Boundary

Numbers indicate survey site #
 Source: Tetra Tech, 2000.

Wetland 8 is excavated and contains abundant switch grass (*Panicum virgatum*). Wetland 9 is small, round, steep-sided, and unvegetated. Wetland 10 is a small, deep, round, artificial, water-filled pond with an inflow from a spring. Finally, wetland 11 consists of artificial impoundments.

Although the bulrush was not identified during this survey effort, it is recommended that wetlands with habitat attributes similar to those of the habitat used by the bulrush should be monitored in the future during July and August when the plant flowers.

5.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

A summary of the findings for each survey effort is presented below, along with recommendations for follow-up monitoring.

- **Bog turtle.** No bog turtles were found during the bog turtle survey conducted during the spring of 2000. In addition, no suitable habitat was identified on or near LEAD that would have passed Step 2 of the USFWS protocol. This finding is primarily a result of a lack of suitable hydrology. Probing the substrate revealed that the mucky substrate was too shallow to support bog turtles. Wetlands north of Bud's Lake and along Muddy Run were considered poor habitat, at best. It is recommended that further bog turtle surveys be conducted in the wetlands north of Bud's Lake (site #7) (specifically Phase 2 survey and trapping, based on USFWS comments) and in open wetland areas along Muddy Run (site #1) (Phase 2 survey, based on USFWS comments). In light of negative survey results, no ESMP was prepared for bog turtle at LEAD. However, in accordance with comments from USFWS, LEAD will pursue active management of sites #1 and #7, until such a time as it is determined, with USFWS concurrence, that these areas are not being used by bog turtles.

- **Indiana Bat.** No Indiana bats were found during three nights of trapping with two mist nets (six net-nights total). Mist netting efforts documented 16 individual bats representing three species using LEAD: big brown bat, Northern long-eared bat, and red bat. Further investigations could likely identify additional bat species at LEAD. With additional survey work it is likely that the small footed myotis, listed in Pennsylvania as a threatened species, could be documented from the area. Additionally, suitable habitat does exist for the Indiana bat. Therefore, in accordance with USFWS recommendations, the installation should consult with USFWS before significant land clearing activities that may affect forested habitat (e.g., timber cuts). Additional field surveys for Indiana bat are recommended at LEAD. Currently, no ESMP for Indiana bat has been prepared.

- **Northeastern Bulrush.** Although the bulrush was not identified during this survey effort, it is recommended that wetlands (#5, 14, 15, and 16) that have habitat attributes similar to those of the habitat used by the bulrush should be monitored in the future during July and August when the plant flowers. The south to southeastern part of wetland #5 (see Figure C-7) contained a small population of *Lysimachia hybrida* (24 plants in 10 m²),

listed by Pennsylvania as a threatened species (PNDI 2000). Conservation measures to protect wetland hydrology and habitat integrity should be put into place to protect this species (e.g.,

maintain 100 foot buffer zone around these wetlands). No ESMP has been prepared for *Lysimachia hybrida* at LEAD.

6.0 REFERENCES

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ATTACHMENT 1
USFWS BOG TURTLE SAMPLING PROTOCOL

GUIDELINES FOR BOG TURTLE SURVEYS

(revised May 11, 1998)

- STEP 1** Contact the U.S. Fish and Wildlife Service (USFWS), Pennsylvania Fish and Boat Commission (PFBC), or Pennsylvania Natural Diversity Inventory (PNDI) to find out if the wetland is *known* to support bog turtles (wetlands in Adams, Berks, Bucks, Chester, Cumberland, Delaware, Franklin, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton and York Counties). If the wetland is known to support bog turtles, measures must be taken to avoid impacts to the species. The PFBC and USFWS will work with federal, state and local regulatory agencies, permit applicants and project proponents to ensure that bog turtles will not be adversely affected.
- STEP 2** If it is *not* a known bog turtle wetland but has an emergent and/or scrub-shrub wetland component, then conduct a survey to determine if the wetland is *potential* bog turtle habitat.

Conditions (Note: these apply only to determine if it is *potential* habitat):

1. Surveys can be performed any month of the year.
2. Potential bog turtle habitat is recognized by three criteria:
 - a) **suitable hydrology** - typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow.
 - b) **suitable soils** - a bottom substrate of soft muck. You will usually sink to your ankles or deeper in muck, although in summers of dry years this may be limited to areas near spring head(s). This is the critical criterion.
 - c) **suitable vegetation** - dominant vegetation of low grasses and sedges (emergent wetland), often with a scrub-shrub wetland component. Common emergent vegetation includes: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum spp.*), jewelweeds (*Impatiens spp.*), arrowheads (*Sagittaria spp.*), skunk cabbage (*Symplocarpus foetidus*), Panic grasses (*Panicum spp.*), other sedges (*Carex spp.*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*). Common scrub-shrub species include alder (*Alnus spp.*), red maple (*Acer rubrum*), and in disturbed sites, multiflora rose (*Rosa multiflora*).
3. The USFWS and the PFBC should be sent a copy of survey results including: a USGS topographic map indicating location of site; project design map, including location of wetlands and streams; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation.

STEP 3 If the wetland is identified as potential bog turtle habitat (see STEP 2), then either (1) completely avoid all direct and indirect project impacts to the wetland, in consultation with the USFWS and PFBC, or (2) conduct a survey to determine the presence of bog turtles. (Note--this is not a survey to estimate population size; a long-term mark/recapture study would be required for that.)

Conditions:

1. Surveys should only be performed during the period from April 15-June 15. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption/destruction of nests or newly hatched young.
2. Water temperatures should be a minimum of 55° F. Air temperatures should be a minimum of 60° F.
3. Cloud cover should be <50 percent, and surveys should not be done during or immediately following rain events, unless it clears rapidly and is sunny.
4. Three (3) people should survey each wetland together. At least one (1) of these should be a USFWS/PFBC-recognized qualified bog turtle surveyor, who will instruct the other surveyors in survey technique. To maintain survey effort consistency and increase the probability of encountering turtles, the same survey team should be used per wetland.

A scientific collector's permit valid for the location and period of the survey must be obtained from the Pennsylvania Fish and Boat Commission by at least one of the surveyors prior to conducting the survey.

5. A *minimum* of three (3) surveys per wetland site are needed to accurately assess the site for presence of bog turtles. At least two of these surveys should be performed in May. From mid-April to mid-May, surveys should be separated by six or more days. From mid-May to mid-June, surveys should be separated by three or more days. The shorter period between surveys during late May and June is needed to ensure that surveys are carried out during the optimum window of time (i.e., before wetland vegetation becomes too thick).

Note that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on three successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find. If turtles are found on the first or second visit, the site does not need to be revisited.

6. Survey time should be a minimum of two hours (6 person-hours) per acre of wetland per site visit unless a bog turtle is found before this time has elapsed. Both random opportunistic searching and transect surveys should be used at each wetland.

7. The USFWS and PFBC should be sent a copy of survey results, including the following: dates of site visits; time spent per wetland per visit; names of surveyors; a site map; a description of the wetlands within the project area (e.g., acreage, vegetation, soils, hydrology); an explanation of which wetlands or portions of wetlands were or were not surveyed, and why; survey methodology; weather per visit (air temperature, water temperature, percent cloud cover, wind, and precipitation); presence or absence of bog turtles, including number of turtles found and date, and age/sex of turtles found; and other reptile and amphibian species found and date.

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*This list includes professional and amateur herpetologists the U.S. Fish and Wildlife Service and the Pennsylvania Fish and Boat Commission recognize as qualified to identify bog turtle habitat and survey for the presence of bog turtles. This list may not include all individuals qualified to survey for this species. Inclusion of names on this list does not constitute endorsement by the Service or any other U.S. Government agency or State agency.

List revised 4/29/98

GUIDELINES FOR BOG TURTLE SURVEYS¹

(revised August 30, 2000)

RATIONALE

A bog turtle survey (when conducted according to these guidelines) is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize survey procedures. It will help maximize the potential for detection of bog turtles at a minimum acceptable level of effort. Although the detection of bog turtles confirms their presence, failure to detect them does not absolutely confirm their absence. Surveys as extensive as outlined below are usually sufficient to detect bog turtles. However, there have been instances in which significant additional effort was necessary to detect bog turtles, especially when habitat was less than optimum and/or turtle densities were low.

PRIOR TO CONDUCTING ANY SURVEYS

If a project is proposed to occur in a county of known bog turtle occurrence (see attached list), contact the U.S. Fish and Wildlife Service (Service) and/or the appropriate State wildlife agency (see attached list). They will determine whether or not any known bog turtle sites occur in or near the project area.

- If a wetland in or near the project area is *known* to support bog turtles, measures must be taken to avoid impacts to the species. The Service and State wildlife agency will work with Federal, State and local regulatory agencies, permit applicants, and project proponents to ensure that adverse effects to bog turtles are avoided or minimized.
- If wetlands in or adjacent to the project area are *not* known bog turtle habitat, conduct a bog turtle habitat survey (Phase I survey) if:
 1. The wetland(s) have an emergent and/or scrub-shrub wetland component, *and*
 2. Direct and indirect adverse effects to the wetland(s) cannot be avoided.

See *Bog Turtle Protection Zones* for guidance regarding activities likely to affect bog turtles and their habitat. In addition, consult with the Service and/or appropriate State wildlife agency to definitively determine whether or not a Phase I survey will be necessary.

BOG TURTLE HABITAT SURVEY (Phase I survey)

The purpose of this survey is to determine whether or not the wetland(s) are *potential* bog turtle habitat. The following conditions and information apply to habitat surveys:

- Surveys can be performed any month of the year (except when significant snow cover is present).
- Potential bog turtle habitat is recognized by three criteria (*not all of which may occur in the same portion of a particular wetland*):
 1. **Suitable hydrology.** Bog turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be

restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 10 cm deep) or pseudo-rivulets are often present.

2. **Suitable soils.** Usually - a bottom substrate of soft muck (you will usually sink to your ankles or deeper in muck, although in summers of dry years this may be limited to areas near spring head(s)). In some portions of the species' range, the soft substrate consists of scattered pockets of peat (6+ inches deep) instead of muck. Suitable soils are the critical criterion.
3. **Suitable vegetation.** Dominant vegetation of low grasses and sedges (emergent wetland), often with a scrub-shrub wetland component. Common emergent vegetation includes: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum spp.*), jewelweeds (*Impatiens spp.*), arrowheads (*Sagittaria spp.*), skunk cabbage (*Symplocarpus foetidus*), Panic grasses (*Panicum spp.*), other sedges (*Carex spp.*), spike rushes (*Eleocharis sp.*), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Potentilla fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub-shrub species include alder (*Alnus spp.*), red maple (*Acer rubrum*), willow (*Salix spp.*), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*).

- ▶ Suitable hydrology, soils and vegetation are necessary to provide the critical wintering sites (soft muck, peat, burrows, root systems of woody vegetation) and nesting habitats (open areas with tussocky or hummocky vegetation) for this species. It is very important to note, however, that one or more of these criteria may be absent from portions of a wetland or wetland complex supporting bog turtles. Absence of one or more criteria does not preclude bog turtle use of these areas to meet important life functions, including foraging, shelter and dispersal.
- ▶ If these criteria (suitable soils, vegetation and hydrology) are present in the wetland, then the wetland is considered to be potential bog turtle habitat, regardless of whether or not that portion of the wetland occurring within the project boundaries contains all three criteria. If the wetland is determined to be potential habitat and the project will directly or indirectly impact any portion of the wetland, then either:
 1. Completely avoid all direct and indirect effects to the wetland, in consultation with the Service and appropriate State wildlife agency, OR
 2. Conduct a Phase 2 survey to determine the presence of bog turtles.
- ▶ The Service and appropriate State agency (see list) should be sent a copy of survey results including: A U.S. Geological Survey topographic map indicating location of site; project design map, including location of wetlands and streams; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation.

BOG TURTLE SURVEY (Phase 2 survey)

If the wetland(s) are identified as potential bog turtle habitat (see Phase 1 survey), and direct and indirect adverse effects cannot be avoided, conduct a bog turtle survey in accordance with the specifications below. Note that this is *not* a survey to estimate population size or structure; a long-term mark/recapture study would be required for that.

Prior to conducting the survey, contact the appropriate State agency (see attached list) to determine whether or not a scientific collector's permit valid for the location and period of the survey will be required.

1. Surveys should only be performed during the period from April 15-June 15. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption or destruction of nests or newly hatched young.
2. Air and water temperatures should be a minimum of 55° F.
3. Surveys should be done during the day, at least one hour after sunrise and no later than one hour before sunset.
4. Cloud cover should be <50 percent, and surveys should not be done during or immediately following rain events, unless it clears rapidly and is sunny.
5. One (1) to three (3) people should survey each wetland together. At least one (1) of these must be a recognized qualified bog turtle surveyor, and the others should have at least some previous experience conducting bog turtle surveys. To maintain survey effort consistency and increase the probability of encountering turtles, the same surveyors should be used for each wetland.
6. A *minimum* of four (4) surveys per wetland site are needed to adequately assess the site for presence of bog turtles. At least two of these surveys must be performed in May. From mid-April to mid-May, surveys should be separated by six or more days. From mid-May to mid-June, surveys should be separated by three or more days. The shorter period between surveys during late May and June is needed to ensure that surveys are carried out during the optimum window of time (i.e., before wetland vegetation becomes too thick).

Note that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on four successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find.

If bog turtles are found on the first, second or third visit, the site does not need to be revisited. Because this is solely a presence/absence survey, survey efforts at a particular wetland may cease once a bog turtle has been found.

7. Survey time should be three (3) to six (6) person-hours per acre of wetland per visit. Both random opportunistic searching and transect surveys should be used at each wetland.

Attachment

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8. Walk quietly through the wetland. Bog turtles will bask on sedge tussocks and mossy hummocks, or be half-buried in shallow water or rivulets. Walking noisily through the wetland will often cause the turtles to submerge before they can be observed. Be sure to search areas where turtles may not be visible, including shallow pools, underground springs, open mud areas, vole runways and under tussocks. Do not step on the tops of tussocks or hummocks because turtle nests, eggs and nesting microhabitat may be destroyed.
9. Photo-documentation of each bog turtle located will be required; a macro lens is highly recommended. The photos should be in color and of sufficient detail and clarity to identify the bog turtle to species and individual. Therefore, photographs of the carapace, plastron, and face/neck markings should be taken of each individual turtle. Do not harass the turtle in an attempt to get photos of the face/neck markings; if gently placed on the ground, most turtles will slowly extend their necks if not harassed. If shell notching is conducted, do the photo-documentation after the notching is done.
10. The following information should be collected for each bog turtle: Sex, carapace length, carapace width, weight, and details about scars/injuries.
11. Each bog turtle should be marked (e.g., notched, PIT tagged) in a manner consistent with the requirements of the appropriate State agency and/or Service. Contact the appropriate State agency prior to conducting the survey to determine what type of marking system, if any, should be used.
12. All bog turtles must be returned to the point of capture as soon as possible on the same day as capture. They should only be held long enough to identify, measure, weigh, and photograph them, during which time their exposure to high temperatures must be avoided. No bog turtles may be removed from the wetland without permission from the Service and appropriate State agency.
13. The Service and appropriate State agency should be sent a copy of survey results, including the following: dates of site visits; time spent per wetland per visit; names of surveyors; a site map; a description of the wetlands within the project area (e.g., acreage, vegetation, soils, hydrology); an explanation of which wetlands or portions of wetlands were or were not surveyed, and why; survey methodology; weather per visit at beginning and end of survey (air temperature, water temperature, percent cloud cover, wind, and precipitation); presence or absence of bog turtles, including number of turtles found and date, and age/sex of turtles found; and other reptile and amphibian species found and date.

ADDITIONAL SURVEYS / STUDIES

Additional surveys may be necessary to determine whether or not bog turtles are using a particular wetland, especially if the Phase 2 survey results are negative but the quality and quantity of habitat are good and in a watershed of known occurrence. In this case, additional surveys (Phase 2 and/or trapping surveys), possibly extending into the following field season, may be recommended by the Service or appropriate State agency.

If bog turtles are documented to occur at a site, additional surveys/studies may be necessary to characterize the population (e.g., number, density, population structure, recruitment), identify nesting and hibernating areas, and/or identify and assess adverse impacts to the species and its habitat, particularly if project activities are proposed to occur in, or within 300 feet of, wetlands occupied by the species.

Attachment

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¹ As additional information becomes available regarding survey techniques and effectiveness, these survey guidelines may be updated and revised. Contact the Fish and Wildlife Service or one of the State agencies listed below for the most recent version of these guidelines.

² Searching for bog turtles and recognizing their habitat is a skill that can take many months or years of field work to develop. This level of expertise is necessary when conducting searches in order to ensure that surveys are effective and turtles are not harmed during the survey (e.g., by stepping on nests). Many individuals that have been recognized as qualified to conduct bog turtle surveys obtained their experience through graduate degree research or employment by a Federal or State wildlife agency.

CONTACT AGENCIES - BY STATE

(Revised 8/24/00)

STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
Connecticut	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, New Hampshire 03301	Department of Environmental Protection Env. & Geographic Information Center 79 Elm Street, Store Floor Hartford, Connecticut 06106 <i>(info about presence of bog turtles in or near a project area)</i> Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor Hartford, Connecticut 06106 <i>(to get a Scientific Collectors Permit or determine what type of marking system to use)</i>
Delaware	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, Maryland 21401	Nongame & Endangered Species Program Delaware Division of Fish and Wildlife 4876 Hay Point Landing Road Smyrna, Delaware 19977
Maryland	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, Maryland 21401	Maryland Department of Natural Resources Wildlife and Heritage Division PO Box 68, Main Street Wye Mills, Maryland 21679
Massachusetts	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, New Hampshire 03301	Division of Fisheries and Wildlife Dept. Fisheries, Wildlife and Env Law Enforcement Route. 135 Westboro, Massachusetts 01581
New Jersey	U.S. Fish and Wildlife Service New Jersey Field Office 927 North Main Street Building D-1 Pleasantville, New Jersey 08232	Endangered and Nongame Species Program Division of Fish, Game and Wildlife Northern Region Office 26 Route 173 West Hampton, New Jersey 08827

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STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
New York	U.S. Fish and Wildlife Service 3817 Luker Road Cortland, New York 13045	New York Natural Heritage Program Department of Environmental Conservation 700 Troy-Schenectady Road Latham, New York 12110-2400 <i>(info about presence of bog turtles in or near a project area)</i> NY Department of Environmental Conservation Special Licenses Unit 50 Wolf Road Albany, New York 12233 <i>(for endangered species permit applications)</i>
Pennsylvania	U.S. Fish and Wildlife Service Pennsylvania Field Office 315 South Allen Street, Suite 322 State College, Pennsylvania 16801	Endangered Species and Herpetology Coordinator Pennsylvania Fish and Boat Commission Bureau of Fisheries and Engineering 450 Robinson Lane Belleville, Pennsylvania 16823

BOG TURTLE COUNTIES OF OCCURRENCE OR LIKELY OCCURRENCE¹
(Revised 9/7/00)

STATE	COUNTY	
Connecticut	Fairfield	Litchfield
Delaware	New Castle	
Maryland	Baltimore Carroll	Cecil Harford
Massachusetts	Berkshire	
New Jersey	Atlantic Burlington Camden Gloucester Hunterdon Mercer Middlesex Monmouth	Morris Ocean Passaic Salem Somerset Sussex Union Warren
New York	Albany Columbia Dutchess Genesee Orange Oswego Putnam	Seneca Sullivan Ulster Warren Wayne Westchester
Pennsylvania	Adams Berks Bucks Chester Cumberland Delaware Franklin	Lancaster Lebanon Lehigh Monroe Montgomery Northampton York

¹ This list is valid for one year from the date indicated. It may, however, be revised more frequently if new counties of occurrence are documented. Updates to this list are available from the Service upon request.

Attachment

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RECOGNIZED QUALIFIED BOG TURTLE SURVEYORS*

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*This list includes professional and amateur herpetologists the U.S. Fish and Wildlife Service and the Pennsylvania Fish and Boat Commission recognize as qualified to identify bog turtle habitats and survey for the presence of bog turtles. This list may not include all individuals qualified to survey for this species. Inclusion of names on this list does not constitute endorsement by the Service or any other U.S. Government agency or State agency.

List revised 6/6/00
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ATTACHMENT 2
USFWS INDIANA BAT SAMPLING PROTOCOL



AGENCY DRAFT

**INDIANA BAT (*Myotis sodalis*)
REVISED
RECOVERY PLAN**

**(Original Approved: October 14, 1983)
(Technical Draft of Revised Plan Completed: October 1996)**

**Prepared by the Indiana Bat Recovery Team
for**

**Region 3
U.S. Fish and Wildlife Service
Ft. Snelling, Minnesota**

March 1999

APPENDIX II MIST NETTING GUIDELINES

RATIONALE

A typical mist net survey is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize procedures for mist netting. It will help maximize the potential for capture of Indiana bats at a minimum acceptable level of effort. Although the capture of bats confirms their presence, failure to catch bats does not absolutely confirm their absence. Netting effort as extensive as outlined below usually is sufficient to capture Indiana bats. However, there have been instances in which additional effort was necessary to detect the presence of the species.

NETTING SEASON

May 15—August 15

These dates define acceptable limits for documenting the presence of summer populations of Indiana bats, especially maternity colonies. Several captures, including adult females and young of the year, indicate that a nursery colony is active in the area. Outside these dates, even when Indiana bats are caught, data should be carefully interpreted: If only a single bat is captured, it may be a transient or migratory individual.

EQUIPMENT

Mist nets - Use the finest, lowest visibility mesh commercially available:

1. In the past, this was 1 ply, 40 denier monofilament—denoted 40/1
2. Currently, monofilament is not available and the finest on the market is 2 ply, 50 denier nylon—denoted 50/2
3. Mesh of approximately 1 1/2 i/4 - 13/4 in (~38 mm)

Hardware - No specific hardware is required. There are many suitable systems of ropes and/or poles to hold the nets. See NET PLACEMENT below for minimum net heights, habitats, and other netting requirements that affect the choice of hardware. The system of Gardner, et al. (1989) has met the test of time.

NET PLACEMENT Potential travel corridors such as streams or logging trails typically are the most effective places to net. Place the nets approximately perpendicular across the corridor. Nets should fill the corridor from side to side and from stream (or ground) level up to the overhanging canopy. A typical set is seven meters high consisting of three or more nets "stacked" on top one another and up to 20 m wide. (Different width nets may be purchased and used as the situation dictates.)

APPENDIX II (CONT.)

Occasionally it may be desirable to net where there is no good corridor. Take caution to get the nets up into the canopy. The typical equipment described in the section above may be inadequate for these situations, requiring innovation on the part of the observers.

RECOMMENDED NET SITE SPACING:

Stream corridors—one net site per km of stream.

Non-corridor land tracts—two net sites per square km of forested habitat.

MINIMUM LEVEL OF EFFORT

Netting at each site should consist of:

At least three net nights (unless bats are caught sooner) (one net set up for one night = one net night)

A minimum of two net locations at each site (at least 30 m apart, especially in linear habitat such as a stream corridor)

A minimum of two nights of netting

Sample Period: begin at sunset; net for at least 5 hr

Each net should be checked approximately every 20 min

No disturbance near the nets, other than to check nets and remove bats

WEATHER CONDITIONS

Severe weather adversely affects capture of bats. If Indiana bats are caught during weather extremes, it is probably because they are at the site and active despite inclement weather. On the other hand, if bats are not caught, it may be that there are bats at the site but they may be inactive due to the weather. Negative results combined with any of the following weather conditions throughout all or most of a sampling period are likely to require additional netting:

Precipitation

Temperatures below 10°C

Strong winds (Use good judgment: moving nets are more likely to be detected by bats.)

MOONLIGHT

There is some evidence that small myotine bats avoid brightly lit areas, perhaps as predator avoidance. It is typically best to set nets under the canopy where they are out of the moon light, particularly when the moon is 1/2-full or greater.

**ATTACHMENT 3
CHARACTERISTICS AND FLORA OF VEGETATED VERNAL
POOLS SURVEYED DURING THE TES SURVEY FOR
NORTHEASTERN BULRUSH**

Characteristics and flora of vegetated "vernal ponds" on Broad Mountain, Letterkenny Army Depot. Larry H. Klotz, Ph.D., 17-18 July 2000. (See topographic map and aerial photograph.)

Orientation and estimated maximum dimensions of entire wetland

Wetland #	5	14 ^a	15	16	17	6	7	4	13	12	3
Length (m)	22	12	52	19	28	35	12	20	45	18	18
orientation	nw		nw	wnw	nw	ne	ne	ne	ene	nw	ne
Width (m)	14	12	15	17	22	25	6	12	12	6	15
orientation	ne		ene	nne	ne	nw	nw	nw	nw	ene	nw

(a) Orientation data was missing for Wetland 14.

Orientation and estimated maximum dimensions of wetland central zone

Wetland #	5	14 ^a	15	16	17	6	7	4	13	12	3
Length (m)	20	10	34	10	20	35	12	8	12	18	10
orientation	nw		nw	wnw	nw	ne	ne	ne	ene	nw	ne
Width (m)	12	10	11	12	14	25	6	8	12	6	6
orientation	ne		ene	nne	ne	nw	nw	nw	nw	ene	nw

(a) Orientation data was missing for Wetland 14.

Standing water, vegetation, exposed soil, open water in wetlands

wetland #	5	14	15	16	17	6	7	4	13	12	3
standing water	yes	yes	yes	yes	yes						
vegetation:	5 ^f	3	4	4	6	6	3 ^g	3 ^f	3 ^f	2 ^h	1 ^{h, e}
exposed soil, slash	4	4	3	5	1	3	6	6	6	6	6 ^c
zone of open water:		4	5		3						

cover classes in central zone: 1 = <1%, 2 = 2-5%, 3 = 6-25%, 4 = 26-50%; 5 = 51-75%; 6 = 76-100%

(b) surface was entirely bare, no vegetation present

(c) surface was 100% exposed soil with slash.

(e) Wetland 3 had almost no definite canopy gap, just the peripheral zone.

(f) Wetland 4 had its peripheral zone mostly at ne end; vegetative cover in the central zone is mostly adjacent to the peripheral zone.

(g) Wetland 7 had a periphera zone that was largely just the central zone and upland forest interface.

(h) Wetland 12 had no definite peripheral zone, but did feature a large canopy opening.

(i) Wetland 13 had a long, narrow peripheral zone extension (23 x 5 m) at wsw end; there was 1 double-trunked *Nyssa* sapling in the central zone.

(j) Wetland 5 had irregular peripheral zone, approximately 1-4 m broad; all trees were saplings

Wetland species: trees and shrubs

Wetland #	5	14	15	16	17	6	7	4	13	12	3
Trees											
Acer rubrum	P	P	P				P	P			
Betula lenta	P										
Carya cordiformis											
Carya ovata	P					P					P
Celtis occidentalis	P										
Fraxinus americana	P				C						
Juglans nigra					C						
Nyssa sylvatica	P	P	P	P		P	D	P	C		C
Quercus palustris	P	P	D	D		P		D			D
Robinia pseudoacacia	P										
Ulmus americana	P				C		P				
Shrubs											
Berberis thunbergii	P										
Cephalanthus occidentalis	C 4	C 3	P C 2	P C 4		C 1					
Gaylussacia baccata						C 1					
Ilex verticillata	P										
Lindera benzoin	P										
Rubus sp.	P						C 1	P			
Smilax glauca						P					
Smilax rotundifolia	P		P	P		C 1		P			
Viburnum prunifolium							C 1				
Vitis vulpina	P				C						

P = peripheral zone (red maple-black gum palustrine forest)

D = highest % cover in peripheral zone

C = central zone (buttonbush wetland and/or herbaceous vernal pond).

cover classes in central zone: C1= ≤1%, C2 = 2-5%, C3 = 6-25%, C4 = 26-50%; C5 = 51-75%; C6 = 76-100%

Wetland species: herbaceous dicots

Wetland #	5	14	15	16	17	6	7	4	13	12	3
Dicot herbs											
<i>Acalypha rhomboidea</i>											P
<i>Apocynum cannabinum</i>	P							C1		C1	P
<i>Barbarea vulgaris</i>					C1						
<i>Bidens discoidea</i> ^k	P										
<i>Boehmeria cylindrica</i>	P				C2	C1		C1		C1	P
<i>Cuscuta</i> sp.					C1						
Dicot seedlings				C1							
<i>Erechtites hieraciifolia</i>						P		C1		C1	
<i>Eupatorium rugosum</i>											
<i>Hypericum mutilum</i>						C1				C1	
<i>Lobelia inflata</i>							C1				
<i>Ludwigia palustris</i>					C1						
<i>Lycopus virginicus</i>	P				C2	C1					
<i>Lysimachia hybrida</i>	P										
<i>Oxalis stricta</i>	P										
<i>Penthorum sedoides</i>	P				C2						
<i>Pilea pumila</i>	P				C1						
<i>Polygonum caespitosum</i>	P				C1	P C1	C1	C1	C1	C1	P
<i>Polygonum hydropiperoides</i>		C1	C1	C1							
<i>Polygonum punctatum</i>	P	P C2	C1			C1		C1			P
<i>Scutellaria lateriflora</i>	P										
<i>Xanthium strumarium</i> ^k					C1						

P = peripheral zone (red maple-black gum palustrine forest)

C = central zone (buttonbush wetland and/or herbaceous vernal pond).

cover classes in central zone: C1 = ≤1%, C2 = 2-5%, C3 = 6-25%, C4 = 26-50%; C5 = 51-75%; C6 = 76-100%

(k) identification uncertain

Wetland species: herbaceous monocots and mosses

Wetland #	5	14	15	16	17	6	7	4	13	12	3
Moncot herbs											
Agrostis perennans ^k	P						C1	C1	C1	C1	
Arisaema triphyllum	P										
Carex annectens								C1			
Carex frankii					C1						
Carex lupulina	P C3	C1				C2		C1			D
Carex squarrosa								C1			
Carex swanii		P									
Carex tribuloides	P				C1	P C1	C2	C1	P C1	C1	
Carex vesicaria			P C4	P C2							
Eleocharis acicularis		P									
Eleocharis obtusa	P										
Glyceria acutiflora seedlings ^k		C1		C1							
Glyceria striata	P										
Juncus acuminatus		P									
Juncus effusus						C1					
Juncus tenuis	P						C1	C1			
Leersia oryzoides	C3	C1			C5						
Leersia virginica								C1			P
Lemna minor					C1						
Microstegium vimineum	P	P			C4	C4	C1	C1		C1	
Panicum dichotomiflorum ^k		P									
Panicum acuminatum	P					C5			C1		
Panicum clandestinum	P							C1			
Panicum rigidulum ^k			C1	C1		C2		C1			
Panicum villosissimum		P					C1				
Scirpus cyperinus		P C1				C2					
Mosses											
Polytrichum sp.		P				C1	C2		C1		
Sphagnum sp.		P	P	P							
other terrestrial mosses		P	P				C1		C1		

P = peripheral zone (red maple-black gum palustrine forest)

D = highest % cover in peripheral zone

C = central zone (buttonbush wetland and/or herbaceous vernal pond).

cover classes in central zone: C1= <1%, C2= 2-5%, C3= 6-25%, C4= 26-50%; C5= 51-75%; C6= 76-100%

(k) identification uncertain

GUIDELINES FOR BOG TURTLE SURVEYS¹

(revised April 2006)

RATIONALE

A bog turtle survey (when conducted according to these guidelines) is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize survey procedures. It will help maximize the potential for detection of bog turtles at previously undocumented sites at a minimum acceptable level of effort. Although the detection of bog turtles confirms their presence, failure to detect them does not absolutely confirm their absence (likewise, bog turtles do not occur in all appropriate habitats and many seemingly suitable sites are devoid of the species). Surveys as extensive as outlined below are usually sufficient to detect bog turtles; however, there have been instances in which additional effort was necessary to detect bog turtles, especially when habitat was less than optimum, survey conditions were less than ideal, or turtle densities were low.

PRIOR TO CONDUCTING ANY SURVEYS

If a project is proposed to occur in a county of known bog turtle occurrence (see attachment 1), contact the U.S. Fish and Wildlife Service (Service) and/or the appropriate State wildlife agency (see attachment 2). They will determine whether or not any known bog turtle sites occur in or near the project area, and will determine the need for surveys.

- < If a wetland in or near the project area is *known* to support bog turtles, measures must be taken to avoid impacts to the species. The Service and State wildlife agency will work with federal, state and local regulatory agencies, permit applicants, and project proponents to ensure that adverse effects to bog turtles are avoided or minimized.
- < If wetlands in or adjacent to the project area are *not* known bog turtle habitat, conduct a bog turtle habitat survey (Phase 1 survey) if:
 1. The wetland(s) have an emergent and/or scrub-shrub wetland component, or are forested with suitable soils and hydrology (see below), *and*
 2. Direct and indirect adverse effects to the wetland(s) cannot be avoided.

See *Bog Turtle Conservation Zones*² for guidance regarding activities that may affect bog turtles and their habitat. In addition, consult with the Fish and Wildlife Service and/or appropriate State wildlife agency to definitively determine whether or not a Phase 1 survey will be necessary.

¹ These guidelines are a modification of those found in the final “Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan” (dated May 15, 2001). Several minor revisions were made to facilitate survey efforts and increase searcher effectiveness. As additional information becomes available regarding survey techniques and effectiveness, these survey guidelines may be updated and revised. Contact the Fish and Wildlife Service or one of the state agencies listed in Attachment 1 for the most recent version of these guidelines.

² See Appendix A of the “Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan” (dated May 15, 2001).

BOG TURTLE HABITAT SURVEY (= Phase 1 survey)

The purpose of this survey is to determine whether or not the wetland(s) are *potential* bog turtle habitat. These surveys are performed by a recognized, qualified bog turtle surveyor (contact the Service or the appropriate State wildlife agency to receive a list of recognized, qualified bog turtle surveyors). The following conditions and information apply to habitat surveys.

- < Surveys can be performed any month of the year (except when significant snow and/or ice cover is present). This flexibility in conducting Phase 1 surveys allows efforts during the Phase 2 survey window to be spent on wetlands most likely to support bog turtles (*i.e.*, those that meet the criteria below).

- < Potential bog turtle habitat is recognized by three criteria (*not all of which may occur in the same portion of a particular wetland*):
 1. **Suitable hydrology.** Bog turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 4 inches deep) or pseudo-rivulets are often present.
 2. **Suitable soils.** Usually a bottom substrate of permanently saturated organic or mineral soils. These are often soft, mucky-like soils (this does not refer to a technical soil type); you will usually sink to your ankles (3-5 inches) or deeper in muck, although in degraded wetlands or summers of dry years this may be limited to areas near spring heads or drainage ditches. In some portions of the species' range, the soft substrate consists of scattered pockets of peat instead of muck.
 3. **Suitable vegetation.** Dominant vegetation of low grasses and sedges (in emergent wetlands), often with a scrub-shrub wetland component. Common emergent vegetation includes, but is not limited to: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum* spp.), jewelweeds (*Impatiens* spp.), arrowheads (*Sagittaria* spp.), skunk cabbage (*Symplocarpus foetidus*), panic grasses (*Panicum* spp.), other sedges (*Carex* spp.), spike rushes (*Eleocharis* spp.), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Dasiphora fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub-shrub species include alder (*Alnus* spp.), red maple (*Acer rubrum*), willow (*Salix* spp.), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*). Some forested wetland habitats are suitable given hydrology, soils and/or historic land use. These forested wetlands include red maple, tamarack, and cedar swamps.

Suitable hydrology and soils are the critical criteria (*i.e.*, the primary determinants of potentially suitable habitat).

- < Suitable hydrology, soils and vegetation are necessary to provide the critical wintering sites (soft muck, peat, burrows, root systems of woody vegetation) and nesting habitats (open

areas with tussocky or hummocky vegetation) for this species. It is very important to note, however, that one or more of these criteria may be absent from portions of a wetland or wetland complex supporting bog turtles. Absence of one or more criteria does not preclude bog turtle use of these areas to meet important life functions, including foraging, shelter and dispersal.

- < If these criteria (suitable soils, vegetation and hydrology) are present in the *wetland*, then the *wetland* is considered to be potential bog turtle habitat, regardless of whether or not that portion of the wetland occurring within the project boundaries contains all three criteria. If the *wetland* is determined to be potential habitat and the project will directly or indirectly impact *any portion* of the wetland (see *Bog Turtle Conservation Zones*), then either:
 - < Completely avoid all direct and indirect effects to the wetland, in consultation with the Service and appropriate State wildlife agency, OR
 - < Conduct a Phase 2 survey to determine the presence of bog turtles.
- < The Service and appropriate State wildlife agency (see list) should be sent a copy of survey results for review and comment including: a USGS topographic map indicating location of site; project design map, including location of wetlands and stream and delineation of wetland type (PEM, PSS, PFO, POW) and “designated survey areas”³; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation. A phase 1 report template and field form are available from the States and Service.

BOG TURTLE SURVEY (= Phase 2 survey)

If the wetland(s) are identified as potential bog turtle habitat (see Phase 1 survey), and direct and indirect adverse effects cannot be avoided, conduct a bog turtle survey in accordance with the specifications below. Note that this is *not* a survey to estimate population size or structure; a long-term mark/recapture study would be required for that.

Prior to conducting the survey, contact the appropriate State agency (see attached list) to determine whether or not a scientific collector's permit valid for the location and period of the survey will be required.

The Phase 2 survey will focus on the areas of the wetland that meet the soils, hydrology and vegetation criteria, as defined under the Phase 1 survey guidelines. Those areas that meet the criteria are referred to as “designated survey areas” for Phase 2 and Phase 3 survey purposes.

1. Surveys should only be performed during the period from April 15-June 15. For the Lake Plain Recovery Unit (see Recovery Plan), surveys should only be performed during the period from May 1 to June 30. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be

³ “Designated survey areas” are those areas of the wetland that meet the soils, hydrology and vegetation criteria for potential bog turtle habitat. These areas may occur within the emergent, scrub-shrub or forested parts of the wetland.

considered inconclusive. Surveys beyond June also have a higher likelihood of disruption or destruction of nests or newly hatched young.

2. Ambient air temperature at the surface in the shade should be $\geq 55^{\circ}$ F.
3. Surveys should be done during the day, at least one hour after sunrise and no later than one hour before sunset.
4. Surveys may be done when it is sunny or cloudy. In addition, surveys may be conducted during and after light rain, provided air temperatures are $\geq 65^{\circ}$ F.
5. At least one surveyor must be a recognized qualified bog turtle surveyor⁴, and the others should have some previous experience successfully conducting bog turtle surveys or herpetological surveys in wetlands. To maintain survey effort consistency and increase the probability of encountering turtles, the same surveyors should be used for each wetland.
6. A minimum of four (4) surveys per wetland site are needed to adequately assess the site for presence of bog turtles. At least two of these surveys must be performed in May. From April 15 to April 30, surveys should be separated by six or more days. From May 1 to June 15, surveys should be separated by three or more days. The shorter period between surveys during May and June is needed to ensure that surveys are carried out during the optimum window of time (*i.e.*, before wetland vegetation becomes too thick).

Note that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on four successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find.

Because this is solely a presence/absence survey, survey efforts at a particular wetland may cease once a bog turtle has been found.

7. Survey time should be at least four (4) to six (6) person-hours per acre of designated survey area per visit. Additional survey time may be warranted in wetlands that are difficult to survey or that have high quality potential habitat. The designated survey area includes all areas of the wetland where soft, mucky-like soils are present, regardless of vegetative cover type. This includes emergent, scrub-shrub, and forested areas of the wetland.

If the cover is too thick to effectively survey using Phase 2 survey techniques alone (*e.g.*, dominated by multiflora rose, reed canary grass, *Phragmites*), contact the Service and State wildlife agency for guidance on Phase 3 survey techniques (trapping) to supplement the Phase 2 effort. In addition, Phase 3 (trapping) surveys may also be warranted if the site is in

⁴ Searching for bog turtles and recognizing their habitat is a skill that can take many months or years of field work to develop. This level of expertise is necessary when conducting searches in order to ensure that surveys are effective and turtles are not harmed during the survey (*e.g.*, by stepping on nests). Many individuals that have been recognized as qualified to conduct bog turtle surveys obtained their experience through graduate degree research or employment by a state wildlife agency. Others have spent many years actively surveying for bog turtles as amateur herpetologists or consultants.

the Lake Plain-Prairie Peninsula Recovery Unit. Check with the Service or State wildlife agency for further guidance.

8. Walk quietly through the wetland. Bog turtles will bask on herbaceous vegetation and bare ground, or be half-buried in shallow water or rivulets. Walking noisily through the wetland will often cause the turtles to submerge before they can be observed. Be sure to search areas where turtles may not be visible, including under mats of dead vegetation, shallow pools, underground springs, open mud areas, vole runways and under tussocks. Do not step on the tops of tussocks or hummocks because turtle nests, eggs and nesting microhabitat may be destroyed. Both random opportunistic searching and transect surveys should be used at each wetland.

The following survey sequence is recommended to optimize detection of bog turtles:

- Semi-rapid walk through the designated survey area using visual encounter techniques.
 - If no bog turtles are found during visual survey, while walking through site identify highest quality habitat patches. Within these highest quality patches, begin looking under live and dead vegetation using muddling and probing techniques.
 - If still no bog turtles are found, the rest of the designated survey area should be surveyed using visual encounter surveys, muddling and probing techniques.
9. Photo-documentation of each bog turtle located will be required; a macro lens is highly recommended. The photos should be in color and of sufficient detail and clarity to identify the bog turtle to species and individual. Therefore, photographs of the carapace, plastron, and face/neck markings should be taken of each individual turtle. Do not harass the turtle in an attempt to get photos of the face/neck markings; if gently placed on the ground, most turtles will slowly extend their necks if not harassed. If shell notching is conducted, do the photo-documentation after the notching is done.
 10. The following information should be collected for each bog turtle: sex, carapace length-straight line and maximum length, carapace width, weight, and details about scars/injuries. Maximum plastron length information should also be collected to differentiate juveniles from adults as well as to obtain additional information on recruitment, growth, and demography.
 11. Each bog turtle should be marked (*e.g.*, notched, PIT tagged) in a manner consistent with the requirements of the appropriate State agency and/or Service. Contact the appropriate State wildlife agency prior to conducting the survey to determine what type of marking system, if any, should be used.
 12. All bog turtles must be returned to the point of capture as soon as possible on the same day as capture. They should only be held long enough to identify, measure, weigh, and photograph them, during which time their exposure to high temperatures must be avoided. No bog turtles may be removed from the wetland without permission from the Service and appropriate State agency.

13. The Fish and Wildlife Service and appropriate State agency should be sent a copy of survey results for review and concurrence, including the following: dates of site visits; time spent per designated survey area per wetland per visit; names of surveyors; a site map including wetlands and delineations of designated survey areas; a table indicating the size of each wetland, the designated survey area within each wetland, and the survey effort per visit; a description of the wetlands within the project area (*e.g.*, acreage, vegetation, soils, hydrology); an explanation of which wetlands or portions of wetlands were or were not surveyed, and why; survey methodology; weather per visit at beginning and end of survey (air temperature, wind, and precipitation); presence or absence of bog turtles, including number of turtles found and date, and information and measurements specified in item 10 above; and other reptile and amphibian species found and date.

ADDITIONAL SURVEYS / STUDIES

Proper implementation of the Phase 2 survey protocol is usually adequate to determine species presence or probable absence, especially in small wetlands lacking invasive plant species.

Additional surveys, however, may be necessary to determine whether or not bog turtles are using a particular wetland, especially if the Phase 2 survey results are negative but the quality and quantity of habitat are good and in a watershed of known occurrence. In this case, additional surveys (Phase 2 and/or Phase 3 (trapping) surveys), possibly extending into the following field season, may be recommended by the Service or appropriate State agency.

If bog turtles are documented to occur at a site, additional surveys/studies may be necessary to characterize the population (*e.g.*, number, density, population structure, recruitment), identify nesting and hibernating areas, and/or identify and assess adverse impacts to the species and its habitat, particularly if project activities are proposed to occur in, or within 300 feet of, wetlands occupied by the species.

CONTACT AGENCIES - BY STATE*(April 2006)*

STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
Connecticut	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Department of Environmental Protection Env. & Geographic Information Center 79 Elm Street, Store Floor, Hartford, CT 06106 <i>(info about presence of bog turtles in or near a project area)</i> Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor, Hartford, CT 06106 <i>(to get a Scientific Collectors Permit or determine what type of marking system to use)</i>
Delaware	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Nongame & Endangered Species Program Delaware Division of Fish and Wildlife 4876 Hay Point Landing Road Smyrna, DE 19977
Maryland	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Maryland Department of Natural Resources Wildlife & Heritage Division PO Box 68, Main Street Wye Mills, MD 21679
Massachusetts	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Division of Fisheries and Wildlife Dept. Fisheries, Wildlife and Env Law Enforcement Rt. 135 Westboro, MA 01581
New Jersey	U.S. Fish and Wildlife Service New Jersey Field Office 927 North Main Street, Bldg. D-1 Pleasantville, NJ 08232	New Jersey Division of Fish and Wildlife Endangered and Nongame Species Program 143 Van Syckels Road Hampton, NJ 08827
New York	U.S. Fish and Wildlife Service 3817 Luker Road Cortland, NY 13045	New York Natural Heritage Program 625 Broadway, 5th Floor Albany, NY 12233-4757 Phone: (518) 402-8935 <i>(info about presence of bog turtles in or near a project area)</i> NYS Department of Environmental Conservation Division of Fish, Wildlife, and Marine Resources Special Licenses Unit 600 Broadway, 5th Floor Albany, NY 12233-4752 <i>(for endangered species permit applications)</i>
Pennsylvania	U.S. Fish and Wildlife Service Pennsylvania Field Office 315 South Allen Street, Suite 322 State College, PA 16801	Natural Diversity Section Pennsylvania Fish and Boat Commission 450 Robinson Lane Bellefonte, PA 16823

BOG TURTLE COUNTIES OF OCCURRENCE OR LIKELY OCCURRENCE¹
(April 2006)

STATE	COUNTY	
Connecticut	Fairfield	Litchfield
Delaware	New Castle	
Maryland	Baltimore Carroll	Cecil Harford
Massachusetts	Berkshire	
New Jersey	Burlington Gloucester Hunterdon Middlesex Monmouth Morris	Ocean Salem Somerset Sussex Union Warren
New York	Albany Columbia Dutchess Genesee Orange Oswego Putnam	Seneca Sullivan Ulster Wayne Westchester
Pennsylvania	Adams Berks Bucks Chester Cumberland Delaware Franklin	Lancaster Lebanon Lehigh Monroe Montgomery Northampton Schuylkill York

¹ This list is valid for one year from the date indicated. It may, however, be revised more frequently if new counties of occurrence are documented. Updates to this list are available from the Service upon request.

VEGETATION COMMUNITIES PLS

The majority of the terrestrial habitat on LEAD consists of open fields and second- or third-growth forest. Of the total 17,793 acres on LEAD, approximately 35 percent is forested and 52 percent is open fields, 1 percent is water, and the remaining 12 percent is mostly developed with scattered vegetation. No comprehensive inventory of flora or vegetative communities has been conducted on LEAD, but some plant species have been recorded with respect to wildlife suitability and wetlands studies.

There are approximately 6,264 acres of forest land on LEAD (USDA 2005). A 1995 Forest Management Plan evaluated approximately 2,500 acres of the forest land on LEAD: 94 percent of the area is forested, and the remaining area is divided into 1 percent development, 1 percent vegetative wetlands, and 4 percent herbaceous openings. In the forested acreage, the timber is mostly hardwood with approximately 90 percent in oak-hickory forest and 10 percent in pine-oak habitat. Dominant tree species on the property include red oak, black oak, white oak, chestnut oak, yellow poplar, white ash, hickories, and red maple. Other tree species include birches (*Betula* spp.), eastern hemlock (*Tsuga canadensis*), black gum (*Nyssa sylvatica*), black locust (*Robinia pseudoacacia*), pin oak (*Quercus palustris*), sassafras (*Sassafras albidens*), black cherry (*Prunus serotina*), aspen (*Populus* sp.), tree-of-heaven (*Ailanthus altissima*), white pine (*Pinus strobus*), black walnut (*Juglans nigra*), Virginia pine (*Pinus virginiana*), apple (*Malus* spp.), elm (*Ulmus* spp.), honey locust (*Gleditsia triacanthos*), sugar maple (*Acer saccharum*), and beech (*Fagus grandifolia*).

Understory species within the forested areas vary according to the dominant trees, and include hawthorn (*Crataegus* spp.), redbud (*Cercis canadensis*), blackhaw (*Viburnum prunifolium*), hackberry (*Celtis* spp.), tatarian honeysuckle (*Lonicera tatarica*), autumn olive (*Eleagnus autumnale*) spicebush (*Lindera benzoin*), and dogwood (*Cornus racemosa*).

Groundcover species vary by shade and hydric regime. Species at LEAD include dogbane (*Apocynum* spp.), hyacinths (*Hyacinthus* spp.), clover (*Trifolium* spp.), goldenrod (*Solidago* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.), wild mustard (*Brassica* spp.), broom sedge (*Carex scoparia*), spring beauty (*Claytonia caroliniana*), cattail (*Typha latifolia*), raspberries and blackberries (*Rubus* spp.), wild garlic (*Allium canadense*), various grasses, barberry (*Berberis thunbergii*), burdock (*Arctium* spp.), mayapple (*Podophyllum peltatum*), and multiflora rose (*Rosa multiflora*).

Vine species at LEAD include greenbriar (*Smilax* spp.), grape (*Vitis* spp.), poison ivy (*Toxicodendron radicans*), and Japanese honeysuckle (*Lonicera japonica*).

Forest habitat is healthy overall and is not seriously affected by any type of forest pest or disease. However, there is some indication that the ash trees are declining due to what is known in general terms as “ash dieback.” Scientists are unsure of the exact cause of the problem, but drought apparently plays an important role. In addition, it was noted that dogwoods (*Cornus* spp.) are infected by dogwood anthracnose (Hyde, 1995). Gypsy moth (*Lymantria dispar*)

outbreaks have been noted in the past, but they are generally being controlled through cooperative efforts with the USFS.

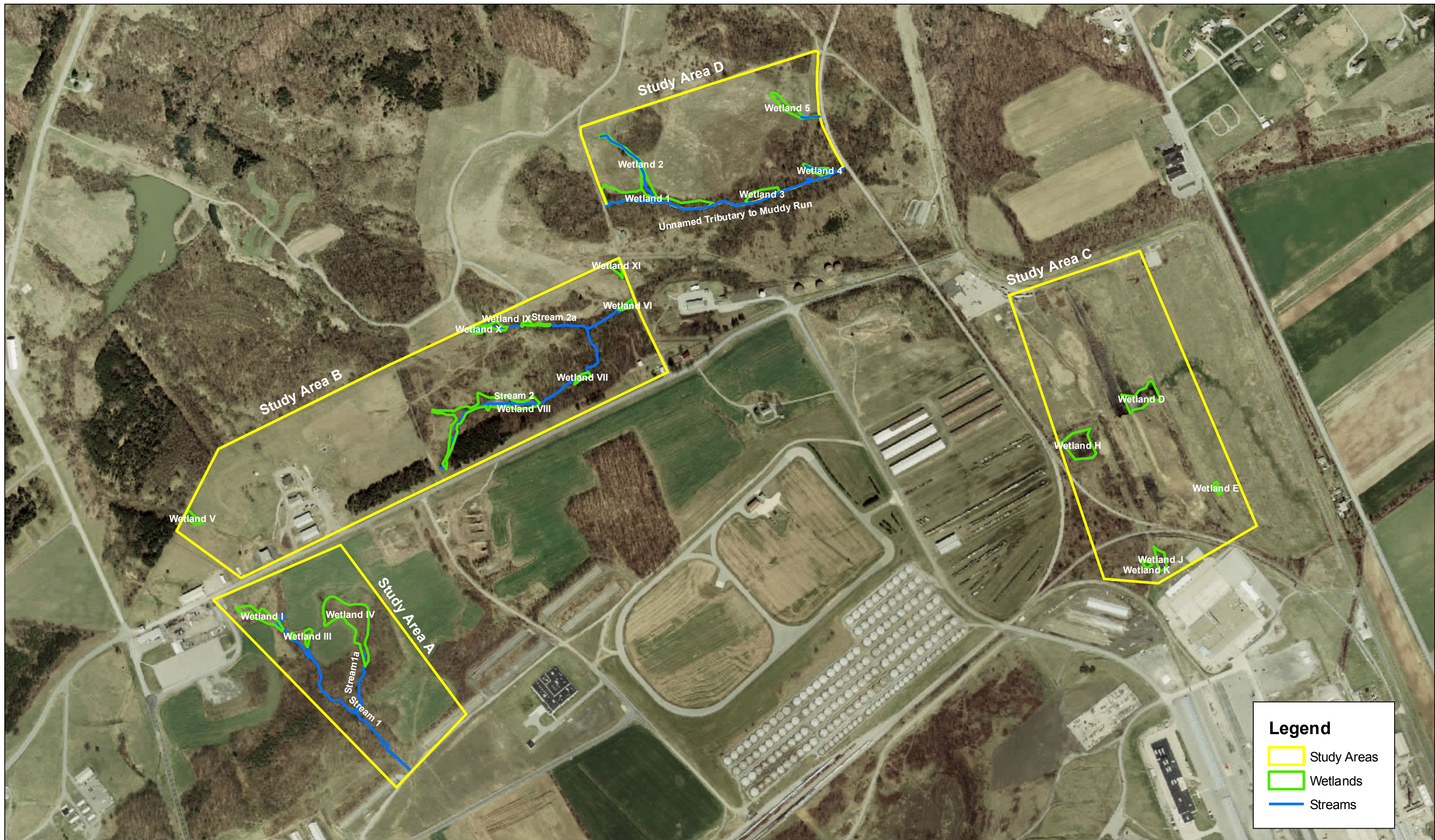
There are approximately 9,250 acres of open habitat on the installation, consisting principally of grassland fields that are incorporated into the agricultural leasing program at the installation. Open areas also include buffer strips (roadways, areas surrounding igloos, field borders) that serve as fire breaks, edge habitat, and buffers for the protection of water resources and sensitive habitat.

LEAD is a predominantly industrial installation. Therefore, very little turf or landscaped area occurs on LEAD. Areas of grass are generally restricted to roadsides, which are dominated by grasses and mowing-tolerant native and non-native broadleaved herbs.

WETLANDS PLS

Wetland delineations were performed in 2005, 2006 and 2007 by USACE. This PLS includes the map of delineated wetlands as well as the wetland data sheets completed for each.

Wetland	Square Meters	Acres	Classification
STUDY AREA A			
Wetland I	1512.97	0.37	Palustrine emergent
Wetland II	84.91	0.02	Palustrine emergent
Wetland III	364.08	0.09	Palustrine emergent
Wetland IV	5482.31	1.35	Palustrine emergent
STUDY AREA B			
Wetland V	501.27	0.12	Palustrine emergent
Wetland VI	278.21	0.07	Palustrine emergent
Wetland VII	367.24	0.09	Palustrine forested
Wetland VIII	4608.14	1.14	Palustrine emergent/forested
Wetland IX	239.47	0.06	Palustrine emergent
Wetland X	765.09	0.19	Palustrine emergent
Wetland XI	611.41	0.15	Palustrine emergent
STUDY AREA C			
Wetland J	740.96	0.18	Palustrine forested
Wetland K	192.64	0.05	Palustrine forested
Wetland H	2793.49	0.69	Palustrine forested
Wetland D	2353.26	0.58	Palustrine emergent
Wetland E	214.74	0.05	Palustrine emergent
STUDY AREA D			
Wetland 1	3813.05	0.94	Palustrine emergent/forested
Wetland 2	1413.1	0.35	Palustrine emergent
Wetland 3	1148.8	0.28	Palustrine forested
Wetland 4	547.1	0.14	Palustrine forested
Wetland 5	953.2	0.24	Palustrine emergent



Wetlands Delineated on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Points: USACE (2007) LEAD INRMP.



ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot **Date:** May 8, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? yes **Community ID:** PEM Flags 1-17 (~0.37 acres)
Is the Site Significantly Disturbed (atypical)? no **Transect ID:** n/a
Is the Area a Potential Problem Area no **Plot ID:** WIB – Wetland I, Sample B

VEGETATION

	Dominant Species	Strat a	Ind		Dominant Species	Strata	Ind
1.	<i>Juncus effusus</i>	Herb	FacW	6.			
2.	<i>Onoclea sensibilis</i>	Herb	FacW	7.			
3.	<i>Carex stipata</i>	Herb	Obl	8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This area is located just west of Sample A. It is surrounded by upland scrub-shrub rangeland. A visual estimate of dominant species was performed in a ~30 foot radius plot area.

Non-dominant species observed within the sample area include: *Brassica rapa* FacU, *Carex sp.1*, *Carex sp.2*, *Cornus amomum* FacW, *Dipsacus sylvestris* NI, *Equisetum sp.?*, *Euthamia graminifolia* Fac, *Fraxinus pennsylvanica* FacW, *Parthenoscissus quinquefolia* FacU and *Rosa multiflora* FacU, *Sambucus Canadensis* FacW, *Senecio aureus* FacW, *Scirpus atrovirens* FacW, *Toxicodendron radicans* Fac and *Veronia noveboracensis* FacW

HYDROLOGY

Recorded Data (describe in remarks)

- Stream, Lake or Tide Gauge Data
- Aerial Photographs
- Other
- No Recorded Data Available
-
-

Wetland Hydrology Primary Indicators (one required):

- Inundated
- Saturated in the Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Field Observations:

Depth to Surface Water _____ in.
 Depth to Free Water in the Pit _____ in.
 Depth to Saturated Soils _____ 0 in.

Secondary Indicators (2 or more required):

- Oxidized Root Channels in the Upper 12 Inches
- Water Stained Leaves
- Local Soil Survey Data
- FAC Neutral Test
- Other (explain in remarks)

Remarks: While no surface waters were observed, numerous barren areas were present indicating shallow inundated conditions normally exist. Blackened leaves and dried algal mats further suggest inundated conditions.

SOILS

Map Unit Name
 (Series and Phase): Urban land-Berks Complex Drainage Class: Well drained

Taxonomy (Subgroup): Typic Dystrachrepts Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-6	A	10YR 3/1	10YR 4/4-4/6	Distinct-small-few	Saturated - Silt loam
6-12	B1	10YR 6/2	10YR 4/6	Distinct-small-common	Moist – silty clay loam A few shale fragments
12-18+	B2	10YR 6/2	10YR 4/6	Distinct-small-common	Moist – silty clay loam A lot more shale fragments

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Field observations revealed the soils actually resemble the poorly drained Brinkerton silt loam (Typic Fragiaqualf). Soils were examined using a combination of a three inch bucket auger and tree planting spade.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **yes** **no**
 Hydric Soils Present? **yes** **no**
 Wetland Hydrology Present? **yes** **no** **Is Sampling Point Within a Wetland?** **yes** **no**

Remarks: All three criteria are met.

SOILS

Map Unit Name
(Series and Phase): Weikert Drainage Class: Well Drained

Taxonomy (Subgroup): Lithic Dystrachrepts Field Observations Confirmed
Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-4	A	10YR 3/1	10YR 4/6	Distinct-small-few	Saturated - Silt loam
4-11	B1	10YR 6/2	10YR 4/6	Distinct-small-common	Moist – silty clay loam
11-16+	B2	10YR 6/2	10YR 4/6	Distinct-small-common	Moist – silty clay loam
					Shale fragments

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Soils identical to Sample B in Wetland I. Field observations revealed the soils actually resemble the poorly drained Brinkerton silt loam (Typic Fragiaqualf). Soils were examined using a combination of a three inch bucket auger and tree planting spade.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **yes**
 Hydric Soils Present? **yes**
 Wetland Hydrology Present? **yes** **Is Sampling Point Within a Wetland? yes**

Remarks: All three criteria are met.

SOILS

Map Unit Name
(Series and Phase): Weikert Drainage Class: Well Drained

Taxonomy (Subgroup): Lithic Dystrachrepts Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-3	A	10YR 3/1	None	None	Saturated – silt loam
3-13	B1	10YR 5/1	10YR 5/6 7.5YR 4/4	Distinct-small few Distinct-small-common	Saturated – silt loam
13-18+	B2	10YR 5/2	7.5YR 5/6	Distinct-small-common	Saturated – silt loam
					Water in the pit at 2”

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Field observations revealed the soils actually resemble the poorly drained Brinkerton silt loam (Typic Fragiaqualf). Soils were examined using a combination of a three inch bucket auger and tree planting spade.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes
 Hydric Soils Present? Yes
 Wetland Hydrology Present? Yes

Is Sampling Point Within a Wetland? Yes

Remarks: All three criteria met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot **Date:** May 8, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes No **Community ID:** PEM – Flags 1-23 (~ 1.35 acres)
Is the Site Significantly Disturbed (atypical)? Yes No **Transect ID:** n/a
Is the Area a Potential Problem Area? Yes No **Plot ID:** WIV – Wetland sample point

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u>Juncus effusus</u> Softrush	Herb	FacW
2.	<u>Scenecio aureus</u> Golden ragwort	Herb	FacW
3.	<u>Toxicodendron radicans</u> Poison ivy	Woody Vine	Fac
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This wetland area is located several hundred feet south of Georgia Avenue and just east of WIII. It is connected by an ephemeral swale to the west. However, most of the drainage drains through Stream channel 1A, which appears to be intermittent. Most of the area is surrounded by hay land but a wooded block exists to the south and east.

A visual estimate of dominant species was performed in a **30 foot radius plot** area. Non-dominant species observed within the sample area include: Agrimonia parviflora Small flowered agrimony– Fac, Carex lurida Lurid sedge– Obl, Euthamia graminifolia Grass leaved goldenrod– Fac, Salix sp. Willow species and Scirpus atrovirens Green bulrush– FacW.

HYDROLOGY

Recorded Data (describe in remarks)

- Stream, Lake or Tide Gauge Data
- Aerial Photographs
- Other
- No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):

- Inundated
- Saturated in the Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water n/a
 Depth to Free Water in the Pit n/a
 Depth to Saturated Soils n/a

Secondary Indicators (2 or more required):

- Oxidized Root Channels in the Upper 12 Inches
- Water Stained Leaves
- Local Soil Survey Data
- FAC Neutral Test
- Other (explain in remarks)

Remarks: Numerous small and medium sized mud flats were observed indication seasonal ponding is likely in those areas. The region has been very dry with no recent precipitation.

SOILS

Map Unit Name
 (Series and Phase): Brinkerton Silt Loam Drainage Class: Poorly

Taxonomy (Subgroup): Typic fragiaqualf Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 3/2	None	None	Moist – silt loam
2-8	B1	10YR 5/2	10YR 5/6 10YR 6/3	Distinct-small-few Distinct-small-common	Moist – silty clay loam
8-14+	B2	10YR 5/6	10YR 5/4 10YR 6/2	Faint-medium-common Distinct-med-common	Moist – clay loam

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Most of this area appears to be mapped as Brinkerton silt loam. Field observations confirmed that a hydric soil resembling this series exists.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All criteria are met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-7 (~0.12 acres)
Is the Site Significantly Disturbed (atypical)? Yes* **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WV – Wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u>Scirpus atrovirens</u> Green bulrush– FacW		FacW
2.	<u>Poa trivialis</u> Rough blue grass– FacW		FacW
3.	<u>Carex sp</u> Sedge species		?
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 67-100 %

Remarks: Sample is located north of Georgia Avenue at the southern boundary of the Ammo Area fence. Site is subject to regular mowing. A visual estimate of dominant species was performed in a **15 foot radius plot** area. Non-dominant species observed within the sample area include: Juncus effusus Softrush– FacW, Brassica rapa Yellow rocket– FacU and Veronica serpyllifolia Thyme leaved speedwell– Fac.

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____ Depth to Free Water in the Pit _____ Depth to Saturated Soils <u>0"</u>

Secondary Indicators (2 or more required):
<input checked="" type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input type="checkbox"/> Other (explain in remarks)

Remarks: Soils in the lowest landscape position of the wetland were saturated to the surface but in most of the area they were only moist. Supporting aerial photography indicates saturated soil signatures in two different years. It should be noted that the region has had a precipitation deficit in the recent past. Therefore, direct observation of wetland hydrology was not possible in some samples.

SOILS

Map Unit Name
 (Series and Phase): Brinkerton Silt Loam Drainage Class: Poorly

Taxonomy (Subgroup): Typic fragiaqualf Field Observations Confirmed Mapped Type? Yes

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 3/2	None	None	Moist – silt loam
2-13+	B1	10YR 5/2	7.5YR 4/6	Distinct-small-common	Moist – silt loam
					Common ORC's

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is mapped as a hydric soil. The sample area was confirmed in the field to have hydric soils similar to the mapped Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All criteria met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-7 (~0.07 acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WVI – wetland VI sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u><i>Acorus calamus</i> Sweetflag</u>	Herb	Obl
2.	<u><i>Glechoma hederacea</i> Ground Ivy</u>	Herb	FacU
3.	<u><i>Carex lurida</i> Lurid Sedge</u>	Herb	FacW
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 66 %

Remarks: This wetland area is directly adjacent to Stream channel 2 and located just west of the Booster Road crossing. It is a small PEM wetland at the eastern edge of a larger forested area. A visual estimate of dominant species was performed in a **20 foot radius plot** area. Non-dominant species observed within the sample area include: *Brassica rapa* Yellow rocket– FacU, *Carex stipata* Stalk grained sedge– Obl, *Impatiens capensis* Touch-me-not– FacW, *Juncus effusus* Softrush– FacW, *Polygonum sagittatum* Arrow leaved tearthumb– Obl, *Scirpus atrovirens* Green bulrush– FacW, *Stellaria media* Common chickweed– FacU, and *Toxicodendron radicans* Poison ivy– Fac

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data
<input type="checkbox"/> Aerial Photographs
<input type="checkbox"/> Other
<input type="checkbox"/> No Recorded Data Available
<input type="checkbox"/>
<input type="checkbox"/>

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated
<input type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Water Marks
<input type="checkbox"/> Drift Lines
<input type="checkbox"/> Sediment Deposits
<input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____
Depth to Free Water in the Pit _____
Depth to Saturated Soils _____

Secondary Indicators (2 or more required):
<input checked="" type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
<input checked="" type="checkbox"/> Water Stained Leaves
<input type="checkbox"/> Local Soil Survey Data
<input checked="" type="checkbox"/> FAC Neutral Test
<input type="checkbox"/> Other (explain in remarks)

Remarks: The channel in this area is deeply incised and appears to be having a negative hydrology affect on part of this wetland (area where sweet flag now predominates). However, it is clear that groundwater discharges from the adjacent slopes prevail enough to maintain wetland hydrology in the majority of the area. A determination at a later date may reveal that part of this area no longer supports wetland hydrology.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-3	A	10YR 3/2	None	None	Dry and crumbly – silt loam
3-10	B1	10YR 5/1	7.5YR 4/6 10YR 5/6	Dist-sm/med-common Distinct-small-few	Moist to dry – silt loam
10-20+	B2	10YR 5/1	7.5YR 4/6	Dist-med/coarse-many	Moist – silt loam - Mg/Fe concretions common – soft and hard masses

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes
 Hydric Soils Present? Yes
 Wetland Hydrology Present? Yes

Is Sampling Point Within a Wetland? Yes

Remarks: All three criteria are met for the majority of the area. As referenced above, the incised channel may be draining some of the area but due to the presence or an obligate species for the interim, this whole area is included as jurisdictional.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PFO – Flags 1-5 (~ 0.09 acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WVII – Wetland VII sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u><i>Poa trivialis</i></u> Rough blue grass– FacW	Herb	FacW
2.	<u><i>Glechoma hederacea</i></u> Ground Ivy– FacU	Herb	FacU
3.	<u><i>Acer negundo</i></u> Boxelder– Fac	Tree	Fac
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 66 %

Remarks: This is technically a PFO area located west of WI and located along Stream channel 2. Most of the area is herbaceous but the mature treed surrounding the area have canopies that overhang and completely shade this area. A visual estimate of dominant species was performed in a **30 foot radius plot** area. Non-dominant species observed within the sample area include: *Acer negundo* Boxelder– Fac (shrub), *Acorus calamus* Sweetflag – Obl, *Alliaria petiolata* Garlic mustard– FacU, *Berberis vulgaris* European barberry– FacU, *Gallium aparine* Catchweed bedstraw– FacU, *Geum laciniatum* Rough avens– Fac, *Onoclea sensibilis* Sensitive fern– FacW, *Podophyllum peltatum* Mayapple– FacU, *Stellaria media* Common chickweed– FacU, and *Viola sp.* Violet species

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____ Depth to Free Water in the Pit _____ Depth to Saturated Soils _____

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input checked="" type="checkbox"/> Other (explain in remarks)

Remarks: Area appears to be uncharacteristically dry for the time of the year. Rainfall has been sparse in the region. Stream is incised and may have the hydrology removed from this area in the future. Part of the area further west was not flagged and considered drained.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 4/2	None	None	Moist – silt loam
2-23	B1	10YR 6/1	7.5YR 5/6	Dist-sm/med-common	Moist to saturated – silt loam
23-26+	B2	10YR 5/1	7.5YR 5/6 10YR 5/6	Dist-medium-common Distinct-small-few	Saturated – water table at 16”

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All three criteria met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-47 – (~1.14 acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WVIII A – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u><i>Acorus calamus</i> Sweetflag</u>	Herb	Obl
2.	<u><i>Poa trivialis</i> Rough blue grass</u>	Herb	FacW
3.			
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: A visual estimate of dominant species was performed in a **30 foot radius plot** area. Non-dominant species observed within the sample area include: *Brassica rapa* Yellow rocket– FacU, *Carex stipata* Stalk grained sedge– Obl, *Polygonum sagittatum* Arrow leaved tearthumb– Obl, *Impatiens capensis* Touch-me-not– FacW.

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water <u>0-3 "</u> Depth to Free Water in the Pit <u>8 "</u> Depth to Saturated Soils <u>0 "</u>

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input type="checkbox"/> Other (explain in remarks)

Remarks: This is a wet meadow area located just west of an old stream crossing and associated fill causeway. This area has been historically ponded and saturated from the damming affect of the old road.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 3/1	10YR 3/4-3/6	Distinct-small-common	Saturated – silt loam
2-19	B1	10YR 5/1	7.5YR 4/4-4/6	Dist-medium-common	Saturated – silt loam
19-21		n/a	n/a	Mostly gravel and shale fragments	Could not accurately characterize colors
21-24+	B2	10YR 6/2	10YR 3/4-3/6	Distinct-small-common	Saturated-silt loam Water table at 8"

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes
 Hydric Soils Present? Yes
 Wetland Hydrology Present? Yes

Is Sampling Point Within a Wetland? Yes

Remarks: All criteria are met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-47 (1.14 acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WVIIIIB – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u><i>Impatiens capensis</i></u> Touch-me-not		FacW
2.	<u><i>Onoclea sensibilis</i></u> Sensitive fern		FacW
3.	<u><i>Polygonum sagittatum</i></u> Arrow leaved tearthumb		Obl
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This is a second sample plot (of three) located within Wetland VIII. It was added because the area is quite different than the other two sample areas. A visual estimate of dominant species was performed in a **30 foot radius plot** area. Non-dominant species observed within the sample area include: *Brassica rapa* Yellow rocket– FacU, *Carex stipata* Stalk grained sedge– Obl, *Cornus amomum* Silky dogwood– FacW, *Dipsacus sylvestris* Teasel, *Fraxinus pennsylvanica* Green ash– FacW, *Phalaris arundinacea* Reed canary grass– FacW, *Poa trivialis* Rough blue grass– FacW, – Obl, *Solidago sp.* Goldenrod species, and *Toxicodendron radicans* Poison ivy– Fac

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____ “ Depth to Free Water in the Pit _____ “ Depth to Saturated Soils _____ “

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input type="checkbox"/> Other (explain in remarks)

Remarks:

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-4	A	10YR 3/1	10YR 3/4	faint-medium-few	Saturated – silt loam
4-9	B1	10YR 5/1	7.5YR 5/6	Dist-sm/med-common	Saturated – silt loam
9-16+	B2	10YR 5/1	7.5YR 5/6	Dist-sm/med-common	Saturated – silty clay loam

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes
 Hydric Soils Present? No
 Wetland Hydrology Present? No

Is Sampling Point Within a Wetland? Yes

Remarks: All three criteria have been met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes No **Community ID:** PEM/FO – Flags 1-47 (~1.14 acres)
Is the Site Significantly Disturbed (atypical)? Yes No **Transect ID:** n/a
Is the Area a Potential Problem Area? Yes No **Plot ID:** WV8IIC – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u><i>Impatiens capensis</i></u> Touch-me-not		FacW
2.	<u><i>Poa trivialis</i></u> Rough blue grass		FacW
3.	<u><i>Fraxinus pennsylvanica</i></u> Green ash		FacW
4.	<u><i>Salix niger</i></u> Black willow		FacW
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This is third sample plot (of three) located within Wetland VIII. It was added because the area is quite different than the other two sample areas. This habitat compartment has significantly more woody plants present than the others but would still be classified mainly as PEM. A visual estimate of dominant species was performed in a **20 foot radius plot** area. Non-dominant species observed within the sample area include: *Acer negundo* Boxelder– Fac, *Aster sp.* Aster species, *Brassica rapa* Yellow rocket– FacU, *Carex lurida* Lurid sedge– Obl, *Carex sp.* Sedge species, *Carex stipata* Stalk grained sedge– Obl., *Juncus effusus* Soft rush– FacW, *Lycopus sp.* bugleweed species. – Obl, *Polygonum sagittatum* Arrow leaved tearthumb– Obl, *Rosa multiflora* Multiflora rose– FacU, and *Toxicodendron radicans* Poison ivy– Fac.

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____ Depth to Free Water in the Pit _____ Depth to Saturated Soils _____

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input checked="" type="checkbox"/> Other (explain in remarks)

Remarks: Numerous barren areas were noted suggesting ponded conditions occur earlier in the season. It should be noted that the region has had a precipitation deficit in the recent past. Therefore, direct observation of wetland hydrology was not possible in some samples.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-4	A	10YR 3/2	None	None	Moist – silt loam
4-9	B1	10YR 5/2	7.5YR 5/8	Prom-med/coarse-few	Moist – silt loam
9-14+	B2	10YR 5/2	10YR 4/4	Distinct-small-common	Moist – silt loam

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All three criteria are met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-13 (~0.06 acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WIX – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u>Poa trivialis</u> Rough blue grass	Herb	FacW
2.	<u>Onoclea sensibilis</u> Sensitive fern	Herb	FacW
3.			
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: Narrow shrub lined PEM wetland area along stream channel 2a. Channel just east of this wetland is deeply incised and appears to be head cutting up through the area. A visual estimate of dominant species was performed in a **15 foot radius plot** area. Non-dominant species observed within the sample area include: Brassica rapa Yellow rocket– FacU, Carex stipata Stalk grained sedge– Obl, Glyceria sp Manna grass species. – Obl, Juncus effusus Softrush– FacW, Typha latifolia Broad leaved cattail– Obl and Viola sp. Violet species.

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water <u>1-3"</u> Depth to Free Water in the Pit <u>7"</u> Depth to Saturated Soils <u>0"</u>

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input type="checkbox"/> Other (explain in remarks)

Remarks:

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-3	A	10YR 3/2	None	None	Saturated – silt loam
3-14+	B1	10YR 5/2	10YR 4/6-5/6	Distinct-small-common	Saturated – silt loam
					Water table at 7"

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All three criteria are met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-12 (0.19acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WX – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u>Juncus effusus</u> Soft rush– FacW	Herb	FacW
2.	<u>Brassica rapa</u> Yellow rocket	Herb	FacU
3.	<u>Scirpus atrovirens</u> Green bulrush– FacW	Herb	FacW
4.	<u>Eleocharis sp</u> Spikerush species	Herb	Obl
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: Wetland located at the head of stream channel 2a. A visual estimate of dominant species was performed in a **30 foot radius plot** area. Non-dominant species observed within the sample area include: Carex lurida Lurid sedge– Obl, Carex stipata Stalk grained sedge– Obl, Juncus tenuis Path rush– Fac-, Poa trivialis Rough blue grass– FacW, Polygonum sagittatum Arrow leaved tearthumb– Obl, Solidago sp. Goldenrod species, Toxicodendron radicans Poison ivy– Fac, Verbena hastata Blue vervain– FacW, Veronica noveboracensis New York Ironweed– FacW and Viola sp. Violet species

HYDROLOGY

Recorded Data (describe in remarks)
<input type="checkbox"/> Stream, Lake or Tide Gauge Data <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in the Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water _____ Depth to Free Water in the Pit _____ Depth to Saturated Soils _____

Secondary Indicators (2 or more required):
<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches <input checked="" type="checkbox"/> Water Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC Neutral Test <input checked="" type="checkbox"/> Other (explain in remarks)

Remarks: It should be noted that the region has had a precipitation deficit in the recent past. Therefore, direct observation of wetland hydrology was not possible in some samples.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-3	A	10YR 3/2	None	None	Moist – silt loam
3-14+	B1	10YR 5/2	10YR 4/6-5/6	Distinct-small-common	Moist – silt loam

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All three criteria have been met.

ROUTINE WETLAND DETERMINATION DATA FORM

(1987 COE Wetlands Delineation Manual)

Project /Site: Letterkenny Army Depot – NAB-2007-08397-P03 **Date:** May 9, 2007
Owner: U.S. Government Military Installation **County:** Franklin
Investigators: Frank Plewa, Sharon Madden **State:** Pennsylvania

Do Normal Circumstances Exist at the Site? Yes **Community ID:** PEM – Flags 1-6 (0.15acres)
Is the Site Significantly Disturbed (atypical)? No **Transect ID:** n/a
Is the Area a Potential Problem Area? No **Plot ID:** WXI – wetland sample plot

VEGETATION

	Dominant Species	Strata	Indicator Status
1.	<u>Scirpus atrovirens</u> Green bulrush	Herb	FacW
2.	<u>Carex stipata</u> Stalk grained sedge	Herb	Obl
3.			
4.			
5.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: Ponedged PEM wetland within a large mowed lawn area at the NE corner of the assessment area. Observations revealed that this was part of a larger PEM wetland that has been bisected by Booster Road. Flows leaving this area have been directed to the south because of the road. A visual estimate of dominant species was performed in a **20 foot radius plot** area. Non-dominant species observed within the sample area include: Alisma plantago-aquatica Water plantain– Obl, Anthoxanthum odoratum Sweet vernal grass– FacU, Carex sp Sedge species, Eleocharis sp Spikerush species. – Obl, Glyceria sp Manna grass species. – Obl, and Juncus effusus Soft rush– FacW.

HYDROLOGY

Recorded Data (describe in remarks)	
<input type="checkbox"/>	Stream, Lake or Tide Gauge Data
<input type="checkbox"/>	Aerial Photographs
<input type="checkbox"/>	Other
<input type="checkbox"/>	No Recorded Data Available

Wetland Hydrology Primary Indicators (one required):	
<input type="checkbox"/>	Inundated
<input type="checkbox"/>	Saturated in the Upper 12 Inches
<input type="checkbox"/>	Water Marks
<input type="checkbox"/>	Drift Lines
<input type="checkbox"/>	Sediment Deposits
<input type="checkbox"/>	Drainage Patterns in Wetlands

Field Observations:	
Depth of Surface Water	_____ “
Depth to Free Water in the Pit	_____ “
Depth to Saturated Soils	_____ “

Secondary Indicators (2 or more required):	
<input checked="" type="checkbox"/>	Oxidized Root Channels in the Upper 12 Inches
<input checked="" type="checkbox"/>	Water Stained Leaves
<input type="checkbox"/>	Local Soil Survey Data
<input checked="" type="checkbox"/>	FAC Neutral Test
<input checked="" type="checkbox"/>	Other (explain in remarks)

Remarks: Clearly a closed depressional area with over flows draining through the referenced ditch. Encrusted algal deposits confirm ponded conditions. It should be noted that the region has had a precipitation deficit in the recent past. Therefore, direct observation of wetland hydrology was not possible in some samples.

SOILS

Map Unit Name
 (Series and Phase): Ernest silt loam Drainage Class: Moderately well drained

Taxonomy (Subgroup): ? Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 4/2	None	None	Moist – silt loam
2-14+	B1	10YR 5/2	10YR 4/6-5/6	Distinct-small-common	Moist – silt loam

Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors

Hydric Soil Indicators
<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Site is not mapped as a hydric soil. However, the sample area was confirmed in the field to have hydric soils similar to the Brinkerton series.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **Yes**
 Hydric Soils Present? **Yes**
 Wetland Hydrology Present? **Yes**

Is Sampling Point Within a Wetland? **Yes**

Remarks: All three criteria have been met.

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site Letterkenny Army Depot (LEAD)	Date 26 October 2005
Applicant / Owner LEAD	County Franklin
Investigator Heather Wells / Steven Pugh	State Pennsylvania
Do Normal Circumstances exist on the site? Yes	Community ID PEM
Is the site significantly disturbed (Atypical Situation)? Yes	Transect ID Wetlands
Is the area a potential Problem Area? (If needed, explain on reverse) No	Plot ID WETD

VEGETATION

Dominant Plant Species	Stratum	Indicator	Non-Dominant Plant Species	Stratum	Indicator
1 <i>Cinna arundinacea</i>	H	FACW+	9 <i>Bidens aristosa</i>	H	FACW+
2 <i>Phragmites australis</i>	H	FACW	10 <i>Pennisetum glaucum</i>	H	FAC
3 <i>Apocynum cannabinum</i>	H	FACU	11 <i>Plantago lanceolata</i>	H	--
4			12 <i>Echinichloa crus-galli</i>	H	FACU
5			13 <i>Carex lurida</i>	H	OBL
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 66%

Remarks

These areas are depressional wetlands along an old gravel road. Areas inundated or saturated at time of survey.

Other plants of note in area include *Symphotrichum depauperatum* and *Centaurea biebersteinii*.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) <ul style="list-style-type: none"> <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS	
FIELD OBSERVATIONS		Primary Indicators: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <ul style="list-style-type: none"> <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands 	
Depth of Surface Water	0-2 (in)	Secondary Indicators (2 or more Required): <ul style="list-style-type: none"> <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks) 	
Depth to Free Water in Pit	0 (in)		
Depth to Saturated Soil	0 (in)		

SOILS

WETD

Map Unit Name (Series and Phase): Urban Land			Drainage Class: N/A		
Taxonomy (Subgroup) Udorthents		Field Observations Confirm Mapped Type?			Yes
PROFILE DESCRIPTION					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	A	2.5Y 4/2	--	--	Silt loam
2-4	B	2.5Y 6/4	10.5YR 4/6	Common, distinct	Platy; silt loam
4+	B	2.5Y 7/2	7.5 YR 5/8	Abundant, distinct	Heavy; clay loam
HYDRIC SOIL INDICATORS:					
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input checked="" type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)			
Remarks: Mn concretions; very thin layer (less than 0.25 inch) of histic material on surface. Lower B horizon exhibits low chroma, and redox colors in root channels and on ped faces.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	Is this Sampling Point Within a Wetland? YES
Wetland Hydrology Present?	Yes	
Hydric Soils Present?	Yes	
Remarks		

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site Letterkenny Army Depot (LEAD)	Date 31 October 2005
Applicant / Owner LEAD	County Franklin
Investigator Heather Wells / Steven Pugh	State Pennsylvania
Do Normal Circumstances exist on the site? No	Community ID PEM
Is the site significantly disturbed (Atypical Situation)? Yes	Transect ID Wetlands
Is the area a potential Problem Area? (If needed, explain on reverse) No	Plot ID WETE

VEGETATION

Dominant Plant Species	Stratum	Indicator	Non-Dominant Plant Species	Stratum	Indicator
1 <i>Carex (bicknellii?)</i>	H		9		
2			10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks

Mowed stems of Carex create a distinct vegetation break.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) <ul style="list-style-type: none"> <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS	
		Primary Indicators: <ul style="list-style-type: none"> <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <ul style="list-style-type: none"> <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands 	
FIELD OBSERVATIONS		Secondary Indicators (2 or more Required): <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks) 	
Depth of Surface Water	-- (in)		
Depth to Free Water in Pit	-- (in)		
Depth to Saturated Soil	0 (in)		

SOILS

WETE

Map Unit Name (Series and Phase): Urban Land				Drainage Class: N/A	
Taxonomy (Subgroup) Udorthents			Field Observations Confirm Mapped Type?		Yes
PROFILE DESCRIPTION					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-8	Ap	10 YR 5/2	2.5 Y 2.5/1	35%; distinct	Silt loam; crumbly
8-12.5+	B	10YR 5/2	10 YR 6/8	45%; distinct	Heavy clay loam
HYDRIC SOIL INDICATORS:					
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)			
Remarks: A horizon highly disturbed, most likely a plow zone. B horizon has low chroma with orange color on ped faces.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	Is this Sampling Point Within a Wetland? YES
Wetland Hydrology Present?	Yes	
Hydric Soils Present?	Yes	
Remarks Depressional wetland or vernal pool.		

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site Letterkenny Army Depot (LEAD)	Date 31 October 2005
Applicant / Owner LEAD	County Franklin
Investigator Heather Wells / Steven Pugh	State Pennsylvania
Do Normal Circumstances exist on the site? No	Community ID PFO
Is the site significantly disturbed (Atypical Situation)? Yes	Transect ID Wetlands
Is the area a potential Problem Area? (If needed, explain on reverse) No	Plot ID WETH

VEGETATION

Dominant Plant Species	Stratum	Indicator	Non-Dominant Plant Species	Stratum	Indicator
1 <i>Acer saccharinum</i>	T	FACW	9 <i>Catalpa speciosa</i>	T	FAC
2 <i>Populus deltoides ssp. deltoides</i>	T	FAC	10 <i>Polygonum hydropiper</i>	H	OBL
3			11 <i>Toxicodendron radicans</i>	V	FAC
4			12 <i>Robinia pseudoacacia</i>	T	FACU-
5			13 <i>Carex spp.</i>	H	--
6			14 <i>Ulmus rubra</i>	T	FAC
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks

Boundary line drawn between *Acer / Populus* dominated area and *Catalpa / Robinia* dominated area. *Populus*-dominated area is more open woodland, with *Polygonum*, *Carex*, and *Toxicodendron* abundant.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) <ul style="list-style-type: none"> <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		<p align="center">WETLAND HYDROLOGY INDICATORS</p> Primary Indicators: <ul style="list-style-type: none"> <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more Required): <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks) 	
FIELD OBSERVATIONS			
Depth of Surface Water		-- (in)	
Depth to Free Water in Pit		-- (in)	
Depth to Saturated Soil		0 (in)	

SOILS

WETH

Map Unit Name (Series and Phase): Urban Land				Drainage Class: N/A	
Taxonomy (Subgroup) Udorthents			Field Observations Confirm Mapped Type?		Yes
PROFILE DESCRIPTION					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-14	Ap	2.5Y 5/2	7.5 YR 4/6	30%; distinct	Silt loam
HYDRIC SOIL INDICATORS:					
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)			
Remarks: The soils at this location are highly disturbed, and very silty. Area appears to be a winter-wet woods in a highly dynamic system.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	Is this Sampling Point Within a Wetland? YES
Wetland Hydrology Present?	Yes	
Hydric Soils Present?	Yes	
Remarks		

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site Letterkenny Army Depot (LEAD)	Date 9 November 2005
Applicant / Owner LEAD	County Franklin
Investigator Heather Wells / Steven Pugh	State Pennsylvania
Do Normal Circumstances exist on the site? No	Community ID PFO
Is the site significantly disturbed (Atypical Situation)? Yes	Transect ID Wetlands
Is the area a potential Problem Area? (If needed, explain on reverse) No	Plot ID WETJ, WETK

VEGETATION

Dominant Plant Species	Stratum	Indicator	Non-Dominant Plant Species	Stratum	Indicator
1 <i>Nyssa sylvatica</i>	T	FAC	9 <i>Vaccinium corymbosum</i>	V / Sh	FACW-
2 <i>Acer negundo var. negundo</i>	T	FAC+	10 <i>Carex spp.</i>	H	--
3			11 <i>Lonicera japonica</i>	V	FAC-
4			12 <i>Rubus allegheniensis</i>	V / Sh	FACU-
5			13 <i>Toxicodendron radicans</i>	V / Sh	FAC
6			14 <i>Morus alba</i>	Sh	UPL
7			15 <i>Allium spp.</i>	H	--
8			16 <i>Alliaria petiolata</i>	H	FACU-

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks

Boundaries of Wetlands J and K drawn based on percentage of *Nyssa* and *Acer* versus *Rubus* and *Alliaria*. *Vaccinium* does not occur to any extent in Wetlands J and K.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) <ul style="list-style-type: none"> <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		<p align="center">WETLAND HYDROLOGY INDICATORS</p> Primary Indicators: <ul style="list-style-type: none"> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <ul style="list-style-type: none"> <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more Required): <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks) 	
FIELD OBSERVATIONS			
Depth of Surface Water		-- (in)	
Depth to Free Water in Pit		-- (in)	
Depth to Saturated Soil		0 (in)	

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 8, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? Yes
 Is the Site Significantly Disturbed (atypical)? Yes
 Is the Area a Potential Problem Area no

Community ID: PEM – idle field
 Transect ID: n/a
 Plot ID: W1 (wetland sample point)

W1 (wetland sample point) is located at the western end of the site (at the upstream end of the riparian corridor) ~ 75-100" east of Bayonet Road. This is an emergent component of the larger wetland/hydric soil unit identified on the associated mapping as Wetland 1. This habitat compartment is located within the large field area and has recently been mowed.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<i>Juncus effusus</i>	Herb	Facw	6.			
2.	<i>Onoclea sensibilis</i>	Herb	Facw	7.			
3.				8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This area has been recently mowed. As a result, several species could not be identified. Other non-dominant species encountered included; *Scirpus cyperinus* Facw, *Agrimonia parviflora* Fac, *Panicum* sp., *Juncus tenuis* Fac-, *Solidago* sp., and *Pycnanthemum* sp.

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input checked="" type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input checked="" type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Hydrology – blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water 0-3 in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit 7 in.	<input checked="" type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils 0 in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: Observation was made outside of the growing season. However, the combination of all field indicators present a strong indication that wetland hydrology is present.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 8, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? no
 Is the Site Significantly Disturbed (atypical)? yes
 Is the Area a Potential Problem Area no

Community ID: PEM
 Transect ID: n/a
 Plot ID: W2 (wetland sample point)

This sample area is located in a drainage corridor flowing north to south through the idle field east of W1. This area is a linear wetland (primarily PEM) bisected by alternating confined and unconfined overland flow. The waterway appears to be intermittent flow carrying several small groundwater discharges. The flows from this drainage feature confluence with the primary UNT to Muddy Run ~ 30-40 yards from the sample point. It is a wetland contiguous with the Wetland 1 system. This area has also been primarily just mowed but a small area just south of a small forested upland area to the north has been plowed. There has been plowing both sides of the corridor.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<i>Juncus effusus</i>	Herb	Facw	6.			
2.				7.			
3.				8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: This area has been recently mowed. As a result, several species could not be identified. Other non-dominant species observed include the following: *Scirpus cyperinus* Facw, *Panicum* sp., *Juncus tenuis* Fac-, *Fraxinus pennsylvanica* FacW (Single Tree).

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input checked="" type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input checked="" type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water <u>0-3</u> in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit <u>3</u> in.	<input checked="" type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils <u>0</u> in.	<input type="checkbox"/> Local Soil Survey Data
	<input checked="" type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: Hydrology – GWD flowing through the drainage but no defined bed and banks within the field. However, a defined B&B can be observed in the wooded section above/upslope of the field. Area is rutted perpendicular to the slope and ruts are ponded. We identified this drainage as UNT - B.

SOILS

Map Unit Name
(Series and Phase): Maurertown Silt loam (Mb) Drainage Class: Poorly drained

Taxonomy (Subgroup): Typic Ochraqualfs Field Observations Confirmed Yes – to some extent
Mapped Type?

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-9	Ap	2.5Y 3/2	7.5YR 4/4	small/distinct/common	SL – saturated
9-13+	B	10YR 6/1-6/2	10YR 5/8	medium/distinct/common	SiCL - saturated

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: water in soil pit @ 3" after 10 minutes

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	yes		
Hydric Soils Present?	yes		
Wetland Hydrology Present?	yes	Is Sampling Point Within a Wetland?	yes

Remarks: Wetland 2 is represented on the associated GPS mapping as Flags 6-19. This wetland area extends from its border with Wetland 1 at the northern edge of the wooded riparian corridor extending north through the field into a small wooded upland area. From this point, the jurisdictional area is primarily a defined bed and banks waterway with some narrow wetland fringe. The jurisdiction was cut off at a point where GWD was no longer apparent at the surface. Hydrophytic vegetation extends further upslope in the form of a few plants following an erosion gully but were not determined to be jurisdictional. The flow in this area appears to be merely ephemeral.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 8, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? **Yes**
 Is the Site Significantly Disturbed (atypical)? **No**
 Is the Area a Potential Problem Area **No**

Community ID: PFO – riparian forest (GPS point 201)
 Transect ID: n/a
 Plot ID: W3 (Wetland Sample Point)

This sample area is located ~ 30 yards inside the wooded riparian corridor within Wetland 1 near the confluence of UNT's A & B.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<i>Fraxinus pennsylvanica</i>	Tree	Facw	6.			
2.	<i>Onoclea sensibilis</i>	Herb	Facw	7.			
3.	<i>Poa trivialis</i>	Herb	Facw	8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100 %

Remarks: The vegetation and hydrology were evaluated within 30' radius plot. Additional non-dominant species include the following: *Ulmus americana* Facw (Sapling), *Quercus palustris* Facw (Shrub), *Acer negundo* Fac (Shrub), *Rosa multiflora* Facu (Shrub), *Lonicera japonica* Fac- (Woody vine), *Scirpus cyperinus* Facw (Herb), *Veronica noveboracensis* Facw (Herb), *Carex lurida* Obl (Herb) and *Agrimonia parviflora* Fac (Herb).

Morphological adaptations on *Fraxinus* are predominant on multiple age classes of this and several other species (elevated roots, fluting and flaring of the trunks and some instances of hypertrophied lenticels were).

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input checked="" type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input checked="" type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input checked="" type="checkbox"/> Drainage Patterns in Wetlands

Hydrology – blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water <u>0-3</u> in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit <u>0</u> in.	<input checked="" type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils <u>0</u> in.	<input type="checkbox"/> Local Soil Survey Data
	<input checked="" type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: Groundwater discharges are flowing throughout the area.

SOILS

Map Unit Name
(Series and Phase): Maurertown Silt loam (Mb) Drainage Class: Poorly drained

Taxonomy (Subgroup): Typic Ochraqualfs Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-2	A	10YR 2/2	No redox	N/a	SL - saturated
2-8	B	10YR 4/1	7.5YR 4/4 10YR 5/6	Sm-med/distinct/common Small/distinct/few	SL - saturated
8-15+	B	10YR 5/1	7.5YR 4/4 10YR 5/6	Sm-med/distinct/common Small/distinct/few	SiCL - saturated

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: water in soil pit @ the surface immediately

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	yes		
Hydric Soils Present?	yes		
Wetland Hydrology Present?	yes	Is Sampling Point Within a Wetland?	yes

Remarks: Wetland 1 is represented on the associated GPS mapping as Flags 1-6, and Flags 19-24. Flags 6-19 illustrate the location and configuration of Wetland 2 located to the north. The referenced boundary flagging represents only the wetlands located on the northern side of the primary UNT to Muddy Run. It should be noted that wetlands extend to the south of the stream but were not delineated as these areas are outside of the project footprint. The bulk of Wetland 1 is PFO and located within the riparian forested corridor adjacent the referenced stream, which is identified as an Unnamed Tributary to Muddy Creek (UNT – A).

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 8, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? yes
 Is the Site Significantly Disturbed (atypical)? yes
 Is the Area a Potential Problem Area Yes

Community ID: Forested – GPS Point 1001
 Transect ID: n/a
 Plot ID: U4 (upland sample point)

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<u><i>Carya ovata</i></u>	Tree	Facu	6.			
2.	<u><i>Carya ovata</i></u>	Sapling	Facu	7.			
3.	<u><i>Prunus serotina</i></u>	Tree	Facu	8.			
4.	<u><i>Lonicera japonica</i></u>	Woody vine	Fac-	9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 0 %

Remarks: Vegetation and hydrology evaluated within 30' radius plot. Additional non-dominant species that were encountered included; *Fraxinus pennsylvanica* Facw (Tree), *Rosa multiflora* Facu (Shrub), *Rubus sp.* Facu (Herb), *Vitis sp.* (Woody vine).

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input checked="" type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water _____ in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit _____ in.	<input type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils _____ in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: Stream is severely incised at this point and there is an old ditch just outside of plot. Despite the observation of water table at 7" below surface and some saturated soil conditions in deeper soil layers, it appears from the nature of the vegetation that this area has been drained in combination from the old ditch and incised stream. Saturation was limited to small sections within the soil profile generally where large ped faces were located. Hydrology indicator was probably due to recent heavy precipitation events as no other long indicators were present.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 8, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? yes no Community ID: PFO
 Is the Site Significantly Disturbed (atypical)? yes no Transect ID: n/a
 Is the Area a Potential Problem Area Yes no Plot ID: W5 (wetland sample points)

W5 is located within a small PFO wetland (Wetland 4) which encompasses what we are calling UNT C. The waterway was flagged upslope to a point where the channel became indistinct and we felt the discharge was ephemeral. The bulk of this area is a saturated/ ponded terrace adjacent to and just upslope of UNT – A.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<i>Quercus palustris</i>	Tree	Facw	6.			
2.	<i>Ulmus Americana</i>	Sapling	Facw	7.			
3.	<i>Lonicera japonica</i>	Woody vine	Fac-	8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 66 %

Remarks: Vegetation and hydrology evaluated within 15' radius plot. See field notes for other plants found in the herbaceous layer. Other non-dominant species encountered include; *Rosa multiflora* Facu (Shrub), *Rubus sp.*, *Lonicera tartarica* Facu (Shrub), *Poa trivialis* Facw (Herb), *Carex sp.*, *Carex sp.* and *Allium canadense* Facu (Herb).

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input checked="" type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input checked="" type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water <u>0-3</u> in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit <u>7</u> in.	<input checked="" type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils <u>0</u> in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: Despite the marginal vegetation, observations revealed that the area we believe the area clearly exhibits wetland hydrology in addition to the verification of hydric soils. Water in soil pit was observed @ 7" below the surface.

SOILS

Map Unit Name
(Series and Phase): Maurertown Silt loam (Mb) Drainage Class: Poorly

Taxonomy (Subgroup): Typic ochraqualfs Field Observations Confirmed
Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
1-0	O				Very dark brown to black
0-4	A	10YR 4/2			SiL
4-7	B	2.5Y 5/3	2.5Y 5/2	Coarse, common, faint	SiCL
7-10	B	2.5Y 5/2	10YR 4/4	Medium, common, distinct	SiCL
10-16+	B	10YR 6/2	10YR 5/6	Small, common, distinct	SiCL

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input checked="" type="checkbox"/> Listed on Local Hydric Soils List <input checked="" type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: Soil was examined but characterization was not performed due to decreased lighting conditions. Soils were saturated. Numerous ponded areas were observed in this area.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? yes
 Hydric Soils Present? yes
 Wetland Hydrology Present? yes Is Sampling Point Within a Wetland? yes

Remarks: Flags 30-36 located by GPS.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 9, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? no
 Is the Site Significantly Disturbed (atypical)? yes
 Is the Area a Potential Problem Area no

Community ID: Idle field (GPS point 2000)
 Transect ID: n/a
 Plot ID: U6 (Upland sample point)

This is an upland area located just outside of Wetland 5 and just upslope of W7. This is located at the eastern end of the field within 50 yards of the railroad grade, which forms the eastern boundary of the assessment area. The area has been mowed recently. Adjacent upland areas have been recently plowed.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	See remarks			6.			
2.				7.			
3.				8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = n/a

Remarks: This area has been recently mowed. As a result, several species could not be identified nor could dominants be evaluated. Species encountered included; *Elaeagnus umbellate* – Upl, *Lonicera japonica* – Fac-, *Rubus sp.*, *Solidago sp.*, Unknown grass spp. A small area (~ 10 foot radius plot) was examined.

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Hydrology – blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water _____ in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit _____ in.	<input type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils _____ in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: No wetland hydrology indicators were observed.

SOILS

Map Unit Name (Series and Phase): Berks Shaly Silt Loam Drainage Class: Well drained

Taxonomy (Subgroup): Typic Distrochrepts Field Observations Confirmed Mapped Type? Generally Yes

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-9"	Ap	10YR 4/3	No redox	N/a	SL - Moist
9-16+"	B	10YR 6/4	10YR 6/2 depletions	Small/faint/few	SL - Moist

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: No water in soil pit was observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **no**
 Hydric Soils Present? **no**
 Wetland Hydrology Present? **no** Is Sampling Point Within a Wetland? **no**

Remarks: Clearly an upland area located 10-15 yards outside of Wetland 5.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 9, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? **Yes**
 Is the Site Significantly Disturbed (atypical)? **no**
 Is the Area a Potential Problem Area **no**

Community ID: Scrub/shrub (GPS point 2004)
 Transect ID: n/a
 Plot ID: U8 (Upland sample point)

This is an upland area located on a gentle slope just north of W5 and outside of Wetland 4. This is located at the eastern end of the riparian forested corridor within 50 yards of the railroad grade, which forms the eastern boundary of the assessment area. This was a makeup plot completed today because light conditions the previous day prevented and accurate characterization.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	<i>Elaeagnus umbellate</i>	Shrub	Upl	6.			
2.	<i>Crataegous sp.</i>	Shrub	??	7.			
3.	<i>Lonicera japonica</i>	Woody vine	Fac-	8.			
4.	<i>Lonicera japonica</i>	Herb	Fac-	9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = n/a

Remarks: Species encountered included; *Quercus bicolor* Facw (shrub), and *Rubus sp.* A - 30 foot radius plot area was examined.

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Hydrology - blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water _____ in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit _____ in.	<input type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils _____ in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: No wetland hydrology indicators were observed.

SOILS

Map Unit Name (Series and Phase): Berks Shaly Silt Loam Drainage Class: Well drained

Taxonomy (Subgroup): Typic Distrochrepts Field Observations Confirmed Mapped Type? No

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-6"	A	10YR 4/3	No redox	N/a	SL – Moist to dry
9-16+"	B	7.5YR 4/4	No redox	N/a	SL – dry

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: No water in soil pit was observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	no		Is Sampling Point Within a Wetland?	no
Hydric Soils Present?	no			
Wetland Hydrology Present?	no			

Remarks: Clearly an upland area.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
Owner: Letterkenny Army Depot
Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 9, 2007
County: Franklin
State: Pennsylvania

Do Normal Circumstances Exist at the Site? no
Is the Site Significantly Disturbed (atypical)? yes
Is the Area a Potential Problem Area no

Community ID: Idle field (GPS point 2005)
Transect ID: n/a
Plot ID: U9 (Upland sample point)

This is an upland area located in the field ~ 25 yards upslope (north) of W3 (Wetland 1). The area has been mowed and plowed recently. Most of the adjacent upland areas have been recently plowed.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	See remarks			6.			
2.				7.			
3.				8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = n/a

Remarks: Most of the vegetation in this area has been destroyed by mowing or plowing. Only a few upland grasses were observed.

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Hydrology – blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water _____ in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit _____ in.	<input type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils _____ in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: No wetland hydrology indicators were observed.

SOILS

Map Unit Name (Series and Phase): Berks Shaly Silt Loam Drainage Class: Well drained

Taxonomy (Subgroup): Typic Distrochrepts Field Observations Confirmed Mapped Type? Generally Yes

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-9"	Ap	10YR 4/3	No redox	N/a	SL - Moist
9-16+"	B	10YR 6/4	10YR 6/2 depletions	Small/faint/few	SL - Moist

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: No water in soil pit was observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	no		Is Sampling Point Within a Wetland?	no
Hydric Soils Present?	no			
Wetland Hydrology Present?	no			

Remarks: Clearly an upland area.

ROUTINE WETLAND DATA FORM

(1987 CORPS Wetland Delineation Manual)

Project /Site: Training & Readiness Maintenance Facility
 Owner: Letterkenny Army Depot
 Investigators: Frank Plewa, Sharon Madden, Sam Pelesky

Date: January 9, 2007
 County: Franklin
 State: Pennsylvania

Do Normal Circumstances Exist at the Site? no
 Is the Site Significantly Disturbed (atypical)? yes
 Is the Area a Potential Problem Area no

Community ID: Idle field (GPS point 2006)
 Transect ID: n/a
 Plot ID: U10 (Upland sample point)

This is an upland area located in the field on a gentle slope just east of Wetland 2 and upslope of W2. The area has been mowed and is plowed upslope. Most of the adjacent upland areas on either side of the drainage way have been recently plowed.

VEGETATION

	Dominant Species	Strata	Ind		Dominant Species	Strata	Ind
1.	See remarks			6.			
2.				7.			
3.				8.			
4.				9.			
5.				10.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = n/a

Remarks: Most of the vegetation in this area has been destroyed by mowing or appear to be agricultural grasses.

HYDROLOGY

Recorded Data (describe in remarks)	Wetland Hydrology Primary Indicators (one required):
<input type="checkbox"/> Stream, Lake or Tide Gauge Data	<input type="checkbox"/> Inundated
<input type="checkbox"/> Aerial Photographs	<input type="checkbox"/> Saturated in the Upper 12 Inches
<input type="checkbox"/> Other	<input type="checkbox"/> Water Marks
<input type="checkbox"/> No Recorded Data Available	<input type="checkbox"/> Drift Lines
	<input type="checkbox"/> Sediment Deposits
	<input type="checkbox"/> Drainage Patterns in Wetlands

Hydrology – blackened leaves, upper two soil layers saturated to surface, scattered shallow ponding

Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water _____ in.	<input type="checkbox"/> Oxidized Root Channels in the Upper 12 Inches
Depth to Free Water in the Pit _____ in.	<input type="checkbox"/> Water Stained Leaves
Depth to Saturated Soils _____ in.	<input type="checkbox"/> Local Soil Survey Data
	<input type="checkbox"/> FAC Neutral Test
	<input type="checkbox"/> Other (explain in remarks)

Remarks: No wetland hydrology indicators were observed.

SOILS

Map Unit Name
(Series and Phase): Berks Shaly Silt Loam Drainage Class: Well drained

Taxonomy (Subgroup): Typic Distrochrepts Field Observations Confirmed
Mapped Type? Generally Yes

PROFILE DESCRIPTION:

Depth (inches)	Soil Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concentrations, Structures, etc...
0-7"	Ap	10YR 4/3	No redox	N/a	SL - Moist
9-14+"	B	2.5Y 5/3	10YR 5/2 depletions	med/faint/few	SL - Moist

Hydric Soil Indicators	Hydric Soil Indicators
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concentrations <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (explain)

Remarks: No water in soil pit was observed. Shale bedrock prevented further sampling.

WETLAND DETERMINATION

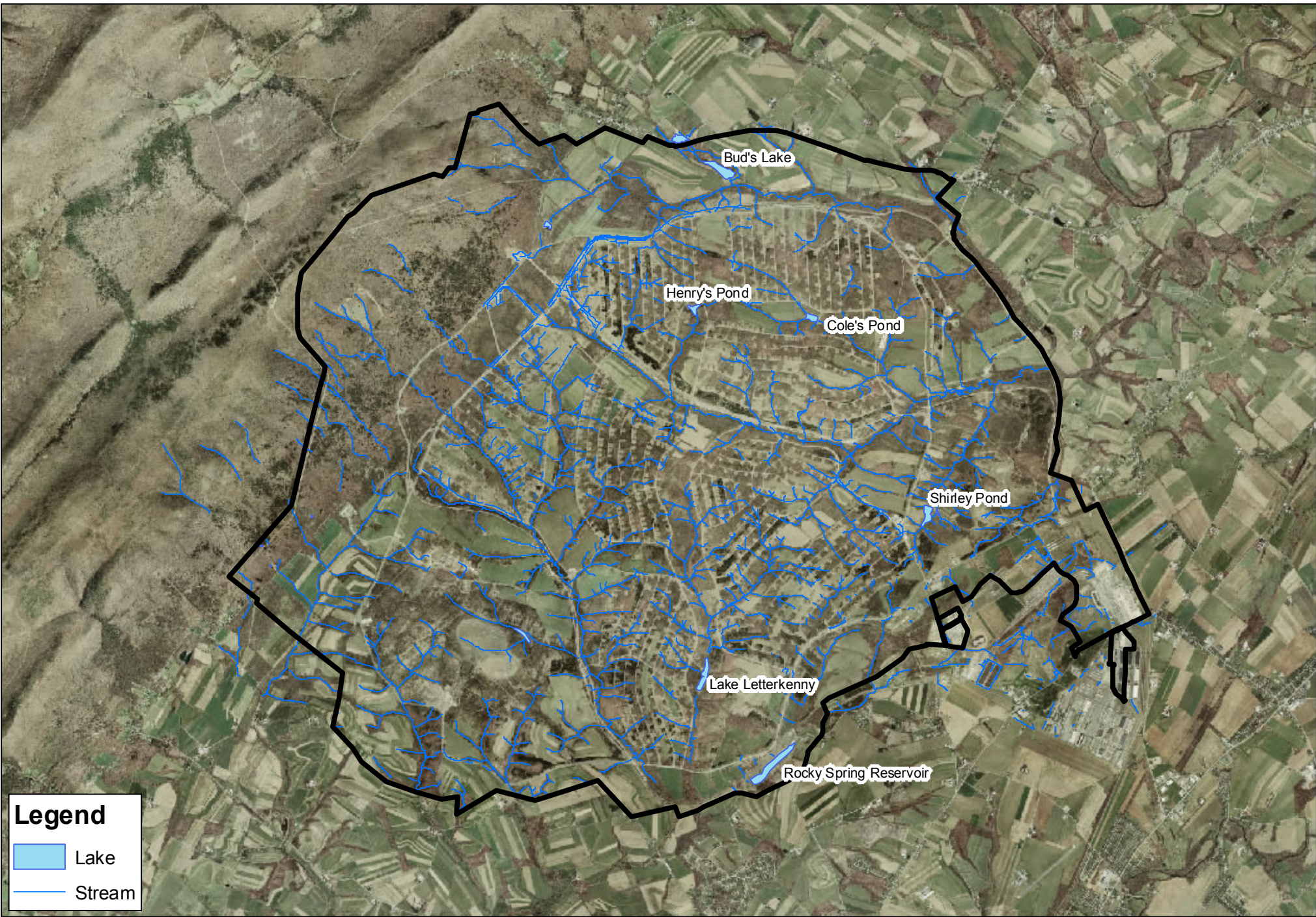
Hydrophytic Vegetation Present?	no		
Hydric Soils Present?	no		
Wetland Hydrology Present?	no	Is Sampling Point Within a Wetland?	no

Remarks: Clearly an upland area.

SURFACE WATER PLS

Streams cutting through the limestone terrain of the Chambersburg Formation and St. Paul Group on LEAD flow through broad, open valleys and are usually intermittent. In contrast to this, streams cutting through the upper shale units of the Martinsburg Formation usually meander in small, steep-walled valleys and are perennial. Surface drainage at LEAD is divided into two watersheds: the Susquehanna River to the northeast and the Potomac River to the southwest. Both the Susquehanna and the Potomac eventually drain into the Chesapeake Bay. Surface water runoff from the northeast portion of LEAD discharges directly or indirectly to Lehman Run, Keasey Run (a tributary of Lehman Run), Muddy Run, or Rowe Run, all contained in the Susquehanna River watershed. Surface water runoff from the southwest portion of the depot discharges to Dennis Creek, Back Creek, Rocky Spring Branch, or Conococheague Creek, all contained in the Potomac River watershed (see Figure 3-2). Much of the drainage on LEAD is ephemeral or intermittent, with the stream channels carrying water only in winter and spring, or after heavy rains. The main channels of Lehman Run, Keasey Run, Muddy Run, and Rocky Spring Branch are permanent (Shippensburg University, 1995). In addition to named streams, a number of small unnamed runs dissect LEAD.

Several small natural ponds are located at the foot of Broad Mountain in the western part of the depot, and six manmade lakes and ponds ranging from 3 to 40 acres in size are also located on LEAD. Rocky Springs Lake is the most significant since it is the center of a developed recreational site. The dam at Lake Letterkenny, another significant lake, was being rebuilt in 1987. A 129-acre reservoir is located 8 miles to the north of the depot (John Milner Associates, 1981).



US Army Corps
of Engineers
Baltimore District

Surface Water Features on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania
South (2004). Streams: LEAD GIS Data (2005)

0 0.5 1 2 3 4 Miles

1 inch equals 1 miles



TOPOGRAPHY PLS

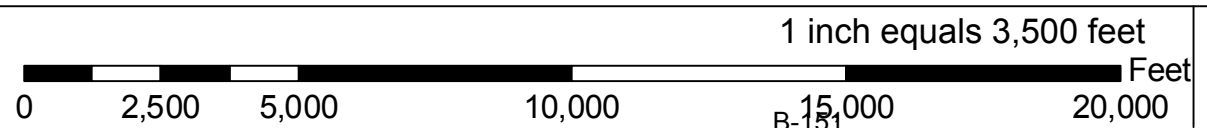
LEAD is located in the Great Valley section of the Valley and Ridge Province of the eastern United States, referred to locally as the Cumberland Valley. The Cumberland Valley trends northeast to southwest through central Pennsylvania and is bordered to the west by the Appalachian Mountains. The South Mountain section of the Blue Ridge Province is situated east of Chambersburg and marks the eastern edge of the Cumberland Valley.

The Cumberland Valley is characterized predominantly by southwest-trending limestone ridges and valleys. Shales, siltstones, and sandstones make up much of the western part of the valley, where the surface is rolling and hilly. Less resistant limestones and dolostones of the eastern part of the valley have eroded to a broader, flatter lowland perforated with sinkholes and caves. Weathering of the folded and faulted underlying geologic formations imparts an overall gently rolling aspect to the local topography. The majority of LEAD is located in the Martinsburg Shale terrain, except for bands of carbonate rocks along the eastern and western edges of the depot. Surface elevations throughout LEAD range from approximately 600 to 800 feet above mean sea level, except for the northwest portion of the installation, where the elevation increases abruptly to more than 2,300 feet above mean sea level in the vicinity of Broad Mountain (Roy F. Weston, Inc., 1996). A portion of the depot includes 2,900 acres of mountainous wooded land along Blue or North Mountain with elevations ranging from 700 feet to 2,300 feet above sea level; the majority of the area is only about 700 feet to 800 feet above mean sea level. Slopes rising in excess of 40 feet per 100 feet are found in the mountainous areas. The mountain ridges west of the depot have some effect on local conditions, tending to shelter the depot from the full effects of northern air in winter. There is also some evidence that precipitation along Broad Mountain, the area generally west of Massachusetts Avenue, may amount to several inches more per year than elsewhere on the depot, but this orographic effect has not been well documented (Shippensburg University, 1995).

The following map of 10 foot contour lines illustrates the topography at LEAD.



Topography on LEAD (10m)
Source: USGS High Resolution Orthoimage, Pennsylvania
South (2004). Topography: LEAD GIS Data (2005).



1 inch equals 3,500 feet



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APPENDIX C
HUNTING AND FISHING REGULATIONS

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Environmental Management Division

DEPOT WILDLIFE MANAGEMENT HUNTING PROGRAM


Applicability. This Regulation applies to civilian and military personnel of Letterkenny Army Depot and collocated activities, general public hunters and other participants involved with the depot's hunting program.

Suggested Improvements. The proponent agency of this publication is Letterkenny Army Depot, Director of Public Works. Users are invited to send comments and suggested improvements to the Natural Resources Manager or the Natural Resources Program Assistant, ATTN: AMLD-EN, Chambersburg, PA 17201-4150.

Distribution: LEAD Portal

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*This Regulation supersedes LEAD Reg 420-16, 28 NOV 2007, including changes.

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CHAPTER 1 GENERAL

1-1. Purpose

The purpose of this Regulation is to establish the procedures and controls for the Hunting Program at Letterkenny Army Depot (LEAD).

1-2. References

- a. AR 190-11, Physical Security of Arms, Ammunition and Explosives, 15 Nov 06
- b. DA PAM 385-64, U.S. Army Explosives Safety Program, 1 Feb 00
- c. AMC-R 385-100, Safety Manual, 26 Sep 95
- d. AR 215-1, MWR and NAF Instrumentalities, 24 Oct 06
- e. AR 200-1 Environmental Protection and Enhancement, 28 Aug 07
- f. Integrated Natural Resources Management Plan for Letterkenny Army Depot. Nov 07.
- g. Memorandum, Authority for Hunting on U.S. AMC Installations, Office of Security, Force Protection and Law Enforcement, AMCOPS-CS, 20 Feb 07.
- h. Memorandum, 2007 AMC Hunting Policy Implementation Guidance, U. S. Army Joint Munitions Command, Force Protection, AMSJM-FP, 21 MAR 07.

1-3. Conditional Provisions

Hunting at LEAD is a privilege conditional upon compliance with all the provisions outlined in this Regulation. Also, if operational requirements would prohibit hunting in any particular area, the Security Manager within the Ammunition Storage Area (ASA) will notify the Natural Resources Manager. The Natural Resources Manager will not allow hunting in these areas until notification by the Security Manager that the special operational requirement has ceased. Hunting is not permitted in the ASA during hours of operation unless authorized by the Security Manager. Hunting at LEAD may be cancelled when required due to mission, fire hazard, snow, or other circumstances. Force Protection conditions may also have an impact on the Program. In the event of cancellation, no hunting permit fees will be refunded.

1-4. General

Persons holding hunting permits, including military personnel, will stand at par with each other for use privileges, except that participation of the general public will be within manageable quotas. Individuals will not be required to join an organization (i.e., Rod and Gun Club) in order to participate in the LEAD hunting program.

CHAPTER 2 HUNTER CATEGORIES, WORK PROJECTS AND PERMITS

2-1. General requirements for hunting purposes

- a. A completed application (Appendix A) and all applicable Pennsylvania State and Federal licenses, permits, and stamps.
- b. A national, state, and/or local municipality criminal record check performed by LEAD. See Appendix B and C.
- c. A current LEAD hunting permit. Scheduled hunt days will be listed on the left side of the hunting permit.
- d. All persons (hunters and non-hunters) with a LEAD Hunting Permit must have a training certificate from the Pennsylvania Game Commission (PGC) Hunter-Trapper Education Course or a certification in another state or National Rifle Association accredited hunter safety course.
- e. All persons (hunters and non-hunters) with a LEAD Hunting Permit must sign a Release in Full and Indemnity Agreement for Hunting, which is the right side of the LEAD hunting permit. This form must provide a phone number, signature and witness signature. The form must be handed in when processing into the hunting area for the first time.

Note: Above requirements do not apply to mentored youth. See Section 5-4.

2-2. Categories of Hunters

- a. Active duty military personnel.
- b. Retired military personnel.
- c. Current and retired LEAD employees.
- d. Agricultural Lessees. An agricultural lessee is defined as the primary or first signatory on the agricultural lease agreement. No more than one agricultural lessee will be granted an A-permit per lease.
- e. General Public.
- f. Commander's Guest (See Section 3-4).

2-3. Volunteer Work Projects (VWP)

VWP is work that is directly related to and directly benefits LEAD's Natural Resources Management Program. Individuals listed in paragraph 2-2 b and c must complete 10 hours to hunt and to sponsor guests. Individuals completing at least one hundred twenty (120) hours will be eligible for additional hunting opportunities in accordance with LEAD R 420-16. VWP must

be completed by 30 June before the beginning of the fall hunting season (See Appendix F). Though not required, general public may perform VWP but will be placed into the random lottery for all hunts.

2-4. Hunting Permits and Fees

- a. The Commander must authorize each individual hunting permit.
- b. The coding of the LEAD Hunting Permit is defined as follows:
 - (1) **A**-permit - Depot civilian employees, retired depot civilian employees, and retired military who have completed VWP; active duty military, commander's guests, and agricultural lessees.
 - (2) **B**-permit- General public hunters that may or may not be sponsored by A-permits.
 - (3) **AN**-permit - Indicates a free non-hunting permit for an A-permit who has completed VWP. Individuals that sponsor hunters, but do not hunt, must have a LEAD hunting permit and have a Pennsylvania State hunting license for control purposes, but will not be charged the LEAD hunting fee.
 - (5) **BN**-permit – Indicates a free non-hunting permit for a B-permit
- c. The fee schedule shall be set on a yearly basis and is located in Appendix A under the Hunting Application Rules and Regulations.
- d. Fees are non-refundable.
- e. The hunting fee shall be utilized to help offset the costs of fish and wildlife management at LEAD as directed by Public Laws and AR 200-1. These fees shall be used only at LEAD and specifically for the protection, conservation, and management of fish and wildlife including habitat improvement, but for no other purposes. The Natural Resources Manager must approve all expenditures.

CHAPTER 3 HUNTING LOTTERY DRAWINGS

3-1. General

a. Random lotteries and drawings are essential in order to assure that maximum quotas established for safety purposes are not exceeded. This provides for the maximum utilization and sharing of available hunting spaces each day by all eligible personnel. Hunter participation and number of hunting days will be based on deer harvest objectives as determined by the Natural Resources Manager.

b. Applicants complying with the provisions of LEAD Regulation 420-16 will be issued a LEAD Hunting Permit (AMLD-EN Form 2147-13). All information with respect to each individual's application is entered into a computer and assigned a permit number. Permit numbers are assigned as the applications are received. A randomized computer drawing is performed for each of the hunt days using only the individual's permit number and/or category of the hunter. Some applicants may not be drawn to hunt depending on the number of applications and available hunting days.

c. The Hunting Program Coordinator and Natural Resources Manager double-check to make sure all information is correct from the randomized drawing and update the database for the Program. Hunting permits are printed with the hunting dates on the permit for each individual applicant that was randomly drawn to hunt. The hunting permit along with a directional map to LEAD is mailed to the applicant in the self-addressed stamped envelope provided in the hunter's application.

d. Zone I: This designation, as it relates to the depot hunting program, pertains to the confines of the restricted ASA. Access to the area is through Post 2 or the Recreation Area.

e. Zone II: This designation, as it relates to the depot hunting program, pertains to the area outside the ASA area, which is the buffer zone between ammunition operations and off-depot lands.

3-2. Zone I Lottery Drawing for Major Deer Hunt Days

a. All hunters may choose only one season to hunt for antlered deer except A-permit individuals that have completed 120 or more hours of VWP (See paragraph 2-3).

b. Zone I Archery, Flintlock, and Antlerless Firearms Hunt Days: A-permit hunters will be drawn based on the number of days available and number of applicants. A-permit hunters may also sponsor 2 general public hunters. General public hunters without sponsors will be randomly drawn with the number determined by the Natural Resources Manager and Hunting Program Coordinator based on the available antlerless permits, number of volunteer guides and deer harvest objective. The goal is to try to give each general public hunter, sponsored or not, at least one hunting day.

c. Zone I Antlered Firearms: Two drawings are conducted for Zone I antlered hunting. The first drawing is limited to A-permit hunters. A separate random drawing for B-permit hunters is also conducted and is based on a point-system. No individual will be authorized to hunt more than one day of the antlered deer firearms season.

3-3. Zone II Lottery Drawing for Major Deer Hunt Days

When possible, all applicants will be given every hunt day of their chosen season per their application. If the number of applicants exceeds the available space, two drawings will be conducted for Zone II hunting. The first drawing is limited to current A-permit hunters and sponsored guests that have requested Zone II on their application. Also a separate, random drawing will be conducted for the non-sponsored general public.

3-4. Exceptions to Policy

The Depot Commander may grant, as the 'Commander's Guest', an A-permit status to individuals not covered under section 2-2. Requests for exceptions must be submitted in writing addressed to the Commander for approval on a yearly basis. The Commander's decision must be recorded in writing and a copy of the written approval must be placed in the hunting files at the Natural Resources Office. Consideration of all such requests must be consistent with safety, security and wildlife management requirements.

CHAPTER 4 ZONE I HUNTING

4-1. Seasons and Hunter Limits (contingent upon areas available)

- a. Archery for Deer: Maximum limit of 550 hunting spaces per day.
- b. Antlered and Antlerless Deer (Firearms): Maximum limit of 460 hunting spaces per day.
- c. Flintlock Muzzleloader/Late Archery for Deer: Maximum limit of 460 hunting spaces per day.
- d. Small Game, Turkey, Waterfowl, and Predator: Maximum limit of 100 spaces per day.

4-2. Major Hunt Days

- a. Processing into Zone I Hunt Area:
 - (1) Access to the hunting area shall be through the Recreation Area on major hunt days.
 - (2) Hunters approved to hunt will enter the appropriate designated line at the Recreation Area. Weapons will be checked as the hunters wait in-line.
 - (3) Persons shall be given a choice of hunting areas. These hunting areas are available on a first-come, first-served basis. Mission requirements, security requirements, or harvest objectives may restrict the number of areas opened to hunting. Once an area has reached its maximum hunter quota, that area is closed and hunters must select another hunting area.
 - (4) Hunters will be properly registered, issued a LEAD visitor's badge, briefed on safety and explosive awareness, as well as the upcoming hunt and any area closures. Hunters must show their LEAD Hunting Permit, PA State Hunting License, and all other applicable licenses and permits. Hunters will also be required to show additional identification such as a driver's license, LEAD badge, Common Access Card (CAC), or military identification card.
 - (5) All individuals are provided a hunting map and responsible for examining those maps and becoming thoroughly familiar with the location and boundaries of the area in which they are permitted to hunt.
 - (6) Hunters will then proceed to the Security check station. Carry-in items such as backpacks will be checked when entering or exiting the hunting area. After processing, hunters must go directly into the hunting area.
 - (7) Authorized hunters not reporting to the hunter check-in station at the Recreation Area by 0600 on their scheduled firearms antlerless deer hunt day are subject to losing their hunting spaces.

(8) In order to obtain the desired harvest goal, stand-by hunters with applicable tags may be authorized to hunt with firearms for antlerless deer. Hunters will be taken on a first-come, first-served basis. If a stand-by line is implemented, the information will be disseminated prior to the hunt day. The stand-by hunting line will be processed beginning at 0600. Not all stand-by hunters may get in to hunt.

(9) No entry is allowed after the time set by the Natural Resource Manager or Hunting Program Coordinator.

(10) Hunters trying to enter the hunting area without proper attire (required fluorescent orange, etc.), guns not plugged, arrows not properly shrouded, appropriate licenses, cameras and any type of flame producing devices may be rejected for that day with no makeup day.

(11) Special provisions may be arranged to accommodate handicapped hunters into and out of the hunting area. Handicapped hunters should contact the hunting office at (717) 267-8674 on Monday or Tuesday, prior to the scheduled hunt date(s).

b. Processing out of the Zone I Hunt Area:

(1) At the end of the hunt day, all hunters must be at a state named road by the designated check out time and be ready for pick up.

(2) All deer harvested in Zone I must be transported by Government vehicles to the Recreation Area. Drivers of vehicles transporting hunters and deer are responsible to ensure the safe transport of hunters, weapons and deer. Load limits of trucks must be observed and all weapons shall be checked to assure they are clear of ammunition and the action open prior to being transported. Also, drivers should ensure that the harvested deer is legal and properly tagged before being loaded on the truck.

(3) Individuals must process out through the Recreation Area including turning in their visitor's badge and area map. All harvested deer must be checked through the weigh-in station.

4-3. Minor Hunt Days

a. Designated Spring and Fall Turkey Hunt days

(1) There will be designated turkey hunting days in the spring and fall season. Security personnel or volunteers will process hunters into and out of the hunting area.

(2) Hunters will be processed through the truck lane at the Main Gate at 0330. The hunter will choose which area they will be hunting. Hunters must show their LEAD hunting permit, state hunting license and will then be required to provide their driver's license, LEAD employee badge, retired LEAD employee CAC card, or retired military ID card in order to be given a hunting badge. LEAD employee CAC cards cannot be accepted.

(3) Hunters will proceed to Post 2 for vehicle and weapon inspection. All vehicles must have a fire extinguisher rated at least 10 BC.

(4) Only 40 privately-owned vehicles (POVs) and/or 100 personnel will be authorized on a first-come, first-served basis. If the 40 POV limit is reached, hunters may elect to walk or ride a bicycle into the hunting area provided that the 100 personnel limit is not reached.

(5) Only A-permit hunters are allowed with 2 B-permit hunters as guests. The guests must hunt in the same area as the A-permit and the guests are not authorized to drive a separate vehicle from the A permit.

(6) At 0600 the processing personnel will move to Post 2 to continue processing hunters in and out. If Post 2 is not manned due to the Ammunition Storage Area (ASA) not working, a Security Officer will open the gate every hour on the half-hour for 10 minutes to allow ingress and egress. Hunting hours will be in accordance with PA state regulations.

(7) All hunters must be checked out of Zone I by one hour after legal shooting time. All harvested game must be presented to the processing personnel.

b. There may be non-designated spring and fall turkey hunt days where hunters can access Zone I through normal small game hunt day procedures as described below.

c. Small Game, Predator and Waterfowl Seasons

(1) Hunting is authorized in accordance with state seasons and bag limits. Hunting can occur after normal duty hours during the week and on weekends and holidays. No POVs are authorized after normal duty hours during the work week. Only 40 privately-owned vehicles (POVs) and/or 100 personnel will be authorized.

(2) Hunters must process through the Main Gate and Post 2 no earlier than 0330. If Post 2 is not manned due to the ASA not working, a Security Officer will open the gate to allow ingress and egress.

(3) Hunters must show their LEAD hunting permit, state hunting license and will then be required to provide their driver's license, LEAD employee badge, CAC card, retired LEAD employee CAC card, or retired military ID card in order to be given a hunting badge.

(4) All vehicles will be inspected and must have a fire extinguisher rated at least 10 BC. All weapons will also be inspected.

(5) Only A-permit hunters are allowed with 2 B-permit hunters as guests. The guests must hunt in the same area as the A-permit and the guests are not authorized to drive a separate vehicle from the A-permit.

(6) All hunters must be checked out of Zone I by one hour after PA legal shooting time. All harvested game must be presented to the processing personnel.

CHAPTER 5 ZONE II HUNTING

5-1. Seasons and Hunter Limits

- a. Archery for Deer: No limit on hunting spaces.
- b. All other Seasons including Firearms, Flintlock/Late Archery, Small Game, Turkey, Waterfowl, and Predator: Maximum limit of 250 hunting spaces per day.

5-2. Major Hunt Days

- a. Processing into Zone II Hunt Area:
 - (1) Access to the hunting area shall be through Boundary Gate (BG) 10 on major hunt days. A Hunting Access Key to BG 10 shall be signed out at the Main Gate by Natural Resources personnel or authorized individuals. No other Hunting Access Keys shall be issued on that day.
 - (2) BG 10 will be manned by Natural Resources personnel or authorized individuals on major hunt days. Hunters must show their LEAD Hunting Permit, PA State Hunting License and all other applicable licenses and permits.
 - (3) Authorized hunters not reporting to BG 10 by 0600 on their scheduled deer hunt day are subject to losing their hunting spaces. All individuals once processed into the hunting area must remain in the area until processed out of BG 10.
 - (4) No entry allowed after the time set by the Natural Resources personnel and/or authorized individuals.
 - (5) Hunters trying to enter the hunting area without proper attire (required fluorescent orange, etc.), guns not plugged, arrows not properly shrouded, or appropriate licenses may be rejected and their hunting space forfeited for that day with no makeup day.
- b. Processing out of the Zone II Hunt Area:
 - (1) At the end of the hunt day, all hunters must return to BG 10 by the designated check out time and be signed out by Natural Resources personnel or authorized individuals.
 - (2) Hunters should ensure all harvested deer are properly tagged. All harvested deer must be checked by Natural Resources personnel or authorized individuals or be checked through a weigh-in station located at the Recreation Area, with the hunter providing additional data as required.

5-3. Minor Hunt Days

a. Processing into Zone II Hunt Area:

- (1) Hunting can occur all days of the year in accordance with PA State Hunting Seasons.
- (2) Hunting Access Keys shall only be issued to A-permit hunters. Access keys may be obtained from the Security Desk at the Main Gate no earlier than 0330. The A-permit hunter is authorized to bring two B-permit hunters as guests. All hunters must sign into the area on AMLD Form 3261 Hunting/Woodcutting/Trapping/Fishing Control Log.
- (3) At the Main Gate, hunters must show their LEAD Hunting Permit and some form of identification.
- (4) Hunters can access the hunting areas through Boundary Gates 7, 10, and 11.

b. Processing out of the Zone II Hunt Area:

- (1) At the end of the hunt day, all hunters must return to the Main Gate by the designated check out time and be signed out by Security personnel or other authorized individuals. Check out times are posted at the Main Gate.
- (2) Each hunter must complete a Hunting Register (whether or not game is harvested) and provide it to the Security Officer on duty. All completed registers and the AMLD Form 3261 Hunting/Woodcutting/Trapping/Fishing Control Logs will be forwarded to the Natural Resources Office on a weekly basis.
- (3) All harvested game must be properly tagged, reported on the Hunting Register, and available for possible inspection at the Main Gate.

c. Hunting at the Recreation Area follows the same processing rules as above and is only for waterfowl. It is authorized as a means of curtailing the resident waterfowl population and only occurs on weekends and holidays during the approved waterfowl hunting season except during scheduled events. Once hunters are inside the Recreation Area, they must ensure that no one else is utilizing the area and secure the Gate so that the area remains secure while hunting is occurring. The gate may be reopened once hunters exit the area.

5-4. Mentored Youth Hunting

- a. Mentored youth hunting is authorized in Zone II in accordance with the PA state rules and regulations. Mentored youth hunting is not authorized in Zone I.
- b. Mentored youth will not be issued a LEAD Hunting Permit, but will be signed in/out at the appropriate location and they must be escorted at all times by a current LEAD permit holder.
- c. Mentored youth hunters may hunt in Zone II in addition to the two sponsored guests.

CHAPTER 6
INDUSTRIAL AREA HUNTING RULES AND REGULATIONS

- a. Hunting within the Industrial Area (IA) of LEAD shall occur on a yearly basis in coordination with the appropriate Directorates and as determined by the Natural Resources Manager to control the deer population.
- b. Notification of hunting within the IA will be sent to appropriate directorates and family housing every year. An email dictated by the Natural Resources Office will be sent by the Director of Public Works to all directorates affected. A letter will also be signed by the Director of Public Works and will be hand carried to all family housing occupants no later than 30 days prior to the first hunt day. The email and letter will include the dates/times of the IA hunts and a map showing the specific hunting locations. The email and letter will also state that these hunting locations should be avoided at all times on the days of the hunts. The letter to the housing occupants will be distributed by the DPW Housing Office.
- c. To be eligible to hunt in the IA you must possess a current LEAD hunting permit and a valid LEAD antlerless deer tag. PA Wildlife Management Unit (WMU) 4B tags are not acceptable.
- d. All A-permit hunters and participants of the Special Organized Hunts are the only authorized personnel to hunt. B-permit hunters are not authorized to hunt.
- e. Hunting in the IA will occur along with all major hunt days in Zone I (weekends and holidays). There will be a line specifically for IA hunters separate from Zone I hunters at the Recreation Area. Hunters will be required to present their weapon for inspection at the Recreation Area.
- f. The only authorized weapons will be archery equipment.
- g. "Earn a buck" program is in effect. Hunters are required to harvest at least one antlerless deer before an antlered deer may be taken. Once a hunter reaches his quota of antlerless deer the hunter is no longer required to have a LEAD antlerless deer tag to hunt.
- h. Once a hunter is eligible to harvest an antlered deer, they must use their PA antlered deer tag.
- i. Designated Hunting Locations (DHL) will be chosen by the Natural Resources Manager and/or the Hunting Coordinator. A trail will be established to the DHL by the use of reflectors and/or surveyor tape. The DHL will be located at a marked metal stake. The hunter must hunt within 60 feet of the marked sign.
- j. The hunter may hunt from the ground or from a tree stand. If the hunter chooses to use a tree stand it must not damage the tree and must be taken down and removed from the area after the hunt is over.

k. Deer are the only game that may be harvested.

l. Hunters will report to the Recreation Area and select a DHL on a first-come, first-serve basis. One hunter per DHL. Hunters will be signed in on a roster and be given a map to the chosen DHL and a temporary antlerless deer tag. Designated parking areas will be shown on the map. If all the DHL's have been taken by hunters then the IA will be closed until a DHL is available. Hunters must return to the Recreation Area to sign out of the area and to have their deer processed at the check station.

m. Check in and out times will be the same for Zone I hunting. No entry allowed after the time set by the Natural Resource Manager or Hunting Program Coordinator.

n. In order to change to another DHL, hunters must return to the Recreation Area and sign out of their original DHL.

o. Hunters are required to follow the fluorescent orange requirements for Zone I.

p. Bows may not be loaded until the hunter reaches the DHL. Once the hunter leaves the DHL the bow must be unloaded.

q. Hunters will be required to carry a cell phone with them while hunting. Hunters must request permission from the hunter check-in station at the Recreation Area in order to track wounded deer out of the DHL. At that time, the hunter can also request assistance in tracking or removing their harvest. The hunter is not guaranteed this help; it will depend on available volunteers and other factors. Tracking of wounded game after closing hours must have the approval of the Natural Resources Manager or Hunting Coordinator.

r. Harvested deer must be field dressed in the wooded areas and completely out of sight. No field dressing of deer along roadways, in fields, parking areas or railroad tracks.

s. Hunters who violate the IA hunting regulations will lose their hunting privileges in the IA and possibly their privileges on the entire installation. Loss of privileges will depend on the severity of the offense.

t. Access into the IA for hunting privileges will be determined based upon security restrictions and wildlife management objectives.

CHAPTER 7 SPECIAL ORGANIZED HUNTS

7-1. General

a. Special Organized Hunts (SOH) include hunts that are for the Army Wounded Warrior (AW2) Program or the Hunt of a Lifetime (HOL) Program. These hunts are coordinated by the Natural Resources Office to provide hunting opportunities for disabled Soldiers and children with life threatening illnesses. SOHs may not be limited to the AW2 Program and the HOL Program. Other hunts may be organized by the Natural Resources Office with proper approvals.

b. SOHs are approved by the LEAD Commander and coordinated through the DPW, DRSK and LEMC.

c. With proper approvals and coordination, hunts may occur on weekdays or weekends and in areas that may normally be off-limits to hunting. Other exceptions to the LEAD Hunting Regulations may be granted on an as needed basis.

d. Volunteers are used to support the SOHs. Volunteers are selected by the Natural Resources Office and are not eligible to hunt during the SOHs.

e. Participants over the age of 11 in the SOH must possess a training certificate from the PGC Hunter - Trapper Education Course or a certification in another State or National Rifle Association - accredited hunter safety course. Wounded Warrior hunters are exempt from having to provide proof of a hunter safety course.

7-2. AW2 Hunts

a. Participants are selected through the AW2 Program at Walter Reed National Military Medical Center (WRNMMC) in coordination with the LEAD Natural Resources Office.

b. The AW2 Program defines eligibility as “the most severely wounded Soldiers and Veterans who suffer from injuries or illness incurred in the line of duty after September 10, 2001, in support of Overseas Contingency Operations since 9/11. These Soldiers and Veterans must receive or expect to receive an Army Physical Disability Evaluation System rating of 30% or greater in one or more specific categories.” More information can be found at <http://wtc.army.mil/aw2/>.

c. Participants in the AW2 hunts may include the following:

(1) AW2 Soldiers and Veterans

(2) Cadre from the AW2 Program at WRNMMC. No more than one cadre per AW2 and no more than three cadres per hunt day. Additional cadre may participate in a support role.

(3) Family members that are at WRNMMC as Non-Medical Attendants (NMA) may also participate in the hunt. No more than one NMA per AW2 hunter. NMAs must have prior approval to hunt and are only authorized if there is available space and escorts. NMAs must hunt with their AW2 sponsor. Family members may participate in a support role.

7-3. HOL Hunts

a. Participants are selected by the HOL Program in coordination with the LEAD Natural Resources Office.

b. HOL is a “nonprofit organization with a mission to grant hunting & fishing dreams for children age 21 and under, who have been diagnosed with life threatening illnesses.” More information can be found at <http://www.huntofalifetime.org/>

c. Participants authorized to hunt for the HOL hunts are limited to the children selected by the Program.

d. Family members, HOL staff, and volunteers are authorized in a support role but are not eligible to hunt.

CHAPTER 8 GENERAL RULES AND REGULATIONS

8-1. General Rules and Regulations

a. All LEAD regulations as well as Federal and State wildlife laws are applicable on LEAD. LEAD's hunting regulations must meet and may exceed State wildlife laws unless specific authorization has been received from the State or Federal agencies to waive such regulations.

b. Appendices A, B, and C include the hunting application procedures, application forms, and criminal records check information and consent forms. These appendices may be edited on a yearly basis to reflect changes in applicable laws, application deadlines, required information in order to obtain hunting privileges, hunt schedule, or fee schedule with the approval of the Natural Resources Manager. Changes must be consistent with safety, security and wildlife management laws, regulations and requirements.

c. The Natural Resources Manager may extend or cancel the number of deer hunting days if necessary to achieve harvest objectives.

d. The Directorate of Risk Management will patrol all hunting areas in Zones I and II. The enforcement of all Federal and State wildlife laws, local policies, and safety regulations will be in accordance with LEAD's INRMP. Violations will be cited in accordance with Federal and State laws.

e. Sunday hunting may be conducted in Zone I or Zone II as long as it is in accordance with PA state hunting regulations and seasons.

f. Only authorized persons with a valid deer or turkey tag shall be permitted to carry a weapon during those respective hunting seasons. Hunters who have used all of their tags shall not be permitted to remain in the hunting area except to accompany a hunter who requires an escort because of age, health, or to establish hunting eligibility.

g. The LEAD hunting permit shall be maintained in possession at all times by both hunters and non-hunters while in the hunting area. State hunting licenses must be carried in accordance with State game laws.

h. Hunters who remain in the hunting area beyond the posted closing time may have their hunting privileges revoked. Posted times are at the Recreation Area and Boundary Gate 10. Tracking of wounded game after closing hours must have the approval of the Natural Resources Manager or designated representative and/or the Fish and Wildlife Conservation Officer on duty.

i. No parking within 20-feet of the ammunition storage area fence.

j. Introduction of alcoholic beverages, illegal drugs, or contraband items onto the depot is prohibited.

k. Littering is strictly prohibited.

l. No person shall pick-up or remove any cultural or archaeological artifact on the installation without consent of the Natural Resources Manger.

m. Unruly, obnoxious, or disrespectful behavior toward LEAD personnel and/or volunteers may result in ejection from the depot during that hunt day and immediate loss of hunting privileges and other action as appropriate.

n. No stocking of game without the consent of the Natural Resources Manager is permitted.

o. No person shall pick-up, remove, harm or harass any non-game or protected wildlife or plant including but not limited to turtles, snakes, small mammals, birds, or other plants or wildlife without consent of the Natural Resources Manager.

p. Hunters, whether armed or unarmed, may not pursue, chase, or disturb wildlife in "Safety Zone Areas". Hunting deer by "driving" is prohibited, unless authorized by the Natural Resources Manager.

q. Hunters who harvest deer and turkey must follow the instructions printed on the tags supplied with their license in accordance with Pennsylvania State Wildlife Laws.

r. In order to harvest an antlered deer, individuals must use their PA antlered deer tag.

s. Deer that are mistakenly or illegally harvested will be dealt with in accordance with the current PA Game and Wildlife Code.

t. All weapons will be unloaded with open chambers during vehicle transport and while waiting in lines to be processed.

u. All broadhead arrows will be carried in a quiver that totally encloses the razor sharp edges and points of the broadheads. The quiver must be of a shatter-resistant material.

v. It is unlawful to construct a tree stand platform or support that causes damage to a live standing tree located on LEAD. Portable climbing devices that do not cause damage may be used.

w. An approved safety harness must secure all individuals hunting from an elevated platform or tree.

x. All volunteers are required to report to and identify themselves to the LEAD hunting program coordinator for the designated hunting day. The hunting coordinator will maintain a roster of the volunteers for each hunting day. The Natural Resources Office or designee will determine the number of volunteers necessary per volunteer event.

y. All volunteers assisting with the Wildlife Management Program will observe all rules, regulations, and instructions. Failure to do so may result in loss of hunting privileges.

8-2. Regulations Specific for Zone I

a. Blaze orange (daylight fluorescent orange material) shall be worn in accordance with the current PA Game and Wildlife Code in Zone I, except for the following:

(1) During the LEAD antlerless deer season in Zone I, all personnel must wear 250 square inches of fluorescent orange material on the head, chest and back at all times.

(2) During the late combined archery/flintlock season in Zone I, all personnel must wear 250 square inches of fluorescent orange material on the head, chest and back at all times while moving. Once stationary it may be removed.

b. Absolutely no hunting is permitted in restricted areas or the shaded areas of the hunt map which include safety and security zones, the demolition grounds or other areas as shown on area hunting maps unless proper approval has been obtained and coordinated through DRSK, DPW and LEMC.

c. Hunting from igloos is permitted; however, hunters must stay back approximately 10-feet from the front of the igloo for safety reasons. Hunting from igloos in K area is strictly prohibited. Hunters must stay out of the mowed area around the igloos in K area and also stay away from the igloo doors.

d. In igloo areas, the direction of fire must be away from igloo doors and ventilators.

e. No shooting is permitted across State named roads to include West Patrol Road, East Patrol Road, South Patrol Road, North Patrol Road, Florida Avenue Extended and Kentucky Avenue Extended. Hunters should use extreme caution when shooting near all roads. Careless acts could result in the loss of hunting privileges.

f. On all minor hunt days, POVs are restricted to travel and parking on only state named roads including Florida Avenue Extended and Kentucky Avenue Extended. POVs are not authorized within the restricted portions of K area which include Nevada Avenue and portions of Louisiana Avenue, Massachusetts Avenue, and Connecticut Avenue.

g. POVs must park off the state named road in an area that will not impede any vehicular traffic or access to any igloo road. POVs must park in an area that will not create a fire hazard such as tall grass.

h. In Zone I, individuals who purchase an antlerless deer tag from LEAD, may harvest one antlerless deer per tag. If authorized and approved by the Natural Resources Manager, hunters may also purchase additional LEAD antlerless deer tags from Natural Resources Office personnel after successfully using their first LEAD antlerless deer tag. Number of tags available per hunter will be set on a yearly basis.

i. Late season flintlock muzzleloader hunters must have a valid LEAD antlerless deer tag to harvest an antlerless deer in Zone I. PA WMU tag and PA antlered deer tag cannot be used to harvest an antlerless deer in Zone I.

j. Smoking, fires, or the possession of flame-producing devices are not permitted in Zone I. All flame-producing devices, including cigarette lighters, must be left outside the hunting area.

k. No cameras (including cell phones with cameras) are permitted in Zone I. The use of cellular phones may be restricted to designated areas in the ASA.

8-3. Regulations Specific for Zone II

a. Blaze orange (daylight fluorescent orange material) shall be worn in accordance with the current PA Game and Wildlife Code

b. POVs in Zone II must stay on designated roads. No POVs may park or drive on any agricultural, forested or natural grassland areas. Roads on the edges of agricultural fields may be utilized.

c. POVs must park off the road in an area that will not impede any vehicular traffic. POVs must not park within 20-feet of the ammunition area fence or in an area that will create a fire hazard such as tall grass.

d. A disabled person permit issued by the (PGC) is required to hunt in Zone II on LEAD from a vehicle. Requirements for this permit are described in Title 34, Section 2923 of the PA Game and Wildlife Code.

e. Individuals hunting antlerless deer in Zone II must have a valid Pennsylvania Wildlife Management Unit (WMU) 4B Antlerless Deer License.

CHAPTER 9 AUTHORIZED WEAPONS

9-1. Archery Season

a. Long bows, recurve bows, compound bows, and crossbows. All arrows will be carried in a quiver that totally encloses the razor sharp edges and points of the broadheads. The quiver must be of a shatter-resistant material.

b. A crossbow is subject to the following restrictions.

(1) Use of a crossbow follows Pennsylvania State Hunting Regulations

(2) Must have a peak drawn weight of 125 pounds.

(3) A bolt must be equipped with a broadhead that has an outside diameter or width of at least 7/8 inches with at least two cutting edges on the same plane throughout the length of the cutting surface, and shall not exceed three inches in length.

(4) Scopes may be used in accordance with Pennsylvania State Hunting Regulations

c. In Zone I, no firearms may be carried while hunting deer during archery season. Zone II follows PA Game Commission rules and regulations.

9-2. Antlered and Antlerless Deer Seasons with a Firearm

a. Shotguns (manually operated) using slugs of not less than 20 gauge which are plugged to a three shell limit in the magazine and chamber combined. Shotguns must be equipped with bead for front sight and a notch or "V" for the back sight, scope, aimpoint, or equivalent.

b. In-line, percussion and flintlock muzzleloaders .44 caliber or larger using single projectile ammo may also be used.

c. Archery equipment as described in 9-1.

9-3. Flintlock Season

a. Only single barrel flintlock ignition long guns .44 caliber or larger using single projectile ammo. It is unlawful to use telescopic sights. Peep sights are permitted.

b. In-line/percussion muzzleloaders are not authorized during the flintlock season.

9-4. Small Game, Predator, and Waterfowl Seasons

a. Shotguns, both manually operated and semiautomatic, which are plugged to a three-shell limit in the magazine and chamber combined. Slugs and shot larger than #4 lead and #T non-toxic is prohibited.

b. Rimfire Rifles, .22 caliber or smaller may be used for small game in both Zone I and Zone II. Rifles of any other caliber are not authorized for any type of hunting.

c. Archery equipment as described in 9-1.

9-5. Turkey Season (spring and fall)

a. Shotguns, both manually operated and semiautomatic, which are plugged to a three-shell limit in the magazine and chamber combined. Shot larger than #4 lead and #T non-toxic is prohibited.

b. Archery equipment as described in 9-1.

c. Rifles of any caliber are not authorized for hunting turkeys during spring turkey season. Rimfire Rifles, .22 caliber or smaller may be used during the fall turkey season.

APPENDIX A
HUNTING APPLICATION REGULATIONS AND PROCEDURES

1. **Applications must be postmarked by the last day of July.** If the application and fees are not properly completed, correct, and postmarked by the last day of July then the application shall be rejected and returned to the applicant. No hunting privileges will be approved for that year.
2. Each applicant interested in hunting on Letterkenny Army Depot (LEAD) must properly complete and submit a separate application (AMLD-EN Form 2147-1-R).
3. Applicants that are sponsoring guests or want to be drawn together for the same hunt days including general public must submit their applications and fees in one envelope. No more than three applications per envelope.
4. Each application package must also include the following:
 - a. One 9"x4" self-addressed stamped envelope with one First Class postage stamp.
 - b. A copy of their Hunter Ed. Training Certificate if you have not previously hunted at LEAD.
 - c. A copy of each applicant's driver's license or state ID card.
 - d. Active duty military must provide a copy of their orders. Retired military must provide a copy of their retired military identification card
 - e. A fully completed Criminal Records Check and Disclosure Form. (This only applies to anyone over the age of 17.)
5. Personal checks or cash will not be accepted. **Each applicant must submit a completed and signed single** money order, cashier's check, or certified check payable to the "Letterkenny Rod and Gun Club" for the total amount:

Applying for Zone I antlered and antlerless deer, total amount = \$35.00

Applying only for Antlered deer in Zone I or hunting in Zone II = \$30.00

6. Applicants must select either Zone I or Zone II to hunt antlered deer. Applicants wanting to hunt antlered deer in Zone II may also apply for an antlerless deer tag in Zone I.
7. A fully completed application qualifies the person to be included in a random drawing to hunt at LEAD. Not all applicants will be drawn to hunt. Drawing results, hunting permits, and directional maps will be returned by mail. Assigned hunting dates are final and can be found on an individual's hunting permit. No changes will be permitted.
8. Mail Applications to:

Letterkenny Army Depot
Natural Resources Office
Building 14 (AMLD-EN)
1 Overcash Avenue
Chambersburg, PA 17201-4150

Letterkenny Army Depot Hunting Permit Application

Eligibility: Please check one of the following:

- Active Duty Military
- Retired Military with work projects
- LEAD Civilian with work projects
- Retired LEAD civilian with work projects
- Agricultural lessee
- General Public (Non-sponsored)
- General Public (Sponsored by _____)

Indicate Name(s) of Sponsored Guests:

1. _____
2. _____

Season(s) and Zone(s): Select either **Zone I** or **Zone II** for deer hunting. For antlered deer in Zone I select one of the following: archery, firearms or flintlock. All applicants may apply for Zone I antlerless deer season. For antlered deer in Zone II, select either archery or shotgun. A-Permit holders with at least 120 hours of work projects may select all dates.

Zone I Antlered Seasons (Select ONLY ONE below)

- Archery Season
- Firearms Season
- Flintlock Season

Zone I Antlerless Season: _____

Zone II Antlered/Antlerless Archery <OR> Firearms

Zone II archery or firearms applicants may also apply for Zone I antlerless deer season
In Zone II, State Seasons apply for all species. You must have a PA WMU 4B tag to hunt for antlerless deer in Zone II.

Zone II – Not drawn for deer but still request a LEAD small game permit: YES NO

Name: _____ /_____/_____
(First) (MI) (Last) (Date of Birth)

Address: _____ City: _____

State: _____ Zip: _____ e-mail: _____

Home Phone: (_____) _____ Work or Cell Phone: (_____) _____

PA Hunting License CID Number (Please include the letter and 9 digit number):

() _____

(Please indicate if it's a Senior Lifetime, Senior Lifetime Combo or Junior Combo license.)

Have you previously hunted on LEAD? YES NO (If No, provide a copy of your Hunter Education Training Program certificate)

I certify that all of the above information and documentation submitted are true and correct.

Signature

Date

APPENDIX B CRIMINAL RECORDS CHECK INFORMATION

B-1. Background Check

a. Participation in the Natural Resources Programs (NRP) at Letterkenny is a privilege and not a right. Given the nature of operations at LEAD and the attendant concerns of national security and force protection, along with the strong desire to ensure the safety of LEAD employees and other sportsmen, only those individuals deemed trustworthy will be allowed to participate in the NRP.

b. Successful applicants will be limited to those whose personal background does not include criminal offenses which would tend to reflect poorly upon the applicant's character and trustworthiness. Upon receipt of your application, LEAD will review your Criminal Records Check Consent and Disclosure Form and then perform a national, state and/or local municipality criminal record check, using your identifying information provided, in order to determine the contents, if any, of your criminal history.

c. Please carefully review the following list of disqualifying criteria prior to submission of your LEAD Hunting Application. **Should you meet any of the criteria for disqualification, please be advised that your application will be denied and that your application fee will not be refunded.**

B-2. Disqualifying Criteria

a. When you are prohibited by law from possessing or transferring a firearm pursuant to applicable state law such as the Uniform Firearms Act , as well as federal law at 18 U.S.C. §§ 922 (g) and (n), specifically as follows:

(1) A person convicted in any court of a crime punishable by imprisonment for a term exceeding one year, whether or not sentence is imposed.

(2) A person under indictment or information for a crime punishable by imprisonment for a term exceeding one year.

(3) Persons who are fugitives of justice; for example, the subject of an active felony or misdemeanor warrant.

(4) An unlawful user and/or an addict of any controlled substance; for example, a person convicted for the use or possession of a controlled substance within the past year, or a person with multiple arrests for the use or possession of a controlled substance within the past five years with the most recent arrest occurring within the past year, or a person found through a drug test to use a controlled substance unlawfully, provided the test was administered within the past year.

(5) A person adjudicated mental defective or involuntarily committed to a mental institution or incompetent to handle own affairs, including dispositions to criminal charges pertaining to found not guilty by reason of insanity or found incompetent to stand trial.

(6) An alien, illegally/unlawfully in the United States or a non-immigrant, who does not qualify for the exceptions under Title 18 U.S.C. Section 922(y).

(7) A person dishonorably discharged from the United States Armed Forces.

(8) A person who has renounced his/her United States citizenship.

(9) The subject of a protective order issued after a hearing in which the respondent had notice that restrains them from harassing, stalking, or threatening an intimate partner or child of such partner. This does not include ex parte orders.

(10) A person convicted in any court of a misdemeanor crime which includes the use or attempted use of physical force or threatened use of a deadly weapon and the defendant was the spouse, former spouse, parent, guardian of the victim, by a person with whom the victim shares a child in common, by a person who is cohabiting with or has cohabited in the past with the victim as a spouse, parent, guardian or similarly situated to a spouse, parent or guardian of the victim.

b. A conviction, at ANY time, or any pending charge, information or indictment for any criminal offense (including attempt and conspiracy) such as:

(1) Any criminal offense in which a firearm was possessed, used, or displayed.

(2) Any drug-related FELONY.

(3) Any violent offense not specifically listed in paras. (c)-(h) (including summary offense of harassment if within two years of submission of application).

(4) Any offense involving theft or forgery/fraudulent practices or bribery or falsification and intimidation-related offenses as described in Chapters 39, 41, 47, and 49 of the Pennsylvania Crimes Code (unless at the summary level) and not specifically listed in paras. (c)-(h).

c. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and includes attempt and conspiracy), occurring AT ANY TIME during the applicant's lifetime such as:

(1) § 907 Possessing instruments of crime

(2) § 911 Corrupt organizations

(3) § 912 Possession of weapon on school property

(4) § 2502 Murder

- (5) § 2503 Voluntary manslaughter
- (6) § 2504 Involuntary Manslaughter (if reckless use of a firearm)
- (7) § 2702 Aggravated assault
- (8) § 2703 Assault by prisoner
- (9) § 2704 Assault by life prisoner
- (10) § 2715 Bomb threats
- (11) § 2716 Weapons of mass destruction
- (12) § 2901 Kidnapping
- (13) § 2910 Luring a child into a motor vehicle
- (14) § 3121 Rape
- (15) § 3123 Involuntary deviate intercourse
- (16) § 3124.1, 3124.2, Sexual Assault
- (17) § 3125 Aggravated indecent assault
- (18) § 3127 Indecent exposure (if convicted for a misdemeanor of the first degree)
- (19) § 3301 Arson and related offenses
- (20) § 3302 Causing or risking catastrophe
- (21) § 3502 Burglary
- (22) § 3503 Criminal trespass (if a felony of the second degree or higher)
- (23) § 3701 Robbery
- (24) § 3702 Robbery of motor vehicle
- (25) § 4302 Bigamy
- (26) § 4303 Incest
- (27) § 4304 Endangering welfare of children
- (28) § 4912 Impersonating a public servant (if impersonating a law enforcement officer)
- (29) § 4952 Intimidation of witnesses or victims
- (30) § 4953 Retaliation against witness or victim
- (31) § 5101 Obstructing administration of law or other governmental function
- (32) § 5104 Resisting arrest or other law enforcement
- (33) § 5121 Escape
- (34) § 5122 Weapons or implements for escape
- (35) § 5501 Riot (if the offense relates to a firearm or other deadly weapon)
- (36) § 5515 Prohibiting of paramilitary training
- (37) § 5516 Facsimile weapons of mass destruction
- (38) § 6302 Sale or lease of weapons and explosives

d. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and including attempt and conspiracy), if record discloses multiple offenses such as:

- (1) § 2709.1 Stalking
- (2) § 3921 Theft by unlawful taking or disposition
- (3) § 3923 Theft by extortion, when the offense is accompanied by threats of violence

- (4) § 5504 Harassment and stalking by communication or address
- (5) § 6301 Corruption of minors

e. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and including attempt and conspiracy), committed within 3 years preceding submission of hunting application such as: § 2710 Ethnic intimidation.

f. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and including attempt and conspiracy), committed within 5 years preceding submission of hunting application such as:

- (1) § 908 Prohibited offensive weapons
- (2) § 2903 False imprisonment
- (3) § 2701 Simple assault
- (4) § 2705 Recklessly endangering another person
- (5) § 3129 Sexual intercourse with an animal

g. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and including attempt and conspiracy), committed within 7 years preceding submission of hunting application such as:

- (1) § 2709.1 Stalking
- (2) § 2706 Terroristic threats
- (3) § 2902 Unlawful restraint
- (4) § 5504 Harassment and stalking by communication or address
- (5) § 6110.1 Possession of firearm by minor
- (6) § 6301 Corruption of minors

h. A conviction, or any pending charge, information or indictment for the following Pennsylvania offenses listed in the Pennsylvania Crimes Code, Title 18 of the Pennsylvania Consolidated Statutes (or its equivalent in another state or federal jurisdiction and including attempt and conspiracy), committed within 10 years preceding submission of hunting application such as:

- (1) § 2707.1 Discharge of a firearm into an occupied structure
- (2) § 3921 Theft by unlawful taking or disposition (if multiple offenses, see para. d)
- (3) § 3923 Theft by extortion, when the offense is accompanied by threats of violence

(4) § 3925 Receiving stolen property, upon conviction of the second felony offense

i. If you received two or more convictions for violating 75 Pa.C.S.A. §3802 (Driving after imbibing alcohol or utilizing drugs) or 75 Pa.C.S.A. §1543(b) (Driving while operating license is suspended or revoked-DUI related), or substantially similar offense within another state's jurisdiction, within the ten years immediately preceding the date on which the application is submitted.

j. If you have been adjudicated delinquent as a juvenile for any felony OR misdemeanor violent criminal offense, sexual criminal offense or theft related criminal offense, and the applicant is less than 30 years of age at the time of application or 15 years has not lapsed since the date supervision ended for the last adjudication.

k. If you are subject of a temporary or civil protection order within the past 10 years.

l. If you are currently subject to court-ordered probation or parole, including pretrial diversionary programs such as Accelerated Rehabilitative Disposition, for any offense.

m. If you were discharged from the military with any Characterization other than 'Honorable'

n. If you have NOT complied with any subpoena or warrant relating to child support or paternity proceedings.

o. If you currently owe a child support arrearage which equals or exceeds the cumulative amount which would be owed after one year of nonpayment.

p. If you have been committed to a state or federal facility for abuse of a controlled substance OR convicted of a misdemeanor relating to a controlled substance within the five-year period immediately preceding the date the application was submitted.

q. If you have been adjudicated mentally incompetent at any time.

r. If you have been committed to a mental institution at any time.

s. If you have been found to be mentally ill and subjected to hospitalization by a court order at any time.

t. If you were involuntarily hospitalized other than for purposes of observation.

B-3. Persons Subject to a Background Check

a. All persons, including military retirees and all guests and dependents of those classes identified below, will be subject to a criminal record check, except for the following:

(1) Active Duty or Reserve Component (United States Army Reserve and Army/Air National Guard of any state or territory) Service-members, Federal Employees, or Federal Government contractors who possess a valid and current security clearance that is accurately reflected in the Joint Personnel Adjudication System (JPAS). **Proof of a valid and current security clearance will be verified by LEAD, utilizing the information you have provided on the Criminal Records Check Consent and Disclosure Form. If LEAD cannot verify your clearance in JPAS, applicants will be subject to a criminal records check.**

(2) Individuals that are deemed trustworthy who possess a valid and current security clearance that is accurately reflected in the Joint Personnel Adjudication System (JPAS) and had their criminal record check waived and given authorization the preceding year by the Commander so long as their record does not reflect anything new that meets the disqualification criteria. **Proof of a valid and current security clearance will be verified by LEAD, utilizing the information you have provided on the Criminal Records Check Consent and Disclosure Form. If LEAD cannot verify your clearance in JPAS, applicants will be subject to a criminal records check.**

(3) Persons applying to hunt under the age of 18 by the cutoff date for the application are not required to have a background check but must be escorted at all times.

B-4. Challenge of Record

a. The Commander, Letterkenny Army Depot, is the sole authority in determining who, in accordance with the disqualifying criteria outlined above, may be admitted onto the installation. The Commander's decision to grant or deny entry, based solely upon the disqualifying criteria discussed above, will be made after review of the applicant's criminal records check. While no formal appeal regarding a denial will be entertained, a request to dispute the existence and/or nature/gravity of the offense may be submitted to the Commander, Letterkenny Army Depot, in writing. Requests for reconsideration must contain results of a Pennsylvania State Police Criminal Background Check (resulting from applicant's submission of Pennsylvania State Police Form SP 4-164 described in the Commander's notice of denial), along with all other court documents, applicable information and data upon which reconsideration is based. *If you fail to do so, Letterkenny Army Depot will rely upon the information contained in the criminal records check and presume that the arrest resulted in a conviction.*

b. Those persons that may otherwise contest the content of their criminal records check must appropriately challenge the record by the specific procedures outlined and required by the law of the jurisdiction from which the information originated. As the data contained in the criminal records check originates from entries made to the Federal Bureau of Investigation or the state central repository in the state in which the arrest was made, any formal challenge to a criminal record must be made in accordance with the procedures, guidelines and legal

requirements which govern the jurisdiction of the originating municipal, state or federal law enforcement agency which entered the original data. Unless and until the information is officially corrected, Letterkenny Army Depot must presume that the information contained within the criminal record is accurate.

APPENDIX C

CRIMINAL RECORDS CHECK CONSENT AND DISCLOSURE FORM

In order to serve the best interest of the security of the United States and national security interests at LEAD, a criminal records check will be performed on all personnel, unless not required. By your signature, you authorize Letterkenny Army Depot to obtain this information about you. Falsification of information on this form will permanently disqualify you from participating in natural resources program activities at LEAD. **Please provide a copy of your driver’s license or state ID card with this form.**

PLEASE PRINT THE FOLLOWING INFORMATION IN INK.

Full Name

Last First Middle

Other Names Used

(List all other names used - aliases, maiden name, other previous names)

Date of Birth (YYYY/MM/DD) Age SSN

Current Address City State Zip

Length of Residence in Pennsylvania Phone

Other Counties/States lived in during the past 2 years

Sex Race Driver’s License # / State

Do you hold a valid and current clearance issued by a DOD Clearance Adjudication Facility (CAF)? Yes _____ No _____ **m**
If yes, please indicate or circle the category you hold the clearance for:
Service-member (Active or Reserve Component) o Federal Employee m
Federal Government Contractor m

(To Be Completed by Directorate of Risk Management-DO NOT Write Below This LINE)

Check Date _____
Clearance: Yes **m** No **m**
Arrest Record: Yes **m** No **m**

Approved **m**
Disapproved **m**
Initials: _____

Answer Yes or No to each item listed below. If the answer to any item is Yes, explain in the area provided, indicating the charge or finding, the date and the court(s) involved, along with the outcome and any documentation as necessary or required.

1. Have you ever been investigated or arrested and charged with any felony crime in any state or country?
Answer _____ If yes, explain the charge, location, date and outcome. *If you were not convicted, you MUST provide documentation of a plea to a lesser or alternate offense, a nolle prosequi or equivalent dismissal order issued from a court of competent jurisdiction. If you fail to do so, and your criminal history indicates a different outcome, Letterkenny Army Depot will rely upon the criminal records check.*

2. Have you ever been investigated or arrested and charged with any misdemeanor offense specifically listed in the above Notice of Disqualifying Criteria?
Answer _____ If yes, explain the charge, location, date and outcome. *If you were not convicted, you MUST provide documentation of a plea to a lesser or alternate offense, a nolle prosequi or equivalent dismissal order issued from a court of competent jurisdiction. If you fail to do so, and your criminal history indicates a different outcome, Letterkenny Army Depot will rely upon the criminal records check.*

3. Please carefully review the Notice of Disqualifying Criteria and indicate whether any of the remaining criteria, other than arrests for felony offenses or specified misdemeanor offenses, may apply to you.
Answer _____ If yes, explain. *If your criminal background check indicates a different outcome than you have provided, you MUST provide appropriate documentation of an alternate disposition. If you fail to do so, Letterkenny Army Depot will rely upon the information disclosed in the criminal records check.*

I hereby consent to a criminal records check, and provide the information set forth. By signing this document, I hereby provide LEAD permission to enter my personal data into a Federal data base, as well as any state or local municipality criminal record databases. This information entered in to the database(s) may include, but is not limited to, physical descriptors and identifying information including my name, date of birth, place of birth, Social Security number, sex, race and driver’s license number. I agree that LEAD may use any information derived from any criminal records check, which may include arrest and conviction data, in evaluating my fitness and eligibility to participate in Natural Resources Program activities on its premises. I have made no willful misrepresentations, omissions, or falsifications of any of the preceding answers. I understand that a criminal history records check may be repeated at any time during the period for which I am authorized to participate in Natural Resources Programs at LEAD. I am aware that should investigation disclose such misrepresentations, falsifications, or omissions in the information I have submitted in the application process, my application will be rejected and my application fee will be non-refundable. If, after extension of access privileges to participate in Natural Resources Programs activities, subsequent investigation should disclose misrepresentation, falsification, or omission, it will be just cause for immediate and permanent disqualification. I declare that I have read Appendix I and further declare that I am fully qualified to participate in Natural Resources Programs activities at LEAD including hunting and am not prohibited by any disqualification. This document

constitutes a governmental record and knowingly making a false entry in, or false alteration of, a governmental record is a violation of Title 18, Section 4904 of the Pennsylvania Crimes Code. I declare under penalty of perjury that the foregoing is true and correct. (See also, Title 28, United States Code, Section 1746.)

I, the undersigned, do for myself, my heirs, executors and administrators, hereby remise, release and forever discharge and agree to indemnify and hold LEAD and all of its employees harmless from and against any and all causes of action, suits, liabilities, costs, debts, and sums of money, claims and demands whatsoever, and any and all related attorney's fee, court costs and other expenses resulting from the investigation of my background in connection with my participation in Natural Resources Programs activities, hunting application and/or disclosure form.

Signature

Date

The Privacy Act of 1974 (5 U.S.C. § 552a) requires that local, state or federal agencies inform individuals whose Social Security number is being requested whether such disclosure is mandatory or voluntary, the basis of authority for such solicitation, and the uses which will be made of it. Accordingly, disclosure of your Social Security number is voluntary; it is being requested pursuant to 28 U.S.C. § 534 for the purposes described above. The Social Security number will be used as an identification tool; consequently, failure to provide the number may result in a reduced ability to make such identifications or provide future identity verifications. Information collected on this form may be released to law enforcement agencies engaged in the investigation or prosecution of a criminal act or the enforcement or implementation of a statute, rule, regulation or order; to any component of the Department of Justice for the purpose of representing the DoD.

The data submitted is for OFFICIAL USE ONLY and will be maintained and used in strict confidence in accordance with Federal law and regulations. Making a knowing and willful false statement on this form may be punishable by fine or imprisonment or both. All information provided by you, which possibly may reflect adversely on your past conduct and performance, may have an adverse impact on you in your military or civilian federal career in situations such as consideration for special assignment, security clearances, court martial, continued future employment, and administrative proceedings, etc.

APPENDIX D HUNTING VIOLATIONS AND PROCESSING PROCEDURES

D-1. General

a. Individuals who have committed a hunting, fishing, or trapping violation on LEAD may not sponsor guests or complete VWP which directly relate to the hunting, fishing, or trapping programs while their hunting, fishing, or trapping privileges are revoked.

b. An individual's LEAD hunting privileges may be revoked due to a conviction of a State or Depot hunting regulation or other violations including administrative actions. The period of time will be based on the severity of the offense and the guidelines contained in Appendix E. Appropriate violations shall also be forwarded to the U.S. Magistrate or military authorities. Because hunting on LEAD is a privilege, the Depot Commander may revoke it for a period of time deemed appropriate to fit the violation.

c. DRSK personnel will investigate violations of security procedures.

d. Hunting rules and regulations will be enforced in accordance with LEAD's INRMP.

e. Individuals who are caught committing violations of federal, state, and/or Letterkenny hunting regulations may have their same-day hunting privileges revoked.

f. All comments on alleged violations of federal, state, and/or Letterkenny hunting regulations must be made in writing on the form provided and signed by the individual providing the alleged violations. The individual shall personally hand the completed form to the hunting program coordinator prior to departing the Recreation Area or Post 2. No other comments, violations or allegations will be addressed if the above procedure is not followed. The hunting program coordinator, in conjunction with the Natural Resources Manager and the Director of Public Works, will make a recommendation to the Depot Commander on actions to be taken in regard to each comment or allegation received.

D-2. Violation Processing Procedures

a. All violations shall be properly recorded on DA Form 3975 by an on duty Fish and Wildlife Conservation officer. This report must contain all details of the incident to include any witnesses and their statements.

b. A copy of the completed DA Form 3975 shall be forwarded to the DPW within ten workdays of when the alleged violation occurred.

c. Following conviction for violating a State hunting regulation, or after being cited for a violation of LEAD hunting regulation, the DPW shall prepare a letter to the subject using Appendix E as a guideline for administrative penalties.

d. In the event that the subject desires to appeal the decision, a request for reconsideration may be submitted in writing, within 5 workdays from the receipt of the Letter of Decision, to the Commander, Letterkenny Army Depot, for review and final decision. This request must contain all applicable information and data on which the appeal is based.

e. Administrative penalties may be applied in addition to any fines or penalties associated with the U.S. Magistrate's decision.

f. Copies of the final action shall be provided to the Natural Resources Manager and the DRSK. Appropriate action shall be taken to remove the subject's name from the hunting roster for the period of time as required by the penalty being imposed.

g. The DRSK in accordance with appropriate established procedures shall handle trespassing and security incidents. This includes fines or penalties associated with the U.S. Magistrate's decision that may be applied in addition to the administrative penalties.

APPENDIX E
TABLE OF STANDARD PENALTIES - LEAD HUNTING VIOLATIONS

E-1. General

This table should be used as a guide. Violations of other game rules and regulations not specifically covered in the following categories may be assessed with more or less severe penalties if the circumstances warrant. Other categories of violations may also be applicable to penalties in accordance with the Pennsylvania Game and Wildlife Code, Pennsylvania Statutes Title 34 and Pennsylvania Game Commission Regulations, PA Code Title 58.

E-2. Category I - Permanent Loss of LEAD Hunting Privileges

Types of violations:

- a. Attempting to, assisting in, or intentionally harvesting illegal game (does not include accidental killing of game if properly reported by the responsible individual).
- b. Falsification of information in order to obtain hunting privileges.
- c. Falsification of information to protect persons who have committed any violation(s).
- d. Deliberate and wanton conduct which endangers or is likely to endanger life or property and not specified in other categories of violations.
- e. Being discovered in or attempting to enter the hunting areas under the influence of alcohol or illegal drugs.
- f. Hunting without proper LEAD permits or Pennsylvania Licenses.

E-3. Category II - Loss of LEAD Hunting Privileges For Three Full Years

Types of violations:

- a. Discharging a weapon in an unsafe manner prohibited by LEAD hunting regulations.
- b. Hunting from a motor vehicle without holding a valid handicapped hunting permit issued by the Pennsylvania Game Commission.
- c. Failure to wear the proper fluorescent orange requirements during prescribed seasons.
- d. Blatant disregard for instructions while assisting with the Wildlife Management Program for the purpose of earning VWP (other categories of violations may also be applicable) and includes failure to follow instructions of LEAD Hunting escorts.

e. Volunteers permitting bus or truck passengers to alight from a vehicle and shoot at any wild animal.

f. Failure to report known violations of rules to proper LEAD officials.

g. Smoking or having flame-producing devices while in the ASA.

E-4. Category III - Loss of LEAD Hunting Privileges For One Full Year

Types of violations:

a. Broadheads not being properly hooded or shrouded.

b. Littering in the hunting area.

c. Using unauthorized firearms or possession of an unregistered firearm.

d. Failure to possess or properly display hunting licenses and permits.

e. Remaining in the hunting area beyond the posted closing time without justifiable cause. (Tracking of wounded game is not considered justifiable cause).

f. Construction and/or use of unauthorized tree stands and climbing devices.

g. Improper tagging of deer and turkey.

h. Violations of other game rules and regulations not specifically covered in this or other categories of violations including State game laws. (Other categories of violations may also be applicable).

i. Hunting, pursuing, or disturbing any wildlife in a safety zone or restricted area.

j. Hunting out of assigned area.

NOTE: This table should be used as a guide. More or less severe penalties may be assessed if the circumstances warrant.

APPENDIX F
TYPES OF VOLUNTEER WORK PROJECTS (VWP)

F-1. Approval

a. VWPs are projects that directly benefit fish and wildlife and their habitat or the Program as determined by the Natural Resources Manager.

b. All VWPs MUST be approved and coordinated through the Natural Resources Office prior to the actual performance of the Project. Written approval must be obtained. Projects that are not approved and/or not coordinated through the Natural Resources Office may not be given credit towards hours performed for hunting and fishing privileges. Number of personnel performing each project must also be prior-approved.

c. Projects for an upcoming year must be completed in between July 1 and June 30 of the preceding year.

F-2. List of Approved Projects

a. Support of Major and Minor hunting and fishing days.

b. Natural resources surveys as performed and coordinated through the Natural Resources Office.

c. Wildlife Habitat Improvement Projects to include food plots, tree planting, invasive species removal, browse cutting, releasing of fruit and nut-bearing trees, or other authorized projects.

d. Processing of applications for Hunting, Fishing and Trapping.

e. Rearing and propagation of game birds.

f. Construction, placement and maintenance of nesting boxes and platforms for wildlife.

g. General maintenance and care of the barn and surrounding grounds including mowing, tree trimming, and maintaining of the pheasant pens, and other associated activities.

h. Fish Habitat Improvement projects to include woody debris placement, log structure construction, tree planting, mowing of parking areas and other approved projects. Mowing shall be limited to only the parking areas and other areas approved by the Natural Resources Office.

i. Placement and maintenance of all signs with respect to restricted access areas, archery hunting only areas, and other signs related to the Program.

j. Projects related to the Kids Fishing Rodeo including set up and tear down of the dams, stocking of the trout, and operations on the event day.

k. Support for the archery target shoots including set up and tear down of the targets, maintenance activities, and operations of the scheduled day.

l. Other Projects as approved by the Natural Resources Office.

APPENDIX G
TRAPPING ON LETTERKENNY ARMY DEPOT

G-1. General

- a. The overall management of fish and wildlife at LEAD including trapping is under the direction and supervision of the Natural Resources Office within the Directorate of Public Works.
- b. The purpose of this Appendix is to outline the trapping program on LEAD.

G-2. Authorized Trappers

- a. Active duty military personnel.
- b. Retired military personnel
- c. Current and retired LEAD employees.
- d. Agricultural Lessees. An agricultural lessee is defined as the primary or first signatory on the agricultural lease agreement. No more than one agricultural lessee will be granted an A-permit per lease.
- e. General public escorted by individuals listed above (a - d).

G-3. Guidelines and Controls

- a. All trappers must complete the Criminal Records Check Consent and Disclosure Form, have a current Pennsylvania Furtaker License, and pay a nonrefundable LEAD fee of \$10.00. All trappers must successfully complete the PA Hunter/Trapper Safety Course prior to being authorized to trap fur-bearing animals.
- b. If necessary, interested persons eligible to trap on the depot may be assigned trapping areas by drawing. This shall be determined by the Natural Resources Manager.
- c. The policy instructions for Trapping (Appendix G) will be posted at Post 2 and the Main gate.
- d. Trappers are encouraged to follow all rabies precautions.
- d. Each trapper must sign a Release in Full and Indemnity Agreement.
- e. Access to Zone I will be through Post 2. When trappers arrive, if Post 2 is not manned with a Security Officer, an officer will open the gate every 2 hours on the half-hour for ten (10) minutes. The same procedure applies to exiting the area. Personnel who are entering Zone I will be issued a Visitor No Escort badge, regardless of whether they have an "A" on their LEAD

Security picture identification badge. Personnel will be required to show a form of picture identification prior to being issued a Visitor No Escort badge.

f. No trapping is permitted during major deer hunt days in Zone I. All traps must be sprung the day before a major deer hunt day in Zone I.

g. Trappers are prohibited from hunting or participating in any hunting activity when they are in their respective area for the purpose of trapping.

h. Trappers must wear a fluorescent orange hat/cap while in the area for trapping.

i. Zone II trappers will report to the Main Gate and check out a key to Boundary Gate 7, 10, or 11 to gain access to the area. The Boundary Gate key must be returned to the Main Gate immediately upon leaving the area.

j. There is no access authorized for preseason scouting of trapping areas.

k. All traps that are not sprung will be checked daily. Only authorized trappers will be allowed entry into the area to check traps. Trap lines may be worked as follows:

(1) In Zone I, trappers may work their trap lines from 0430 to 0630 and from 1630 to 1930 Monday through Friday and from 0430 hours to sunset on holidays and weekends. No firearms are authorized during the week Monday through Friday. No hand guns are allowed in Zone I. Only .22 caliber or smaller rimfire rifles are authorized in Zone I on weekends and holidays. POVs are authorized in Zone I during the trapping hours defined above.

(2) In Zone II, trappers may work their trap lines from 0430 hours to sunset. No hand guns are allowed in Zone II. Only .22 caliber or smaller rimfire rifles are authorized.

l. All traps will be appropriately tagged in accordance with Pennsylvania Game Laws. Also, all other Pennsylvania Game Laws apply to trapping on the depot.

m. Trappers are subject to all depot security and fire regulations. This includes not having any flame producing devices in Zone I. No cameras or cell phones with cameras are authorized in Zone I. POVs must have a fire extinguisher rated at least 10 BC in Zone 1.

n. Trappers will report their catches to the Natural Resources Assistant, extension 7-8674, by 1200 hours on Friday of each week or fill out a hunting register at the main gate. Failure to do so will constitute a trapping violation.

o. Failure to comply with depot trapping, security, or safety regulations and State trapping laws will result in loss of LEAD trapping and hunting privileges in accordance with the Table of Standard Penalties (Appendix E). Appropriate fines will also be assessed as determined by a U.S. Federal Magistrate.

p. Trapping may be cancelled at any time if required by depot operations or other circumstances.

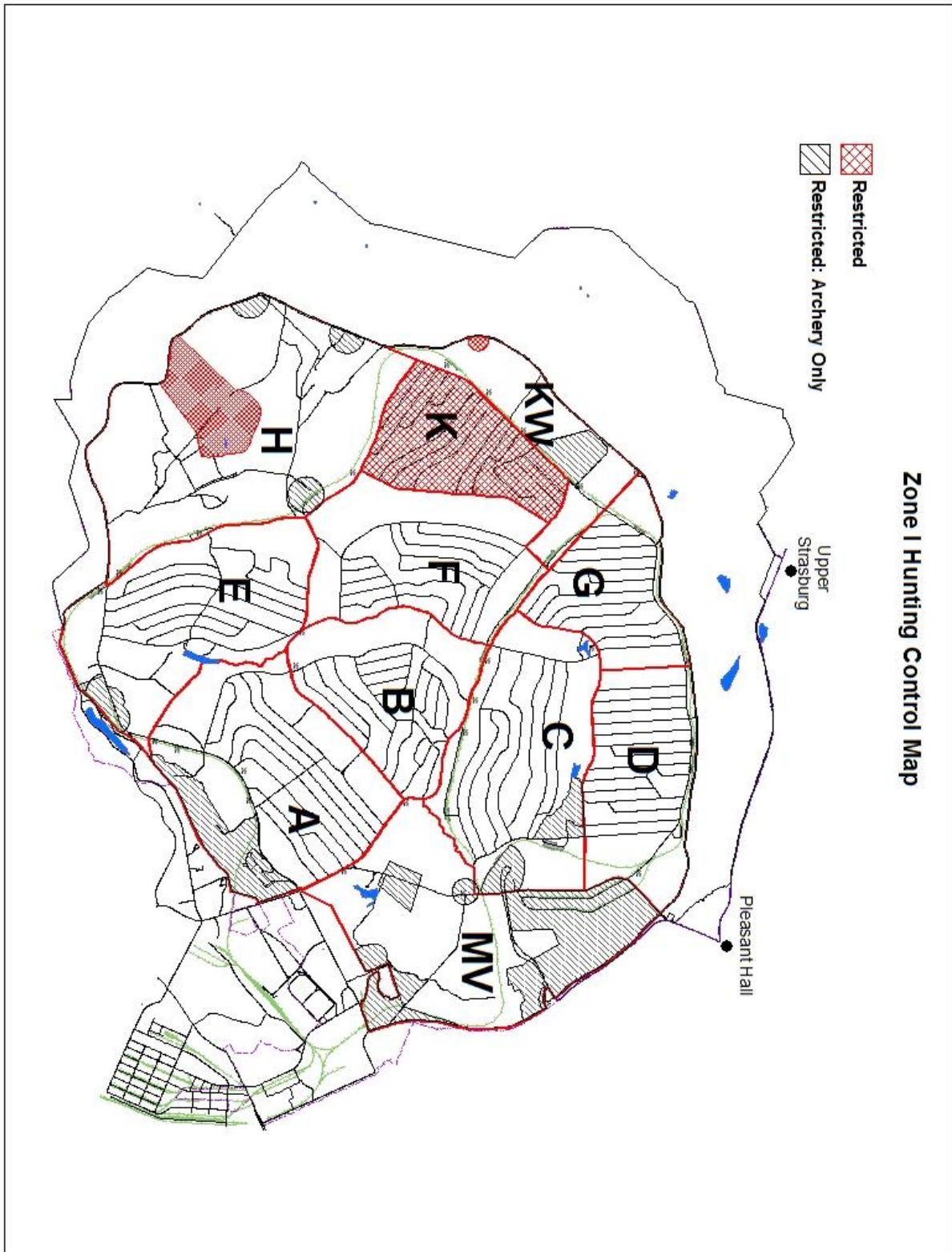
q. Precautions to be taken when trapping are as follows:

(1) Must wear rubber gloves.

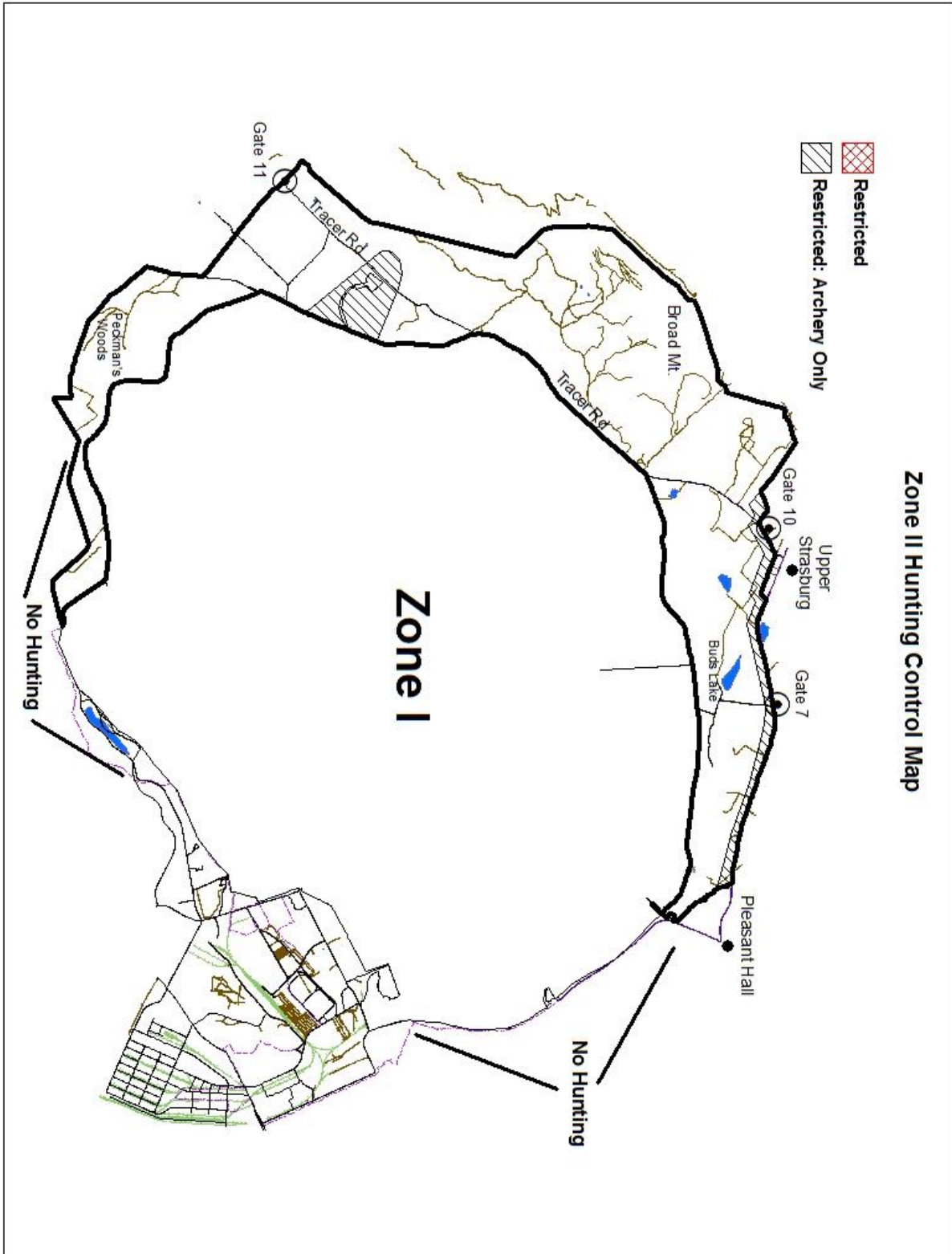
(2) Properly dispose of all carcasses after skinning animals.

r. Seasons are set in accordance with the Pennsylvania state seasons and bag limits unless otherwise restricted by the Natural Resources Manager.

APPENDIX H ZONE I HUNTING MAP



APPENDIX I ZONE II HUNTING MAP



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Department of the Army
Letterkenny Army Depot
Chambersburg, PA 17201-4150

LEAD-P 420-5

09 July 2009

Environmental Management Division

Depot Fishing Program

Applicability. This pamphlet applies to Department of the Army civilian and military personnel of Letterkenny Army Depot and collocated activities and other personnel as defined within certain provisions of this pamphlet. It applies to all fishable waters at Letterkenny.

Suggested Improvements. The proponent agency of this publication is Letterkenny Army Depot, Directorate of Public Works (DPW). Users are invited to send comments and suggested improvements to the Natural Resources Manager or the Natural Resources Assistant, ATTN: AMSAM-LE-EE-N, building 14, Chambersburg, PA 17201-4150.

Distribution. LEAD Portal, AMSAM-LE-EE-N(100),AMSAM-LE-SS(50),

OFFICIAL:

STEVEN A. SHAPIRO
Colonel, OD
Commanding



JEFFREY SUMMERS
Printing Specialist
Directorate of Information
Management

*This pamphlet supersedes LEAD-P 420-5, 04 Apr 03 , including changes.

1. Purpose. The purpose of this pamphlet is to establish the Fishing Program at Letterkenny Army Depot (LEAD).
2. References.
 - a. AR 200-1, Environmental Protection and Enhancement
 - b. AR 215-1, Military Morale, Welfare, and Recreation Programs and Nonappropriated Fund Instrumentalities
 - c. TM 5-633, Natural Resources Fish and Wildlife Management
3. Explanation of Terms (See Glossary – Appendix E).
4. General. The authority and procedures to fish on military installations is contained in, and must conform to, the overall management of the Natural Resources Program, including fishing, will be under the direction and supervision of the DPW. Rules and regulations concerning the Fishing Program will be established and coordinated by the DPW. The Natural Resources Manager approves the final regulations to assure compliance with the depot's Natural Resources Management Program and Federal and State regulations.
5. Eligible Anglers:
 - a. Active duty military personnel and their family members.
 - b. Retired military personnel residing in the local area who have completed the required ten (10) hours or five (5) Conservation Fish and Wildlife Work Projects (CFWWP) and their family members.
 - c. Current LEAD civilian employees and retired LEAD civilians who have completed the required ten (10) or five (5) CFWWP and their family members.
 - d. All eligible anglers listed in paragraphs (b) and (c) and those whom are only acting as sponsors must complete the required ten (10) or five (5) CFWWP to be eligible to fish and to sponsor two guests in addition to their family members.
 - e. The Natural Resources Manager may waive the CFWWP requirement for individuals where the disability is such that the individual cannot perform available work to earn credits.

f. Exceptions. The Depot Commander may authorize individuals not listed under paragraph 5 to fish. Requests for exceptions to policy must be submitted in writing to the Natural Resources Office to be submitted for Command approval. Consideration of all such requests must be consistent with safety and security.

6. Licenses, Permits, and Fees:

a. Types of licenses and permits.

(1) Individuals, 16 years of age and older, who fish on LEAD must possess the following:

(a) A valid Pennsylvania Fishing License.

(b) A LEAD Fishing Permit.

(c) A Pennsylvania Trout Stamp if fishing in trout stocked waters. Sponsors that must accompany their guests or desire to be with their spouse or parent, but do not intend to fish, must have a free LEAD Non-Fishing Permit. These individuals do not require a Pennsylvania Fishing License, but are required to have completed ten (10) hours or five (5) CFWWP's to sponsor family or guests.

(d) Children under the age of 16 do not need a Pennsylvania Fishing License or a LEAD Fishing Permit. They are considered as family members and are not subject to the access limit of two individuals.

(2) Coding of LEAD Permit: The coding of the LEAD Fishing Permit indicates the areas where the angler is authorized to fish and is defined as follows:

A - Valid for all personnel who have completed the required five CFWWP and active duty personnel. These personnel have access to all areas of the depot open to fishing.

B - Valid for all guests to include family members.

N - Indicates a free Non-Fishing Permit and should also reflect the letter A.

b. Where to obtain licenses and permits.

(1) Pennsylvania Fishing License may be obtained from any authorized issuing agents that include many local sporting goods stores and the Franklin County Treasurer's Office.

(2) LEAD Fishing Permits may be obtained at the Hunting and Fishing Office, building 14. Please call 267-8674 or 267-8832 to schedule an appointment to apply for a permit.

(3) All individuals who are issued a LEAD Fishing Permit must sign a Waiver of Liability.

c. Fee for LEAD Fishing Permits.

(1) The LEAD Fishing Permit fee is \$7.00 and must be paid by all anglers' 16 years of age or older. These permits are valid for all depot waters open to fishing that the angler is eligible to fish. ONLY Cash will be accepted. Personal checks will not be accepted under any circumstances.

(2) These seasonal fees shall be collected at the Hunting and Fishing Office, building 14. These fees are utilized to help offset the cost of fish and wildlife management programs at LEAD as directed by Public Laws 86-797 and 90-465, and AR 200-1. These fees shall be used only at LEAD and specifically for the protection, conservation, and management of fish and wildlife, including habitat improvements. All expenditures are approved by the Natural Resources Manager.

7. Processing In and Out

a. Bud's Lake and Keasey's Run.

(1) Access to Bud's Lake and Keasey's Run will be through boundary gate 7b along State Route 533 between Pleasant Hall and Upper Strasburg. Reference listed in Appendix F for locations of fishing areas and travel routes.

(2) Fishing will be conducted during daylight hours only and must be processed out of the area one half-hour after sunset. Fishing will begin at 0800 on the opening day of trout season. Trout fishing is prohibited on stocking days.

(3) When volunteers are available, boundary gate 7b will be manned on Saturdays and Sundays for the first four weeks of trout season. The procedures are as follows:

(a) Volunteers will obtain a boundary gate key, LEAD Fisherman Roster and LEAD Fishing Registers at the Main Gate building 380.

(b) Upon arriving at the gate, each angler will present their Pennsylvania Fishing License and LEAD Fishing Permit to the volunteer on duty.

(c) The volunteer will determine the angler's eligibility to enter the area, give each angler a copy of the LEAD Fishing Register, and enter appropriate information on the LEAD Fisherman Roster.

(d) Anglers will report to boundary gate 7b to process-out by 2000 hours and give the completed LEAD Fishing Register to the volunteer on duty.

(e) Volunteers will complete the LEAD Fisherman Roster, assure that all anglers have departed, secure boundary gate, and return boundary gate key to the Main Gate building 380. The LEAD Fisherman Roster and LEAD Fishing Registers should be placed in the box provided and will be picked up weekly by the Natural Resources Manager or Natural Resource Technician, building 14.

b. When boundary gate 7b is not manned by volunteers, the following procedures will apply:

(1) Anglers will report to the Main Gate building 380, and will be required to show their Category A LEAD Fishing Permit, and another form of picture identification.

(2) The Security Officer will determine the angler's eligibility to enter the area prior to issuing a key to the boundary gate.

(3) Each angler signing for a boundary gate key shall be responsible for ingress and egress for themselves and their party and must ensure no unauthorized entry or exit occurs while they are entering or exiting the area.

(4) When the angler departs the area, they will ensure that the boundary gate is secured and immediately return the boundary gate key and completed LEAD Fishing Register to the Main Gate building 380.

c. Shirley's Lake, Cole's Lake, Henry's Pond, and Lake Letterkenny.

(1) Access to Shirley's Lake, Cole's Lake, Henry's Pond, and Lake Letterkenny, will be through post 2, building 3318, which is the entrance to the Ammunition Storage Area (ASA).

(2) Anglers entering the ASA will be required to be in possession of a LEAD Visitor Badge and a Category A LEAD Fishing Permit.

(3) The hours for fishing are Monday through Friday, 1530 to one-half hour after sunset. On Saturdays, Sundays, and holidays, the hours of fishing are 0600 to one-half hour after sunset.

(4) Transportation to the fishing areas will be by Privately Owned Vehicles (POVs), bicycle, or walking. Ten (10) hours or Five (5) CFWWP must be completed in order to drive POVs into the ASA for the purpose of fishing. It is mandatory for everyone in the POV to be wearing seat belts. It is also mandatory to follow the posted speed limits. POVs are authorized on Saturdays, Sundays, and holidays only. POVs must be equipped with a 10:BC rated fire extinguisher.

(a) Anglers may walk to the fishing area from post 2, building 3318. POVs will be parked in the parking lot adjacent to the Post 2 Gate, building 3318.

(b) Vehicular routes to fishing locations in Zone I are:

Shirley's Lake is restricted to Pennsylvania Avenue.

Henry's Pond and Cole's Lake is restricted to Pennsylvania to Virginia to Arizona to Wyoming Avenue. Travel is permitted on Wyoming Avenue to lake entrance road.

Lake Letterkenny is restricted to Georgia Avenue to Arizona Avenue.

(c) Anglers found traveling on other than designated routes may lose their fishing privileges. Reference is made to Appendix F for location of fishing area and authorized travel routes.

d. Processing-in and processing-out of the ASA is as follows:

(1) All anglers desiring access will report to post 2, building 3318. A Security Officer will be present at post 2, building 3318, every hour on the half hour for approximately 10 minutes to allow entry into the area. The same procedure applies for checking-out of the area.

(2) The Security Officer will check each angler's LEAD Fishing Permit, and if required, another form of picture identification. The Security Officer will inspect each vehicle upon entry and exit of the AA&E storage area. Cameras and flame producing devices are prohibited. Cell phones are authorized unless they have a camera. The Security Officer will give the fisherman LEAD Fishing Registers before entering the area.

(3) The Security Officer will collect the completed LEAD Fishing Registers. The Fishing Log Worksheet and the LEAD Fishing Registers will be picked up weekly by the Natural Resources Manager or Natural Resource Technician, building 14. The Security Officer will make spot checks of fish being removed from the fishing area(s).

(4) Security Officers will ensure that all anglers have checked-out at the end of each fishing day.

e. Rocky Springs Lake. Access is via the South Patrol Road and is catch and release only.

f. Cole's Lake. Fishing is authorized in this area in accordance with the seasons reflected in the Pennsylvania Fishing Regulations. Cole's Lake is located off Wyoming Ave at the D-5-Igloo Line.

Appendix A

Fishing Rules and Regulations

1. General.

- a. All Pennsylvania Fishing Regulations apply when fishing on the depot.
- b. All guests, dependents, and family members must be accompanied by their sponsor at all times.
- c. Lakes are not open for fishing on trout stocking days April through May.
- d. Fishing is not permitted in these areas during LEAD major deer (shotgun) hunt days in Zone II.
- e. Fishing is not permitted in these areas during LEAD major deer hunt days in Zone I. Areas are open to fishing daily on Saturdays, Sundays, and holidays by POV. Also, the areas located in the ASA are opened during the weekdays, after 1530 hours by bicycle or walking.
- f. Littering is strictly prohibited.
- g. Fish will not be cleaned inside boats, at boat launching areas, or on the breast of the dams.
- h. No smoking in the ASA. Flame producing devices (i.e. matches, lighters, etc.) are prohibited in the ASA and will not be carried into the ASA by anglers.
- i. Your Pennsylvania Fishing License and LEAD Fishing Permit must be displayed on an outer garment at all times while fishing.
- j. Introduction of alcoholic beverages, illegal drugs, or contraband items onto the depot is prohibited. Also, anglers may not have in their possession firearms, ammunition, or explosives of any type. No flame producing devices are permitted in the ASA.
- k. Travel will only be permitted on designated roads.
- l. Upon request, anglers will comply with requests from Security Officers, the Natural Resources Manager, and other authorized depot officials to show proper identification, to state reason for being in zone I, to show catch, and to assure that angler does not have any flame-producing items. Failure to comply with any of above requests may result in the loss of fishing privileges. Also, anglers must depart the fishing area by the designated time.

2. Boats.

a. The use of all boats on the depot shall comply with the following:

b. Coast Guard approved personal flotation devices (PFD's), a type I, II, III, or IV must be on board for each boat occupant. PFD's must be worn in accordance with state laws and regulations.

c. No internal combustion engine may be used to propel a boat; electric motors may be used.

d. Depot owned boats (DOBs) shall not be removed from the lakes in which they are docked without permission of the Natural Resources Manager.

e. Capacity of DOBs shall not exceed the weight reflected on the capacity plate.

f. All DOBs shall be cleaned and properly secured after use.

g. All depot owned PFDs and boat paddles shall be properly secured in the storage box located at each docking area.

h. All depot owned boats are for the sole purpose of an angler who is not in possession of their own privately owned boat.

i. Privately owned boats (POBs) may be used on LEAD and are subject to Pennsylvania Boating Regulations (PFC-250A), to include the requirement for a current Pennsylvania registration number (if applicable).

j. Capacity of POBs shall not be exceeded. All boats must have a legible capacity plate; if yours does not have one, you must obtain a capacity plate from the Pennsylvania Fish and Boat Commission.

Appendix B

Table of Standard Penalties (LEAD Fishing Violations)

1. Category 1- Permanent Loss of LEAD Fishing Privileges.
 - a. Misrepresentation of information in order to obtain fishing privileges.
 - b. Misrepresentation of information to protect persons who have committed violations.
 - c. Possession of alcoholic beverages, illegal drugs, firearms, ammunition, or explosives while in the fishing area.
 - d. Being discovered in or attempting to enter the fishing area while under the influence of alcohol or illegal drugs.
 - e. Refusing to permit Security personnel, the Natural Resources Manager, or authorized depot officials to check catch, licenses, permits, fishing equipment, etc.
 - f. Fishing in a water area without proper LEAD Fishing Permit and/or a Pennsylvania Fishing License.
 - g. Deliberate and wanton conduct that endangers or is likely to endanger lives or property and not specified in other categories of violations.
 - h. Committing a second category II type violation.
2. Category II - Loss of LEAD Fishing Privileges for Three Years.
 - a. Having in possession more than one day's limit of fish, or fish under the legal minimum size, or species of fish for which the season is closed.
 - b. Smoking in the ASA.
 - c. Possession of flame-producing devices while in the ASA.
 - d. Blatant disregard of instructions while assisting with the Fish Management Program for the purpose of earning CFWWP. (Other categories of violations may also be applicable).
 - e. Failure to observe boating safety rules and regulations.

- f. Committing a second category III type violation.
3. Category III - Loss of LEAD Fishing Privileges for One Full Year.
- a. Littering.
 - b. Cleaning fish in an unauthorized area.
 - c. Fishing without being accompanied by required sponsor.
 - d. Using unauthorized fishing devices.
 - e. Failure to observe other fishing rules and regulations not specifically covered in this or other categories of violations including State fishing laws. (Other categories of violations may also be applicable).

Appendix C

Fishing Violations

1. General.

a. Anglers cited for any State or LEAD fishing violation may have their fishing privileges revoked. The period of time will be based on the severity of the offense and the guidelines established in Appendix B. Appropriate violations shall also be forwarded to the U.S. Magistrate or military authorities. Because fishing on LEAD is a privilege, fishing privileges may be revoked by the Depot Commander for a period of time deemed appropriate to fit the violation.

b. Personnel who violate security measures shall be referred to the FBI or appropriate military agency.

c. Anglers and other personnel violating fishing rules, regulations, and instructions at LEAD are subject to the appropriate penalties. Anglers may be ejected from the fishing area depending on the severity of the offense.

d. Anglers who have committed a State or LEAD fishing violation on LEAD, may not sponsor guests (to include family members), or complete CFWWP which directly relates to the hunting, fishing, or trapping programs.

e. Personnel may lose other privileges related to the Natural Resources Program including hunting, trapping, firewood cutting, and providing CFWWP to use these privileges.

2. Procedures for processing violations described in Appendix B paragraph 3.

a. All violations shall be properly recorded on DA Form 3975 by an on-duty Security Officer. This report must contain all details of the incident to include any witnesses and their statements.

b. DA Form 3975, completed by the Security Officer, shall be forwarded to the Natural Resources Manager within 10 workdays of when the alleged violation occurred. The Natural Resources Manager shall recommend an appropriate penalty in accordance with Appendix B. The seriousness of the offense and other related factors must be carefully weighed in arriving at the recommendation to the Director of Public Works.

c. A Letter of Decision shall be issued by the Natural Resources Manager to the subject(s) indicating the penalty and/or actions being imposed. Based on the severity of the offense, the individual may permanently lose his or her fishing privileges. As a minimum, this letter shall be a Notification of Warning if the violation is substantiated.

d. Copies of the final action shall be provided to the Directorate of Risk Management and the Natural Resources Manager. The Natural Resources Program Assistant shall take appropriate action to remove the subject's name from the eligible angler's list for the period of time as required by the penalty being imposed.

e. In the event that the subject desires to appeal the decision, a request for reconsideration may be submitted in writing, within five workdays from the receipt of the Letter of Decision, to the Commander, Letterkenny Army Depot, for review and final decision. This request must contain all applicable information and data on which the appeal is based.

f. These procedures pertain only to off-duty personnel, either in a fishing or CFWWP status. Infractions of rules and regulations committed by employees assisting with the Fishing Program in an official duty status shall be processed in accordance with LEAD-R 690-1 and other pertinent regulations.

g. Administrative penalties may be applied in addition to any fines or penalties associated with the U.S. Magistrate's decision.

Appendix D

ICE FISHING

1. Ice fishing is permitted only when the ice is a minimum of six inches thick.
2. Ice fishing equipment may include a maximum of five tipups or any combination of five devices; these may include not more than two lines fished by rod or by hand. All lines and devices must be under the immediate control of the person using them.
3. Holes cut in the ice may not exceed 10 inches in diameter between the farthest points in a rectangular hole.
4. Shelters or shanties may not be left overnight.
5. Use caution when fishing on thin ice around pilings, trees, and spring inlets.

Appendix E

GLOSSARY

Explanation of Terms.

a. Sponsored guests. Any licensed general public fisherman who is not a Department of the Army civilian employee, retiree, or Active Duty Military personnel.

b. Family member. Family members are defined as follows:

(1) The spouse of a sponsor.

(2) Unremarried widow or widower of a member or former member of a uniformed service.

(3) Unmarried child of a sponsor, including an adopted child, stepchild, foster child, or ward, who either:

(a) Has not passed his twenty-first birthday and is dependent on the sponsor for over one-half of his support;

(b) Is incapable of self-support because of a mental or physical incapacity that existed before that birthday and is (or was at the time of the member's or former member's death) in fact dependent on the sponsor for over one-half of his support; or

(c) Has not passed his twenty-third birthday, is enrolled in a full-time course of study in an institution of higher learning approved by a Secretary of an executive department specified in 10 U.S.C., Section 1073, and is (or was at the time of the member's or former members' death) in fact dependent on the sponsor for over one-half of his support.

(4) A parent or parent-in-law of a sponsor who is (or was at the time of the member's or former member's death) in fact dependent on the sponsor for over one-half of his support and residing in the sponsor's household.

c. Depot employees. All current Department of the Army civilian and military employees of LEAD and collocated activities.

d. Retired employees. All civilian and military personnel who are retired from the Department of the Army.

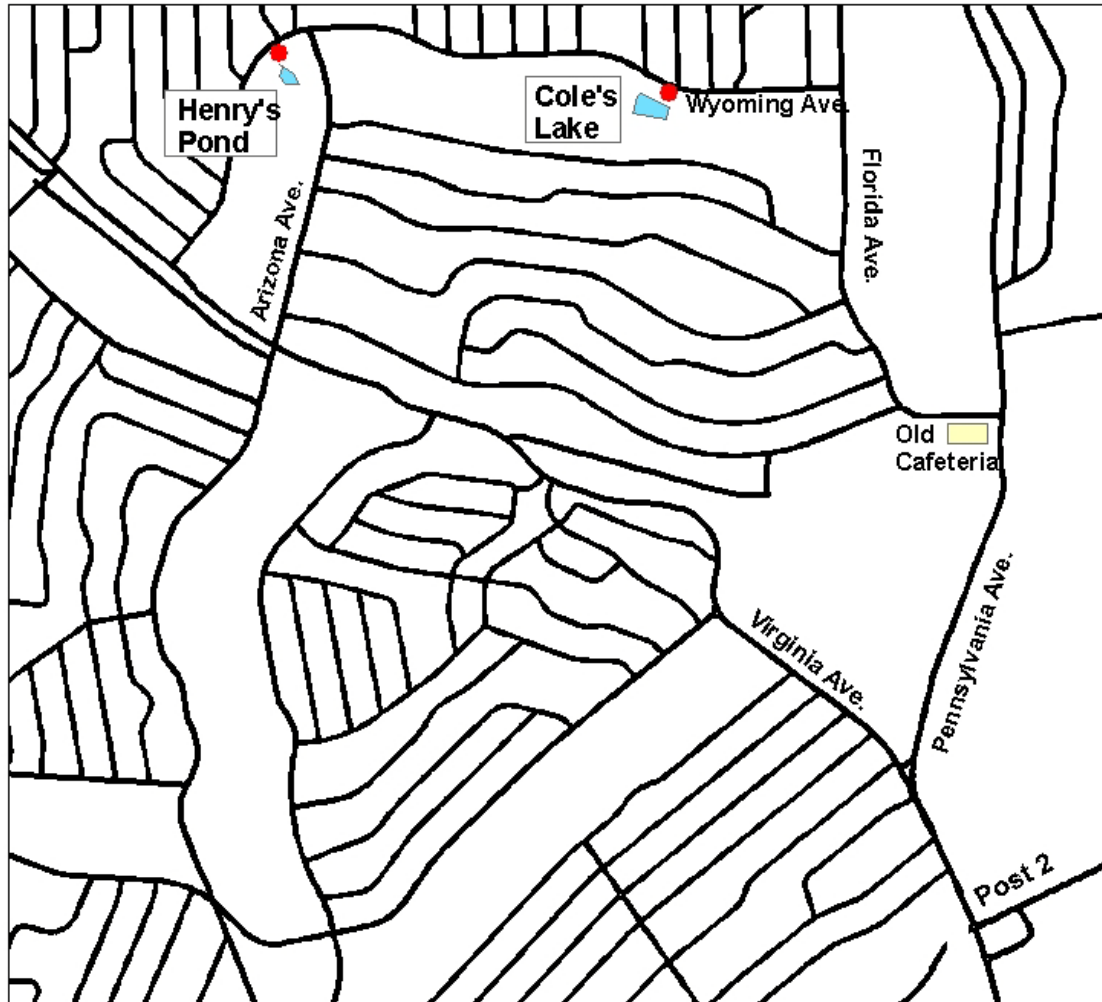
e. Local area. The geographic area contiguous on the depot and extending approximately 25 miles or 30 minutes from the depot.

f. Conservation Fish and Wildlife Work Projects. Work which is directly related to and directly benefits LEAD's Fish and Wildlife Management Program. Individuals who have committed a State and/or LEAD hunting, fishing, or trapping violation, may not sponsor guests or complete Conservation Fish and Wildlife Work Projects which directly relates to the hunting, fishing, or trapping programs while their privileges are revoked. All projects must be approved by the Natural Resources Manager.

Appendix F

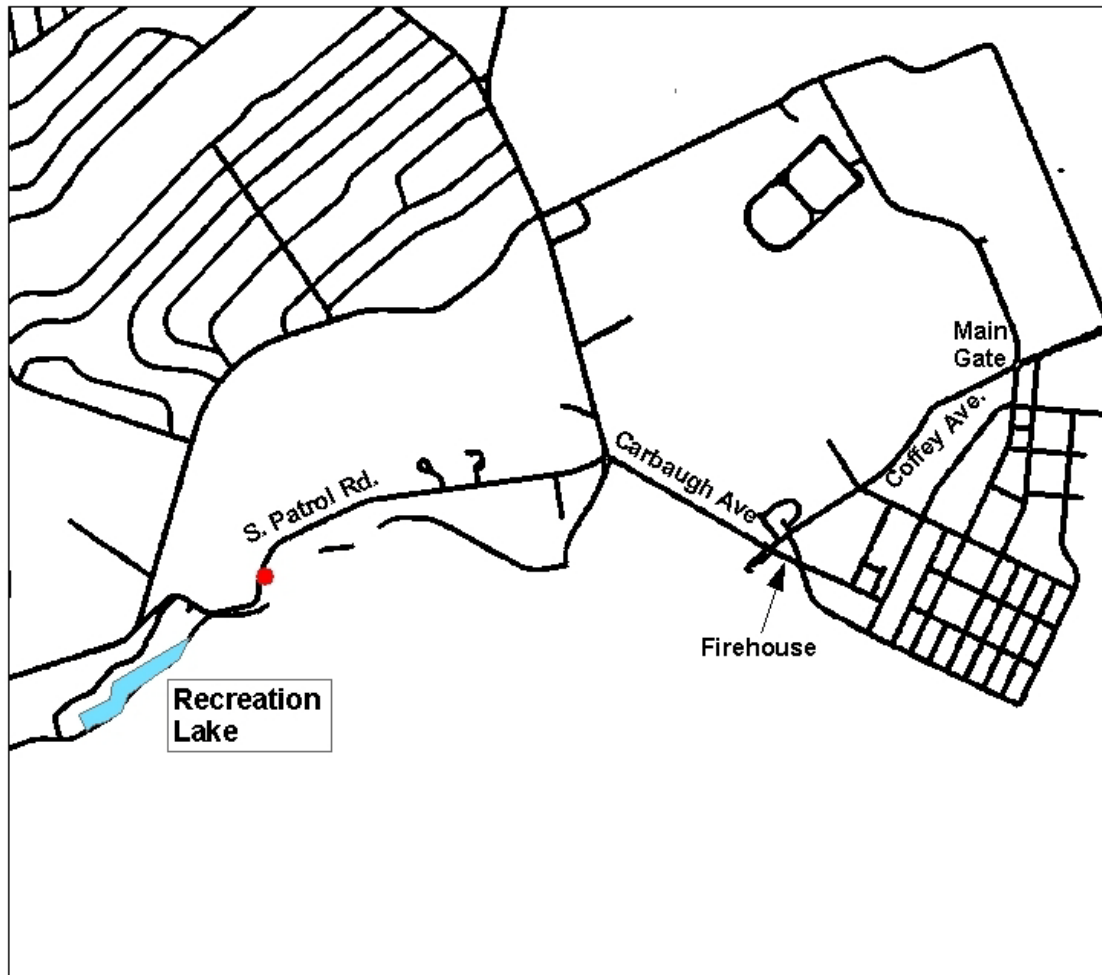
Fishing Areas and Travel Routes
(on the following pages)

Cole's Lake and Henry's Pond Map



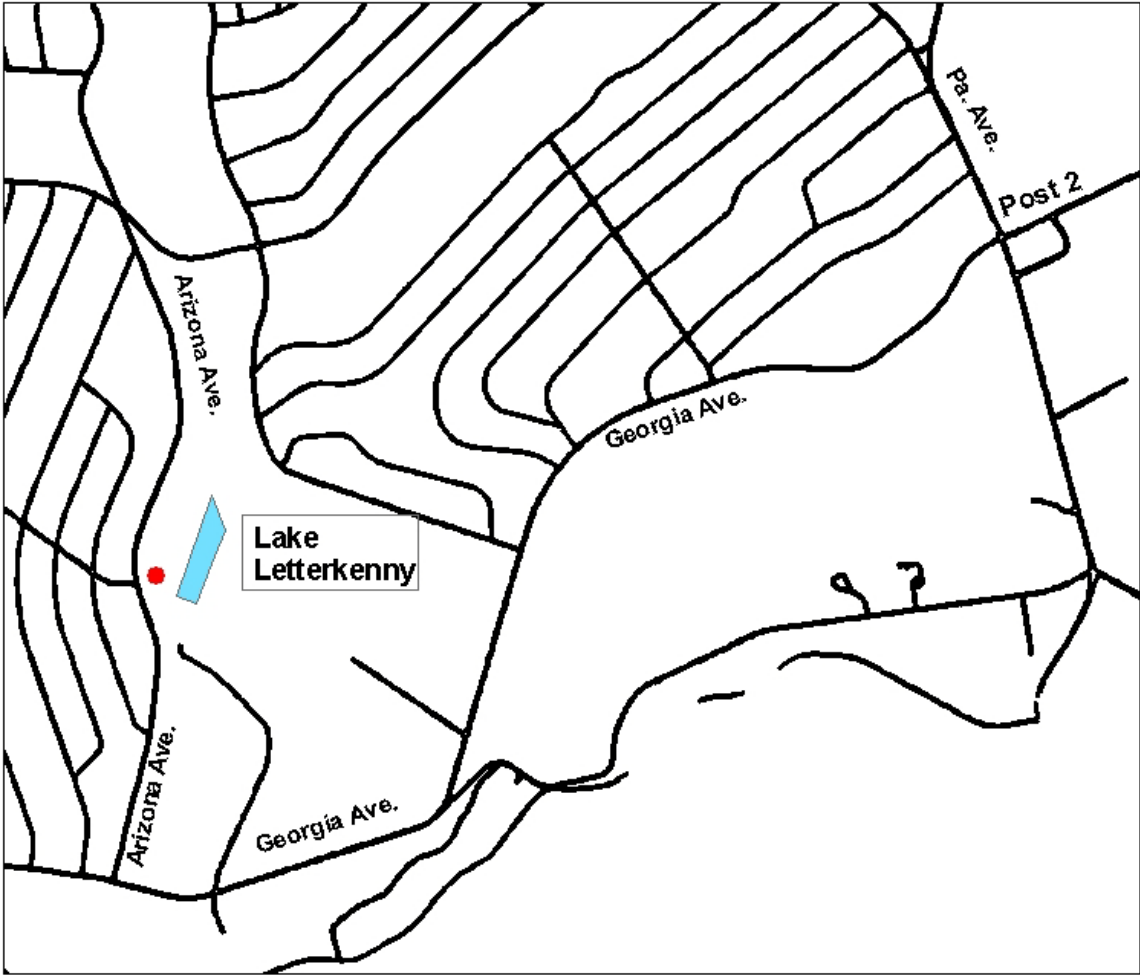
Directions: Through Post 2, make right onto Pennsylvania Ave. and follow to old cafeteria. Make left onto Florida Ave. and continue until Wyoming Ave. on left side. Turn onto Wyoming Ave. and follow to Cole's Lake entrance on left side of road.
- To Henry's , follow same route, continuing along Wyoming Ave. past Cole's. Just beyond intersection of Arizona Ave. (left side) is the entrance for Henry's Pond (also on left side of road).

Recreation Lake Map



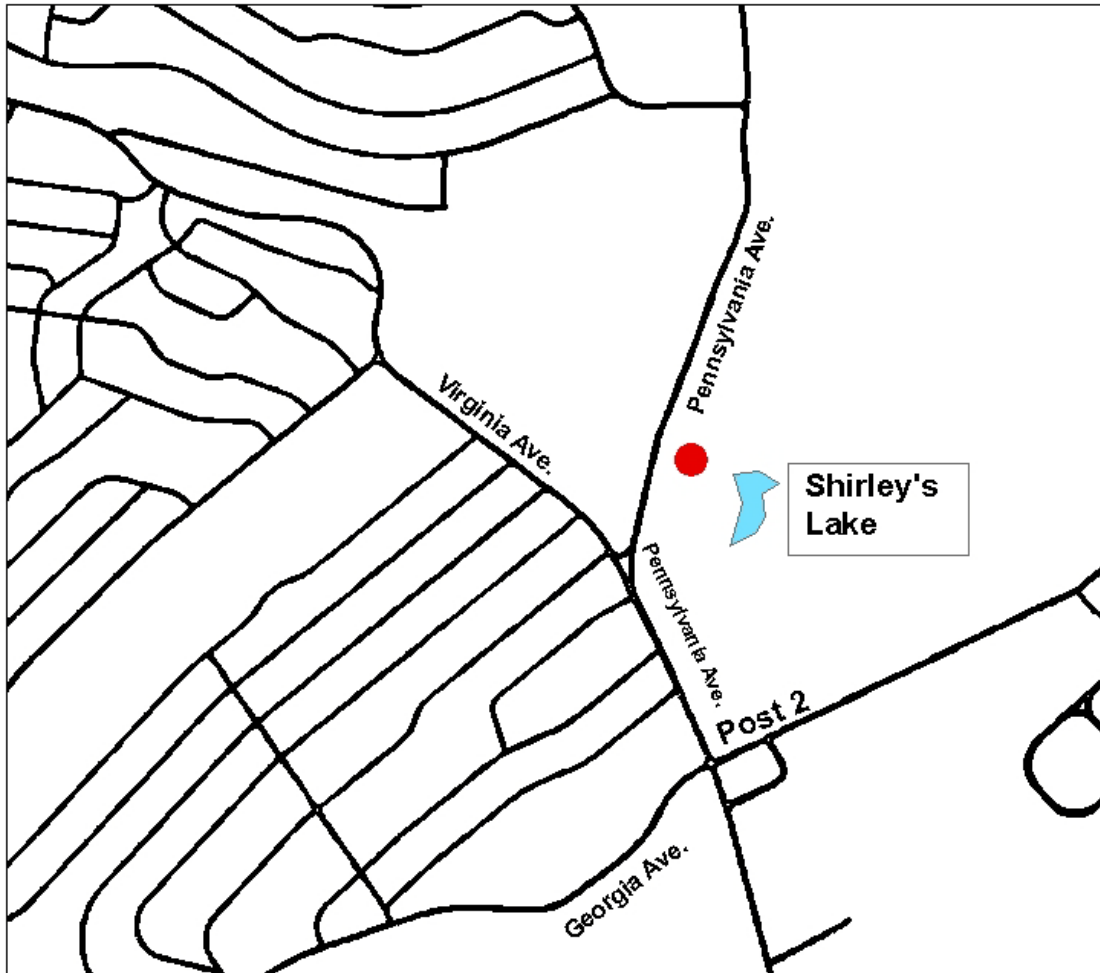
Directions: From main gate, make a right onto Coffey Ave. and follow until traffic light at firehouse. Make a right onto Carbaugh Ave. and continue to stop sign. Cross straight through intersection onto South Patrol Road and continue to Rec Area entrance (gate).

Lake Letterkenny Map



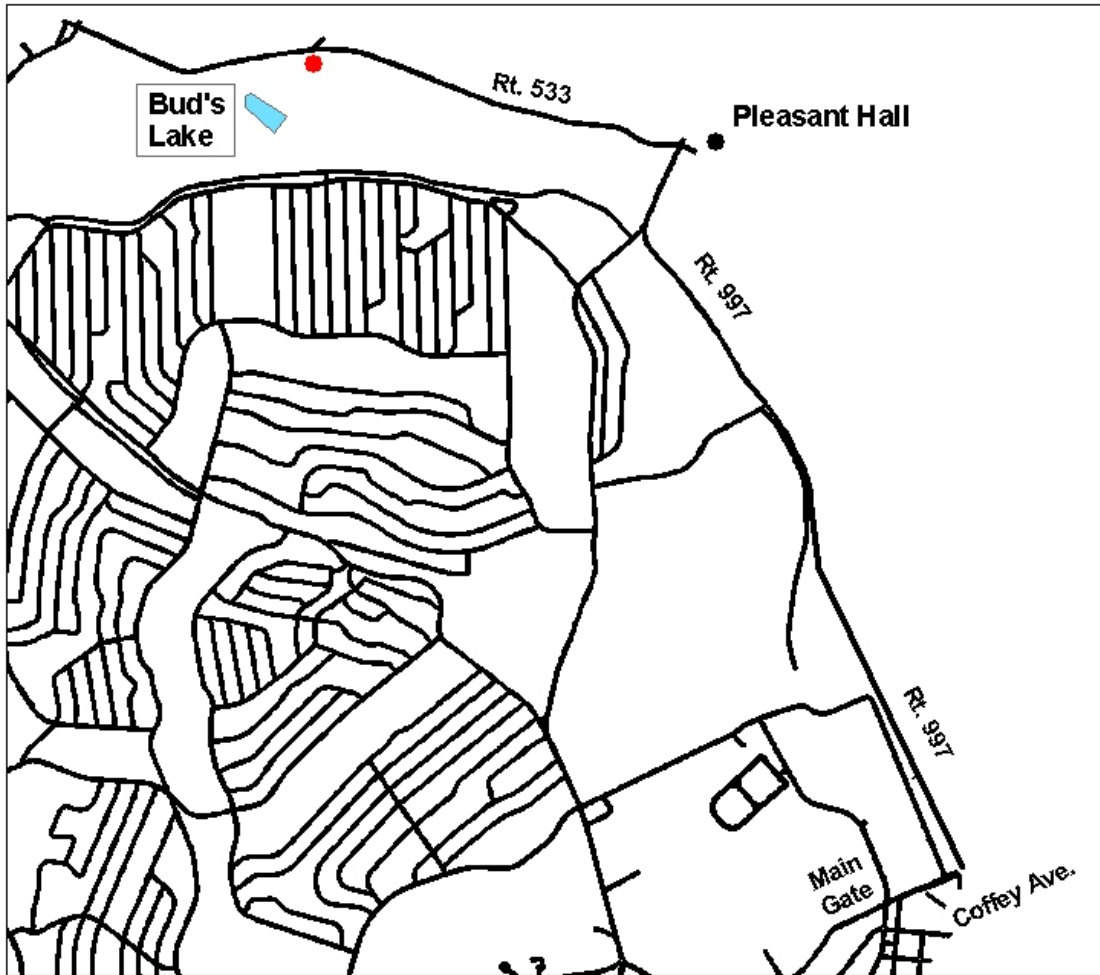
Directions: Through Post 2, follow Georgia Ave. Make right onto Arizona Ave and follow to Lake Letterkenny entrance on right side of road (across from E9 line).

Shirley's Lake Map



Directions: Through Post 2, make right onto Pennsylvania Ave. and follow to Shirley's Lake entrance on right side of road.

Bud's Lake Map



Directions: From main gate, make a left onto Coffey Ave. and follow until traffic light. Make a left onto Rt. 997 North and continue to Pleasant Hall. At post office, make a left onto Rt. 533, and follow until Gate 7B on left side of road (Bud's Lake entrance).

APPENDIX D
DEER HUNTING STATISTICS

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Letterkenny Army Depot (LEAD) Deer Harvest Summary

LEAD Zone I Deer Harvest History (2002 – 2018)

Harvest Season	Bucks	Fawns		Does	Total
		Male	Female		
2002-03	162	108	92	286	648
2003-04	216	90	69	279	654
2004-05	189	60	92	209	550
2005-06	148	88	74	197	507
2006-07	200	78	70	233	581
2007-08	210	95	72	265	642
2008-09	276	116	87	384	863
2009-10	332	135	111	415	993
2010-11	351	213	182	685	1431
2011-12	302	105	67	277	751
2012-13	164	76	68	206	514
2013-14	153	40	51	130	374
2014-15	124	54	36	100	314
2015-16	86	36	40	94	256
2016-17	109	37	41	99	286
2017-18	138	57	49	155	399
2018-19	155	68	68	214	505

LEAD Zone I Deer Hunter Participation (2006 – 2018)

Hunting Season	Number of Hunters	Number of Deer Harvested	Antlered	Antlerless	Success Rate
2006-07	2415	581	200	381	0.24
2007-08	3044	642	196	442	0.21
2008-09	3668	863	236	626	0.24
2009-10	4186	993	275	716	0.24
2010-11	6180	1431	305	1126	0.23
2011-12	4729	751	285	466	0.16
2012-13	4554	514	152	362	0.11
2013-14	2967	374	139	235	0.13
2014-15	2822	314	115	199	0.11
2015-16	2503	256	79	177	0.10
2016-17	2141	286	102	184	0.13
2017-18	2460	399	125	274	0.16
2018-19	2976	505	134	371	0.17

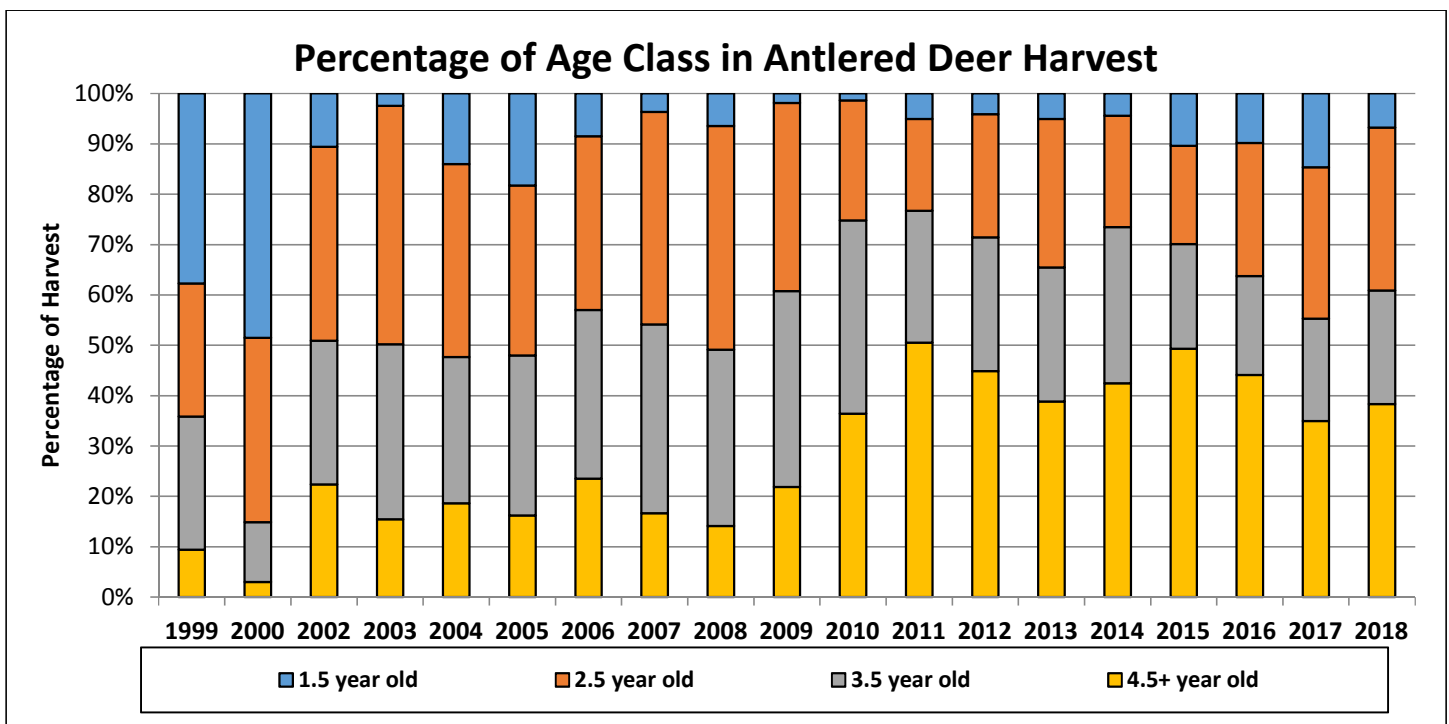
LEAD Zone I Deer Weights (2002 – 2018)

Average Weight by Age Class					
Male					
Year	BB	1.5	2.5	3.5	4.5+
2002	51.20	102.88	131.87	151.52	156.50
2003	51.84	100.20	126.86	144.14	152.64
2004	52.73	110.56	129.36	148.70	169.14
2005	52.85	99.70	125.94	142.81	156.88
2006	47.99	90.00	122.00	133.00	140.02
2007	45.85	81.14	114.53	132.71	150.75
2008	46.30	83.82	116.56	130.32	145.48
2009	44.07	76.52	109.46	121.98	132.28
2010	51.56	83.85	111.49	124.02	136.44
2011	50.42	84.45	109.98	125.39	136.16
2012	50.91	84.90	115.73	130.46	140.68
2013	53.90	91.41	121.09	128.59	141.86
2014	52.57	99.07	119.81	132.68	148.46
2015	51.69	91.20	113.94	129.81	148.42
2016	49.97	93.20	119.32	132.10	154.69
2017	49.74	90.58	125.49	139.96	154.98
2018	48.68	84.21	117.30	131.67	149.90
Female					
Year	Fawn	1.5	2.5	3.5	4.5+
2002	47.03	83.85	89.08	98.61	103.38
2003	46.71	85.36	90.18	98.89	100.78
2004	45.05	81.28	89.18	95.31	90.88
2005	47.81	82.78	87.46	94.37	101.14
2006	43.31	79.97	84.72	92.16	94.83
2007	43.07	79.10	83.10	87.56	90.90
2008	44.67	77.20	87.26	89.38	96.03
2009	41.25	73.94	80.54	88.23	90.40
2010	48.14	77.14	86.30	90.21	94.49
2011	47.75	77.25	81.02	88.02	88.23
2012	46.56	79.77	82.86	88.17	89.22
2013	51.10	83.19	86.25	91.71	93.13
2014	49.44	83.09	90.93	90.10	99.00
2015	49.88	87.53	93.26	91.48	96.41
2016	47.24	85.32	94.96	95.12	96.70
2017	47.69	82.70	90.23	97.85	93.07
2018	46.79	80.57	87.02	92.58	96.92

LEAD Zone I Fawn Harvest (2002 – 2018)

YEAR	Male	Female	Total Fawn	Adult Antlerless	Total Antlerless Harvest	Percentage of Fawns in Antlerless Harvest
2002	108	92	200	286	486	0.41
2003	90	69	159	279	438	0.36
2004	60	92	152	209	361	0.42
2005	88	74	162	197	359	0.45
2006	78	70	148	233	381	0.39
2007	95	72	167	283	450	0.37
2008	116	87	203	423	626	0.32
2009	135	111	246	472	718	0.34
2010	213	182	395	731	1126	0.35
2011	105	67	172	294	466	0.37
2012	76	68	144	218	362	0.40
2013	40	51	91	144	235	0.39
2014	54	36	90	109	199	0.45
2015	36	40	76	101	177	0.43
2016	37	41	78	106	184	0.42
2017	57	49	106	168	274	0.39
2018	68	68	136	235	371	0.37

LEAD Zone I Antlered Deer Harvest (1999 – 2018)



LEAD Zone II Deer Harvest History (2000 – 2018)

Harvest Season	Bucks	Does	Button Bucks	Total
2000-01	99	101	28	228
2002-03	74	199	41	314
2003-04	42	97	21	160
2004-05	42	106	29	177
2005-06	24	75	0	99
2006-07	54	85	25	164
2007-08	27	30	9	66
2008-09	30	31	16	77
2009-10	21	26	11	58
2010-11	32	26	6	64
2011-12	46	38	9	93
2012-13	44	37	12	93
2013-14	41	47	8	96
2014-15	20	42	6	68
2015-16	36	40	12	88
2016-17	20	32	8	60
2017-18	19	34	4	57
2018-19	23	22	4	49

APPENDIX E
FOREST MANAGEMENT PLAN

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US Army Corps
of Engineers
Baltimore District

FOREST MANAGEMENT PLAN

Letterkenny Army Depot
Chambersburg, Pennsylvania



Prepared for: Letterkenny Army Depot,
Chambersburg, Pennsylvania

Prepared by: U.S. Army Corps of Engineers, Baltimore District
10 South Howard Street
Baltimore, Maryland 21201

August 2012

FOREST MANAGEMENT REPORT

FOR

LETTERKENNY ARMY DEPOT

AUGUST 2012

Prepared For:

Letterkenny Army Depot
Chambersburg, Pennsylvania

Prepared By:



Department of the Army
U.S. Army Corps of Engineers
Baltimore District
Planning Division
Baltimore, Maryland

And



EA Engineering, Science, and Technology
Sparks, Maryland

A handwritten signature in blue ink, appearing to read 'D. Cockerham', written over a light blue background.

Daniel Cockerham
ISA Certified Arborist MA-4435A

29 August 2012

DATE

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FOREST MANAGEMENT REPORT FOR LETTERKENNY ARMY DEPOT

I. Introduction

The purpose of this Forest Management Plan is to update the existing Forest Management Plans (1988 and 1995) for Letterkenny Army Depot (LEAD) and prepare management actions, such as timber harvest, invasive species management and wildfire fuel removal, to improve forest health and wildlife habitat, sell timber and reduce the risks of wildfire. This Forest Management Plan covers the forested areas on LEAD within Zones 1 and 2 on the western portion of the depot, and builds upon previous forest management plans and activities.

II. Site Description

LEAD is located northwest of Chambersburg, Franklin County, Pennsylvania (see Vicinity Map, Appendix A). The majority of the site is characterized by gently rolling hills; however, the western portions, which include the eastern slopes of Broad Mountain, are relatively steep. The site ranges in elevation from 680 to 2,280 feet. The majority of the site lies within the Cumberland Valley Sequence and is underlain by the Ordovician Martinsburg Formation, Chambersburg Formation, and the St. Paul Group, which are characterized by gray to dark gray shale and cobbly limestone with impure sandstone interbeds. The upper slopes of Broad Mountain are underlain by the Silurian Tuscarora Formation and Clinton Group. These are characterized by light olive gray to medium gray sandstone and fossiliferous shale.

The study area, covered within this report, is located in the western portions of LEAD. This area is divided into two Zones (see Site Maps, Appendix A). Zone 1 is located on the western side of the ammunition area and Zone 2 is located west of Zone 1 at the foot and on the eastern slopes of Broad Mountain. Zone 1 is approximately 418 acres and Zone 2 is approximately 2,191 acres. The zones were divided into Compartments, and some of the Compartments were further divided into Management Stands. Tables 1 and 2 present the total acreages for Zones 1 and 2, the Compartments, and the various Management Stands.

Table 1. Total Acreages for Zone 1 and Zone 2

Zone	Compartment	Acreage
1	---	418.43
Total Zone 1		418.43
2	1	377.22
2	2	558.44
2	3	260.36
2	4	283.87
2	5	193.78
2	6	126.97
2	7	390.41
Total Zone 2		2,191.04
Total Acreage		2,609.46

Table 2. Total Acreages of Management Areas within Zone 1 and Zone 2

Compartment	Management Stand	Acreage
Zone 1		
---	1	85.83
	2	170.02
	3	148.40
Zone 2		
1	1	170.03
	2	131.54
	3	75.64
2	1	186.77
	2	240.19
	3	131.47
3	1	260.36
4	1	228.55
	2	55.32
5	1	193.78
6	1	126.97
7	1	390.41

III. Pennsylvania Natural Diversity Inventory

A search of the Pennsylvania Natural Diversity Inventory (PANDI) provided information concerning potential Rare, Threatened, or Endangered species as well as habitats in need of conservation/preservation on LEAD. The findings are as follows:

- Habitat suitable for the Pennsylvania-threatened Allegheny Woodrat (*Neotoma magister*) is located on-site within the forested slopes of Broad Mountain and adjacent Buchanan State Forest. Suitable habitat is described as rocky outcrops, talus slopes and associated caves and crevasses.
 - No Allegheny woodrats were observed during field studies, but suitable habitat was observed in Zone 2, Compartment 7. Further studies may be required to determine the presence/absence of this species within the confines of LEAD.
- Hay dominated fields adjacent to Compartments 5 and 6, Zone 2, are suitable habitat for the Henslow's Sparrow (*Ammodramus henslowii*) and the upland sandpiper (*Bartramia longicauda*), two grassland dependent birds that are species of concern.
 - The field efforts associated with the Forest Management Report did not include the non-forested hay fields at LEAD.
- Ephemeral/fluctuating Natural Pool Community is critical habitat for multiple amphibian species.
 - These communities were located throughout the forested lower elevations of Zone 2. Table 3 presents the wildlife species observed during the field efforts conducted February through early April 2012.
- Keasey Run Wetlands, located along the northern perimeter of LEAD, are habitat for two plant species of concern, brown sedge (*Carex buxbaumii*) and short's sedge (*Carex shortiana*).
 - The study area for the Forestry Management Report did not include the Keasey Run Wetlands.

Table 3. Wildlife Species Observed During Field Efforts

Common Name	Scientific name
Reptiles and Amphibians	
Wood frog	<i>Rana sylvatica</i>
Green frog	<i>Rana clamitans</i>
Upland chorus frog	<i>Pseudoacris feriarum</i>
Spring peeper	<i>Pseudoacris crucifer</i>
Red-backed salamander	<i>Plethodon cinereus</i>
Birds	
American woodcock	<i>Scolopax minor</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Common raven	<i>Corvus corax</i>
American crow	<i>Corvus brachyrhynchos</i>
Fish crow	<i>Corvus ossifragus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Blue jay	<i>Cyanocitta cristata</i>
Wild turkey	<i>Meleagris gallopavo</i>
Turkey vulture	<i>Cathartes aura</i>
Eastern bluebird	<i>Sialia sialis</i>
American robin	<i>Turdus migratorius</i>
American kestrel	<i>Falco sparverius</i>
Mourning dove	<i>Zenaida macroura</i>
Mammals	
White-tailed deer	<i>Odocoileus virginianus</i>
Red fox	<i>Vulpes vulpes</i>
Raccoon	<i>Procyon lotor</i>
Red bat	<i>Lasiurus borealis</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern chipmunk	<i>Tamias striatus</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Fox squirrel	<i>Sciurus niger</i>

IV. Methodology

Prior to field investigations, previous reports and orthophotographs were reviewed to identify probable forest stand boundaries. The field effort for this study generally used the previously assigned Zones and Compartments in order to provide continuity with previous management reports (LEAD, 1988 and Forest Management Center, 1995).

A 1/10 acre fixed plot sampling technique was used to assess forest stand conditions, forest structure, and volume of board feet per stand. This is a common plot size used by forestry professionals for conducting forest stand delineations and collecting representative forest data. Sampling plots were randomly chosen so as to be evenly distributed throughout each stand, approximately one plot per every ten acres. A stick flag was placed in the center of each plot and along the perimeter of the circular plot in each of the four cardinal directions. The plot center was marked in the field with orange or pink flagging and the stand and plot number labeled with a black marker. Each plot center was located using a handheld Trimble GEOXH Geographic Positioning System (GPS) for mapping purposes. Basal area was determined using the 10 BAF factor notch of a cruz-all. Board feet of timber within the stands was estimated using the International 1/4" scale.

Due to the steep slope aspect of Compartment 7, located in Zone 2, the methodology for forest assessment focused instead on the health of the forest and a qualitative analysis as the steep slopes limited access and effectiveness of fixed plot samples. The location and condition of this stand make it unsuitable for timber harvest; therefore an in-depth assessment was not performed. Plots were not established due to the steep terrain. The forested area of Compartment 7 was traversed in the lower elevation areas (southeastern border) where slope is less severe and also along the top of the ridge where safe access was granted by the public road located on the ridge top adjacent to the LEAD property boundary.

V. Results

Field efforts were conducted from mid-February through early April 2012. The study area is divided into two Zones: the ammunition storage area (Zone 1) and the buffer area (Zone 2), see maps, Appendix A. Zone 1 was located within the western extents of the ammunition area and contains 3 management stands. Zone 2 was located along the western edge of the depot, on the eastern slopes of Broad Mountain, and contained 7 Compartments, four of which had multiple stands.

Mapping, located in Appendix A, depicts the approximate location of the sampling plots and boundary of management stands. A photographic record of the forest conditions during field efforts

can be found in Appendix B. Stand descriptions and management recommendations can be found in the following sections. Stand variations result from changes in topographic position, degree of slope, and amount and type of historical disturbance. Forest stand conditions and forest structure were assessed at sample plots within the stand as detailed in the following stand descriptions and in forest sampling data sheets located in Appendix C.

Fuel loading, in the form of dead standing and fallen timber, within Zone 1, are relatively low and pose a low threat for wildfire. Zone 2, however, has a large amount of dead standing and newly fallen timber in several of the compartments. In addition, many currently living eastern hemlock trees are in the advanced stages of infestation by hemlock wooly adelgid (*Adelges tsugae*) (HWA) and will likely add to the fuel load in the near future. These areas pose a high risk for wildfire. Fuel loading in these areas should be reduced, either by manual removal or by controlled burns. These areas are addressed further in the stand descriptions.

Harvestable timber is relatively low in Zone 1. Several compartments in Zone 2 have higher amounts of harvestable timber.

The forests within both Zones are comprised mainly of hardwood with oak and hickory species being dominant. There are small areas of pine scattered throughout the site, which provide good winter shelter for wildlife; however, these areas should be expanded or new areas planted in pine after any timber harvest. The larger areas of hemlock within Zone 2 have been mostly lost due to the HWA. These areas are no longer providing suitable cover and should be planted in pine or white spruce after removal of the dead and dying hemlock.

The opportunities within both zones for wildlife management are high. The white-tailed deer population remains above optimum carrying capacity for the site based on a lack of observed climax tree species regeneration. Increased white-tailed deer harvest should be implemented in order to insure the regeneration of the oak dominant forest. Currently, little regeneration of oaks is evident within Zone 1 due to excessive white-tailed deer browse. Minor to moderate amounts of regeneration of oaks was observed within Zone 2. Turkey populations appear to be thriving due to the presence of quality habitat with both cover and hard and soft mass production.

Table 3 presents a list of wildlife species observed during the field efforts, either by direct visual observation or observation of sign in the form of calls, tracks, or scat.

HWA, a non-native pest of Canadian hemlock, was observed on most hemlock from all size and age classes in both Zones. The continued removal of dead and dying trees is important to both the management of the HWA and also to fire load management. Some areas, mostly within Zone

2, had high amounts of downed woody debris in the form of dead hemlock on the ground, which is creating an increased fire hazard. Currently, one parasitoid is approved for release to control HWA. Permits must be obtained from the USDA in order to release biological control organisms.

The presence of the emerald ash borer (*Agrilus planipennis*) (EAB) in the Midwestern and eastern United States is a potential threat to the white ash on site. While white ash is not an abundant species on LEAD, it is commercially important. No evidence of EAB was documented during site visits, but, the probability of its future presence is high. EAB has been detected in neighboring Fulton County, Pennsylvania. Currently, the statewide ban on inter-county transport of timber products has been lifted, but the federal ban, prohibiting inter-state transport is still in effect. Harvest of saleable white ash within management areas is recommended while these trees are still healthy. Currently, three parasitoids are approved for release to control EAB. Permits must be obtained from the USDA in order to release biological control organisms.

Multiple invasive plant species were observed during site visits. The most common were Japanese barberry, Japanese honeysuckle, multiflora rose, bush honeysuckle, Japanese stilt grass, tree-of-heaven, and wineberry. Some compartments in Zone 2 have considerable understory coverage of Japanese barberry and multiflora rose which can prevent the regeneration of native species. In addition, non-native, invasive species generally have low value as wildlife food or cover. To improve forest health and regeneration, as well as wildlife value, management of invasive species is recommended either by manual removal or through the use of controlled burns.

VI. Forest Stand Descriptions

The information collected within each Management Stand is summarized within the pages that follow. Data sheets for the plots supporting the descriptions are located within Appendix C.

ZONE 1

Management Stand 1 (MS-1)

(FSD stands 8-12)

Acreage:	85
Sample Plots:	10
Successional Stage:	Mid/Late
Cover Type:	Mixed regrowth/transition
Basal Area:	72 sq. ft per acre
Board Feet sawtimber:	44,160 board feet or 520 board feet per acre
Canopy Closure:	62%
Canopy Tree Size:	10-12" dbh
Canopy Tree Height:	65 feet (average)
Canopy Species:	White ash, pin oak, black oak, black locust, black cherry, shagbark hickory, red maple, white oak, black walnut
Understory Cover:	66%
Understory Species:	White ash, red bud, slippery elm, hawthorn, tree-of-heaven, black birch, bitternut hickory
Ground Cover:	96%
Ground Cover species:	Black raspberry, wineberry, multiflora rose, spring beauty, Japanese barberry, field garlic, poison ivy, Indian strawberry, bottle-brush grass
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	40%
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven, field garlic,
Downed Woody Debris:	52%

Management Recommendations: No timber harvest is recommended for this stand. This stand should be cut for timber stand improvement by removing poorly formed trees and undesirable species, such as black birch and tree-of-heaven. Species to be left are oaks, hickory, poplar and black walnut. Areas with dense understory of Japanese barberry should be sprayed with an approved herbicide or removed with a controlled burn.

ZONE 1

Management Stand 2 (MS-2)

(FSD stands 5-7)

Acreage:	170
Sample Plots:	17
Successional Stage:	Mid/Late
Cover Type:	Mixed regrowth/Oak
Basal Area:	78 sq. ft per acre
Board Feet sawtimber:	116,870 board feet or 687 board feet per acre
Canopy Closure:	68%
Canopy tree size:	12-14" dbh
Canopy tree height:	69 feet (average)
Canopy Species:	Red maple, white ash, black oak, black locust, black cherry, shagbark hickory, red maple, white oak, black walnut
Understory Cover:	55%
Understory Species:	Spice bush, honey locust, red bud, slippery elm, hawthorn, tree-of-heaven, black birch, bitternut hickory
Ground Cover:	91%
Ground Cover species:	Black raspberry, wineberry, multiflora rose, spring beauty, Japanese barberry, field garlic, poison ivy, Indian strawberry, bottle-brush grass
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	39%
Invasive species:	Bush Honeysuckle, multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven, field garlic,
Downed Woody Debris:	58%

Management Recommendations: No timber harvest is recommended for this stand. This stand should be cut for timber stand improvement by removing poorly formed trees and undesirable species, such as black birch and tree-of-heaven. Species to be left are oaks, hickory, poplar and black walnut. In addition, leave existing standing snags and cavity trees for wildlife. Areas with dense understory of Japanese barberry should be cut and sprayed with an approved herbicide or possibly burned, in order to open up the understory and ground for increased germination of acorns and seeds of other desirable species.

ZONE 1

Management Stand 3 (MS-3)

(FSD stands 1-4)

Acreage:	148
Sample Plots:	14
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	82 sq. ft per acre
Board Feet sawtimber:	259,640 board feet or 1,754 board feet per acre
Canopy Closure:	73%
Canopy tree size:	14-18" dbh
Canopy tree height:	78 feet (average)
Canopy Species:	White oak, red maple, black oak, black locust, black gum, shagbark hickory, mockernut hickory, black walnut
Understory Cover:	44%
Understory Species:	Black birch, sassafras, Carolina hornbeam, tree-of-heaven, black birch, bitternut hickory, black cherry
Ground Cover:	88%
Ground Cover species:	Black raspberry, wineberry, multiflora rose, spring beauty, Japanese barberry, field garlic, poison ivy, Indian strawberry
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	30%
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven, field garlic,
Downed Woody Debris:	70 %

Management Recommendations: Timber harvest is possible in this stand but due to the low basal area, it could be easily over-cut. This stand shows evidence of selective harvest within the last 20 years. Harvest of 800 board feet per acre of small sawtimber is sustainable. During timber harvest remove poorly formed trees and undesirable species. In addition, leave existing standing snags and cavity trees for wildlife.

ZONE 2

Compartment 1

Management Stand 1 (MS-1)

(FSD stands 1-3 & 7)

Acreage:	170
Sample Plots:	17
Successional Stage:	Mid
Cover Type:	Mixed regrowth/transition
Basal Area:	83 sq. ft per acre
Board Feet sawtimber:	22,820 board feet or 134 board feet per acre
Canopy Closure:	75%
Canopy tree size:	14-16" dbh
Canopy tree height:	53 feet (average)
Canopy Species:	Tulip poplar, white oak, black oak, red maple, shagbark hickory, black locust, Virginia pine, red oak
Understory Cover:	83%
Understory Species:	Red maple, red bud, flowering dogwood, hawthorn, tree-of-heaven, black birch, bitternut hickory, shagbark hickory, black cherry
Ground Cover:	87%
Ground Cover species:	Hairy hawkweed, wineberry, multiflora rose, spring beauty, Japanese barberry, field garlic, poison ivy, Eastern hemlock
Vines:	Common greenbrier, poison ivy, Japanese honeysuckle
Invasive Cover:	37%
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven, field garlic,
Downed Woody Debris:	50%

Management Recommendations: This stand should have a timber stand improvement cut due to a relatively high density of undesirable trees and shrubs. Species to be left include oaks, hickory, poplar, and black walnut. In addition, leave existing standing snags and cavity trees for wildlife. Areas with dense understory of Japanese barberry should be cut and sprayed with an approved herbicide or removed with a controlled burn, in order to open up the understory and ground for increased germination of acorns and seeds of other desirable species.

ZONE 2

Compartment 1

Management Stand 2 (MS-2)

(FSD Stands 4 & 5)

Acreage:	131
Sample Plots:	14
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	72 sq. ft per acre
Board Feet sawtimber:	77,270 board feet or 590 board feet per acre
Canopy Closure:	94%
Canopy tree size:	12-14" dbh
Canopy tree height:	68 feet (average)
Canopy Species:	Chestnut oak, white oak, northern red oak, black oak, small amounts of Virginia pine
Understory Cover:	51%
Understory Species:	Bitternut hickory, mountain laurel, black cherry, red maple, black birch, Carolina hornbeam, striped maple, Virginia pine
Ground Cover:	54%
Ground Cover species:	Lowbush blueberry, black raspberry, black huckleberry, black birch, eastern hemlock
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	6%
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, garlic mustard
Downed Woody Debris:	38%

Management Recommendations: This stand is primarily small sawtimber dominated by chestnut oak. This stand should be cut for timber stand improvement by removing poorly formed trees and undesirable species. Species to be left include oaks and hickory. During improvement cuts, remove all birch of 4" dbh or greater to reduce excessive regrowth in canopy gaps. In addition, leave standing snags and live or dead cavity trees for wildlife.

ZONE 2

Compartment 1

Management Stand 3 (MS-3)

(FSD Stand 6)

Acreage:	75
Sample Plots:	6
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	96 sq. ft per acre
Board Feet sawtimber:	29,930 board feet or 399 board feet per acre
Canopy Closure:	88%
Canopy tree size:	20-24" dbh
Canopy tree height:	80 feet (average)
Canopy Species:	White oak, chestnut oak, tulip poplar, black oak, shagbark hickory
Understory Cover:	72%
Understory Species:	Black birch, bitternut hickory, red maple, striped maple, Carolina hornbeam, chestnut oak
Ground Cover:	80%
Ground Cover species:	Low bush blueberry, black birch, black huckleberry, common blackberry, eastern hemlock, moss
Vines:	Common greenbrier
Invasive Cover:	5%
Invasive species:	Japanese honeysuckle, Japanese barberry, garlic mustard, multiflora rose
Downed Woody Debris:	52%

Management Recommendations: No harvest is recommended for this stand; this management stand was harvested within the last 2 years. The remaining trees will supply a good seed base for regeneration and for wildlife forage. Reduction in the amount of ground cover in the form of multiflora rose and Japanese barberry will increase regeneration of oaks and other desirable species. Reduction of these species may be obtained through application of an approved herbicide to individual plants with a backpack sprayer or through a controlled burn.

ZONE 2

Compartment 2

Management Stand 1 (MS-1)

(FSD stands 1-3)

Acreage:	186
Sample Plots:	19
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	105 sq. ft per acre
Board Feet sawtimber:	89,360 board feet or 480 board feet per acre
Canopy Closure:	87%
Canopy tree size:	16-20" dbh
Canopy tree height:	81 feet (average)
Canopy Species:	White oak, northern red oak, black oak, chestnut oak
Understory Cover:	60%
Understory Species:	Black birch, bitternut hickory, red maple, striped maple, American beech, black cherry, black gum, flowering dogwood, pignut hickory
Ground Cover:	38%
Ground Cover species:	Striped wintergreen, moss, black birch, oak seedlings, common blackberry
Vines:	Common greenbrier
Invasive Cover:	3%
Invasive species:	Multiflora rose, Japanese barberry, wineberry, Japanese stilt grass
Downed Woody Debris:	52%

Management Recommendations: Timber stand improvement cut and harvest of approximately 200 board feet of small sawtimber per acre is recommended. Leave 3 to 5 seed trees per acre of desirable species (oak, hickory, tulip poplar) during each cut. The basal area of this stand is too high and should be reduced to around 70 to 75 s.f. per acre. This will increase the growing space and improve the growth of trees left after the cut. Remove 4" dbh and greater black birch during cut. Maintain buffers around vernal pools and streams. Some maintenance on existing roads is required due to wash outs.

ZONE 2

Compartment 2

Management Stand 2 (MS-2)

(FSD stands 4-6 & 9)

Acreage:	240
Sample Plots:	25
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	87 sq. ft per acre
Board Feet sawtimber:	127,500 board feet or 531 board feet per acre
Canopy Closure:	85%
Canopy tree size:	16-18" dbh
Canopy tree height:	74 feet (average)
Canopy Species:	White oak, chestnut oak, northern red oak, eastern hemlock, black oak
Understory Cover:	70%
Understory Species:	Black birch, eastern hemlock, red maple, striped maple, sassafras, witch hazel, shagbark hickory, black gum
Ground Cover:	52%
Ground Cover species:	Black huckleberry, oak seedlings, common blackberry, teaberry, moss, eastern hemlock
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	2%
Invasive species:	Japanese honeysuckle, Japanese barberry, Japanese stilt grass, tree-of-heaven
Downed Woody Debris:	65%

Management Recommendations: Timber harvest of approximately 250 board feet per acre will reduce the basal area to allow better growth on remaining trees. Timber improvement cut is recommended for this stand to remove dead/dying hemlocks and black birch. Canopy opening left by dead hemlocks have created thick stands of 1-2" dbh black birch. Remove all black birch saplings during any harvest or timber stand improvement cuts.

ZONE 2

Compartment 2

Management Stand 3 (MS-3)

(FSD stands 7, 8, 10, 11)

Acreage:	131
Sample Plots:	13
Successional Stage:	Late/Mature
Cover Type:	Mixed oak
Basal Area:	94 sq. ft per acre
Board Feet sawtimber:	46,300 board feet or 353 board feet per acre
Canopy Closure:	86%
Canopy tree size:	12-14" dbh
Canopy tree height:	68 feet (average)
Canopy Species:	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
Understory Cover:	54%
Understory Species:	Black birch, red maple, black gum, spicebush, witch hazel, sassafras, flowering dogwood, striped maple, black locust, white ash
Ground Cover:	83%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	28%
Invasive species:	Common privet, multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven
Downed Woody Debris:	70%

Management Recommendations: No timber harvest recommended for FSD stands 7 or 11 at this time. Timber improvement cuts are highly recommended in FSD stand 8 to remove all black birch of 4" dbh or greater and within FSD stand 10 to remove poorly formed trees or stump sprouts. Little to no oak regeneration was noted in this area.

ZONE 2

Compartment 3

Management Stand 1 (MS-1)

(FSD stands 1-3)

Acreage:	260
Sample Plots:	26
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	95 sq. ft per acre
Board Feet sawtimber:	225,680 board feet or 868 board feet per acre
Canopy Closure:	84%
Canopy tree size:	16-18" dbh
Canopy tree height:	77 feet (average)
Canopy Species:	Chestnut oak, black oak, eastern hemlock, tulip poplar, black birch, white oak, northern red oak
Understory Cover:	55%
Understory Species:	Red maple, black birch, pignut hickory, black gum, spicebush, witch hazel, white pine, Virginia pine, shagbark hickory, flowering dogwood, striped maple, black locust, white ash, black locust
Ground Cover:	49%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Glaucous greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	4%
Invasive species:	Japanese barberry, Japanese honeysuckle, wineberry, Japanese stilt grass, garlic mustard, multiflora rose
Downed Woody Debris:	70%

Management Recommendations: Timber harvest is recommended for this stand. Approximately 500 board feet of small sawtimber could be harvested. The basal area is too high for ideal growth of target species. Oak regeneration was noted within the stand but advanced regeneration is low or absent in most of the management stand. During harvest, removal of dead hemlock is recommended to reduce fuel loading for fire management as well as removal of poorly formed trees and undesirable species, such as black birch or tree-of heaven.

ZONE 2

Compartment 4

Management Stand 1 (MS-1)

(FSD stands 1, 2 & 4)

Acreage:	228
Sample Plots:	22
Successional Stage:	Late/Mature
Cover Type:	Mixed oak
Basal Area:	87 sq. ft per acre
Board Feet sawtimber:	237,910 board feet or 1,043 board feet per acre
Canopy Closure:	88%
Canopy tree size:	12-14" dbh
Canopy tree height:	74 feet (average)
Canopy Species:	Chestnut oak, black oak, tulip poplar, eastern hemlock, white oak, white ash, northern red oak
Understory Cover:	50%
Understory Species:	Red maple, black birch, black gum, spicebush, witch hazel, sassafras, flowering dogwood, striped maple, black locust, white ash
Ground Cover:	69%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	11%
Invasive species:	Field garlic, multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven
Downed Woody Debris:	62%

Management Recommendations: Timber harvest is recommended for this stand. The basal area is too high for ideal growth of target species. Oak regeneration was noted within the stand but advanced regeneration is low or absent in most of the management stand. During harvest, removal of dead hemlock is recommended to reduce fuel loading for fire management.

ZONE 2

Compartment 4

Management Stand 2 (MS-2)

(FSD stand 3)

Acreage:	55
Sample Plots:	6
Successional Stage:	Mature
Cover Type:	Mixed oak
Basal Area:	96 sq. ft per acre
Board Feet sawtimber:	55,380 board feet or 1,007 board feet per acre
Canopy Closure:	83%
Canopy tree size:	12-14" dbh
Canopy tree height:	78 feet (average)
Canopy Species:	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
Understory Cover:	60%
Understory Species:	Red maple, black birch, black gum, spicebush, witch hazel, sassafras, flowering dogwood, striped maple, black locust, white ash
Ground Cover:	70%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	23%
Invasive species:	Common privet, multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stilt grass, tree-of-heaven
Downed Woody Debris:	73%

Management Recommendations: Timber harvest is recommended for this stand. Approximately 500 board feet per acre of small sawtimber could be harvested. The basal area is too high for ideal growth of target species. Oak regeneration was noted within the stand but advanced regeneration is low or absent in most of the management stand. During harvest, removal of areas with dense Japanese barberry is recommended as well as removal of poorly formed trees and undesirable species.

ZONE 2

Compartment 5

Management Stand 1 (MS-1)

(FSD stand 1)

Acreage:	193
Sample Plots:	19
Successional Stage:	Late/Mature
Cover Type:	Mixed oak
Basal Area:	83 sq. ft per acre
Board Feet sawtimber:	289,970 board feet or 1,502 board feet per acre
Canopy Closure:	85%
Canopy tree size:	12-14" dbh
Canopy tree height:	80 feet (average)
Canopy Species:	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
Understory Cover:	50%
Understory Species:	Red maple, black birch, black gum, spicebush, witchhazel, sassafras, flowering dogwood, striped maple, black locust, white ash
Ground Cover:	89%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	32%
Invasive species:	Common privet, multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stiltgrass, tree-of-heaven
Downed Woody Debris:	68%

Management Recommendations: The majority of this stand had been harvested within the last 2 years. No harvest is recommended at this time. The eastern portion of the site has moderate to heavy Japanese barberry in the understory. Apply an approved herbicide or burn to remove barberry and promote oak regeneration. Moderate oak regeneration was noted.

ZONE 2

Compartment 6

Management Stand 1 (MS-1)

(FSD stand 1)

Acreage:	126
Sample Plots:	13
Successional Stage:	Late/Mature
Cover Type:	Mixed oak
Basal Area:	86 sq. ft per acre
Board Feet sawtimber:	218,800 board feet or 1,737 board feet per acre
Canopy Closure:	86%
Canopy tree size:	16-20" dbh
Canopy tree height:	80 feet (average)
Canopy Species:	Tulip poplar, black cherry, bitternut hickory, black oak, black birch, white oak, chestnut oak
Understory Cover:	70%
Understory Species:	Red maple, black birch, black gum, spicebush, sassafras, flowering dogwood, black locust, white ash
Ground Cover:	97%
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive Cover:	33%
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, tree-of-heaven, field garlic
Downed Woody Debris:	47%

Management Recommendations: Timber harvest is recommended for this stand. The majority of the medium to large sawtimber is tulip poplar located in the eastern end of the stand. The basal area should be reduced to provide growth potential. Oak regeneration was noted within the stand but with little advanced regeneration. Japanese barberry should be sprayed with an approved herbicide or removed with a controlled burn in order to open up ground cover and promote better oak regeneration.

ZONE 2

Compartment 7

Management Stand 1 (MS-1)

Acreage:	390
Sample Plots:	0
Successional Stage:	Mature
Cover Type:	Mixed oak
Canopy tree size:	12-14" dbh
Canopy tree height:	68 feet (average)
Canopy Species:	Chestnut oak, black oak, tulip poplar, black birch, white oak, northern red oak
Understory Species:	Red maple, black birch, black gum, spicebush, witchhazel, sassafras, flowering dogwood, striped maple, black locust, white ash
Ground Cover species:	Black birch, common blackberry, black huckleberry, striped wintergreen
Vines:	Common greenbrier, Japanese honeysuckle, fox grape, poison ivy
Invasive species:	Multiflora rose, Japanese honeysuckle, Japanese barberry, wineberry, Japanese stiltgrass, tree-of-heaven

Management Recommendations: No timber harvest or timber improvement cuts recommended due to poor quality of timber and steep slopes. Maintain stand as is for wildlife and stabilization of steep, rocky slopes.

VII. Recommendations

Through the use of forest management tools such as timber harvest and timber stand improvement cuts, the forested land of LEAD within Zones 1 and 2 may be improved to better support multiple activities. Timber harvest could provide the funds needed to make improvement cuts, planting, and management of non-native, invasive plants and animals.

Continued reduction of the white-tailed deer herd on LEAD will improve the regeneration potential of oaks within the forests. Advanced regeneration was low throughout both Zones. Although, early regeneration of oaks, in the form of seedlings, was noted in several stands within Zone 2, Zone 1 showed little regeneration of oaks, early or advanced.

Control of invasive plant species, especially Japanese barberry, throughout most of the site, will allow more opportunity for regeneration of desirable species. Management may be achieved through either application of approved herbicides or controlled burns.

Controlled burns, to thin understory and remove dense invasive plant stands and removal of excessive dead plant material, mostly hemlock in Zone 2, will decrease fuel loads within the forests of LEAD, thereby decreasing the potential of wild fire frequency and severity.

In order to provide a variety of cover types, areas of heavy hemlock mortality caused by HWA should be replanted in Virginia pine, white spruce, or a combination of the two.

Currently, there is one parasitoid approved for biological control of HWA, although permits must be obtained from the USDA in order to release these parasitoids. Management of HWA on LEAD would allow native hemlock to recover and possibly become a viable species, based on the high amount of regeneration observed, in spite of the current infestation.

Table 4 is a schedule of activities for the management of these forests over the next ten years. Timber harvests and invasive species control are the main concentration, but other minor maintenance issues are addressed.

Table 4. 10 Year Proposed Schedule of Activity

YEAR	SEASON	ZONE	COMPARTMENT	STAND	ACTIVITY
2012-2022	Anytime	2		As Necessary	Repair and Maintain roads
2013	Spring	1 and 2		As Funds Allow	Fertilize fruit trees/maintain openings
2013-2018	Fall/Winter	1	-----	3	Timber harvest
2013-2018	Fall/Winter	2	4	1	Timber harvest
2013-2022	Spring-Fall	1 and 2		As Necessary	Spray/burn Japanese barberry
2013-2018	Fall/Winter	1	-----	1 and 2	Timber improvement cut
2013-2018	Fall/Winter	2	2	1 and 2	Timber harvest
2015-2020	Fall/Winter	2	1	1 and 2	Timber improvement cut
2013-2018	Fall/Winter	2	2	2	Remove dead hemlock to reduce fuel load
2014-2019	Spring	2	2	2	Plant pine/spruce
2014-2019	Fall/Winter	2	3	1	Remove dead hemlock to reduce fuel load
2015-2020	Spring	2	3	1	Plant pine/spruce
2015-2020	Fall/Winter	2	4	1	Remove dead hemlock and black birch
2016-2021	Spring	2	4	1	Plant pine
2020	Fall/Winter	2	5	1	Remove black birch
2020-2022	Fall/Winter	2	6	1	Timber harvest

VIII. References

Eyre, F.H. 1980. Forest Cover Types of the United States and Canada. Society of American Foresters, Washington, D.C. 148 pp.

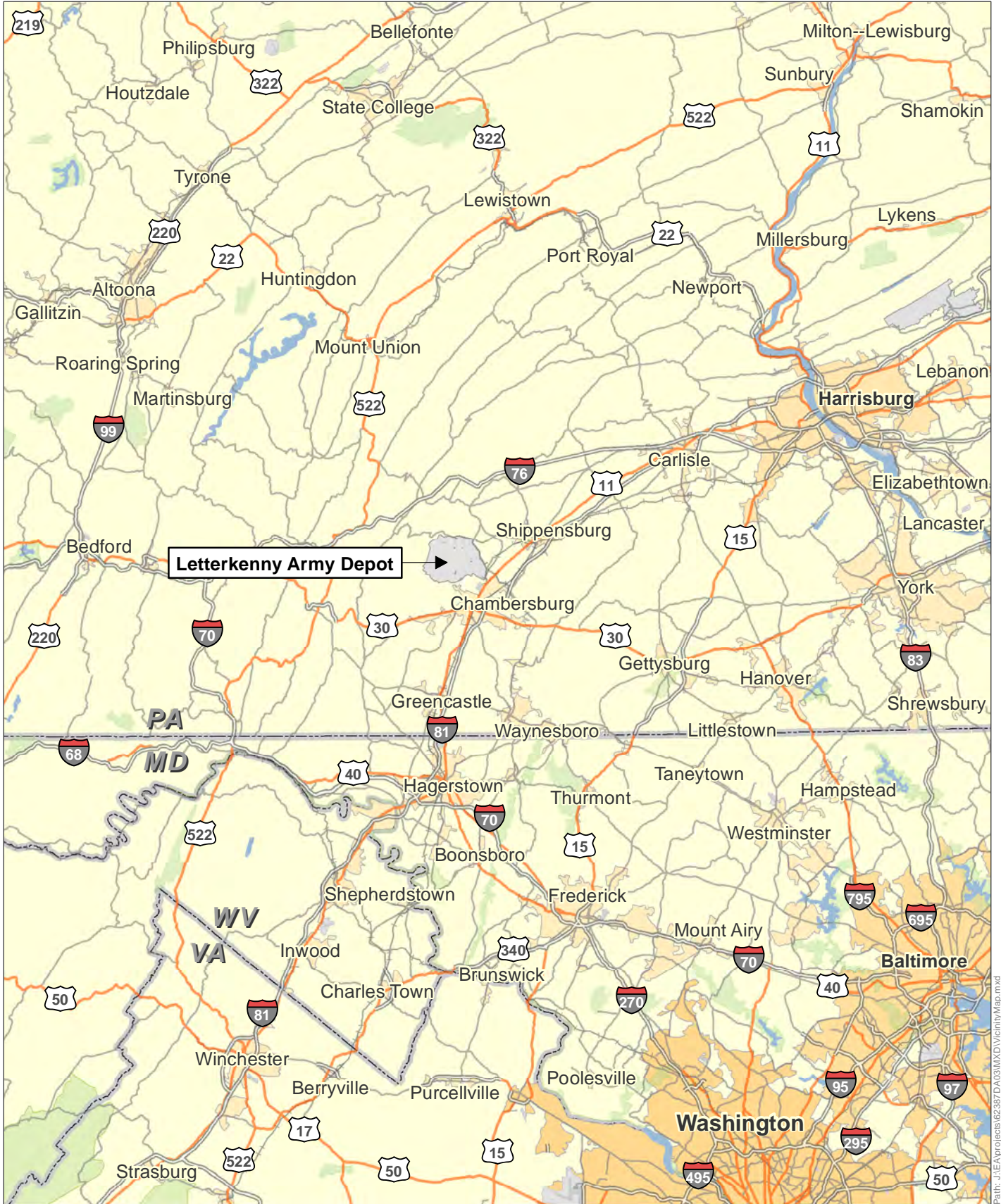
Forest Management Center. 1995. Report of Forestlands on Letterkenny Army Depot: Forest Management Plan. Thompsontown, Pennsylvania.

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APPENDIX A

**VICINITY,
FOREST STAND DELINEATION, AND
SOIL MAPS**



Path: J:\NEA\projects\62387\DA03\MXD\VicinityMap.mxd

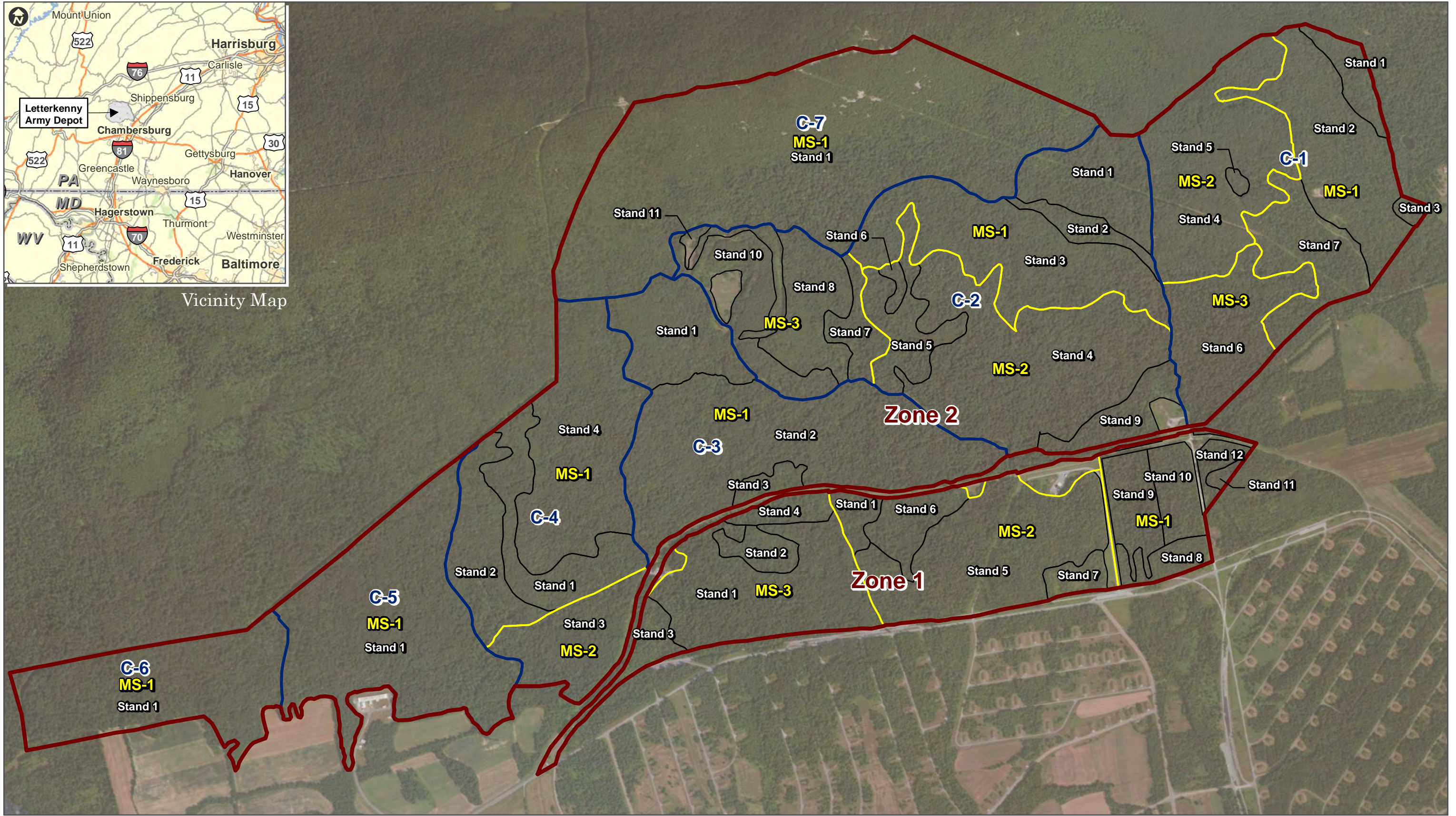

 0 10 20
 Miles
 Date: 8/29/2012

Letterkenny Army Depot
Forest Stand Delineation





Vicinity Map



Vicinity Map

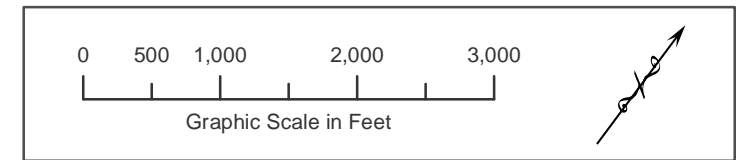


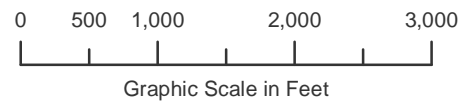
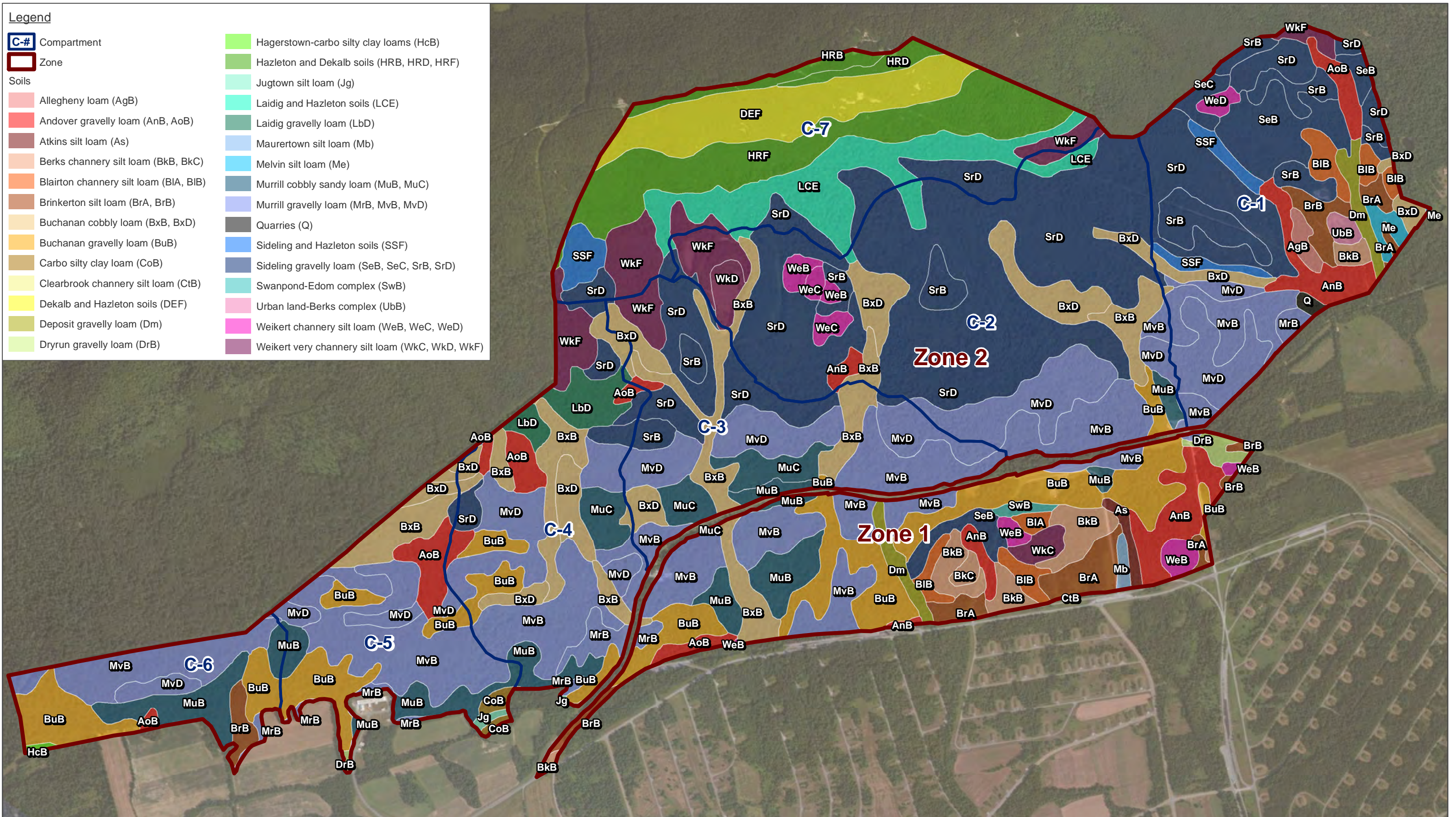
Date: 8/29/2012

 Forest Stands	 Compartment
 Management Stands	 Zone

Letterkenny Army Depot

Forest Stand Delineation





Letterkenny Army Depot

USDA NRCS Soils Map

Date: 8/29/2012



APPENDIX B
PHOTOGRAPHIC RECORD

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 1
February – April 2012



Management Stand 3 - Representative photograph of Stand 1 (taken at S1P5)



Management Stand 3 - Representative photograph of Stand 2 (taken at S2P1)



Management Stand 3 - Representative photograph of Stand 3 (taken at S3P1)



Management Stand 3 - Representative photograph of Stand 4 (taken at S4P1)



Management Stand 2 - Representative photograph of Stand 5 (taken at S5P6)



Management Stand 2 - Representative photograph of Stand 6 (taken at S6P2)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 1
February – April 2012



Management Stand 2 - Representative photograph of Stand 7 (taken at S7P1)



Management Stand 1 - Representative photograph of Stand 8 (taken at S8P2)



Management Stand 1 - Representative photograph of Stand 9 (taken at S9P2)



Management Stand 1 - Representative photograph of Stand 10 (taken at S10P1)



Management Stand 1 - Representative photograph of Stand 11 (taken at S11P1)



Management Stand 1 - Representative photograph of Stand 12 (taken at S12P1)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 2, Compartments 1 through 7
February – April 2012



Compartment 1, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P1)



Compartment 1, Management Stand 1 –
Representative photograph of Stand 2 (taken at
S2P6)



Compartment 1, Management Stand 1 –
Representative photograph of Stand 3 (taken at
S3P1)



Compartment 1, Management Stand 2 –
Representative photograph of Stand 4 (taken at
S4P2)



Compartment 1, Management Stand 3 –
Representative photograph of Stand 6 (taken at
S6P6)



Compartment 1, Management Stand 1 –
Representative photograph of Stand 7 (taken at
S7P1)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 2, Compartments 1 through 7
February – April 2012



Compartment 2, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P1)



Compartment 2, Management Stand 1 –
Representative photograph of Stand 2 (taken at
S2P1)



Compartment 2, Management Stand 1 –
Representative photograph of Stand 3 (taken at
S3P6)



Compartment 2, Management Stand 2 –
Representative photograph of Stand 4 (taken at
S4P3)



Compartment 2, Management Stand 2 –
Representative photograph of Stand 5 (taken at
S5P1)



Compartment 2, Management Stand 2 –
Representative photograph of Stand 6 (taken at
S6P1)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 2, Compartments 1 through 7
February – April 2012



Compartment 2, Management Stand 3 –
Representative photograph of Stand 7 (taken at
S7P2)



Compartment 2, Management Stand 3 –
Representative photograph of Stand 8 (taken at
S8P2)



Compartment 2, Management Stand 2 –
Representative photograph of Stand 9 (taken at
S9P1)



Compartment 2, Management Stand 3 –
Representative photograph of Stand 10 (taken at
S10P3)



Compartment 2, Management Stand 3 –
Representative photograph of Stand 11 (taken at
S11P1)



Compartment 3, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P1)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 2, Compartments 1 through 7
February – April 2012



Compartment 3, Management Stand 1 –
Representative photograph of Stand 2 (taken at
S2P15)



Compartment 3, Management Stand 1 –
Representative photograph of Stand 3 (taken at
S3P1)



Compartment 4, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P3)



Compartment 4, Management Stand 1 –
Representative photograph of Stand 2 (taken at
S2P2)



Compartment 4, Management Stand 2 –
Representative photograph of Stand 3 (taken at
S3P6)



Compartment 4, Management Stand 1 –
Representative photograph of Stand 4 (taken at
S4P3)

Photographic Record

Letterkenny Army Depot (LEAD)
Forest Stand Delineation – Zone 2, Compartments 1 through 7
February – April 2012



Compartment 5, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P9)



Compartment 5, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P11)



Compartment 6, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P2)



Compartment 6, Management Stand 1 –
Representative photograph of Stand 1 (taken at
S1P8)



Compartment 7, Management Stand 1 – Lower
portion



Compartment 7, Management Stand 1 – Upper
portion

APPENDIX C
FOREST SAMPLING DATA SHEETS

ZONE 1
FIELD SAMPLING DATA SHEETS

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: -- Stand #: 1 Plot #: 1
 Forest Cover Type: Oak Date: 3/12/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>			1			3			5							69, 72, 76, 80	9
2 <i>Carya alba</i>								3									3
3 <i>Quercus velutina</i>						1			2							75, 60	3
4 <i>Betula lenta</i>			1														1
5 <i>Acer rubrum</i>			1					2									3
6 <i>Carya ovata</i>			2					1									3
7 <i>Nyssa sylvatica</i>								2									2
8 <i>Carya glabra</i>								1									1
9																	0
Total Number of Trees per Size Class	5			13			7										25
Number & Size of Standing Dead Trees				2			2										4

List of Woody Plant Species 3'-20': <i>Carya ovata, Betula lenta, Quercus alba, Acer rubrum, Berberis thunbergii</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	N	N	N	N	20		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Rubus allegheniensis, Acer rubrum, Tsuga canadensis, Betula lenta, moss, Berberis thunbergii</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	Y	100	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species,
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	Y	Y	Y	Y	80	Habitat size, location, configuration: 10.6 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All
Exotic Plants? Yes	Y	N	Y	Y	Y	80	
Leaf litter? Light							Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to vernal pool
Fire Management Zone (Yes/No) No
Fuel load and type located in stand Yes, Down woody debris, dead standing trees, few invasive species
Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 2182
13	37	192	14	36	238	
18	39	466	16	32	288	
19	16	225	18	27	344	
15	37	287	12	14	56	
11	29	86				

Comments: Photo 104 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 1

Plot #: 2

Forest Cover Type: Oak

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																																																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total																																		
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other																																				
1 <i>Carya glabra</i>			1			4			2							75	7																																		
2 <i>Carya ovata</i>						2			3							65, 67	5																																		
3 <i>Quercus palustris</i>										1						80	1																																		
4 <i>Acer rubrum</i>						2											2																																		
5 <i>Quercus velutina</i>							1									80	1																																		
6 <i>Carya alba</i>			1														1																																		
7 <i>Nyssa sylvatica</i>			1														1																																		
8																	0																																		
9																	0																																		
Total Number of Trees per Size Class		3			8			6			1							18																																	
Number & Size of Standing Dead Trees		1			1													2																																	
List of Woody Plant Species 3'-20': <i>Carya glabra, Carya alba, Betula lenta, Berberis thunbergii</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:																																					
							C	N	E	S	W	%	5%		Mature																																				
							Y	Y	Y	Y	Y	100																																							
List of Understory Species 0'-3': <i>Smilax rotundifolia, Berberis thunbergii, Claytonia virginica, Acer rubrum, Tsuga canadensis, Rosa multiflora</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):																																							
							C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora</i>																																						
							N	N	N	Y	N	20																																							
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?																																							
Specimen Trees?	No						C	N	E	S	W	%	Deer, frogs, red bat																																						
Historic Sites?	No						N	Y	Y	Y	Y	80	Habitat size, location, configuration:																																						
Disease?	No											103.7 acres																																							
Insects/Infestation?	Yes, hemlock woolly adelgid						Downed Woody Debris:					Wildlife cover/food/water?																																							
Exotic Plants?	Yes						C	N	E	S	W	%	All																																						
Leaf litter?	Light						Y	Y	Y	Y	Y	100	Stand corridor/patch?																																						
Downed woody debris:	Yes																																																		
FUNCTION: Where is stand in relation to sensitive areas on site? perennial stream adjacent and within plot																																																			
Fire Management Zone (Yes/No) No																																																			
Fuel load and type located in stand Yes, down woody debris and dead standing trees																																																			
Fire Break locations in stand No																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th rowspan="5" style="text-align: center; vertical-align: middle;">Total Board Feet: 1955</th> </tr> </thead> <tbody> <tr> <td>14</td> <td>22</td> <td>138</td> <td>15</td> <td>22</td> <td>167</td> </tr> <tr> <td>13</td> <td>25</td> <td>122</td> <td>17</td> <td>30</td> <td>318</td> </tr> <tr> <td>12</td> <td>26</td> <td>96</td> <td>14</td> <td>25</td> <td>150</td> </tr> <tr> <td>22</td> <td>47</td> <td>932</td> <td></td> <td></td> <td></td> </tr> <tr> <td>12</td> <td>9</td> <td>32</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>															DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1955	14	22	138	15	22	167	13	25	122	17	30	318	12	26	96	14	25	150	22	47	932				12	9	32			
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1955																																													
14	22	138	15	22	167																																														
13	25	122	17	30	318																																														
12	26	96	14	25	150																																														
22	47	932																																																	
12	9	32																																																	
Comments: Photo 105 Management Stand 3																																																			

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 1 Plot #: 3

Forest Cover Type: Oak

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus velutina</i>		2			1			2			2					65, 60	7	
2 <i>Acer rubrum</i>			2			1										50	3	
3 <i>Betula lenta</i>			15			2			2							48, 38	19	
4 <i>Robinia pseudoacacia</i>			1			1											2	
5 <i>Sassafras albidum</i>			1			2											3	
6 <i>Quercus alba</i>								1									1	
7 <i>Prunus serotina</i>			1			1											2	
8 <i>Ailanthus altissima</i>																	0	
9																	0	
Total Number of Trees per Size Class		22			8			5			2							37
Number & Size of Standing Dead Trees		2																2
List of Woody Plant Species 3'-20': <i>Betula lenta, Robinia pseudoacacia, Quercus velutina, Acer rubrum, Sassafras albidum, Prunus serotina</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	15%		Mature			
							Y	N	Y	Y	Y	60						
List of Understory Species 0'-3': <i>Rosa multiflora, Smilax rotundifolia, Berberis thunbergii, Tsuga canadensis, Betula lenta</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Ailanthus altissima</i>					
							Y	N	N	Y	N	40						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species, frog species					
Historic Sites?	No						N	Y	Y	N	Y	60	Habitat size, location, configuration:					
Disease?	No											103.7						
Insects/Infestation?	Yes, hemlock woolly adelgid						Downed Woody Debris:											
Exotic Plants?	Yes						C	N	E	S	W	%	Wildlife cover/food/water?					
Leaf litter?	Light						Y	N	N	Y	Y	60	All					
Downed woody debris:	Yes											Stand corridor/patch?						
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to perennial stream and vernal pond											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris and dead standing trees											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 2332				
20		25		384			24		34		850							
21		23		434			10		15		32							
11		16		49														
22		26		527														
12		15		56														
Comments: Photo 106							Management Stand 3											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 1

Plot #: 4

Forest Cover Type:

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus alba</i>								2					1					85	3	
2	<i>Carya ovata</i>					1			5										75	6	
3	<i>Carya glabra</i>					1						1							75	2	
4	<i>Betula lenta</i>					2						1							77	3	
5	<i>Acer rubrum</i>								1											1	
6	<i>Ostrya virginiana</i>					1														1	
7	<i>Quercus prinus</i>								1										80	1	
8																				0	
9																				0	
Total Number of Trees per Size Class		5			6			5			1										17
Number & Size of Standing Dead Trees																					0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Robinia pseudoacacia, Betula lenta, Carya ovata, Carya glabra, Ostrya virginiana</i>				C	N	E	S	W	%	15%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Claytonia virginica, Smilax rotundifolia, Tsuga canadensis, Rubus allegheniensis, Rosa multiflora, Lonicera japonica, Viburnum prunifolium, Rubus occidentalis</i>				C	N	E	S	W	%	<i>Rosa multiflora, Lonicera japonica</i>											
				Y	N	Y	N	N	40												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, frog species											
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No							103.7 acres													
Insects/Infestation?	Yes, hemlock wooly adelgid			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	Yes			C	N	E	S	W	%	All											
Leaf litter?	Light			Y	Y	Y	Y	Y	100	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream																	
Fire Management Zone (Yes/No)				No																	
Fuel load and type located in stand				Yes, down woody debris																	
Fire Break locations in stand				No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 2191							
18		21		270			10		20		46										
16		25		216			14		20		126										
28		28		1008																	
13		19		91																	
21		25		434																	
Comments: Photo 108				Management Stand 3																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 1 Plot #: 5

Forest Cover Type: Oak

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			5			1					72, 77, 75	7	
2 <i>Betula lenta</i>			3			1											4	
3 <i>Carya cordiformis</i>									1							70	1	
4 <i>Prunus serotina</i>			7			3											10	
5 <i>Carya ovata</i>									1							75	1	
6 <i>Quercus rubra</i>					1												1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		10			6			7			1							24
Number & Size of Standing Dead Trees		1																1
List of Woody Plant Species 3'-20': <i>Betula lenta, Prunus serotina</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 2%		Plot Successional Stage: Mature						
					C	N	E	S	W	%								
					Y	Y	Y	Y	N	80								
List of Understory Species 0'-3': <i>Smilax rotundifolia, Vitis sp., Betula lenta, Tsuga canadensis, Rubus occidentalis, Rubus allegheniensis, Ailanthus altissima, moss</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Ailanthus altissima</i>								
					C	N	E	S	W	%								
					Y	Y	N	N	Y	60								
Rare, etc. Species? No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species								
Specimen Trees? No					C	N	E	S	W	%								
Historic Sites? No					N	Y	Y	Y	Y	80	Habitat size, location, configuration: 103.7 acres							
Disease? No																		
Insects/Infestation? No					Downed Woody Debris:					Wildlife cover/food/water? All								
Exotic Plants? Yes					C	N	E	S	W	%	Stand corridor/patch?							
Leaf litter? Light					N	N	N	Y	Y	40								
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 3310				
20		24		384			23		25		542							
20		25		384			14		19		113							
28		24		864			15		30		227							
17		28		296			19		32		450							
11		16		50														
Comments: Photo 109					Management Stand 3													

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 1 Plot #: 8

Forest Cover Type: Oak

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus velutina</i>								1								60	1	
2 <i>Quercus alba</i>		2			1											56	3	
3 <i>Carya ovata</i>			10			7			1							79, 55	18	
4 <i>Acer rubrum</i>			2														2	
5 <i>Betula lenta</i>						2										50	2	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		14			10			2										26
Number & Size of Standing Dead Trees								1										1
List of Woody Plant Species 3'-20': <i>Acer rubrum, Betula lenta, Carya ovata, Quercus alba, Berberis thunbergii</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 45%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	N	Y	Y	Y	80						
List of Understory Species 0'-3': <i>Rubus occidentalis, Rosa multiflora, Lonicera japonica, Smilax rotundifolia, Claytonia virginica, Rubus allegheniensis, Alliaria petiolata, moss.</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Lonicera japonica, Berberis thunbergii, Alliaria petiolata</i>						
							C	N	E	S	W	%						
							Y	N	N	N	N	20						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C N E S W %					Deer, bird species											
Historic Sites? No		Y Y Y Y Y 100					Habitat size, location, configuration:											
Disease? No							103.7 acres											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? Yes		C N E S W %					All											
Leaf litter? Light		Y Y N N Y 60					Stand corridor/patch?											
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, Down woody debris, dead standing, and invasives																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 939						
8		14		14		10		20		46								
9		15		22		17		24		294								
21		28		506														
9		16		25														
9		20		32														
Comments: Photo 113							Management Stand 3											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 1 Plot #: 9
 Forest Cover Type: Oak Date: 3/13/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>				1			7									78, 84	8
2 <i>Carya ovata</i>						6			1							65, 80, 80	7
3																	0
4																	0
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class				7			8										15
Number & Size of Standing Dead Trees				1													1

List of Woody Plant Species 3'-20': <i>Betula lenta, Quercus alba</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	N	Y	Y	Y	Y	80		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Berberis thunbergii, Rosa multiflora, Rubus occidentalis, moss.</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	Y	N	N	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	N	80	Habitat size, location, configuration: 103.7 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? Yes	Y	Y	N	Y	Y	80	
Leaf litter? Moderate							
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1847
11	21	62	15	8	61	
14	26	163	10	20	46	
13	30	152	17	31	317	
10	19	41	20	21	320	
11	14	43	16	19	162	
14	28	176	18	20	246	
10	20	46	8	13	12	

Comments: Photo 115 Management Stand 3

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 1 Plot #: 10

Forest Cover Type: Oak

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Total		
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus alba</i>							1									88	1
2	<i>Carya ovata</i>			2			3										82, 76, 73	11
3	<i>Acer rubrum</i>			1														1
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		3			3			7										13
Number & Size of Standing Dead Trees					1			1										2
List of Woody Plant Species 3'-20': <i>Carya ovata, Acer rubrum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 20%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	Y	N	Y	Y	80									
List of Understory Species 0'-3': <i>Rubus occidentalis, Smilax rotundifolia, Lonicera japonica, Rubus allegheniensis, Rosa multiflora, Berberis thunbergii, Elymus hystrix, Allium vineale</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rosa multiflora, Berberis thunbergii, Allium vineale</i>										
				C	N	E	S	W	%									
				N	Y	Y	N	Y	60									
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species, frog species												
Specimen Trees? No		C	N	E	S	W	%											
Historic Sites? No		Y	Y	Y	Y	Y	100					Habitat size, location, configuration: 103.7 acres						
Disease? No																		
Insects/Infestation? No																		
Exotic Plants? Yes		C	N	E	S	W	%					Wildlife cover/food/water? All						
Leaf litter? Light		Y	N	Y	N	Y	60					Stand corridor/patch?						
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, dead standing																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
15		30		227			23		26		587			1658				
13		20		102			13		22		112							
16		24		216			8		12		12							
11		20		62			13		24		122							
13		25		122			12		25		96							
Comments: Photo 116 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 1 Plot #: 11

Forest Cover Type: Oak

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>								1								73	1	
2 <i>Quercus velutina</i>								1								72	1	
3 <i>Quercus alba</i>					2			5			1					78	8	
4 <i>Carya ovata</i>			1			1			1							81	3	
5 <i>Acer rubrum</i>						1											1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		1			4			8			1							14
Number & Size of Standing Dead Trees					1			2										3
List of Woody Plant Species 3'-20': <i>Betula lenta, Berberis thunbergii, Rosa multiflora, Carya ovata</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 10%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Rubus allegheniensis, Rosa multiflora</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>						
							C	N	E	S	W	%						
							Y	Y	Y	N	N	60						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species, frog species						
Specimen Trees?	No						C	N	E	S	W	%						
Historic Sites?	No						Y	Y	N	Y	Y	80	Habitat size, location, configuration: 103.7 acres					
Disease?	No						Downed Woody Debris:											
Insects/Infestation?	No						C	N	E	S	W	%	Wildlife cover/food/water? All					
Exotic Plants?	Yes						Y	Y	Y	Y	N	80	Stand corridor/patch?					
Leaf litter?	Light																	
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris, dead standing											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 3005				
22		27		470			11		20		62							
15		20		152			22		38		770							
16		25		216			16		28		270							
11		25		74			10		20		46							
16		24		216			21		28		506							
13		15		71			15		20		152							
Comments: Photo 117							Management Stand 3											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 2 Plot #: 1

Forest Cover Type: Birch

Date: 3/12/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Average Tree Height (ft)	Total	
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Betula lenta</i>	25			7													32
2	<i>Prunus serotina</i>			3			9											12
3	<i>Acer rubrum</i>			4			1											5
4	<i>Quercus alba</i>											1						1
5	<i>Carya ovata</i>						1											1
6	<i>Ailanthus altissima</i>			1														1
7	<i>Quercus velutina</i>						1											1
8	<i>Robinia pseudoacacia</i>						1											1
9	<i>Carya alba</i>			1														1
Total Number of Trees per Size Class		34			20						1						55	
Number & Size of Standing Dead Trees		1															1	
List of Woody Plant Species 3'-20': <i>Prunus serotina, Quercus velutina, Acer rubrum, Ailanthus altissima, Carya alba, Berberis thunbergii</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 30%		Plot Successional Stage: Early/Mid								
				C	N	E	S	W	%									
				N	Y	Y	Y	Y	80									
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Rubus occidentalis, Lonicera japonica, Claytonia virginica, Acer rubrum, Betula lenta, Rosa carolina</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Ailanthus altissima</i>										
				C	N	E	S	W	%									
				Y	Y	Y	N	N	60									
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, frog species, avian species										
Specimen Trees? No				C	N	E	S	W	%	Habitat size, location, configuration: 13.7 acres								
Historic Sites? No				Y	Y	Y	Y	N	80									
Disease? No				Downed Woody Debris:				Wildlife cover/food/water? All										
Insects/Infestation? No				C	N	E	S	W	%	Stand corridor/patch?								
Exotic Plants? Yes				Y	Y	Y	Y	Y	100									
Leaf litter? Light																		
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to ephemeral channel																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, invasives																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 918						
10		9		18														
9		8		13														
27		26		860														
10		12		27														
Comments: Photo 107 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 4

Plot #: 1

Forest Cover Type: Ash/Black Locust

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Fraxinus americana</i>		2			5			1								60	8
2	<i>Robinia pseudoacacia</i>					1			1								70	2
3	<i>Prunus serotina</i>			14			2											16
4	<i>Quercus prinus</i>												2				70	2
5	<i>Acer rubrum</i>						5										53	5
6	<i>Sassafras albidum</i>									1								1
7	<i>Carya ovata</i>						1											1
8																		0
9																		0
Total Number of Trees per Size Class			16			14			3				2					35
Number & Size of Standing Dead Trees			1			6												7
List of Woody Plant Species 3'-20': <i>Fraxinus americana, Prunus serotina, Lindera benzoin, Betula lenta</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 70%		Plot Successional Stage: Early/Mid						
					C	N	E	S	W	%								
					Y	Y	Y	N	Y	80								
List of Understory Species 0'-3': <i>Rosa multiflora, Lonicera japonica, Berberis thunbergii, Smilax rotundifolia, Lindera benzoin, Allium vineale, Toxicodendron radicans, Rosa carolina, moss.</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Lonicera japonica, Allium vineale</i>								
					C	N	E	S	W	%								
					N	Y	N	Y	N	40								
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease? No							13.1 ac											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? Yes		C	N	E	S	W	%	All										
Leaf litter? Light		N	N	Y	Y	N	40	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, invasives, thick understory, down woody debris, dead standing trees																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
20		13		192										1490				
8		12		12														
9		16		26														
24		16		400														
27		26		860														
Comments: Photo 114 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 5 Plot #: 2

Forest Cover Type: Unknown

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Fraxinus americana</i>						4			2							78	6
2	<i>Robinia pseudoacacia</i>						1			2							62, 75	3
3	<i>Liriodendron tulipifera</i>												1				90	1
4	<i>Prunus serotina</i>						1											1
5	<i>Ailanthus altissima</i>						1											1
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class					7			4			1							12
Number & Size of Standing Dead Trees		2			9			2										13
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Lonicera tatarica, Berberis thunbergii, Prunus serotina, Lindera benzoin</i>							C	N	E	S	W	%	60%		Mid			
							Y	N	Y	N	Y	60						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Smilax rotundifolia, Rubus phoenicolasius, Rosa multiflora, Lonicera japonica, Allium vineale, Toxicodendron radicans, Vitis sp., Duchesnea indica, rosa carolina</i>							C	N	E	S	W	%	Allium vineale, Berberis thunbergii, Ailanthus altissima, Lonicera tatarica, Rubus phoenicolasius, Rosa multiflora, Lonicera japonica					
							Y	Y	Y	N	Y	80						
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':							HABITAT: What species present?							
Specimen Trees?		No		C	N	E	S	W	%	Deer, bird species								
Historic Sites?		No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No									121.7 acres							
Insects/Infestation?		No		Downed Woody Debris:							Wildlife cover/food/water?							
Exotic Plants?		Yes		C	N	E	S	W	%	Cover, food								
Leaf litter?		Light		Y	Y	Y	Y	N	80	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to ephemeral channel																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasives, thick understory																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
10		25		54										1352				
15		16		121														
25		33		882														
10		18		41														
17		24		254														
Comments: Photo 119 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 3
 Forest Cover Type: Oak (previously labeled as unknown) Date: 3/13/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			3								72	4	
2 <i>Quercus velutina</i>								1								86	1	
3 <i>Acer rubrum</i>						1			1							65	2	
4 <i>Carya ovata</i>			1			5			2							70	8	
5 <i>Carya alba</i>			1			4										75	5	
6 <i>Prunus serotina</i>									1								1	
7 <i>Carya glabra</i>			1			1			2							65	4	
8																	0	
9																	0	
Total Number of Trees per Size Class		3			12			10										25
Number & Size of Standing Dead Trees								3										3

List of Woody Plant Species 3'-20': <i>Lindera benzoin, Carya ovata, Carya alba, Carya glabra, Berberis thunbergii</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Lonicera japonica, Rubus occidentalis, Vitis sp.</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	N	N	N	N	20	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	N	Y	Y	80	Habitat size, location, configuration: 121.7 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? Food, cover Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	Y	Y	Y	Y	80	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, invasives, thick understory beyond plot
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 2313
18	16	196	19	9	113	
12	20	80	9	10	16	
12	22	88	20	19	288	
16	21	180	13	19	91	
9	12	19	13	11	51	
8	12	12	12	15	56	
9	11	16	24	24	600	
17	19	190	17	30	317	

Comments: Photo 123 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 4
 Forest Cover Type: Unknown Date: 3/13/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Fraxinus americana</i>								1							1		68	4	
2	<i>Cercis canadensis</i>					1			1										2	
3	<i>Acer rubrum</i>								2										2	
4	<i>Carya ovata</i>								1									50	1	
5	<i>Juglans nigra</i>								1			1							2	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		1			6			3			1									11
Number & Size of Standing Dead Trees					1															1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
<i>Lindera benzoin, Berberis thunbergii, Cercis canadensis, Viburnum prunifolium</i>				C	N	E	S	W	%	70%		Mid/Mature								
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Smilax rotundifolia, Rosa multiflora, Lonicera japonica, Toxicodendron radicans, Berberis thunbergii, Allium vineale, Vitis sp.</i>				C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Lonicera japonica, Allium vineale</i>										
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species										
Historic Sites?	No			Y	Y	N	Y	Y	80	Habitat size, location, configuration:										
Disease?	No			Downed Woody Debris:				121.7 acres												
Insects/Infestation?	No			C	N	E	S	W	%	Wildlife cover/food/water?										
Exotic Plants?	Yes			Y	Y	N	N	Y	60	food, cover										
Leaf litter?	Light							Stand corridor/patch?												
Downed woody debris:	Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No)		Yes																		
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasives, thick understory																		
Fire Break locations in stand		No																		
DBH (inches)	Length of Log (ft)	Contents in Board Feet		DBH (inches)	Length of Log (ft)	Contents in Board Feet		Total Board Feet: 1071												
9	18	28																		
22	19	365																		
20	17	256																		
19	30	422																		
Comments: Photo 124 Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 5
 Forest Cover Type: Unknown Date: 3/13/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus americana</i>							10										65, 48	10
2 <i>Robinia pseudoacacia</i>							3						1				72	4
3 <i>Cercis canadensis</i>				9													23	9
4 <i>Prunus serotina</i>				2														2
5 <i>Ulmus rubra</i>				1														1
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		12			13						1							26
Number & Size of Standing Dead Trees		1			4			2										7

List of Woody Plant Species 3'-20': <i>Cercis canadensis, Berberis thunbergii, Lonicera tatarica, Prunus serotina, Ulmus rubra</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%	Plot Successional Stage: Mature					
C	N	E	S	W	%	Y	N			N	Y	N	40	
List of Understory Species 0'-3': <i>Claytonia virginica, rubus phoenicolasius, Rosa multiflora, Lonicera japonica, Smilax rotundifolia, Allium vineale</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Allium vineale, rubus phoenicolasius, Lonicera tatarica, Berberis thunbergii, Lonicera japonica</i>						
C	N	E	S	W	%	Y	Y	Y	N	N	60	HABITAT: What species present? Deer, bird species		
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				Habitat size, location, configuration: 121.7 acres						
Specimen Trees? No				C	N	E	S	W	%	Wildlife cover/food/water? Cover, food				
Historic Sites? No				Y	Y	Y	Y	Y	100	Stand corridor/patch?				
Disease? No				Downed Woody Debris:										
Insects/Infestation? No				C	N	E	S	W	%					
Exotic Plants? Yes				Y	N	Y	Y	Y	80					
Leaf litter? Light														
Downed woody debris: Yes														

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, Down woody debris, dead standing trees, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 329
10	12	27	9	16	25	
12	15	56	9	13	19	
10	18	41	9	10	16	
12	19	72	11	20	61	
8	12	12				

Comments: Photo 125 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 6
 Forest Cover Type: Unknown Date: 3/13/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus americana</i>			5			6										38	11
2 <i>Robinia pseudoacacia</i>			2			1										48	3
3 <i>Carya ovata</i>			5			3										50	8
4 <i>Gleditsia triacanthos</i>			2													36	2
5 <i>Quercus palustris</i>			1														1
6 <i>Celtis occidentalis</i>			1														1
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	16			10													26
Number & Size of Standing Dead Trees	1			1													2

List of Woody Plant Species 3'-20': <i>Viburnum prunifolium, Crataegus sp., Ulmus rubra, Gleditsia triacanthos, Robinia pseudoacacia, Quercus palustris, Celtis occidentalis</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 40%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	N	Y	N	60		
List of Understory Species 0'-3': <i>Rubus occidentalis, Claytonia virginica, Allium vineale, Lonicera japonica, rosa multiflora, Smilax rotundifolia, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rosa multiflora, Allium vineale</i>	
	C	N	E	S	W	%		
	Y	N	Y	Y	N	60		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird speices, frog species	
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	Y	Y	Y	N	Y	80	Habitat size, location, configuration: 121.7 acres	
Disease? No	Downed Woody Debris:						Wildlife cover/food/water? All	
Insects/Infestation? No	C	N	E	S	W	%	Stand corridor/patch?	
Exotic Plants? Yes	N	N	Y	Y	Y	60		
Leaf litter? Light								
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to channel, wet area

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species, and thick understory outside of plot

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 101
12	18	72				
8	10	10				
9	6	9				
8	10	10				

Comments: Photo 126 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 7
 Forest Cover Type: Unknown Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>						1			1			1				70	3
2 <i>Quercus velutina</i>									1							65	1
3 <i>Carya ovata</i>			8			11			2						59, 65, 61	21	
4 <i>Ailanthus altissima</i>			1														1
5 <i>Prunus serotina</i>						1											1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	9			13			4			1							27
Number & Size of Standing Dead Trees	2			6													8

List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Ailanthus altissima, Carya ovata, Prunus serotina</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 25%	Plot Successional Stage: Mid/Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Lonicera japonica, Berberis thunbergii, Allium vineale, Rubus occidentalis, Rosa multiflora</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Lonicera japonica, Ailanthus altissima, Allium vineale</i>
	C	N	E	S	W	%	
	Y	N	Y	N	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species, frog species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	N	80	Habitat size, location, configuration: 121.7 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? Yes	N	N	Y	Y	N	40	
Leaf litter? Light							
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, Down woody debris, invasive species, dead standing, thick understory outside of plot
 Fire Break locations in stand Yes - Missile Road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1297
22	20	406	9	19	28	
15	23	182	12	20	80	
25	10	276	9	12	19	
9	12	19	10	13	27	
9	18	28	12	18	72	
9	16	25	11	25	74	
11	20	61				

Comments: Photo 127 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 5 Plot #: 8

Forest Cover Type: Unknown

Date: 3/14/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus palustris</i>									1							53	1	
2 <i>Fraxinus americana</i>			2			8										48, 52	10	
3 <i>Prunus serotina</i>						1			1							52	2	
4 <i>Carya ovata</i>						1											1	
5 <i>Ulmus rubra</i>			2														2	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		4			10			2			0							16
Number & Size of Standing Dead Trees		2			13			2										17
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Berberis thunbergii, Prunus serotina, Viburnum prunifolium, Carya alba, Ulmus rubra, Fraxinus americana, Carya glabra</i>							C	N	E	S	W	%	50%		Mid/Mature			
Y							Y	Y	Y	Y	N	80						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Claytonia virginica, Rosa multiflora, Berberis thunbergii, Allium vineale, Lonicera japonica, Rubus allegheniensis, Smilax rotundifolia, Toxicodendron radicans, Rubus occidentalis</i>							C	N	E	S	W	%	<i>Berberis thunbergii, Allium vineale, Lonicera japonica, Rosa multiflora</i>					
N							N	N	N	Y	N	20						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species, frog species					
Historic Sites?	No						Y	Y	Y	Y	Y	80	Habitat size, location, configuration:					
Disease?	No											121.7 acres						
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	Yes						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	N	Y	N	N	40	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to wetland area adjacent to railroad tracks											
Fire Management Zone (Yes/No)							Yes											
Fuel load and type located in stand							Yes, down woody debris, dead standing trees, invasive species											
Fire Break locations in stand							Yes, Missile Road and Massachusetts Road											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
11		14		43			10		6		14			336				
13		15		71			8		15		14							
15		20		152														
8		10		10														
10		15		32														
Comments: Photo 128							Management Stand 2											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 5

Plot #: 10

Forest Cover Type: Unknown

Date: 3/14/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Prunus serotina</i>			3			3										38	6
2	<i>Robinia pseudoacacia</i>			5			2			1							40	8
3	<i>Ulmus rubra</i>			1														1
4	<i>Gleditsia triacanthos</i>			3														3
5	<i>Fraxinus americana</i>			1			4										40	5
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		13			9			1			0							23
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Berberis thunbergii, Lonicera tatarica, Elaeagnus umbellata, Cercis canadensis, Gleditsia triacanthos, Robinia pseudoacacia, Prunus serotina</i>							C	N	E	S	W	%	50%		Mid			
<i>Y Y N N Y 60</i>																		
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Lonicera japonica, Toxicodendron radicans, Allium vineale, Rubus phoenicolasius, Rosa multiflora, Rubus occidentalis, Claytonia virginica, Elymus hystrix</i>							C	N	E	S	W	%	<i>Rosa multiflora, Elaeagnus umbellata, Lonicera japonica, Allium vineale, Rubus phoenicolasius, Berberis thunbergii, Lonicera tatarica</i>					
<i>Y N Y N N 40</i>																		
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer					
Historic Sites? No							Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease? No													121.7 acres					
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? Yes							C	N	E	S	W	%	cover, food					
Leaf litter? Very Light							N	N	N	N	N	0	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing, invasive species																		
Fire Break locations in stand Yes																		
DBH (inches) Length of Log (ft) Contents in Board Feet												DBH (inches) Length of Log (ft) Contents in Board Feet			Total Board Feet:			
No measurements taken																		
Comments: Photo 131 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 5

Plot #: 11

Forest Cover Type: Unknown

Date: 3/14/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other				
1	<i>Fraxinus americana</i>					3			2			2						68	7
2	<i>Robinia pseudoacacia</i>								1			1						62	2
3	<i>Prunus serotina</i>					8			3									50	11
4	<i>Ulmus rubra</i>					1													1
5																			0
6																			0
7																			0
8																			0
9																			0
Total Number of Trees per Size Class		12			6			3			0							21	
Number & Size of Standing Dead Trees		2			2			1										5	
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:							
<i>Lindera benzoin, Prunus serotina, Berberis thunbergii, Fraxinus americana, Ulmus rubra</i>				C	N	E	S	W	%	60%				Mature					
Y				N	N	Y	Y	60											
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):											
<i>Toxicodendron radicans, Lonicera japonica, Rubus phoenicolasius, Rosa multiflora, Allium vineale, moss</i>				C	N	E	S	W	%	<i>Allium vineale, Berberis thunbergii, Lonicera japonica, Rubus phoenicolasius, Rosa multiflora</i>									
Y				Y	Y	Y	Y	100											
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?											
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, rabbit									
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:									
Disease?	No			121.7 acres															
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?											
Exotic Plants?	Yes			C	N	E	S	W	%	Cover, food									
Leaf litter?	Light			Y	Y	Y	N	Y	80	Stand corridor/patch?									
Downed woody debris:	Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																			
Fire Management Zone (Yes/No)		Yes																	
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasive species																	
Fire Break locations in stand		No																	
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet:									
11	25	74								408									
13	10	51																	
18	10	123																	
10	25	54																	
15	15	106																	
Comments: Photo 132 Management Stand 2																			

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 12
 Forest Cover Type: Unknown Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Robinia pseudoacacia</i>															60	3	
2	<i>Juglans nigra</i>															65	1	
3	<i>Prunus serotina</i>					2			1								3	
4	<i>Gleditsia triacanthos</i>								1							55	2	
5	<i>Ailanthus altissima</i>					3			5							58	10	
6	<i>Carya ovata</i>								1							55	1	
7	<i>Fraxinum americana</i>								1								1	
8																	0	
9																	0	
Total Number of Trees per Size Class		5			11			5			0							21
Number & Size of Standing Dead Trees		1																1

List of Woody Plant Species 3'-20': <i>Prunus serotina, Celtis occidentalis, Ailanthus altissima, Berberis thunbergii</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 15%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	N	N	Y	N	40		

List of Understory Species 0'-3': <i>Rubus occidentalis, Rosa multiflora, Toxicodendron radicans, Claytonia virginica, Rubus phoenicolasius, Lonicera japonica</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Lonicera japonica, Rosa multiflora, Berberis thunbergii, Ailanthus altissima</i>
	C	N	E	S	W	%	
	Y	Y	Y	N	N	60	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species, box turtle
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 121.7 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? No	N	Y	Y	Y	Y	80	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, invasive species, thick understory outside of plot
 Fire Break locations in stand Yes, Missile Road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 208
13	20	102				
17	10	106				

Comments: Photo 133 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 5 Plot #: 13
 Forest Cover Type: Unknown Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																									
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total										
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other												
1	<i>Juglans nigra</i>								1									52	2								
2	<i>Prunus serotina</i>								1										1								
3	<i>Fraxinus americana</i>					2													2								
4	<i>Robinia pseudoacacia</i>								2			2						50	4								
5	<i>Quercus palustris</i>								1										1								
6	<i>Celtis occidentalis</i>					5													5								
7	<i>Gleditsia triacanthos</i>								1									35	1								
8																			0								
9																			0								
Total Number of Trees per Size Class		7			6			3			0									16							
Number & Size of Standing Dead Trees		4			3															7							
List of Woody Plant Species 3'-20': <i>Fraxinus americana, Celtis occidentalis, Cercis canadensis, Prunus serotina</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%		Plot Successional Stage: Mature																	
				C	N	E	S	W	%																		
				Y	N	N	Y	N	40																		
List of Understory Species 0'-3': <i>Rubus occidentalis, Lonicera japonica, Allium vineale, Toxicodendron radicans, Claytonia virginica, Vitis sp., moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rubus phoenicolasius, Allium vineale, Rosa multiflora</i>																			
				C	N	E	S	W	%																		
				Y	Y	Y	N	N	60																		
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?																			
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, groundhog																	
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:																	
Disease?	No							121.7 acres																			
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?																			
Exotic Plants?	Yes			C	N	E	S	W	%	All																	
Leaf litter?	Very light			N	Y	Y	Y	Y	80	Stand corridor/patch?																	
Downed woody debris:	Yes																										
FUNCTION: Where is stand in relation to sensitive areas on site?																											
Fire Management Zone (Yes/No)	Yes																										
Fuel load and type located in stand	Yes, invasive species, dead standing trees, down woody debris																										
Fire Break locations in stand	No																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>12</td> <td>91</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>														DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	15	12	91				Total Board Feet: 91	
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet																						
15	12	91																									
Comments: Photo 134 Management Stand 2																											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 6

Plot #: 1

Forest Cover Type: Oak (previously designated as birch)

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Liriodendron tulipifera</i>						2									94	4	
2	<i>Quercus alba</i>									1						68	1	
3	<i>Quercus rubra</i>									1						62	1	
4	<i>Betula lenta</i>					16			1								17	
5	<i>Nyssa sylvatica</i>					4			2								6	
6	<i>Acer rubrum</i>								2			1					3	
7	<i>Quercus prinus</i>						1										1	
8	<i>Prunus serotina</i>					2											2	
9	<i>Quercus velutina</i>									2						85	2	
Total Number of Trees per Size Class		22			8			6			1							37
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:						
<i>Betula lenta, Nyssa sylvatica, Prunus serotina, Berberis thunbergii</i>				C	N	E	S	W	%	2%				Mature				
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Smilax rotundifolia</i>				C	N	E	S	W	%	<i>Berberis thunbergii</i>								
				Y	N	Y	N	Y	60									
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species								
Historic Sites?	No			Y	Y	Y	Y	N	80	Habitat size, location, configuration:								
Disease?	No							23.6 acres										
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?										
Exotic Plants?	Yes			C	N	E	S	W	%	All								
Leaf litter?	Light			Y	Y	N	Y	N	60	Stand corridor/patch?								
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?				Abuts perennial stream														
Fire Management Zone (Yes/No)				No														
Fuel load and type located in stand				Yes, down woody debris														
Fire Break locations in stand				No														
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 2790								
28	36	1296			16	21	180											
12	16	64			11	12	37											
17	23	233			14	17	101											
22	36	730			13	17	81											
11	22	68																
Comments: Photo 121				Management Stand 2														

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 6

Plot #: 2

Forest Cover Type: Previously designated as Birch

Date: 3/13/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya cordiformis</i>			1			1			2							67	4	
2 <i>Carya ovata</i>			1			2										62	3	
3 <i>Acer rubrum</i>			1			2										57	3	
4 <i>Betula lenta</i>			2			1											3	
5 <i>Prunus serotina</i>									1							65	1	
6 <i>Liriodendron tulipifera</i>			1			1											2	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		6			7			3			0							16
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Betula lenta, Acer rubrum, Carya cordiformis, Liriodendron tulipifera, Carya ovata</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	40%		Mature			
							Y	N	Y	N	Y	60						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Lonicera japonica, Rosa multiflora, Vitis sp.</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>					
							Y	Y	Y	Y	N	80						
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species										
Historic Sites?	No	Y	Y	Y	Y	N	80	Habitat size, location, configuration:										
Disease?	No						23.6 acres											
Insects/Infestation?	No	Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants?	Yes	C	N	E	S	W	%	All										
Leaf litter?	Light	Y	N	Y	N	N	40	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to perennial stream channel											
Fire Management Zone (Yes/No)							Yes											
Fuel load and type located in stand							Yes, down woody debris, invasive species											
Fire Break locations in stand							No											
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 631								
15	14	106			14	20	126											
10	11	23			11	16	49											
15	10	76			12	18	72											
11	10	31																
17	14	148																
Comments: Photo 122							Management Stand 2											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1

Compartment #: -

Stand #: 7

Plot #: 1

Forest Cover Type: Unknown - oldfield with sparatic trees

Date: 3/14/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Fraxinus pennsylvanica</i>					11			6								23, 25	17
2																		0
3																		0
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		11			6			0			0							17
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
<i>Gleditsia triacanthos, Fraxinus pennsylvanica, Crataegus sp., Elaeagnus umbellata, Quercus paustris</i>				C	N	E	S	W	%	Early								
				Y	Y	N	Y	N	60	10%								
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Rubus allegheniensis, Toxicodendron radicans, Aster sp., Solidago sp., Allium vineale, Penstemon digitalis, Rosa multiflora</i>				C	N	E	S	W	%	<i>Lonicera japonica, Allium vineale, Rosa multiflora, Elaeagnus umbellata</i>								
				N	N	N	N	N	0									
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species, Frog species, raccoon								
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?	No							10.8 acres										
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?										
Exotic Plants?	Yes			C	N	E	S	W	%	All								
Leaf litter?	Very Light			N	N	N	N	N	0	Stand corridor/patch?								
Downed woody debris:	No																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		No																
Fire Break locations in stand		Yes - close to Massachusetts Road and Railroad tracks																
<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>				<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>				Total Board Feet:										
No measurements taken																		
Comments: Photo 130 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 8 Plot #: 1
 Forest Cover Type: Mostly Ash Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 40		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other				
1	<i>Quercus palustris</i>					1			2			1							4
2	<i>Fraxinus americana</i>			18			7												25
3	<i>Ulmus rubra</i>					9			1										10
4	<i>Robinia pseudoacacia</i>								1										1
5	<i>Prunus serotina</i>					1													1
6																			0
7																			0
8																			0
9																			0
Total Number of Trees per Size Class				29			11			1			0						41
Number & Size of Standing Dead Trees				2			5												7
List of Woody Plant Species 3'-20': <i>Crataegus</i> sp., <i>Ulmus rubra</i> , <i>Fraxinus americana</i> , <i>Quercus palustris</i> , <i>Prunus serotina</i> , <i>Cercis canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:									
				C	N	E	S	W	%	40%		Mature							
				Y	N	Y	Y	Y	80										
List of Understory Species 0'-3': <i>Lonicera japonica</i> , <i>Elymus hystrix</i> , <i>Allium vineale</i> , <i>Crataegus</i> sp., <i>Toxicodendron radicans</i> , <i>Claytonia virginica</i> , <i>Rubus occidentalis</i> , <i>Rosa multiflora</i> , <i>Smilax rotundifolia</i> , <i>Vitis</i> sp.				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):											
				C	N	E	S	W	%	<i>Lonicera japonica</i> , <i>Rosa multiflora</i> , <i>Allium vineale</i>									
				Y	Y	Y	Y	N	80										
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?											
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, frog species									
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:									
Disease?	No							14.9 acres											
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?											
Exotic Plants?	Yes			C	N	E	S	W	%	All									
Leaf litter?	Light			Y	Y	N	N	N	40	Stand corridor/patch?									
Downed woody debris:	Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?												Adjacent to perennial stream							
Fire Management Zone (Yes/No)				Yes															
Fuel load and type located in stand				Yes, down woody debris, dead standing trees, invasive species															
Fire Break locations in stand				No															
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 145							
10		20		46															
12		14		56															
11		15		43															
Comments: Photo 135												Management Stand 1							

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 8 Plot #: 2
 Forest Cover Type: Mostly Ash Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus americana</i>	10			11												55	21
2 <i>Robinia pseudoacacia</i>						2										60	2
3 <i>Juglans nigra</i>						1										42	1
4 <i>Prunus serotina</i>						1											1
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	10			15			0			0							25
Number & Size of Standing Dead Trees	5			4													9

List of Woody Plant Species 3'-20': <i>Carya ovata, Fraxinus americana, Crataegus sp., Prunus serotina</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 60%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	N	Y	N	Y	Y	60		
List of Understory Species 0'-3': <i>Lonicera japonica, Allium vineale, Rubus phoenicolasius, Toxicodendron radicans, Rubus occidentalis, Microstegium vimineum, Rosa multiflora</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rubus phoenicolasius, Rosa multiflora, Microstegium vimineum, Allium vineale</i>	
	C	N	E	S	W	%		
	Y	Y	Y	Y	N	80		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?	
Specimen Trees? No	C	N	E	S	W	%	Deer, bird species, frog species	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:	
Disease? No							14.9 acres	
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water?	
Exotic Plants? Yes	C	N	E	S	W	%	All	
Leaf litter? Very light	N	Y	N	Y	Y	60	Stand corridor/patch?	
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species, thick understory

Fire Break locations in stand Yes

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 130
9	17	25	10	8	18	
9	10	16	9	11	16	
9	8	9				
9	12	19				
10	12	27				

Comments: Photo 144. Plot is located outside of original study area. LEAD requested survey to be conducted within this plot Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 1 Compartment #: - Stand #: 9 Plot #: 1

Forest Cover Type: Hickory

Date: 3/14/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya ovata</i>	2			10			1									67, 68, 65, 58	13	
2 <i>Prunus serotina</i>			2														2	
3 <i>Ailanthus altissima</i>			1														1	
4 <i>Carya cordiformis</i>			1														1	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		6			10			1			0							17
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Crataegus</i> sp., <i>Carya ovata</i> , <i>Prunus serotina</i> , <i>Ailanthus altissima</i> , <i>Carya cordiformis</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	10%		Mature			
							Y	N	N	Y	Y	60						
List of Understory Species 0'-3': <i>Toxicodendron radicans</i> , <i>Lonicera japonica</i> , <i>Rubus allegheniensis</i> , <i>Rosa multiflora</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Lonicera japonica</i> , <i>Rosa multiflora</i> , <i>Ailanthus altissima</i>					
							Y	Y	N	N	N	40						
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species										
Historic Sites?	No	Y	Y	Y	N	Y	80	Habitat size, location, configuration:										
Disease?	No						27.2 acres											
Insects/Infestation?	No	Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants?	Yes	C	N	E	S	W	%	All										
Leaf litter?	Light	Y	N	N	N	N	20	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes, portions of habitat																
Fuel load and type located in stand		Yes, down woody debris, invasives, thick understory outside of plot																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet					DBH (inches)	Length of Log (ft)	Contents in Board Feet					Total Board Feet: 431				
12	20	80					11	25	74									
11	22	68					12	28	112									
9	10	16																
10	15	32																
11	17	49																
Comments: Photo 136 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 9 Plot #: 2
 Forest Cover Type: Mostly Ash Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 40		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Acer saccharinum</i>								1							46	1
2	<i>Quercus palustris</i>								1								1
3	<i>Fraxinus americana</i>			1			3			2						45, 52	6
4	<i>Ailanthus altissima</i>					8			3							35	11
5	<i>Carya ovata</i>					1											1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class		10			7			3			0						20
Number & Size of Standing Dead Trees					5												5
List of Woody Plant Species 3'-20': <i>Crataegus</i> sp., <i>Ailanthus altissima</i> , <i>Carya ovata</i> , <i>Fraxinus americana</i> , <i>Robinia pseudoacacia</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%		Plot Successional Stage: Mature							
				C	N	E	S	W	%								
				Y	N	N	Y	Y	60								
List of Understory Species 0'-3': <i>Claytonia virginica</i> , <i>Rosa multiflora</i> , <i>Lonicera japonica</i> , <i>Allium vineale</i> , <i>Poa</i> sp., <i>Vitis</i> sp., <i>Rubus occidentalis</i> , <i>Rosa carolina</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica</i> , <i>Rosa multiflora</i> , <i>Allium vineale</i> , <i>Ailanthus altissima</i>									
				C	N	E	S	W	%								
				Y	Y	Y	N	N	60								
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?									
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, frog/toad species							
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:							
Disease?	No							27.2 acres									
Insects/Infestation?	No			Downed Woody Debris:													
Exotic Plants?	Yes			C	N	E	S	W	%	Wildlife cover/food/water?							
Leaf litter?	Light			Y	N	N	Y	N	40	All							
Downed woody debris:	Yes							Stand corridor/patch?									
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream													
Fire Management Zone (Yes/No)				Yes													
Fuel load and type located in stand				Yes, down woody debris, dead standing trees, invasive species, thick understory													
Fire Break locations in stand				No													
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:					
11		10		31								149					
13		10		51													
12		10		40													
10		12		27													
Comments: Photo 137 Habitat/cover type is more closely related to Stand 8 Management Stand 1																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 9 Plot #: 3
 Forest Cover Type: Mostly Hickory Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya ovata</i>	9			5												50	14	
2 <i>Quercus velutina</i>									2							75	2	
3 <i>Prunus serotina</i>						2											2	
4 <i>Betula lenta</i>			10														10	
5 <i>Ailanthus altissima</i>			1														1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		20			7			2			0							29
Number & Size of Standing Dead Trees		1																1

List of Woody Plant Species 3'-20': <i>Betula lenta, Carya ovata, Ailanthus altissima</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 10%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus allegheniensis, Rosa multiflora, Berberis thunbergii, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Ailanthus altissima, Berberis thunbergii, Rosa multiflora</i>
	C	N	E	S	W	%	
	N	N	Y	N	Y	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species, frog species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	Y	Y	Y	Y	80	Habitat size, location, configuration: 27.2 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? food, cover Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	Y	Y	Y	Y	Y	100	
Downed woody debris: es							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, thick understory outside plot
 Fire Break locations in stand Yes-West Patrol Road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1023
22	10	203	22	26	527	
10	15	32	16	15	126	
11	20	62				
10	15	32				
10	18	41				

Comments: Photo 138 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 9 Plot #: 4
 Forest Cover Type: Mostly Hickory Date: 3/14/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya ovata</i>	3			3			3									80, 75	9	
2 <i>Acer rubrum</i>			7						3							60	10	
3 <i>Quercus alba</i>												1				75	1	
4 <i>Prunus serotina</i>			6						1								7	
5 <i>Quercus velutina</i>			3														3	
6 <i>Robinia pseudoacacia</i>			2														2	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		21			7			4			0							32
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
<i>Betula lenta, Berberis thunbergii, Acer rubrum, Carya ovata, Prunus serotina, Quercus velutina, Robinia pseudoacacia</i>				C	N	E	S	W	%	Mature								
				Y	Y	Y	N	Y	80	40%								
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Smilax rotundifolia, Lonicera japonica, Rosa multiflora, Claytonia virginica, Vitis sp., Rubus occidentalis</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>								
				Y	N	Y	Y	N	60									
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species, frog species										
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease?	No					27.2 acres												
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	Yes	C	N	E	S	W	%	All										
Leaf litter?	Light	N	N	N	Y	Y	40	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?											Close to stream channel							
Fire Management Zone (Yes/No)											Yes							
Fuel load and type located in stand											Yes, down woody debris, invasive species, thick understory							
Fire Break locations in stand											No							
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 1056								
18	22	270			13	30	152											
13	15	71			8	17	16											
10	18	41			10	20	46											
10	18	41			13	20	102											
17	30	317																
Comments: Photo 139											Management Stand 1							

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 10 Plot #: 2
 Forest Cover Type: Unknown Date: 3/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Fraxinus americana</i>								9			2							56	11	
2	<i>Prunus serotina</i>					8			1										48	9	
3	<i>Cercis canadensis</i>					16													30	16	
4	<i>Quercus velutina</i>					1														1	
5	<i>Carya cordiformis</i>					1														1	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		26			10			2			0										38
Number & Size of Standing Dead Trees		1			1			1													3
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Berberis thunbergii, Cercis canadensis, Prunus serotina, Carya cordiformis, Celtis occidentalis, Crataegus sp.</i>				C	N	E	S	W	%	70%				Mature							
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Toxicodendron radicans, Lonicera japonica, Rosa multiflora, Rubus occidentalis, Allium vineale, Microstegium vimineum, Rosa carolina</i>				C	N	E	S	W	%	<i>Lonicera japonica, Rosa multiflora, Berberis thunbergii, Microstegium vimineum, Allium vineale</i>											
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species (woodcock), frog species											
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No							22.2 acres													
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	Yes			C	N	E	S	W	%	All											
Leaf litter?	Light			Y	N	Y	N	N	40	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		Yes																			
Fuel load and type located in stand		Yes, down woody debris, invasive species, dead standing trees, thick understory																			
Fire Break locations in stand		No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet:											
9	10	16								116											
13	16	81																			
9	13	19																			
Comments: Photo 143 Management Stand 1																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 1 Compartment #: - Stand #: 11 Plot #: 1
 Forest Cover Type: Mostly Ash Date: 3/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus americana</i>	11			6												45, 51	17
2 <i>Juglans nigra</i>						1			1							52	2
3 <i>Cercis canadensis</i>			1														1
4																	0
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	12			7			1			0							20
Number & Size of Standing Dead Trees	3			2													5

List of Woody Plant Species 3'-20': <i>Fraxinus americana, Cercis canadensis, Berberis thunbergii, Lindera benzoin</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 40%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	N	N	Y	60		
List of Understory Species 0'-3': <i>Rubus occidentalis, Microstegium vimineum, Allium vineale, Lonicera japonica, Elymus hystrix, Rosa multiflora, Rubus phoenicolasius, Toxicodendron radicans, Claytonia virginica, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Microstegium vimineum, Lonicera japonica, Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius</i>	
	C	N	E	S	W	%		
	Y	N	Y	Y	Y	80		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?	
Specimen Trees? No	C	N	E	S	W	%	Deer, turtle, bird species	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:	
Disease? No							2.8 acres	
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water?	
Exotic Plants? Yes	C	N	E	S	W	%	All	
Leaf litter? Very Light	Y	Y	Y	Y	N	80	Stand corridor/patch?	
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, dead standing trees, and invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 206
15	18	137				
9	10	16				
11	15	43				
8	11	10				

Comments: Photo 140 Management Stand 1

ZONE 2
FIELD SAMPLING DATA SHEETS

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 1 Plot #: 1
 Forest Cover Type: Oak Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Liriodendron tulipifera</i>					3				8								61	13
2	<i>Quercus alba</i>						4				5							76	9
3	<i>Betula lenta</i>					8				2								48	10
4	<i>Nyssa sylvatica</i>					8				8								60	16
5	<i>Quercus velutina</i>					1													1
6	<i>Acer rubrum</i>					1				1								44	2
7																			0
8																			0
9																			0
Total Number of Trees per Size Class		21			23			7			0							51	
Number & Size of Standing Dead Trees		1																1	

List of Woody Plant Species 3'-20': <i>Liriodendron tulipifera, Prunus serotina, Betula lenta, Nyssa sylvatica, Rosa multiflora</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 2%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	N	Y	Y	80		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	N	Y	Y	Y	80	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	Y	Y	Y	Y	80	Habitat size, location, configuration: 17.5 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? Hemlock woolly adelgid	C	N	E	S	W	%	Wildlife cover/food/water? All
Exotic Plants? Yes	Y	N	Y	Y	N	60	
Leaf litter? Light							Stand corridor/patch?
Downed woody debris: Yes-moderate							

FUNCTION: Where is stand in relation to sensitive areas on site? adjacent to wetland and stream. Slope above stream and wetland

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, some down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 500
16	20	180				
14	16	100				
12	10	40				
16	20	180				

Comments: Photo 1 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 1 Plot #: 2
 Forest Cover Type: Oak Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>	2						4									63.5	6
2 <i>Carya ovata</i>						1										52	1
3 <i>Carya cordiformis</i>						1			2							66	3
4 <i>Quercus velutina</i>			4														4
5 <i>Quercus coccinea</i>									1							62.5	1
6 <i>Acer rubrum</i>			3														3
7 <i>Liriodendron tulipifera</i>			1														1
8 <i>Prunus serotina</i>			3														3
<i>Betula lenta</i>			1														1
9 <i>Ostrya virginiana</i>			3														3
Total Number of Trees per Size Class	17			2			7			0							26
Number & Size of Standing Dead Trees	2																2

List of Woody Plant Species 3'-20': <i>Quercus velutina, Ostrya virginiana, Quercus alba, Quercus coccinea, Carya ovata, Prunus serotina, Berberis thunbergii</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 2%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Hieracium sp., Rubus allegheniensis, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	Y	100	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	Habitat size, location, configuration: 17.5 acres Wildlife cover/food/water? All Stand corridor/patch?
Historic Sites? No	Y	N	N	Y	N	40	
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	Y	Y	N	N	40	
Downed woody debris: Yes, moderate							

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream
Fire Management Zone (Yes/No) No
Fuel load and type located in stand Yes, down woody debris
Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 438
14	22	138				
16	20	180				
12	12	48				
12	18	72				

Comments: Photo 2 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 1
 Forest Cover Type: Maple/Ash/Cherry Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other				
1	<i>Fraxinus pennsylvanica</i>				1			5				1						46	7
2	<i>Prunus serotina</i>					1												42	5
3	<i>Acer rubrum</i>				7			9				2						58	18
4	<i>Ostrya virginiana</i>					2													2
5	<i>Quercus palustris</i>					2													2
6	<i>Carya ovata</i>					1													1
7	<i>Nyssa sylvatica</i>					1													1
8	<i>Carya cordiformis</i>					1													1
9																			0
Total Number of Trees per Size Class		16			18			3			0							37	
Number & Size of Standing Dead Trees					13													13	

List of Woody Plant Species 3'-20': <i>Quercus palustris, Ostrya virginiana, Acer rubrum, Carya cordiformis, Carya ovata, Prunus serotina, Fraxinus pennsylvanica, Liriodendron tulipifera, Nyssa sylvatica</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 35%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Claytonia virginica, Rosa multiflora, Smilax rotundifolia, Rubus allegheniensis, Rubus occidentalis, Berberis thunbergii</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	Y	100	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	N	Y	80	Habitat size, location, configuration: 94.1 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	Y	Y	Y	N	Y	80	Stand corridor/patch? Patch
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to stream/wetlands
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, dead standing trees
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet:
0						

Comments: Photo 3 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 2
 Forest Cover Type: Cherry/Locust Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Prunus serotina</i>		4			9												13
2 <i>Robinia pseudoacacia</i>								1									1
3 <i>Crataegus sp.</i>			10														10
4 <i>Celtis occidentalis</i>			8														8
5 <i>Ostrya virginiana</i>			2														2
6 <i>Fraxinus pennsylvanica</i>						2											2
7																	0
8																	0
9																	0
Total Number of Trees per Size Class		24			11			1			0						36
Number & Size of Standing Dead Trees		1			7			1									9

List of Woody Plant Species 3'-20': <i>Robinia pseudoacacia, Crataegus sp., Celtis occidentalis, Ostrya virginiana, Fraxinus pennsylvanica, Lonicera tatarica</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 35-40%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	Y	N	80		
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus multiflorus, Rubus occidentalis, Allium oleraceum, Claytonia virginica, Toxicodendron radicans, Rubus phoenicolasius, Alliaria petiolata, Stellaria media</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera tatarica, Rosa multiflora, Rubus phoenicolasius, Alliaria petiolata</i>	HABITAT: What species present? Deer
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						94.1 acres	Habitat size, location, configuration:
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	Y	Y	Y	Y	Y	100		
Disease? No	Downed Woody Debris:						Wildlife cover/food/water? All	Stand corridor/patch?
Insects/Infestation? No	C	N	E	S	W	%		
Exotic Plants? Yes	Y	N	Y	Y	Y	80		
Leaf litter? Light								
Downed woody debris: yes								

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet:

Comments: Photo 4 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 3
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus pennsylvanica</i>	14			9												30.5	23
2 <i>Crataegus sp.</i>			7													38.5	7
3 <i>Robinia pseudoacacia</i>			3			1										38	4
4 <i>Quercus velutina</i>			1														1
5 <i>Prunus serotina</i>			1														1
6 <i>Acer rubrum</i>			1			1											2
7 <i>Pinus virginiana</i>									1			1					2
8 <i>Quercus rubra</i>			1														1
9																	0
Total Number of Trees per Size Class	28			11			1			1							41
Number & Size of Standing Dead Trees	6			1													7

List of Woody Plant Species 3'-20': <i>Crataegus sp., Quercus rubra, Fraxinus pennsylvanica, Pinus virginiana, Acer rubrum, Prunus serotina, Robinia pseudoacacia, Quercus velutina</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 35-40%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	Y	N	80		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Vitis sp., Toxicodendron radicans, Allium oleraceum, Alliaria petiolata, Berberis thunbergii</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Alliaria petiolata, Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	Y	100	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	N	Y	80	Habitat size, location, configuration: 94.4 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	N	Y	N	N	20	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, dead standing trees, and invasive species
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 122
11	10	31				
15	12	91				

Comments: Photo 5 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 4
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Fraxinus pennsylvanica</i>				7			3									62	10
2	<i>Prunus serotina</i>			9			1										58.5	10
3	<i>Ostrya virginiana</i>			17			1											18
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		26			9			3			0							38
Number & Size of Standing Dead Trees		3			2													5
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Fraxinus pennsylvanica, Prunus serotina, Ostrya virginiana, Acer pensylvanicum</i>							C	N	E	S	W	%	40%		Mid			
Y							Y	Y	Y	N	Y	80						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Lindera benzoin, Rubus phoenicolasius, Berberis thunbergii, Rosa multiflora, Lonicera japonica, Toxicodendron radicans, Allium oleraceum, Smilax rotundifolia</i>							C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius, Lonicera japonica</i>					
Y							Y	Y	Y	Y	Y	100						
Rare, etc. Species?		No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?		No					C	N	E	S	W	%	Deer					
Historic Sites?		No					Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease?		No										94.1 acres						
Insects/Infestation?		No					Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?		Yes					C	N	E	S	W	%	All					
Leaf litter?		Light					Y	Y	Y	N	N	60	Stand corridor/patch?					
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasive species																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
13		12		61								185						
15		10		76														
12		12		48														
Comments: Photo 8 4x4 activity track observed within plot Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 5
 Forest Cover Type: Black Cherry Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Prunus serotina</i>			8			9			1									40	18
2	<i>Ostrya virginiana</i>					2			1											3
3	<i>Robinia pseudoacacia</i>								1										32.5	1
4	<i>Cercis canadensis</i>					1														1
5	<i>Juglans cinerea</i>								1											1
6	<i>Cornus florida</i>					2														2
7																				0
8																				0
9																				0
Total Number of Trees per Size Class		13			12			1			0							26		
Number & Size of Standing Dead Trees		7			3													10		
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:								
<i>Ostrya virginiana, Prunus serotina, Fraxinus pennsylvanica, Cornus florida, Cercis canadensis, Robinia pseudoacacia</i>				C	N	E	S	W	%	40%				MID						
<i>Y Y N Y Y 80</i>																				
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Rosa multiflora, Rubus phoenicolasius, Smilax rotundifolia, Allium vineale, Lonicera japonica, Berberis thunbergii, Rubus allegheniensis, Ostrya virginiana</i>				C	N	E	S	W	%	<i>Rosa multiflora, Rubus phoenicolasius, Berberis thunbergii, Lonicera japonica, Allium vineale</i>										
<i>Y Y N N Y 60</i>																				
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees? No		C	N	E	S	W	%	Deer, Bird species												
Historic Sites? No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:												
Disease? No						94.1 acres														
Insects/Infestation? No		Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants? Yes		C	N	E	S	W	%	All												
Leaf litter? Light		N	Y	Y	N	N	40	Stand corridor/patch?												
Downed woody debris: Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																				
Fire Break locations in stand No																				
<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>												<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>				Total Board Feet:				
Comments: Photo 9 Management Stand 1																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 6
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Fraxinus pennsylvanica</i>	4			6												41	10
2 <i>Prunus serotina</i>						1										48	1
3 <i>Ailanthus altissima</i>			2														2
4 <i>Crataegus sp.</i>			2														2
5 <i>Quercus Palustris</i>						1											1
6 <i>Quercus velutina</i>						1											1
7 <i>Juglans nigra</i>								1								43.5	1
8 <i>Celtis occidentalis</i>			4														4
9																	0
Total Number of Trees per Size Class	12			9			1			0							22
Number & Size of Standing Dead Trees	4			8													12

List of Woody Plant Species 3'-20': <i>Crataegus sp., Fraxinus pennsylvanica, Prunus serotina, Ailanthus altissima, Celtis occidentalis, Quercus palustris, Quercus Velutina, Juglans nigra</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 45%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	N	Y	80		

List of Understory Species 0'-3': <i>Rosa multiflora, Lonicera japonica, Toxicodendron radicans, Rubus phoenicolasius, Smilax rotundifolia, Microstegium vimineum, Allium vineale</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Rubus phoenicolasius, Rosa multiflora, Ailanthus altissima, Lonicera japonica, Microstegium vimineum</i>
	C	N	E	S	W	%	
	Y	N	N	Y	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 94.1 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	Y	N	Y	Y	Y	80	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 147
18	12	147				

Comments: Photo 10 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 7
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Average Tree Height (ft)	Total	
		Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
TREE SPECIES	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Fraxinus pennsylvanica</i>	3			6			1									40, 38	10
2	<i>Celtis occidentalis</i>			6														6
3	<i>Crataegus sp.</i>			1														1
4	<i>Juglans nigra</i>			1		1				1							46	3
5	<i>Robinia pseudoacacia</i>			1			1											2
6	<i>Ulmus rubra</i>			1														1
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		13			8			2			0							23
Number & Size of Standing Dead Trees		3			5													8

List of Woody Plant Species 3'-20': <i>Fraxinus pennsylvanica, Celtis occidentalis, Crataegus sp., Juglans nigra, Robinia pseudoacacia, Ulmus rubra</i>	Canopy Closure: C N E S W % Y Y N Y N 60	Percent of Invasive Cover per Plot (All Layers): 35%	Plot Successional Stage: Mid
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List of Understory Species 0'-3': <i>Rosa multiflora, Microstegium vimineum, Smilax rotundifolia, Elymus hystrix, Allium vineale, Lonicera japonica, Rubus phoenicolasius, Rubus occidentalis</i>	Understory Cover 3'-20': C N E S W % N Y Y Y Y 80	List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Microstegium vimineum, Allium vineale, Lonicera japonica, Rubus phoenicolasius</i>
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Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3': C N E S W % Y Y Y Y Y 100	HABITAT: What species present? Deer
Specimen Trees? No	Downed Woody Debris: C N E S W % Y Y N N N 40	Habitat size, location, configuration: 94.1 acres
Historic Sites? No		Wildlife cover/food/water? All
Disease? No		Stand corridor/patch?
Insects/Infestation? No		
Exotic Plants? Yes		
Leaf litter? Light		
Downed woody debris: Yes		

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 91
12	10	40				
13	10	51				

Comments: Photo 11 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 8
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus pennsylvanica</i>	10			7												35.4	17	
2 <i>Prunus serotina</i>			5			2										32	7	
3 <i>Celtis occidentalis</i>			11			2										30	13	
4 <i>Robinia pseudoacacia</i>			1			2										28	3	
5 <i>Crataegus sp.</i>			4														4	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		31			13			0			0							44
Number & Size of Standing Dead Trees		3			4													7
List of Woody Plant Species 3'-20': <i>Fraxinus pennsylvanica, Prunus serotina, Celtis occidentalis, Crataegus sp.</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	40%		Mid			
							Y	N	Y	N	Y	60						
List of Understory Species 0'-3': <i>Lonicera japonica, Rosa multiflora, Smilax rotundifolia, Rubus occidentalis, Rubus phoenicolasius, Elymus hystrix, Allium vineale</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Lonicera japonica, Rosa multiflora, Rubus phoenicolasius, allium vineale</i>					
							Y	Y	Y	Y	Y	100						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer										
Historic Sites? No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease? No							94.1 acres											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? Yes		C	N	E	S	W	%	All										
Leaf litter? Light		N	Y	Y	Y	Y	80	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																		
Fire Break locations in stand No																		
<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>							<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>							Total Board Feet:				
Comments: Photo 12							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 2 Plot #: 9
 Forest Cover Type: Ash Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Total		
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD			Other
1	<i>Fraxinus pennsylvanica</i>	3			4			1									48	8
2	<i>Prunus serotina</i>			1			5										40.5	6
3	<i>Gleditsia triacanthos</i>			1			1										56	2
4	<i>Celtis occidentalis</i>			1														1
5	<i>Robinia pseudoacacia</i>						3											3
6	<i>Acer negundo</i>			1														1
7	<i>Crataegus sp.</i>			3														3
8																		0
9																		0
Total Number of Trees per Size Class		10			13			1			0							24
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Fraxinus pennsylvanica, Prunus serotina, Gleditsia triacanthos, Acer negundo, Crataegus sp.</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 35%	Plot Successional Stage: Mid
C	N	E	S	W	%	Y	80		
List of Understory Species 0'-3': <i>Rosa multiflora, Rubus phoenicolasius, Lonicera japonica, Allium vineale, Microstegium vimineum</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Rubus phoenicolasius, Lonicera japonica, Allium vineale, Microstegium vimineum</i>	
C	N	E	S	W	%	Y	100	HABITAT: What species present? Deer	
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				Habitat size, location, configuration: 94.1 acres	
Specimen Trees? No				C	N	E	S	W	%
Historic Sites? No				Y	Y	Y	Y	Y	100
Disease? No				Downed Woody Debris:				Wildlife cover/food/water? All	
Insects/Infestation? No				C	N	E	S	W	%
Exotic Plants? Yes				N	N	Y	Y	N	40
Leaf litter? Light								Stand corridor/patch?	
Downed woody debris: Yes									

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 71
13	15	71				

Comments: Photo 13 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 3 Plot #: 1
 Forest Cover Type: Pine Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Crataegus sp.</i>					21											21
2	<i>Pinus virginiana</i>						7			1						37	8
3	<i>Fraxinus pennsylvanica</i>					1			1							42	2
4																	0
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class		22			8			1			0						31
Number & Size of Standing Dead Trees		3			7												10
List of Woody Plant Species 3'-20': <i>Crataegus sp., Pinus virginiana, Fraxinus pennsylvanica</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%		Plot Successional Stage: Mid							
				C	N	E	S	W	%								
				Y	Y	Y	N	N	60								
List of Understory Species 0'-3': <i>Rosa multiflora, Lonicera japonica, Allium vineale, Rubus occidentalis, Microstegium vimineum, Lindera benzoin, Vitis labrusca</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>rosa multiflora, Lonicera japonica, Allium vineale, Microstegium vimineum</i>									
				C	N	E	S	W	%								
				N	Y	Y	Y	Y	80								
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?									
Specimen Trees?	No			C	N	E	S	W	%	Deer							
Historic Sites?	No			N	N	N	Y	Y	40	Habitat size, location, configuration:							
Disease?	No							3.7 acres									
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?									
Exotic Plants?	Yes			C	N	E	S	W	%	All							
Leaf litter?	Light			N	N	N	N	N	0	Stand corridor/patch?							
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																	
Fire Management Zone (Yes/No)		Yes															
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasive species															
Fire Break locations in stand		No															
<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>			<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>			Total Board Feet:			
14		12		75										75			
Comments: Photo 6 Management Stand 1																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 1
 Forest Cover Type: Oak Date: 2/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus alba</i>															68	2	
2	<i>Quercus rubra</i>																1	
3	<i>Acer rubrum</i>					7			2								9	
4	<i>Prunus serotina</i>					1			1								3	
5	<i>Ostrya virginiana</i>					12											12	
6	<i>Quercus velutina</i>												1			71	1	
7	<i>Acer pensylvanicum</i>					1											1	
8																	0	
9																	0	
Total Number of Trees per Size Class		21			3			4			1							29
Number & Size of Standing Dead Trees		4			2													6
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
<i>Quercus rubra, Pinus virginiana, Quercus alba, acer rubrum, Cornus florida, Prunus serotina, Acer pensylvanicum, Ostrya virginiana, Quercus velutina</i>				C	N	E	S	W	%	15%		Mid						
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Vitis sp., Lonicera japonica, Ostrya virginiana, Acer pensylvanicum, Betula lenta, Prunus serotina, Smilax rotundifolia, Berberis thunbergii</i>				C	N	E	S	W	%	<i>Berberis thunbergii</i>								
				Y	Y	N	Y	Y	80									
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?		No		C	N	E	S	W	%	Deer								
Historic Sites?		No		N	Y	Y	N	Y	60	Habitat size, location, configuration:								
Disease?		No						129.2 acres										
Insects/Infestation?		No		Downed Woody Debris:				Wildlife cover/food/water?										
Exotic Plants?		Yes		C	N	E	S	W	%	All								
Leaf litter?		Light		N	N	Y	N	Y	40	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, Light dead standing trees and down woody debris																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 496						
15		13		91														
12		11		40														
22		18		365														
Comments: Photo 7 Management Stand 2																		

LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 2
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus prinus</i>		2			7			6								66	15
2 <i>Quercus rubra</i>								1								65	1
3 <i>Quercus alba</i>					1											56	1
4 <i>Betula lenta</i>			3														3
5 <i>Acer rubrum</i>								1								54	1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	5			8			8			0							21
Number & Size of Standing Dead Trees																	0

List of Woody Plant Species 3'-20': <i>Quercus rubra, Quercus prinus, Quercus alba, Acer rubrum, Betula lenta</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Tsuga canadensis, Gaylussacia baccata, Betula lenta, Vaccinium angustifolium, Kalmia latifolia, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	Y	Y	Y	N	Y	80	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	N	N	Y	Y	60	Habitat size, location, configuration: 129.2 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? No	C	N	E	S	W	%	
Leaf litter? Moderate	N	Y	N	Y	N	20	
Downed woody debris: Yes, light							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand No
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 730
13	14	71	13	13	61	
18	12	147	16	12	108	
15	15	106				
12	11	40				
19	15	197				

Comments: Photo 14 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 3
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Ostrya virginiana</i>			10														10	
2 <i>Quercus rubra</i>								3									64	3
3 <i>Quercus velutina</i>								1									65	1
4 <i>Prunus serotina</i>			16															16
5 <i>Quercus alba</i>					1												67	1
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		26			1			4			0							31
Number & Size of Standing Dead Trees		2																2
List of Woody Plant Species 3'-20': <i>Quercus rubra, Quercus velutina, Ostrya virginiana, Prunus serotina, Quercus alba</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 5%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Acer pensylvanicum, Betula lenta, Rubus occidentalis, Alliaria petiolata, Rubus phoenicolasius, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Alliaria petiolata</i>						
							C	N	E	S	W	%						
							Y	Y	Y	N	Y	80						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species						
Specimen Trees? No							C	N	E	S	W	%						
Historic Sites? No							N	Y	Y	Y	N	60	Habitat size, location, configuration: 129.2 acres					
Disease? No																		
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water? All						
Exotic Plants? Yes							C	N	E	S	W	%	Stand corridor/patch?					
Leaf litter? Moderate							Y	N	Y	N	Y	60						
Downed woody debris: Yes, light																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, light down woody debris																		
Fire Break locations in stand No																		
							<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	Total Board Feet: 381					
							12	10	40									
							15	13	91									
							18	10	123									
							17	13	127									
Comments: Photo 15 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 5
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus rubra</i>							1									62.5	1
2 <i>Quercus alba</i>				1												47	1
3 <i>Ostrya virginiana</i>			14														14
4 <i>Robinia pseudoacacia</i>			2														2
5 <i>Carya cordiformis</i>						4		1		1						59.5	6
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	16			5			2			1							24
Number & Size of Standing Dead Trees	1																1

List of Woody Plant Species 3'-20': <i>Quercus rubra, Quercus alba, Carya cordiformis, Ostrya virginiana, Robinia pseudoacacia, Acer pensylvanicum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	N	Y	Y	80		
List of Understory Species 0'-3': <i>Rubus phoenicolasius, Alliaria petiolata, few Quercus saplings.</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Alliaria petiolata</i>	
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer	
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	Y	Y	Y	N	N	60	Habitat size, location, configuration: 129.2 acres	
Disease? No								
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All	
Exotic Plants? Yes	C	N	E	S	W	%		
Leaf litter? Light	N	N	N	N	Y	20	Stand corridor/patch?	
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, small down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 470
15	12	91				
14	10	63				
23	15	316				

Comments: Photo 17 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 6
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>		2			12			5								41.5, 56	19
2	<i>Quercus rubra</i>							1									50	1
3																		0
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		2			12			6			0							20
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20': <i>Quercus prinus, Quercus rubra</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%				Plot Successional Stage: Mature						
				C N E S W %														
				Y Y Y Y Y 100														
List of Understory Species 0'-3': <i>Chimaphila maculata, moss, few Quercus saplings</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):				---						
				C N E S W %														
				Y Y N N N 40														
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?				Deer						
Specimen Trees? No				C N E S W %														
Historic Sites? No				N Y Y N Y 60								Habitat size, location, configuration:						
Disease? No												129.2 acres						
Insects/Infestation? No				Downed Woody Debris:								Wildlife cover/food/water?						
Exotic Plants? Yes				C N E S W %								All						
Leaf litter? Moderate				Y N N N N 20								Stand corridor/patch?						
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, light down woody debris, few dead standing trees																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 517						
13		10		51		16		15		126								
15		8		61														
14		12		75														
12		8		32														
18		14		172														
Comments: Photo 18 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 8
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Prunus serotina</i>					9			7									46	16	
2	<i>Quercus prinus</i>						4			2								45	6	
3	<i>Quercus rubra</i>											1						62	1	
4	<i>Robinia pseudoacacia</i>					2													2	
5	<i>Carya ovata</i>								1										1	
6	<i>Ailanthus altissima</i>					1													1	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		12			12			3			0									27
Number & Size of Standing Dead Trees		6																		6
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:								
<i>Quercus prinus, Prunus serotina, Quercus rubra, Robinia pseudoacacia, Carya ovata</i>				C	N	E	S	W	%	20%				Mature						
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Rubus phoenicolasius, Rubus occidentalis, Smilax rotundifolia, Robinia pseudoacacia, Prunus serotina, Crataegus sp., few Quercus saplings.</i>				C	N	E	S	W	%	<i>Ailanthus altissima, Rubus phoenicolasius</i>										
				N	N	N	N	N	0											
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species												
Historic Sites?	No	N	Y	Y	N	N	40	Habitat size, location, configuration:												
Disease?	No					129.2 acres														
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants?	Yes	C	N	E	S	W	%	All												
Leaf litter?	Light	Y	Y	N	Y	N	60	Stand corridor/patch?												
Downed woody debris:	Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?												Adjacent to perennial stream								
Fire Management Zone (Yes/No)		No																		
Fuel load and type located in stand		Yes, dead standing trees and down woody debris																		
Fire Break locations in stand		No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 274								
15		10		76																
14		12		75																
18		11		123																
Comments: Photo - Cell phone 1												Management Stand 2								

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 9
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>							1			3								71	4	
2	<i>Quercus alba</i>										2								72	2	
3	<i>Prunus serotina</i>					5														5	
4	<i>Acer rubrum</i>								1											1	
5	<i>Betula lenta</i>					3														3	
6	<i>Carya cordiformis</i>					1														1	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		9			2			5			0										16
Number & Size of Standing Dead Trees								1													1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Quercus prinus, Quercus alba, Carya cordiformis, Betula lenta, Prunus serotina</i>				C	N	E	S	W	%	0%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Prunus serotina, few Quercus saplings</i>				C	N	E	S	W	%	---											
				Y	N	N	Y	N	40												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species											
Historic Sites?	No			Y	N	Y	N	N	40	Habitat size, location, configuration:											
Disease?	No							129.2 acres													
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	No			C	N	E	S	W	%	All											
Leaf litter?	Moderate			N	N	N	N	N	0	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream																	
Fire Management Zone (Yes/No)				No																	
Fuel load and type located in stand				Yes, light down woody debris																	
Fire Break locations in stand				No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
12		10		40								231									
11		7		18																	
16		9		72																	
13		10		51																	
14		8		50																	
Comments: Photo - Cell phone 3													Management Stand 2								

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 10
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus prinus</i>				4			8			1						65	13
2	<i>Nyssa sylvatica</i>					1												1
3	<i>Quercus rubra</i>													1			70	1
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		5			8			1			1							15
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:						
<i>Quercus prinus, Nyssa sylvatica, Quercus rubra</i>				C	N	E	S	W	%	0%				Mature				
				Y	Y	N	Y	Y	80									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Vaccinium angustifolium, Gaylussacia baccata, Tsuga canadensis, moss</i>				C	N	E	S	W	%	---								
				Y	N	N	Y	N	40									
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer										
Historic Sites?	No	N	Y	Y	N	N	40	Habitat size, location, configuration:										
Disease?	No					129.2 acres												
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Light	N	N	N	N	N	0	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, small down woody debris																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet					DBH (inches)	Length of Log (ft)	Contents in Board Feet					Total Board Feet: 472				
18	15	172																
24	12	300																
Comments: Photo - Cell phone 4 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 11
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>		1			2			2			1					78	6	
2 <i>Quercus velutina</i>											1					77	1	
3 <i>Ostrya virginiana</i>			2			1											3	
4 <i>Carya cordiformis</i>			1			6											7	
5 <i>Prunus cerasus</i>						2											2	
6 <i>Betula lenta</i>						1											1	
7 <i>Liriodendron tulipifera</i>									1							82	1	
8																	0	
9																	0	
Total Number of Trees per Size Class		4			12			3			2							21
Number & Size of Standing Dead Trees								1										1

List of Woody Plant Species 3'-20': <i>Quercus alba, Quercus velutina, Ostrya virginiana, Carya cordiformis, Prunus cerasus, Betula lenta, Liriodendron tulipifera</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus phoenicolasius, Berberis thunbergii, Vaccinium angustifolium, Rosa multiflora, few Quercus saplings</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius</i>
	C	N	E	S	W	%	
	N	Y	Y	Y	N	60	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	Y	Y	Y	Y	80	Habitat size, location, configuration: 129.2 acres
Disease? No							

Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	Y	Y	N	N	N	40	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1152
18	15	172				
13	10	51				
15	10	76				
22	17	324				
27	16	529				

Comments: Photo - Cell phone 5 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 12
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>												1					92	1
2 <i>Carya cordiformis</i>			1			3												4
3 <i>Quercus alba</i>								1									74	1
4 <i>Betula lenta</i>			3															3
5 <i>Quercus rubra</i>												1					86	1
6 <i>Liriodendron tulipifera</i>			2															2
7 <i>Prunus serotina</i>																		0
8																		0
9																		0
Total Number of Trees per Size Class		6			3			1			2							12
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Quercus velutina, Quercus rubra, Betula lenta, Carya cordiformis, Liriodendron tulipifera, Quercus alba, Prunus serotina</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Prunus serotina, Rubus phoenicolasius, moss, few Quercus saplings</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius</i>
	C	N	E	S	W	%	
	Y	N	N	N	N	20	

Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?
Specimen Trees?	No	C	N	E	S	W	Deer
Historic Sites?	No	N	Y	Y	N	N	Habitat size, location, configuration:

Disease?	No	Downed Woody Debris:					129.2 acres
Insects/Infestation?	No	C	N	E	S	W	Wildlife cover/food/water?
Exotic Plants?	Yes	Y	Y	Y	N	Y	All

Leaf litter?	Light						Stand corridor/patch?
Downed woody debris:	Yes						

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, light down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 643
14	11	63				
21	13	217				
26	12	363				

Comments: Photo Cell phone 6 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 4 Plot #: 13
 Forest Cover Type: Oak Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Total		
		Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	
TREE SPECIES		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus rubra</i>											1					85	1
2	<i>Quercus alba</i>							1				2					78	3
3	<i>Carya alba</i>					1												1
4	<i>Acer rubrum</i>					2												2
5	<i>Liriodendron tulipifera</i>					2												2
6	<i>Carya cordiformis</i>			2		2												4
7	<i>Betula lenta</i>			1														1
8																		0
9																		0
Total Number of Trees per Size Class		3			7			1			3							14
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Quercus rubra, Quercus alba, Carya cordiformis, Betula lenta, Carya alba, Acer rubrum, Liriodendron tulipifera</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature				
C	N	E	S	W	%	Y	Y			N	Y	Y	80
List of Understory Species 0'-3': <i>Rubus phoenicolasius, Rubus occidentalis, Microstegium vimineum, Allium vineale, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rubus allegheniensis, Microstegium vimineum, Allium vineale</i>					
C	N	E	S	W	%	Y	Y	N	N	N	40		
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?							
Specimen Trees?	No	C	N	E	S	W	%	Deer					
Historic Sites?	No	N	Y	Y	Y	Y	80	Habitat size, location, configuration:					
Disease?	No	Downed Woody Debris:				129.2 acres							
Insects/Infestation?	No	C	N	E	S	W	%	Wildlife cover/food/water?					
Exotic Plants?	Yes	Y	Y	Y	N	N	60	All					
Leaf litter?	Moderate					Stand corridor/patch?							
Downed woody debris:	Yes												

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, light down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1309
15	10	76				
28	20	720				
25	15	386				
17	13	127				

Comments: Photo-Cell phone 5 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 5 Plot #: 1
 Forest Cover Type: Pine Date: 2/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Pinus virginiana</i>	1			8			4									43	13	
2 <i>Robinia pseudoacacia</i>						2										48	2	
3 <i>Prunus serotina</i>			14			1			1							52	16	
4 <i>Ostrya virginiana</i>			8														8	
5 <i>Pinus rigida</i>						2										49	2	
6 <i>Ailanthus altissima</i>			1														1	
7 <i>Acer rubrum</i>			6														6	
8 <i>Fraxinus americana</i>			1														1	
9																	0	
Total Number of Trees per Size Class		31			13			5			0							49
Number & Size of Standing Dead Trees		3			4													7
List of Woody Plant Species 3'-20': <i>Pinus virginiana, Robinia pseudoacacia, Prunus serotina,, Ostrya virginiana, Pinus rigida, Acer rubrum, Acer pensylvanicum, Ailanthus altissima, Fraxinus americana</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	25-30%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Vaccinium angustifolium, Smilax rotundifolium, Lonicera japonica, Toxicodendron radicans</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Lonicera japonica, Ailanthus altissima</i>					
							Y	Y	N	Y	Y	80						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species					
Historic Sites?	No						N	Y	N	N	Y	20	Habitat size, location, configuration:					
Disease?	No											2.3 acres						
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	Yes						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	Y	Y	N	Y	80	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Ephemeral stream cuts through plot											
Fire Management Zone (Yes/No)							Yes											
Fuel load and type located in stand							Yes, dead standing trees, down woody debris, thick understory											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 309				
13		15		71														
12		10		40														
16		10		90														
16		12		108														
Comments: Photo - Cell phone 2 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 6 Plot #: 4
 Forest Cover Type: Oak Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>										3								82	3	
2	<i>Quercus alba</i>										2								76	2	
3	<i>Liriodendron tulipifera</i>					1			2											3	
4	<i>Betula lenta</i>					22														22	
5	<i>Quercus velutina</i>										1								74.5	1	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		23			2			6			0										31
Number & Size of Standing Dead Trees		1																			1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:											
<i>Quercus prinus, Quercus alba, Betula lenta, Quercus velutina, Acer pensylvanicum</i>				C	N	E	S	W	%	0%		Mature									
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Betula lenta, Vaccinium angustifolium, Gaylussacia baccata</i>				C	N	E	S	W	%	---											
				Y	Y	N	Y	N	60												
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species													
Historic Sites?	No	N	Y	Y	N	N	40	Habitat size, location, configuration:													
Disease?	No					75.6 acres															
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants?	No	C	N	E	S	W	%	All													
Leaf litter?	Moderate	Y	Y	Y	N	Y	80	Stand corridor/patch?													
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes down woody debris																			
Fire Break locations in stand		No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 553											
12	11	40			17	14	148														
15	11	76																			
13	12	61																			
12	14	56																			
18	15	172																			
Comments: Photo 1						Management Stand 3															

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 1 Stand #: 6 Plot #: 5

Forest Cover Type: Oak

Date: 2/21/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus alba</i>							1			4			1					89	6	
2	<i>Quercus prinus</i>													1					84	1	
3	<i>Quercus rubra</i>											2							77	2	
4	<i>Liriodendron tulipifera</i>								1											1	
5	<i>Betula lenta</i>					20			2											22	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		20			4			6			2										32
Number & Size of Standing Dead Trees																					0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Quercus alba, Quercus prinus, Quercus rubra, Liriodendron tulipifera, Betula lenta</i>				C	N	E	S	W	%	0%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Smilax rotundifolia, Rubus allegheniensis, Duchesnea indica, Betula lenta, moss</i>				C	N	E	S	W	%	---											
				Y	Y	Y	Y	Y	100												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species											
Historic Sites?	No			Y	Y	N	Y	Y	80	Habitat size, location, configuration:											
Disease?	No							75.6 acres													
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	No			C	N	E	S	W	%	all											
Leaf litter?	Light			Y	N	Y	N	Y	60	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to drainage channel and perennial stream																	
Fire Management Zone (Yes/No)				No																	
Fuel load and type located in stand				Yes, down woody debris																	
Fire Break locations in stand				No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1525									
13		11		51		19		15		197											
14		13		75		23		18		407											
18		15		172		26		15		424											
17		15		148																	
13		11		51																	
Comments: Photo 2				Management Stand 3																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 6 Plot #: 6
 Forest Cover Type: Oak Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 140		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Betula lenta</i>			2			5			1							50	8	
2 <i>Quercus alba</i>		1				3			3							75	7	
3 <i>Quercus rubra</i>									1							80	1	
4 <i>Acer rubrum</i>			1														1	
5 <i>Ostrya virginiana</i>			4														4	
6 <i>Prunus cerasus</i>			1														1	
7 <i>Carya cordiformis</i>						1											1	
8																	0	
9																	0	
Total Number of Trees per Size Class		9			9			5			0							23
Number & Size of Standing Dead Trees		3			2			1										6
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Quercus prinus, Prunus cerasus, Ostrya virginiana, Acer rubrum, Betula lenta</i>							C	N	E	S	W	%	3%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Lonicera japonica, Smilax rotundifolia, Linder benzoin, Vitis sp., Duchesnea indica, moss</i>							C	N	E	S	W	%	<i>Lonicera japonica</i>					
							Y	Y	Y	Y	N	80						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer, bird species					
Historic Sites? No							N	Y	Y	Y	Y	80	Habitat size, location, configuration:					
Disease? No												75.6 acres						
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? Yes							C	N	E	S	W	%	All					
Leaf litter? Moderate							N	Y	Y	N	N	40	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							Yes											
Fuel load and type located in stand							Yes, down woody debris, dead standing											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
16		14		126								398						
13		12		61														
17		15		148														
14		11		63														
Comments: Photo 3							Management Stand 3											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 6 Plot #: 7
 Forest Cover Type: Oak Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Quercus prinus</i>								1									52	1	
2	<i>Carya ovata</i>								2			1						73	3	
3	<i>Betula lenta</i>					1						1						50	2	
4	<i>Carya cordiformis</i>					1			1									60	2	
5	<i>Ostrya virginiana</i>					4			1										5	
6	<i>Prunus cerasus</i>					1													1	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		6			3			3			2									14
Number & Size of Standing Dead Trees		1																		1
List of Woody Plant Species 3'-20': <i>Ostrya virginiana, Prunus cerasus, Carya cordiformis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 20%				Plot Successional Stage: Mature								
				C	N	E	S	W	%											
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3': <i>Lindera benzoin, Smilax rotundifolia, Berberis thunbergii, Rosa multiflora, Betula lenta, Lonicera japonica, Alliaria petiolata</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Lonicera japonica, Alliaria petiolata</i>												
				C	N	E	S	W	%											
				Y	Y	Y	Y	Y	100											
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species												
Specimen Trees? No				C	N	E	S	W	%											
Historic Sites? No				Y	Y	Y	Y	Y	100											
Disease? No								Habitat size, location, configuration: 75.6 acres												
Insects/Infestation? No				Downed Woody Debris:																
Exotic Plants? Yes				C	N	E	S	W	%	Wildlife cover/food/water? All										
Leaf litter? Moderate				N	Y	Y	N	Y	60	Stand corridor/patch?										
Downed woody debris: Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees, thick understory																				
Fire Break locations in stand No																				
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 442								
15		10		76																
12		8		32																
14		10		63																
23		13		271																
Comments: Photo 4 Management Stand 3																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 6 Plot #: 6
 Forest Cover Type: Oak Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 140		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Quercus velutina</i>								1									80.5	1	
2	<i>Liriodendron tulipifera</i>											1						91	1	
3	<i>Betula lenta</i>					1						3						64	4	
4	<i>Acer rubrum</i>					2			1										3	
5																			0	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		3			1			5			0									9
Number & Size of Standing Dead Trees																				0
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
				C	N	E	S	W	%	Mature										
				Y	Y	N	N	N	40	0%										
List of Understory Species 0'-3': <i>Acer pensylvanicum, Smilax rotundifolia, Rubus allegheniensis, Acer rubrum, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
				C	N	E	S	W	%	---										
				N	N	Y	N	N	20											
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species												
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:												
Disease?	No					75.6 acres														
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants?	No	C	N	E	S	W	%	All												
Leaf litter?	Light	N	Y	N	N	Y	20	Stand corridor/patch?												
Downed woody debris:	Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No)	No																			
Fuel load and type located in stand	Yes, down woody debris																			
Fire Break locations in stand	No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet		DBH (inches)	Length of Log (ft)	Contents in Board Feet		Total Board Feet:												
14	13	75						75												
Comments: Photo 10 Management Stand 3																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 7 Plot #: 3
 Forest Cover Type: Mixed regrowth Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Robinia pseudoacacia</i>								1									75	1	
2	<i>Acer rubrum</i>					2			4			2							8	
3	<i>Carya cordiformis</i>								2									65	2	
4	<i>Quercus velutina</i>														1			80	1	
5	<i>Prunus serotina</i>					2			1										3	
6	<i>Sassafras albidum</i>					1						1							2	
7	<i>Fraxinus americana</i>								1										1	
8																			0	
9																			0	
Total Number of Trees per Size Class		5			9			3			1									18
Number & Size of Standing Dead Trees		2			2			1												5
List of Woody Plant Species 3'-20': <i>Prunus serotina, Sassafras albidum, Acer rubrum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%				Plot Successional Stage: Mature								
				C	N	E	S	W	%											
				Y	Y	N	Y	Y	80											
List of Understory Species 0'-3': <i>Vitis sp., Berberis thunbergii, Rubus phoenicolasius, Lindera benzoin</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rubus phoenicolasius, Lonicera japonica</i>												
				C	N	E	S	W	%											
				Y	Y	Y	N	N	60											
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species														
Specimen Trees? No		C	N	E	S	W	%													
Historic Sites? No		Y	Y	Y	N	Y	80													
Disease? No						Habitat size, location, configuration: 54.8 acres														
Insects/Infestation? No						Downed Woody Debris: Wildlife cover/food/water? All Stand corridor/patch?														
Exotic Plants? Yes		C	N	E	S	W	%													
Leaf litter? Moderate		Y	Y	Y	N	N	60													
Downed woody debris: Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																				
Fire Break locations in stand No																				
<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>		<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>		Total Board Feet: 181								
21		10		181																
Comments: Photo 7 Management Stand 1																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 7 Plot #: 4
 Forest Cover Type: Mixed regrowth Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Fraxinus americana</i>					1			2			1						62	4	
2	<i>Robinia pseudoacacia</i>																		0	
3	<i>Carya ovata</i>								4			1						52	5	
4	<i>Juglans nigra</i>								1									50.5	1	
5	<i>Cercis canadensis</i>								1										1	
6	<i>Prunus serotina</i>								1										1	
7	<i>Ailanthus altissima</i>					1			1										2	
8																			0	
9																			0	
Total Number of Trees per Size Class		2			10			2			0									14
Number & Size of Standing Dead Trees					2															2
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
<i>Fraxinus americana, Ailanthus altissima, Crataegus sp.</i>				C	N	E	S	W	%	50%		Mid								
				Y	Y	Y	Y	N	80											
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Gleditsia triacanthos, Lonicera japonica, Rubus occidentalis, Rosa multiflora, Allium oleraceum, Smilax rotundifolium, Microstegium vimineum, Berberis thunbergii, Alliaria petiolata, Linder benzoin</i>				C	N	E	S	W	%	<i>Alliaria petiolata, Berberis thunbergii, Lonicera japonica, Rosa multiflora, Rubus phoenicolasius, Microstegium vimineum</i>										
				N	Y	Y	Y	N	60											
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species										
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease?	No							54.8 acres												
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	Yes			C	N	E	S	W	%	All										
Leaf litter?	Light			N	Y	N	Y	N	40	Stand corridor/patch?										
Downed woody debris:	Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No)		Yes																		
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, invasive species																		
Fire Break locations in stand		No																		
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 93														
15	8	61																		
12	8	32																		
Comments: Photo 8 Management Stand 1																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 1 Stand #: 7 Plot #: 5
 Forest Cover Type: Mixed regrowth Date: 2/21/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Fraxinus americana</i>			2			4										44	6
2	<i>Prunus serotina</i>			5			8			1							35, 53	14
3	<i>Liriodendron tulipifera</i>			1						2							65	3
4	<i>Prunus cerasus</i>			1														1
5	<i>Cercis canadensis</i>			4			2											6
6	<i>Crataegus</i> sp.			1														1
7	<i>Acer rubrum</i>			2														2
8																		0
9																		0
Total Number of Trees per Size Class		16			14			3			0							33
Number & Size of Standing Dead Trees		3			2													5
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Cercis canadensis, Prunus serotina, Crataegus</i> sp., <i>Fraxinus americana, Liriodendron tulipifera, Acer rubrum</i>							C	N	E	S	W	%	60%		Mid			
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Rubus occidentalis, Berberis thunbergii, Rosa multiflora, Rubus phoenicolasius, Lonicera japonica, Rubus allegheniensis, Allium vineale</i>							C	N	E	S	W	%	<i>Berberis thunbergii, Lonicera japonica, Rosa multiflora, Rubus phoenicolasius, Allium vineale</i>					
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer					
Historic Sites? No							Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease? No							Downed Woody Debris:					54.8 acres						
Insects/Infestation? No							C	N	E	S	W	%	Wildlife cover/food/water?					
Exotic Plants? Yes							N	N	Y	N	N	20	All					
Leaf litter? Light												Stand corridor/patch?						
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																		
Fire Break locations in stand No																		
DBH (inches) Length of Log (ft) Contents in Board Feet							DBH (inches) Length of Log (ft) Contents in Board Feet							Total Board Feet:				
14 11 63														235				
18 15 172																		
Comments: Photo 9 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 1 Plot #: 1
 Forest Cover Type: Oak Date: 2/22/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus alba</i>					2			1								82	3
2	<i>Quercus rubra</i>					4			3								77.5	7
3	<i>Acer rubrum</i>			6			3											9
4	<i>Carya cordiformis</i>			1					1								68	2
5	<i>Acer pensylvanicum</i>			2														2
6	<i>Betula lenta</i>						1											1
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		9			10			5			0			0				24
Number & Size of Standing Dead Trees		2			1													3

List of Woody Plant Species 3'-20': <i>Acer rubrum, Carya cordiformis, Acer pensylvanicum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Acer pensylvanicum, Hamamelis virginiana, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	N	Y	N	N	N	20	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	N	Y	N	Y	40	Habitat size, location, configuration: 53.6 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All
Exotic Plants? No	N	N	N	Y	Y	40	
Leaf litter? Mocerate							Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 490
13	12	61				
18	15	172				
15	10	76				
15	12	91				
16	10	90				

Comments: Photo 11 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 1 Plot #: 2

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus rubra</i>					3			4								77	7	
2 <i>Quercus prinus</i>		3			2			5								63	10	
3 <i>Betula lenta</i>			15														15	
4 <i>Carya cordiformis</i>			1														1	
5 <i>Acer rubrum</i>			1														1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		20			5			9			0			0				34
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20': <i>Betula lenta, Quercus prinus, Acer rubrum</i>							Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:					
							C	N	E	S	W	%	0%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Acer pensylvanicum, Betula lenta, few oak saplings, moss</i>							Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):							
							C	N	E	S	W	%	---					
							Y	N	Y	Y	N	60						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species (turkey)					
Historic Sites?	No						N	Y	N	N	Y	40	Habitat size, location, configuration:					
Disease?	No											53.6 acres						
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	No						C	N	E	S	W	%	All					
Leaf litter?	Light						N	N	N	Y	Y	40	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 557						
12		10		40		17		10		106								
13		12		61		15		11		76								
15		12		91		15		8		61								
14		8		50		12		10		40								
12		8		32														
Comments: Photo 12							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 1 Plot #: 3

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					5			3								94	8	
2 <i>Quercus rubra</i>											1					87	1	
3 <i>Acer rubrum</i>			3			4											7	
4 <i>Betula lenta</i>			11			1											12	
5 <i>Quercus alba</i>											1					74	1	
6 <i>Carya cordiformis</i>			3														3	
7 <i>Nyssa sylvatica</i>			2			1											3	
8																	0	
9																	0	
Total Number of Trees per Size Class		19			11			3			2			0				35
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20': <i>Betula lenta, Carya cordiformis, Acer rubrum, Nyssa sylvatica</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	0%		Mature			
							Y	N	Y	Y	Y	80						
List of Understory Species 0'-3': <i>Betula lenta, Acer rubrum, Smilax rotundifolia, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	---					
							Y	Y	Y	Y	Y	100						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		Y	Y	Y	N	N	60	Habitat size, location, configuration:										
Disease? No							53.6 acres											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? No		C	N	E	S	W	%	All										
Leaf litter? Light		Y	N	N	N	N	20	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
12		10		40										989				
14		8		50														
13		10		51														
23		18		407														
25		16		441														
Comments: Photo 13 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 1 Plot #: 4

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>							2									93	2	
2 <i>Carya glabra</i>						1										61	1	
3 <i>Nyssa sylvatica</i>			5			3			1							52	9	
4 <i>Betula lenta</i>			9			2											11	
5 <i>Prunus serotina</i>			4			2											6	
6 <i>Acer rubrum</i>			1			2			1								4	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		19			10			4			0			0				33
Number & Size of Standing Dead Trees		1																1
List of Woody Plant Species 3'-20': <i>Betula lenta, Prunus serotina, Acer rubrum, Nyssa sylvatica</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	3%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubuss allegheniensis, Nyssa sylvatica, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Berberis thunbergii</i>					
							Y	Y	Y	Y	N	80						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer, bird species					
Historic Sites? No							Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease? No												53.6 acres						
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? Yes							C	N	E	S	W	%	All					
Leaf litter? Moderate							N	Y	Y	Y	Y	80	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees, and few invasives																		
Fire Break locations in stand No																		
							<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	Total Board Feet:					
							15	11	76				203					
							17	12	127									
Comments: Photo 15 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 2 Plot #: 1

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fagus grandifolia</i>									2							68	2	
2 <i>Quercus alba</i>								2								89.5, 74	2	
3 <i>Quercus velutina</i>								1								54	1	
4 <i>Betula lenta</i>			20			2											22	
5 <i>Acer rubrum</i>			1			1											2	
6 <i>Quercus prinus</i>					1												1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class	21			4			5			0			0				30	
Number & Size of Standing Dead Trees				1													1	
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	N	Y	Y	Y	80									
List of Understory Species 0'-3': <i>Smilax rotundifolia, Betula lenta, Acer rubrum, Hamamelis virginiana, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%									
				Y	Y	Y	N	Y	80					---				
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species								
Historic Sites?	No			N	N	Y	N	N	20	Habitat size, location, configuration:								
Disease?	No							14.2 acres										
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?										
Exotic Plants?	No			C	N	E	S	W	%	All								
Leaf litter?	Light			N	Y	60	Y	N		Stand corridor/patch?								
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, down woody debris																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet													Total Board Feet:
16	12	108																234
13	10	51																
14	12	75																
Comments: Photo 14 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 2 Plot #: 2

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																													
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total														
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other																
1	<i>Acer rubrum</i>								3			2							93	5											
2	<i>Nyssa sylvatica</i>											3							95.5	3											
3	<i>Betula lenta</i>					1			2			3							90	6											
4	<i>Fagus grandifolia</i>								1											1											
5	<i>Acer pensylvanicum</i>					1														1											
6																				0											
7																				0											
8																				0											
9																				0											
Total Number of Trees per Size Class		2			6			8			0			0							16										
Number & Size of Standing Dead Trees		1			3																4										
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer pensylvanicum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 5%				Plot Successional Stage: Mature																			
				C	N	E	S	W	%																						
				Y	Y	Y	Y	Y	100																						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Linderla benzoin, Betula lenta, Acer rubrum, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii</i>																							
				C	N	E	S	W	%																						
				Y	Y	N	Y	N	60																						
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species																							
Specimen Trees? No				C	N	E	S	W	%																						
Historic Sites? No				N	N	N	N	Y	20	Habitat size, location, configuration: 14.2 acres																					
Disease? No				Downed Woody Debris:				Wildlife cover/food/water? All																							
Insects/Infestation? No				C	N	E	S	W	%	Stand corridor/patch?																					
Exotic Plants? Yes				N	N	Y	Y	Y	60																						
Leaf litter? Moderate																															
Downed woody debris: Yes																															
FUNCTION: Where is stand in relation to sensitive areas on site?																															
Fire Management Zone (Yes/No) No																															
Fuel load and type located in stand Yes, down woody debris, dead standing trees, few invasive species																															
Fire Break locations in stand No																															
												Total Board Feet:																			
<table border="1"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th colspan="2">Total Board Feet:</th> </tr> </thead> <tbody> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td colspan="2"> </td> </tr> </tbody> </table>																DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet:									
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet:																									
Comments: Photo 17								Management Stand 2																							

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 3 Plot #: 1

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya glabra</i>			4			6										78	10	
2 <i>Quercus alba</i>					1			2								82	3	
3 <i>Quercus rubra</i>					1			2								78	3	
4 <i>Quercus velutina</i>								1									1	
5 <i>Acer rubrum</i>			1			4			2							72	7	
6 <i>Betula lenta</i>			3														3	
7 <i>Quercus prinus</i>					1												1	
8																	0	
9																	0	
Total Number of Trees per Size Class		8			13			7			0			0				28
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Carya glabra, Betula lenta, Acer rubrum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Chimaphila maculata, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	Y	Y	Y	N	N	60	

Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, avian species Habitat size, location, configuration: 119 acres Wildlife cover/food/water? All Stand corridor/patch?	
Specimen Trees?	No	C	N	E	S	W		%
Historic Sites?	No	N	Y	N	N	N		20
Disease?	No	Downed Woody Debris:						
Insects/Infestation?	No	C	N	E	S	W		%
Exotic Plants?	No	N	Y	N	Y	N	40	
Leaf litter?	Light							
Downed woody debris:	Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Wetland area east of plot

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris

Fire Break locations in stand No

Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 448
15	13			91	
18	10			123	
13	10			51	
12	15			56	
17	12			127	

Comments: Photo 18 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 3 Plot #: 2

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					3			4								80	7	
2 <i>Betula lenta</i>			37			3											40	
3 <i>Pinus strobus</i>						1										48	1	
4 <i>Quercus rubra</i>					1											51	1	
5 <i>Fagus grandifolia</i>						1										35	1	
6 <i>Quercus alba</i>					1												1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		37			10			4			0			0				51
Number & Size of Standing Dead Trees								1										1
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Betula lenta</i>							C	N	E	S	W	%	0%		Mature			
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Betula lenta, few oak saplings, moss</i>							C	N	E	S	W	%	---					
							Y	N	Y	N	N	40						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species					
Historic Sites?	No						N	Y	Y	N	Y	60	Habitat size, location, configuration:					
Disease?	No											119 acres						
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	No						C	N	E	S	W	%	All					
Leaf litter?	Light to moderate						N	Y	Y	N	N	40	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, down woody debris																
Fire Break locations in stand		No																
	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>												Total Board Feet:	
	18	13			147												421	
	17	15			148													
	14	10			63													
	14	11			63													
Comments: Photo 19 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 3

Plot #: 8

Forest Cover Type: Oak

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					3			3								85	6	
2 <i>Quercus velutina</i>								1								65	1	
3 <i>Quercus rubra</i>								1								68	1	
4 <i>Carya glabra</i>			1			1											2	
5 <i>Betula lenta</i>			17			9			1							50	27	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		18			13			6			0			0				37
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20': <i>Betula lenta, Carya glabra</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 2%		Plot Successional Stage: Mature						
					C	N	E	S	W	%								
					Y	N	N	Y	Y	60								
List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis, Acer pensylvanicum, Rubus phoenicolasius, Betula lenta, Rubus allegheniensis, moss</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius</i>								
					C	N	E	S	W	%								
					Y	Y	Y	N	N	60								
Rare, etc. Species? No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species								
Specimen Trees? No					C	N	E	S	W	%								
Historic Sites? No					N	N	Y	N	N	20	Habitat size, location, configuration: 119 acres							
Disease? No																		
Insects/Infestation? No					Downed Woody Debris:					Wildlife cover/food/water? All								
Exotic Plants? Yes					C	N	E	S	W	%	Stand corridor/patch?							
Leaf litter? Light					N	Y	Y	Y	Y	80								
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
14		9		50								486						
18		9		98														
18		16		196														
13		10		51														
15		12		91														
Comments: Phto 26 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 3 Plot #: 10
 Forest Cover Type: Oak Date: 2/23/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>					1			3								76	4
2 <i>Quercus prinus</i>					1			1								60	2
3 <i>Carya glabra</i>			1			5			2							66	8
4 <i>Acer rubrum</i>						2			1							55	3
5 <i>Robinia pseudoacacia</i>			3														3
6 <i>Prunus serotina</i>			3			1											4
7 <i>Acer saccharum</i>						1											1
8																	0
9																	0
Total Number of Trees per Size Class	7			11			7			0			0				25
Number & Size of Standing Dead Trees	1																1

List of Woody Plant Species 3'-20': <i>Carya glabra, Prunus serotina, Robinia pseudoacacia, Betula lenta</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 15%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Duchesnea indica, Rubus phoenicolasius, Berberis thunbergii, Lonicera japonica, Betula lenta, Acer rubrum</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Berberis thunbergii, Lonicera japonica</i>
	C	N	E	S	W	%	
	Y	N	N	N	N	20	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No		Y	Y	Y	Y	80	Habitat size, location, configuration: 119 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light		Y	N	N	N	20	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 338
15	12	91				
15	14	106				
16	10	90				
13	10	51				

Comments: Photo 30 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 3

Plot #: 11

Forest Cover Type: Oak

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus rubra</i>											1					68	1	
2 <i>Acer rubrum</i>						2			4							70	6	
3 <i>Betula lenta</i>			6														6	
4 <i>Quercus prinus</i>								1									1	
5 <i>Prunus serotina</i>			2														2	
6 <i>Quercus alba</i>								1								70	1	
7 <i>Carya glabra</i>						1										50	1	
8 <i>Quercus velutina</i>									1							72	1	
9																	0	
Total Number of Trees per Size Class		8			3			7			1			0				19
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer pensylvanicum, Prunus serotina, Cornus florida, Ostrya virginiana</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 5%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3': <i>Acer pensylvanicum, Rubus phoenicolasius, Smilax rotundifolium, Rosa multiflora, Acer rubrum, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Rosa multiflora</i>						
							C	N	E	S	W	%						
							Y	N	Y	N	N	40						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species											
Specimen Trees? No		C	N	E	S	W	%	Habitat size, location, configuration: 119 acres										
Historic Sites? No		N	N	Y	N	Y	40											
Disease? No		Downed Woody Debris:					Wildlife cover/food/water? All											
Insects/Infestation? No		C	N	E	S	W	%	Stand corridor/patch?										
Exotic Plants? Yes		N	Y	N	N	Y	40											
Leaf litter? Light																		
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
23		16		361										665				
13		15		71														
15		14		106														
17		12		127														
Comments: Photo 31 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 4

Plot #: 1

Forest Cover Type: Oak

Date: 2/22/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					4			1								72	5	
2 <i>Acer rubrum</i>						1			1							64	2	
3 <i>Betula lenta</i>			7					1									8	
4 <i>Quercus prinus</i>					2											75	2	
5 <i>Sassafras albidum</i>			2														2	
6 <i>Tsuga canadensis</i>			1														1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		10			7			3			0			0				20
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20': <i>Betula lenta, Sassafras albidum</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:						
					C	N	E	S	W	%	0%		Mature					
					Y	Y	N	Y	Y	80								
List of Understory Species 0'-3': <i>Tsuga canadensis, Smilax rotundifolia, moss</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):								
					C	N	E	S	W	%	---							
					Y	N	Y	N	Y	60								
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		N	Y	Y	N	N	20	Habitat size, location, configuration:										
Disease? No							167.7 acres											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? No		C	N	E	S	W	%	All										
Leaf litter? Moderate		N	Y	N	Y	N	40	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing tree, future dead Eastern Hemlocks																		
Fire Break locations in stand No																		
<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>			<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>			Total Board Feet:				
14		12		75										75				
Comments: Photo 25 Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 4
 Forest Cover Type: Hemlock/Oak Date: 2/23/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 150		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom		CoD	Other		
1	<i>Tsuga canadensis</i>							2			4								68	6	
2	<i>Quercus prinus</i>										4								71	4	
3	<i>Pinus strobus</i>								1			1							46	2	
4	<i>Betula lenta</i>					1			2											3	
5																				0	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		1			5			9			0			0							15
Number & Size of Standing Dead Trees								1													1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Betula lenta</i>				C	N	E	S	W	%	0%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Betula lenta, Tsuga canadensis, Acer pensylvanicum, Oak saplings, moss</i>				C	N	E	S	W	%	---											
				Y	Y	N	Y	Y	80												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species											
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No							167.7 acres													
Insects/Infestation?	Hemlock woolly adelgid			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	No			C	N	E	S	W	%	All											
Leaf litter?	Light			Y	N	Y	N	N	40	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		Yes																			
Fuel load and type located in stand		Yes, down woody debris, dead standing tree																			
Fire Break locations in stand		No																			
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:							
15		19		137										490							
18		13		147																	
14		16		100																	
17		10		106																	
Comments: Photo 34 Management Stand 2																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Leasure

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 4

Plot #: 5

Forest Cover Type: Oak (previously hemlock)

Date: 2/27/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Tsuga canadensis</i>									1							35	1	
2 <i>Quercus alba</i>								1								77	1	
3 <i>Quercus velutina</i>								4			1					75	5	
4 <i>Quercus prinus</i>					1			1								70	2	
5 <i>Liriodendron tulipifera</i>			1			1											2	
6 <i>Betula lenta</i>			7			1											8	
7 <i>Prunus serotina</i>						1											1	
8 <i>Quercus coccinea</i>								1								74	1	
9																	0	
Total Number of Trees per Size Class		8			4			8			1			0				21
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Betula lenta, Prunus serotina, Hamamelis virginiana, Liriodendron tulipifera</i>							C	N	E	S	W	%	0%		Mature			
							Y	N	N	Y	Y	60						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Acer rubrum, Rubus allegheniensis, Betula lenta, moss</i>							C	N	E	S	W	%	---					
							Y	Y	Y	Y	Y	100						
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees?	No	C	N	E	S	W	%	Deer, Barred owl, turkey										
Historic Sites?	No	Y	N	N	Y	N	40	Habitat size, location, configuration:										
Disease?	No						167.7 acres											
Insects/Infestation?	Hemlock wooly adelgid	Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Light	Y	Y	Y	Y	Y	100	Stand corridor/patch?		Patch-complete unit								
Downed woody debris:	Moderate to heavy																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, dead hemlock, down woody debris																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet					DBH (inches)	Length of Log (ft)	Contents in Board Feet					Total Board Feet: 1216				
16	10	90					14	10	63									
18	15	172					17	14	148									
27	12	397					19	12	169									
16	15	126																
13	11	51																
Comments: Photo 50 Birch regeneration in opening created by dead hemlocks																	Management Stand 2	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Leasure

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 6

Forest Cover Type: Hemlock/Oak

Date: 2/27/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Tsuga canadensis</i>					2			1							74	3	
2	<i>Quercus prinus</i>						2			2						64	4	
3	<i>Betula lenta</i>					1						2				68	3	
4	<i>Acer rubrum</i>					3			3								6	
5	<i>Carya glabra</i>					1			1								2	
6	<i>Nyssa sylvatica</i>					1											1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		6			8			5			0			0				19
Number & Size of Standing Dead Trees		1			1			1										3
List of Woody Plant Species 3'-20':					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:						
<i>Betula lenta, Nyssa sylvatica, Acer rubrum, Hamamelis virginiana</i>					C	N	E	S	W	%	0%		Mature					
					Y	Y	Y	Y	Y	100								
List of Understory Species 0'-3':					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):								
<i>Smilax rotundifolia, Rubus allegheniensis, moss</i>					C	N	E	S	W	%	---							
					Y	Y	Y	N	Y	80								
Rare, etc. Species?	No				Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?								
Specimen Trees?	No				C	N	E	S	W	%	Deer, turkey, bird species							
Historic Sites?	No				Y	N	N	N	N	20	Habitat size, location, configuration:							
Disease?	No									167.7 acres								
Insects/Infestation?	Hemlock wooly adelgid				Downed Woody Debris:													
Exotic Plants?	No				C	N	E	S	W	%	Wildlife cover/food/water?							
Leaf litter?	Light				N	N	Y	Y	Y	60	All							
Downed woody debris:	Yes									Stand corridor/patch? Patch								
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, dead hemlocks, dead standing, down woody debris																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
18		15		172										235				
14		10		63														
Comments: Photo 51 Oaks in canopy becoming dominant as hemlocks die																		
Management Stand 2																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 8
 Forest Cover Type: Oak with hemlock understory Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Tsuga canadensis</i>					7			2									46	9	
2	<i>Quercus prinus</i>			1			4			3								70, 72	8	
3	<i>Acer rubrum</i>								2									59	2	
4	<i>Betula lenta</i>					2			1										3	
5	<i>Betula velutina</i>					1													1	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		11			9			3			0			0						23
Number & Size of Standing Dead Trees		2			5			1												8
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
				C	N	E	S	W	%	Mature										
				Y	Y	N	Y	Y	80	0%										
List of Understory Species 0'-3': <i>Gaylussacia baccata, Vaccinium angustifolium, Chimaphila maculata, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
				C	N	E	S	W	%	---										
				Y	Y	Y	Y	Y	100											
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees? No		C N E S W %				Deer, turkey														
Historic Sites? No		N N Y N N 20				Habitat size, location, configuration:														
Disease? No						167.7 acres														
Insects/Infestation? Hemlock woolly adelgid		Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants? No		C N E S W %				All														
Leaf litter? Thick		Y N Y Y Y 80				Stand corridor/patch?														
Downed woody debris: Moderate																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, dead standing trees, down woody debris																				
Fire Break locations in stand No																				
		<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	Total Board Feet: 268												
		15	7	45																
		15	10	76																
		18	12	147																
Comments: Photo 53 Dense hemlock understory Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 9
 Forest Cover Type: Mixed oak/hemlock Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Quercus alba</i>								3					1					78, 87	4
2	<i>Tsuga canadensis</i>											5							47, 50	7
3	<i>Acer rubrum</i>								2											2
4	<i>Quercus prinus</i>								1										72	1
5	<i>Betula lenta</i>					8														8
6																				0
7																				0
8																				0
9																				0
Total Number of Trees per Size Class		8			7			6			1			0					22	
Number & Size of Standing Dead Trees					3														3	
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
				C	N	E	S	W	%	0%		Mature								
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3': moss				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
				C	N	E	S	W	%	---										
				Y	Y	Y	Y	Y	100											
Rare, etc. Species? No		Specimen Trees? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
				C	N	E	S	W	%	Deer, turkey										
Historic Sites? No		Disease? No		N	N	Y	N	N	20	Habitat size, location, configuration:										
Insects/Infestation? Hemlock woolly adelgid				Downed Woody Debris:				167.7 acres												
Exotic Plants? No				C	N	E	S	W	%	Wildlife cover/food/water?										
Leaf litter? Thick				Y	Y	Y	Y	Y	100	All										
Downed woody debris: Light								Stand corridor/patch? Patch												
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees																				
Fire Break locations in stand No																				
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 855								
15		18		137																
18		14		172																
13		11		51																
27		15		463																
12		8		32																
Comments: Photo 54 Birch dominated understory Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 10
 Forest Cover Type: Mixed Oak Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus Prinus</i>		1			6			2								73, 73, 76	9	
2 <i>Tsuga canadensis</i>			1														1	
3 <i>Betula lenta</i>						1											1	
4 <i>Quercus alba</i>					1			2								72, 75	3	
5 <i>Acer rubrum</i>			2			2											4	
6 <i>Quercus velutina</i>								1								73	1	
7 <i>Quercus rubra</i>					1												1	
8 <i>Pinus strobus</i>						1											1	
9																	0	
Total Number of Trees per Size Class		4			12			5			0			0				21
Number & Size of Standing Dead Trees		1			4													5

List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Vaccinium angustifolium, Gaylussacia baccata, Betula lenta, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	Y	N	Y	Y	Y	80	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, turkey
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	N	N	Y	Y	40	Habitat size, location, configuration: 167.7 acres
Disease? No							
Insects/Infestation? Hemlock woolly adelgid	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? No	C	N	E	S	W	%	
Leaf litter? Light	Y	Y	Y	Y	Y	100	Stand corridor/patch? Patch
Downed woody debris: Moderate							

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 528
17	15	148				
18	10	123				
18	8	98				
13	10	51				
16	12	108				

Comments: Photo 55 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 11
 Forest Cover Type: Mixed oak Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1 <i>Quercus prinus</i>						3						4							71, 73	7
2 <i>Quercus alba</i>						1													65	1
3 <i>Acer rubrum</i>			1			3			1										60	5
4 <i>Liriodendron tulipifera</i>									1										55	1
5 <i>Betula lenta</i>			4			3													48	7
6																				0
7																				0
8																				0
9																				0
Total Number of Trees per Size Class		5			11			5			0			0					21	
Number & Size of Standing Dead Trees		2			2						1								5	
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:						
<i>Betula lenta</i>							C	N	E	S	W	%	1%		Mature					
							Y	Y	Y	Y	Y	100								
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):								
<i>Quercus alba, Vaccinium angustifolium, Acer pensylvanicum, Ailanthus altissima, Rubus allegheniensis, Betula lenta, moss</i>							C	N	E	S	W	%	<i>Ailanthus altissima</i>							
							Y	N	N	N	N	20								
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?								
Specimen Trees? No							C	N	E	S	W	%	Deer, turkey							
Historic Sites? No							N	Y	N	Y	N	40	Habitat size, location, configuration:							
Disease? No												167.7 acres								
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?								
Exotic Plants? Yes							C	N	E	S	W	%	All							
Leaf litter? Moderate							Y	Y	Y	Y	Y	100	Stand corridor/patch? Patch							
Downed woody debris: Heavy																				
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to stream													
Fire Management Zone (Yes/No)							Yes													
Fuel load and type located in stand							Yes, down woody debris,													
Fire Break locations in stand							No													
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:								
18		14		172								488								
17		16		169																
17		10		106																
13		8		41																
Comments: Photo 56							Management Stand 2													

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 12
 Forest Cover Type: Mixed oak/hemlock Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Tsuga canadensis</i>											1							55	1
2	<i>Quercus prinus</i>						4			1									83, 55	5
3	<i>Quercus velutina</i>						2			1			1						84, 82	4
4	<i>Betula lenta</i>					1			2			1								4
5																				0
6																				0
7																				0
8																				0
9																				0
Total Number of Trees per Size Class		1			8			4			1			0				14		
Number & Size of Standing Dead Trees					1			3										4		
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:								
<i>Betula lenta</i>				C	N	E	S	W	%	0%				Mature						
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Vaccinium angustifolium, Pinus strobus, Gaylussacia baccata, moss</i>				C	N	E	S	W	%	---										
				Y	Y	N	N	Y	60											
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees?	No	C	N	E	S	W	%	Deer, turkey												
Historic Sites?	No	N	Y	N	N	Y	40	Habitat size, location, configuration:												
Disease?	No					167.7 acres														
Insects/Infestation?	Hemlock wooly adelgid	Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants?	No	C	N	E	S	W	%	All												
Leaf litter?	Thin	Y	Y	Y	Y	Y	100	Stand corridor/patch? Patch												
Downed woody debris:	Heavy																			
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No)		Yes																		
Fuel load and type located in stand		Yes, down woody debris, dead standing trees																		
Fire Break locations in stand		No																		
DBH (inches)	Length of Log (ft)	Contents in Board Feet				DBH (inches)	Length of Log (ft)	Contents in Board Feet				Total Board Feet: 608								
15	8	61																		
26	16	484																		
14	10	63																		
Comments: Photo 57 Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 13
 Forest Cover Type: Mixed oak - hemlock understory Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom		CoD	Other		
1	<i>Tsuga canadensis</i>					2														2	
2	<i>Quercus prinus</i>						3			8									85, 90, 80	11	
3	<i>Betula lenta</i>					1			2										63	3	
4	<i>Nyssa sylvatica</i>					3														3	
5	<i>Acer saccharum</i>					2														2	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		8			5			8			0			0							21
Number & Size of Standing Dead Trees					1																1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Tsuga canadensis</i>				C	N	E	S	W	%	0%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Tsuga canadensis, Vaccinium angustifolium, moss</i>				C	N	E	S	W	%	---											
				Y	Y	Y	Y	Y	100												
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees?	No	C	N	E	S	W	%	Deer, turkey													
Historic Sites?	No	N	N	N	N	Y	20	Habitat size, location, configuration:													
Disease?	No					167.7 acres															
Insects/Infestation?	Hemlock woolly adelgid	Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants?	No	C	N	E	S	W	%	All													
Leaf litter?	Moderate	Y	N	N	Y	Y	60	Stand corridor/patch? Patch													
Downed woody debris:	Light																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)	Yes																				
Fuel load and type located in stand	Yes, down woody debris, infestation																				
Fire Break locations in stand	No																				
DBH (inches)	Length of Log (ft)	Contents in Board Feet				DBH (inches)	Length of Log (ft)	Contents in Board Feet				Total Board Feet: 597									
14	10	63				18	8	98													
13	10	51				16	14	126													
12	8	32				15	13	91													
14	12	75																			
13	13	61																			
Comments: Photo 58. Gypsy moth egg cases on birch observed. Hemlock understory Management Stand 2																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 14
 Forest Cover Type: Mixed deciduous Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Tsuga canadensis</i>					4			3									48	7	
2	<i>Acer rubrum</i>								3			1						66	4	
3	<i>Quercus prinus</i>											2						65, 56	2	
4	<i>Betula lenta</i>					12													12	
5	<i>Nyssa sylvatica</i>								1										1	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		16			7			3			0			0						26
Number & Size of Standing Dead Trees					1															1
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
				C	N	E	S	W	%	0%		Mature								
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3': <i>Vaccinium angustifolium, Tsuga canadensis, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
				C	N	E	S	W	%	---										
				Y	Y	Y	Y	Y	100											
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees? No		C	N	E	S	W	%	Deer, turkey												
Historic Sites? No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:												
Disease? No						167.7 acres														
Insects/Infestation? hemlock woolly adelgid		Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants? No		C	N	E	S	W	%	All												
Leaf litter? Thin		Y	Y	N	Y	Y	80	Stand corridor/patch? Patch												
Downed woody debris: Moderate																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris																				
Fire Break locations in stand No																				
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 214								
18		10		123																
15		12		91																
Comments: Photo 59 Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 15
 Forest Cover Type: Deciduous with hemlock Date: 2/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Tsuga canadensis</i>					2			1			1						68	4	
2	<i>Quercus prinus</i>								1			3						65, 66	4	
3	<i>Quercus rubra</i>								1			1						66, 76	2	
4	<i>Pinus strobus</i>											1						66	1	
5	<i>Acer rubrum</i>								2									73	2	
6	<i>Betula lenta</i>					2													2	
7	<i>Quercus alba</i>								1									64	1	
8	<i>Acer saccharum</i>								1									63	1	
9																			0	
Total Number of Trees per Size Class		4			6			7			0			0						17
Number & Size of Standing Dead Trees		11			4			2												17
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:										
				C	N	E	S	W	%	0%		Mature								
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3': Moss				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
				C	N	E	S	W	%	---										
				Y	N	N	Y	N	40											
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees? No				C	N	E	S	W	%	Deer, turkey										
Historic Sites? No				N	N	N	Y	N	20	Habitat size, location, configuration:										
Disease? No								167.7 acres												
Insects/Infestation? Hemlock woolly adelgid				Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants? No				C	N	E	S	W	%	All										
Leaf litter? Moderate				Y	Y	N	Y	Y	80	Stand corridor/patch? Patch										
Downed woody debris: Moderate																				
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees, thick understory																				
Fire Break locations in stand No																				
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 422								
15		10		76																
17		12		127																
13		16		81																
18		8		98																
12		10		40																
Comments: Photo 60 Management Stand 2																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Leasure

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 17

Forest Cover Type: Mixed oak

Date: 2/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>								1										76, 63	3	
2	<i>Quercus alba</i>											1							73	1	
3	<i>Betula lenta</i>					38			1											39	
4	<i>Nyssa sylvatica</i>					1			2											3	
5	<i>Acer rubrum</i>					1			2											3	
6	<i>Tsuga canadensis</i>					4														4	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		44			6			3			0			0							53
Number & Size of Standing Dead Trees		1																			1
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Acer rubrum</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:											
				C	N	E	S	W	%	0%		Mature									
				Y	Y	N	Y	Y	80												
List of Understory Species 0'-3': <i>Betula lenta, Chimaphila maculata, Gaylussacia baccata, Gaultheria procumbens</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
				C	N	E	S	W	%	---											
				Y	Y	Y	Y	Y	100												
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees? No		C				N	E	S	W	%	Deer, turkey										
Historic Sites? No		Y				N	Y	Y	Y	80	Habitat size, location, configuration:										
Disease? No										16.7 acres											
Insects/Infestation? Hemlock woolly adelgid		Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants? No		C				N	E	S	W	%	All										
Leaf litter? Moderate		Y				Y	N	N	Y	60	Stand corridor/patch? Patch										
Downed woody debris: Moderate																					
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No) Yes																					
Fuel load and type located in stand Yes, down woody debris																					
Fire Break locations in stand No																					
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
18		20		246								423									
15		16		121																	
12		14		56																	
Comments: Photo 62. opening in canopy in 1/3 of plot. black birch dominates remainder of understory. Management Stand 2																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Leasure

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 4 Plot #: 18

Forest Cover Type: Oak

Date: 2/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom		CoD	Other		
1	<i>Quercus prinus</i>									5									65, 68, 70, 65, 72	5	
2	<i>Quercus rubra</i>									1									74	1	
3	<i>Acer rubrum</i>					1						1							67	2	
4	<i>Betula lenta</i>					21			1											22	
5	<i>Tsuga canadensis</i>					4			3											7	
6	<i>Nyssa sylvatica</i>								1											1	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		26			5			7			0			0							38
Number & Size of Standing Dead Trees		1			2			2													5
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%				Plot Successional Stage: Mature									
				C	N	E	S	W	%												
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3': <i>Vaccinium angustifolium, Euonymus americana, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):				---									
				C	N	E	S	W	%												
				Y	Y	Y	Y	N	80												
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?				Deer, turkey									
Specimen Trees? No				C	N	E	S	W	%												
Historic Sites? No				Y	N	Y	Y	N	40					Habitat size, location, configuration:							
Disease? No												167.7 acres									
Insects/Infestation? Hemlock woolly adelgid				Downed Woody Debris:				Wildlife cover/food/water?				All									
Exotic Plants? No				C	N	E	S	W	%					Stand corridor/patch? Patch							
Leaf litter? Thin				Y	Y	Y	Y	Y	100												
Downed woody debris: Light																					
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No) Yes																					
Fuel load and type located in stand Yes, down woody debris, dead standing																					
Fire Break locations in stand No																					
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
16		8		72		11		10		31		585									
19		16		225																	
12		14		56																	
14		12		75																	
16		15		126																	
Comments: Photo 63. Management Stand 2																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 5 Plot #: 1

Forest Cover Type: Birch

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other				
1	<i>Betula lenta</i>			37			8											45	
2	<i>Quercus alba</i>								2							58		2	
3	<i>Carya glabra</i>								1							75		1	
4	<i>Quercus velutina</i>					1			1							64		2	
5	<i>Acer rubrum</i>							1										1	
6																		0	
7																		0	
8																		0	
9																		0	
Total Number of Trees per Size Class				38			9			4			0			0			51
Number & Size of Standing Dead Trees																			0
List of Woody Plant Species 3'-20': <i>Betula lenta, Quercus velutina</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%		Plot Successional Stage: Early									
				C	N	E	S	W	%										
				Y	Y	Y	Y	Y	100										
List of Understory Species 0'-3': <i>Acer pensylvanicum, Betula lenta, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): ---											
				C	N	E	S	W	%										
				N	N	N	N	N	0										
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species											
Specimen Trees?	No			C	N	E	S	W	%	Habitat size, location, configuration: 37.9 acres									
Historic Sites?	No			N	Y	Y	N	N	40										
Disease?	No																		
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water? All											
Exotic Plants?	No			C	N	E	S	W	%	Stand corridor/patch?									
Leaf litter?	Light			N	N	N	N	Y	20										
Downed woody debris:	Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream															
Fire Management Zone (Yes/No)				Yes															
Fuel load and type located in stand				Yes, down woody debris															
Fire Break locations in stand				No															
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 95							
12		8		32															
14		11		63															
Comments: Photo 27														Management Stand 2					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 5 Plot #: 3
 Forest Cover Type: Oak/hemlock Date: 2/23/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 50		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus rubra</i>										2								60	2	
2	<i>Quercus prinus</i>						3			1									58	4	
3	<i>Tsuga canadensis</i>						1			1									30	2	
4	<i>Betula lenta</i>					11														11	
5	<i>Quercus velutina</i>				2			1												3	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		13			5			4			0			0							22
Number & Size of Standing Dead Trees								1													1
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta, Quercus velutina</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 2%				Plot Successional Stage: Mature									
				C	N	E	S	W	%												
				N	N	Y	Y	Y	60												
List of Understory Species 0'-3': <i>Tsuga canadensis, Betula lenta, Rubus allegheniensis, Microstegium vimineum, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Microstegium vimineum</i>													
				C	N	E	S	W	%												
				Y	Y	N	Y	N	60												
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees? No						Deer, bird species															
Historic Sites? No						Habitat size, location, configuration:															
Disease? No						37.9 acres															
Insects/Infestation? Hemlock woolly adelgid		Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants? Yes						All															
Leaf litter? Light						Stand corridor/patch?															
Downed woody debris: Yes																					
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No) No																					
Fuel load and type located in stand Yes, down woody debris																					
Fire Break locations in stand No																					
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 392							
12		10		40																	
15		15		106																	
18		20		246																	
Comments: Photo 37 Management Stand 2																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 6

Plot #: 1

Forest Cover Type: Oak

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																																						
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total																							
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other																									
1 <i>Tsuga canadensis</i>						1			1							65	2																							
2 <i>Quercus alba</i>					1			2								85	3																							
3 <i>Quercus prinus</i>								1								80	1																							
4 <i>Betula lenta</i>			6			2											8																							
5 <i>Acer rubrum</i>						1											1																							
6 <i>Nyssa sylvatica</i>									1								1																							
7 <i>Fraxinus americana</i>						1											1																							
8 <i>Carya cordiformis</i>			1														1																							
9																	0																							
Total Number of Trees per Size Class	7			6			5			0			0				18																							
Number & Size of Standing Dead Trees	3			4						1							8																							
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta, Carya cordiformis</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:																										
							C	N	E	S	W	%	0%		Mature																									
							N	Y	Y	Y	N	60																												
List of Understory Species 0'-3': <i>Acer pensylvanicum, Tsuga canadensis, Betula lenta, Vitis sp., moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):																												
							C	N	E	S	W	%	---																											
							N	Y	N	N	Y	40																												
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?																												
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species																											
Historic Sites?	No						N	Y	Y	Y	N	60	Habitat size, location, configuration:																											
Disease?	No											4 acres																												
Insects/Infestation?	Hemlock wooly adelgid						Downed Woody Debris:					Wildlife cover/food/water?																												
Exotic Plants?	No						C	N	E	S	W	%	All																											
Leaf litter?	Light to moderate						N	N	N	N	N	0	Stand corridor/patch?																											
Downed woody debris:	Yes																																							
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to stream channel																																								
Fire Management Zone (Yes/No) Yes																																								
Fuel load and type located in stand Yes, down woody debris, dead standing trees																																								
Fire Break locations in stand No																																								
<table border="1"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th rowspan="3">Total Board Feet: 543</th> </tr> </thead> <tbody> <tr> <td>18</td> <td>21</td> <td>246</td> <td></td> <td></td> <td></td> </tr> <tr> <td>17</td> <td>18</td> <td>191</td> <td></td> <td></td> <td></td> </tr> <tr> <td>15</td> <td>14</td> <td>106</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>															DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 543	18	21	246				17	18	191				15	14	106				
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 543																																		
18	21	246																																						
17	18	191																																						
15	14	106																																						
Comments: Photo 36 Management Stand 2																																								

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 7 Plot #: 1

Forest Cover Type: Maple

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Acer rubrum</i>					2			7			2							50	11	
2	<i>Betula lenta</i>								3			3							63	6	
3	<i>Sassafras albidum</i>								1											1	
4	<i>Quercus velutina</i>											1							61	1	
5	<i>Nyssa sylvatica</i>								2											2	
6	<i>Fraxinus pennsylvanica</i>								1										60	1	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		2			14			6			0			0							22
Number & Size of Standing Dead Trees					3																3
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Betula lenta, Acer rubrum</i>				C	N	E	S	W	%	40%				Mature							
				Y	Y	N	Y	Y	80												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Smilax rotundifolia, Berberis thunbergii, Lonicera japonica, Rosa multiflora, Betula lenta, Vitis sp.</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Lonicera japonica, Rosa multiflora</i>											
				Y	N	Y	Y	N	60												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species											
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No							18.2 acres													
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	Yes			C	N	E	S	W	%	All											
Leaf litter?	Light			Y	Y	N	Y	Y	80	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?				Plot located between two perennial streams																	
Fire Management Zone (Yes/No)				Yes																	
Fuel load and type located in stand				Yes, down woody debris, dead standing trees, invasive species																	
Fire Break locations in stand				No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
18		20		221								221									
Comments: Photo 39													Management Stand 3								

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 7 Plot #: 2
 Forest Cover Type: Mix oak/maple Date: 2/24/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Liriodendron tulipifera</i>														1	95	1
2	<i>Acer rubrum</i>					1			1							65	2
3	<i>Betula lenta</i>					20			1								21
4	<i>Quercus prinus</i>								1			1				40/59	2
5	<i>Acer pensylvanicum</i>					2						1					3
6	<i>Nyssa sylvatica</i>								2								2
7	<i>Quercus velutina</i>											1					1
8	<i>Carya glabra</i>					1											1
9																	0
Total Number of Trees per Size Class		24			5			3			1			0			33
Number & Size of Standing Dead Trees								2									2
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta, Carya glabra</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 15%		Plot Successional Stage: Mid							
				C	N	E	S	W	%								
				Y	N	Y	Y	N	60								
List of Understory Species 0'-3': <i>Berberis thunbergii, Rubus allegheniensis, Smilax rotundifolia, Acer rubrum, Acer pensylvanicum, Betula lenta, Vitis sp., moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii</i>									
				C	N	E	S	W	%								
				Y	Y	Y	N	Y	80								
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species									
Specimen Trees? No				C	N	E	S	W	%	Habitat size, location, configuration: 18.2 acres							
Historic Sites? No				Y	N	Y	Y	Y	80	Wildlife cover/food/water? All							
Disease? No				Downed Woody Debris:				Stand corridor/patch? 18.2 acres									
Insects/Infestation? No				C	N	E	S	W	%	Wildlife cover/food/water? All							
Exotic Plants? Yes				Y	Y	Y	Y	Y	100	Stand corridor/patch? 18.2 acres							
Leaf litter? Light																	
Downed woody debris: Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site? Abuts perennial stream																	
Fire Management Zone (Yes/No) No																	
Fuel load and type located in stand Yes, down woody debris, dead standing trees																	
Fire Break locations in stand No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1128					
27		26		860													
16		18		162													
17		10		106													
Comments: Photo 44												Management Stand 3					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 2

Stand #: 7

Plot #: 3

Forest Cover Type: Deciduous - Black cherry/red maple

Date: 2/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya glabra</i>									1							70	1	
2 <i>Prunus serotina</i>			8			2			1							32, 28	11	
3 <i>Acer rubrum</i>		1			2				1							43, 38	4	
4 <i>Robinia pseudoacacia</i>									1							55	1	
5 <i>Quercus prinus</i>									1							66	1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		9			4			5			0			0				18
Number & Size of Standing Dead Trees					3													3
List of Woody Plant Species 3'-20': <i>Acer rubrum, Toxicodendron radicans, Lindera benzoin, Acer pensylvanicum, Vitis sp.</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 90%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	N	Y	80						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus allegheniensis, Cardamine bulbosa, Rosa multiflora, Berberis thunbergii, Lonicera japonica</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii, Lonicera japonica</i>						
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species (turkey)											
Specimen Trees? No		C	N	E	S	W	%											
Historic Sites? No		Y	Y	Y	Y	Y	100											
Disease? No							Habitat size, location, configuration: 18.2 acres											
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water? All											
Exotic Plants? Yes		C	N	E	S	W	%											
Leaf litter? very light		Y	Y	Y	N	Y	80	Stand corridor/patch? Patch										
Downed woody debris: Yes, heavy																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, thick understory																		
Fire Break locations in stand No																		
DBH (inches) 12		Length of Log (ft) 8		Contents in Board Feet 32			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 32				
Comments: Photo 64 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 8 Plot #: 2
 Forest Cover Type: Black Birch Date: 2/24/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Prunus serotina</i>					7			1									40	8	
2	<i>Betula lenta</i>			13			10											40	23	
3	<i>Robinia pseudoacacia</i>								1									38	1	
4	<i>Acer rubrum</i>					1													1	
5	<i>Sassafras albidum</i>					2													2	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		23			12			0			0			0						35
Number & Size of Standing Dead Trees		2																		2
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Prunus serotina, Betula lenta, Acer rubrum, Sassafras albidum, Berberis thunbergii</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 40%		Plot Successional Stage: Mid						
							C	N	E	S	W	%								
							Y	Y	N	Y	Y	80								
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus phoenicolasius, Rubus allegheniensis, Acer pensylvanicum, Zanthoxylum clava-herculis, Microstegium vimineum</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius, Berberis thunbergii, Microstegium vimineum</i>								
							C	N	E	S	W	%								
							N	N	Y	N	Y	40								
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?													
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species												
Historic Sites? No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:												
Disease? No							46.6 acres													
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water?													
Exotic Plants? Yes		C	N	E	S	W	%	All												
Leaf litter? Light		Y	N	N	Y	Y	60	Stand corridor/patch?												
Downed woody debris: Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream and wetland area																				
Fire Management Zone (Yes/No) Yes																				
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																				
Fire Break locations in stand No																				
<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>		<u>DBH (inches)</u> <u>Length of Log (ft)</u> <u>Contents in Board Feet</u>		Total Board Feet:																
0																				
Comments: Photo 43							Management Stand 3													

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 8 Plot #: 4
 Forest Cover Type: Black Birch Date: 2/24/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Betula lenta</i>			40			9												47	49	
2	<i>Quercus prinus</i>											2							75	2	
3	<i>Quercus rubra</i>								1			1							80	2	
4	<i>Quercus velutina</i>											1							55	1	
5	<i>Acer rubrum</i>								1										47	1	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		40			11			4			0			0							55
Number & Size of Standing Dead Trees		2																			2
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 10%				Plot Successional Stage: Mature/selected harvest									
				C	N	E	S	W	%												
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3': <i>Smilax rotundifolia, Acer pensylvanicum, Acer rubrum, Rubus allegheniensis, Rubus phoenicolasius</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius</i>													
				C	N	E	S	W	%												
				N	N	N	N	Y	20												
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, bird species													
Specimen Trees? No				C	N	E	S	W	%												
Historic Sites? No				N	N	Y	Y	N	40	Habitat size, location, configuration: 46.6 acres											
Disease? No																					
Insects/Infestation? No				Downed Woody Debris:				Wildlife cover/food/water? All													
Exotic Plants? Yes				C	N	E	S	W	%	Stand corridor/patch?											
Leaf litter? Light				Y	Y	Y	Y	N	80												
Downed woody debris: Yes																					
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No) No																					
Fuel load and type located in stand Yes, down woody debris																					
Fire Break locations in stand No																					
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
14		11		63								490									
14		13		75																	
18		15		172																	
16		20		180																	
Comments: Photo 46 Management Stand 3																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 8 Plot #: 5

Forest Cover Type: Black Birch

Date: 2/24/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Betula lenta</i>	57			8												45	65
2 <i>Quercus prinus</i>									1								1
3 <i>Robinia pseudoacacia</i>						1										45	1
4																	0
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	57			9			1			0			0				67
Number & Size of Standing Dead Trees	2																2
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:			
<i>Betula lenta</i>							C	N	E	S	W	%	25%		Mid		
							Y	Y	Y	Y	Y	100					
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):					
<i>Betula lenta, Microstegium vimineum, Berberis thunbergii, Rubus allegheniensis, Aster sp.</i>							C	N	E	S	W	%	<i>Microstegium vimineum, Berberis thunbergii</i>				
							N	N	N	N	N	0					
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?					
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species				
Historic Sites?	No						Y	Y	Y	Y	Y	100	Habitat size, location, configuration:				
Disease?	No											46.6 acres					
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?					
Exotic Plants?	Yes						C	N	E	S	W	%	All				
Leaf litter?	Light						Y	N	N	N	Y	40	Stand corridor/patch?				
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																	
Fire Management Zone (Yes/No) No																	
Fuel load and type located in stand Yes, down woody debris																	
Fire Break locations in stand No																	
															Total Board Feet:		
<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>		<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>				282			
19		21		282													
Comments: Photo 49 Management Stand 3																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 2 Stand #: 9 Plot #: 1

Forest Cover Type: Oak

Date: 2/23/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			2								65	3	
2 <i>Quercus velutina</i>								3								75	3	
3 <i>Acer rubrum</i>						1										58	1	
4 <i>Carya ovata</i>						1											1	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		0			3			5			0			0				8
Number & Size of Standing Dead Trees											1							1
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 25%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							N	Y	N	N	Y	40						
List of Understory Species 0'-3': <i>Rubus allegheniensis, Rubus occidentalis, Smilax rotundifolia, Pinus strobus, Lonicera japonica, Tsuga canadensis, Rosa multiflora, Microstegium vimineum</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Microstegium vimineum, Lonicera japonica</i>						
							C	N	E	S	W	%						
							N	N	Y	Y	Y	60						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		Y	N	Y	Y	N	60	Habitat size, location, configuration:										
Disease? No							25.5 acres											
Insects/Infestation? Yes		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? Yes		C	N	E	S	W	%	All										
Leaf litter? Moderate		Y	N	N	N	Y	40	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to wetland area																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, dead standing tree, and invasive species																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 591						
16		8		72														
18		17		196														
19		10		141														
12		15		56														
14		21		126														
Comments: Photo 40							Management Stand 2											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 10 Plot #: 2
 Forest Cover Type: Oak Date: 2/24/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>								11										85	14	
2	<i>Acer rubrum</i>					2														2	
3	<i>Quercus rubra</i>											2							85	2	
4																				0	
5																				0	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		2			11			5			0			0							18
Number & Size of Standing Dead Trees					2																2
List of Woody Plant Species 3'-20':					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:									
<i>Betula lenta, Acer rubrum</i>					C	N	E	S	W	%	0%		Mature								
					Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3':					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):											
<i>Smilax rotundifolia, Betula lenta, Acer rubrum</i>					C	N	E	S	W	%	---										
					Y	N	Y	N	Y	60											
Rare, etc. Species?		No			Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees?		No			C	N	E	S	W	%	Deer, bird species										
Historic Sites?		No			N	N	N	N	Y	20	Habitat size, location, configuration:										
Disease?		No								46.6 acres											
Insects/Infestation?		No			Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants?		No			C	N	E	S	W	%	All										
Leaf litter?		Light			N	Y	Y	Y	Y	80	Stand corridor/patch?										
Downed woody debris:		Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes, down woody debris																			
Fire Break locations in stand		Yes, adjacent to access road																			
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:							
17		8		85										616							
19		11		141																	
17		13		127																	
15		18		137																	
16		15		126																	
Comments: Photo 48 Management Stand 3																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 10 Plot #: 3
 Forest Cover Type: Mixed Oak Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Total		
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>		5			11			4							62, 69, 70, 64, 46,	20	
2	<i>Quercus rubra</i>					2			2							60, 75	4	
3	<i>Acer rubrum</i>			2													2	
4																	0	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		7			13			6			0			0				26
Number & Size of Standing Dead Trees		1																1
List of Woody Plant Species 3'-20': <i>Hamamelis virginiana, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
				C	N	E	S	W	%	Mature								
				Y	Y	N	Y	Y	80	0%								
List of Understory Species 0'-3': <i>Tsuga canadensis, Gaylussacia baccata, Vaccinium angustifolium, Chimaphila maculata, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%	---								
				Y	Y	N	Y	Y	80									
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species (turkey)										
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease?	No					46.6 acres												
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Light	Y	Y	N	Y	Y	80	Stand corridor/patch? Patch										
Downed woody debris:	Yes, moderate																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, down woody debris																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 645								
18	17	196			12	10	40											
19	10	141																
15	10	76																
15	17	121																
13	14	71																
Comments: Photo 65 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 10 Plot #: 4
 Forest Cover Type: Oak/Hickory Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD			Other
1	<i>Quercus prinus</i>		1			2											47, 35	3
2	<i>Quercus rubra</i>					2			1								70, 52	3
3	<i>Prunus serotina</i>			5														5
4	<i>Robinia pseudoacacia</i>								1								45	1
5	<i>Carya glabra</i>		5			4			1								66, 58	10
6	<i>Fraxinus americana</i>								2									2
7	<i>Ailanthus altissima</i>							1										1
8																		0
9																		0
Total Number of Trees per Size Class			11			12			2					0			0	25
Number & Size of Standing Dead Trees			3			1												4
List of Woody Plant Species 3'-20': <i>Prunus serotina, Ailanthus altissima</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 25%		Plot Successional Stage: Mature						
					C	N	E	S	W	%								
					Y	Y	Y	Y	Y	100								
List of Understory Species 0'-3': <i>Rubus phoenicolasius, Rubus allegheniensis, Berberis thunbergii, Rosa multiflora, Stellaria media, moss, Asplenium platyneuron</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Ailanthus altissima, Berberis thunbergii, Rosa multiflora, Rubus phoenicolasius</i>								
					C	N	E	S	W	%								
					N	Y	Y	N	Y	60								
Rare, etc. Species? No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, Avian species (turkey)								
Specimen Trees? No					C	N	E	S	W	%								
Historic Sites? No					Y	Y	Y	Y	Y	100								
Disease? No										Habitat size, location, configuration: 46.6 acres								
Insects/Infestation? No					Downed Woody Debris:					Wildlife cover/food/water? All								
Exotic Plants? Yes					C	N	E	S	W	%								
Leaf litter? Light					Y	Y	Y	N	Y	80								
Downed woody debris: Moderate										Stand corridor/patch? Patch								
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, invasive species																		
Fire Break locations in stand No																		
<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>		<u>DBH (inches)</u>		<u>Length of Log (ft)</u>		<u>Contents in Board Feet</u>		Total Board Feet:						
12		14		56								252						
18		16		196														
Comments: Photo 66 Management Stand 3																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 2 Stand #: 11 Plot #: 1
 Forest Cover Type: Oak/Hickory Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 40		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																		
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total			
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other					
1	<i>Quercus rubra</i>							2			3							80, 78, 80, 61	5	
2	<i>Carya glabra</i>							2										57, 58	2	
3	<i>Fraxinus americana</i>					5			1									56, 40	6	
4	<i>Acer pensylvanicum</i>					1													1	
5																			0	
6																			0	
7																			0	
8																			0	
9																			0	
Total Number of Trees per Size Class		6			5			3			0			0						14
Number & Size of Standing Dead Trees					1															1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:								
<i>Cornus florida</i>				C	N	E	S	W	%	50%				Mature						
				Y	Y	Y	Y	Y	100											
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):												
<i>Rubus occidentalis, Rubus phoenicolasius, Stellaria media, Berberis thunbergii, Liugustrum vulgare</i>				C	N	E	S	W	%	<i>Rubus phoenicolasius, Berberis thunbergii, Liugustrum vulgare</i>										
				Y	Y	N	N	N	40											
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?														
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species (turkey)												
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:												
Disease?	No					2.6 acres														
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?														
Exotic Plants?	Yes	C	N	E	S	W	%	All												
Leaf litter?	Light	Y	Y	Y	Y	Y	100	Stand corridor/patch?												
Downed woody debris:	Moderate																			
FUNCTION: Where is stand in relation to sensitive areas on site?																				
Fire Management Zone (Yes/No)		Yes																		
Fuel load and type located in stand		Yes, down woody debris, invasive species																		
Fire Break locations in stand		No																		
DBH (inches)	Length of Log (ft)	Contents in Board Feet				DBH (inches)	Length of Log (ft)	Contents in Board Feet				Total Board Feet: 436								
12	12	48																		
15	14	106																		
19	21	282																		
Comments: Photo 67. Wineberry dominates understory. Management Stand 3																				

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 1 Plot #: 1
 Forest Cover Type: Oak Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>		1			15			3								66, 56, 58, 58, 56	19
2	<i>Quercus rubra</i>					4			1								68, 69, 75	5
3	<i>Pinus strobus</i>									1							53	1
4	<i>Betula lenta</i>			5														5
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		6			19			5			0			0				30
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Betula lenta</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Vaccinium angustifolium, Tsuga canadensis, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	Y	N	N	Y	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species (turkey)
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	N	Y	80	Habitat size, location, configuration: 57.1 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All
Exotic Plants? No	Y	Y	Y	Y	Y	100	
Leaf litter? Thin							Stand corridor/patch? Patch
Downed woody debris: Light							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 548
18	20	246				
17	10	106				
14	15	88				
16	12	108				

Comments: Photo 68 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 1 Plot #: 2
 Forest Cover Type: Oak Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>			1		12			6								71, 79, 72, 77, 68,	19	
2 <i>Quercus rubra</i>								2								68, 67	2	
3 <i>Betula lenta</i>			1														1	
4																	0	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		2			12			8			0			0				22
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Quercus prinus</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature		
C	N	E	S	W	%	Y	Y			Y	Y
List of Understory Species 0'-3': <i>Tsuga canadensis, Chimaphila maculata, Cayussacia baccata, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): ---			
C	N	E	S	W	%	Y	N			N	N
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?					
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species (turkey)			
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:			
Disease?	No	Downed Woody Debris:				57.1 acres					
Insects/Infestation?	No	C	N	E	S	W	%	Wildlife cover/food/water?			
Exotic Plants?	No	Y	Y	Y	Y	Y	100	All			
Leaf litter?	Thin					Stand corridor/patch? Patch					
Downed woody debris:	Moderate										

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, light down woody deris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1061
18	21	246	15	11	76	
17	18	191	13	8	41	
14	16	100	16	11	90	
19	12	169				
17	15	148				

Comments: Photo 69. moss dominates ground cover - no shrubs. closed canopy in growing season. Slight slope to east.
Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Leasure
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 1 Plot #: 3
 Forest Cover Type: Oak Date: 2/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus prinus</i>								1								71	1
2 <i>Quercus alba</i>								2								79, 82	2
3 <i>Betula lenta</i>			10			2			5							53, 48, 54	17
4 <i>Liriodendron tulipifera</i>			3			5										56	8
5 <i>Acer rubrum</i>						1											1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	13			8			8			0			0				29
Number & Size of Standing Dead Trees	1																1

List of Woody Plant Species 3'-20': <i>Betula lenta</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 1%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	N	Y	Y	Y	80		
List of Understory Species 0'-3': <i>Tsuga canadensis, Smilax rotundifolia, Acer pensylvanicum, Berberis thunbergii, Dryopteris sp.</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii</i>	
	C	N	E	S	W	%		
	N	Y	N	Y	N	40		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species (turkey)	
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	Y	N	Y	Y	Y	80	Habitat size, location, configuration: 57.1 acres	
Disease? No								
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? Yes	
Exotic Plants? Yes	C	N	E	S	W	%		
Leaf litter? Thin	Y	Y	Y	Y	Y	100	Stand corridor/patch? Patch	
Downed woody debris: Thin								

FUNCTION: Where is stand in relation to sensitive areas on site? Stream located on south slope

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 496
15	21	152				
18	16	196				
17	14	148				

Comments: Photo 70. Occasional rocks at surface. Very little shrub understory **Management Stand 1**

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Leasure

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 1 Plot #: 4

Forest Cover Type: Oak

Date: 2/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 130		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>								4								68, 74, 59	4	
2 <i>Betula lenta</i>			5			6			2							54, 66	13	
3 <i>Acer rubrum</i>			3			5			1								9	
4 <i>Quercus rubra</i>											1					78	1	
5 <i>Liriodendron tulipifera</i>									1							70	1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		8			11			8			1			0				28
Number & Size of Standing Dead Trees					1			1										2
List of Woody Plant Species 3'-20': <i>Betula lenta, Nyssa sylvatica</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3': <i>Rubus allegheniensis, Acer rubrum, Smilax rotundifolia, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%									
				Y	Y	N	Y	N	60					---				
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species (turkey)										
Historic Sites?	No	Y	Y	N	N	Y	60	Habitat size, location, configuration:										
Disease?	No					57.1 acres												
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Thin	Y	Y	N	Y	Y	80	Stand corridor/patch? Patch										
Downed woody debris:	Moderate																	
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, moderate down woody debris																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet:								
15	21	152			17	15	148			1319								
15	13	91																
18	16	196																
16	15	126																
26	20	606																
Comments: Photo 71. Thin understory with few shrubs or sub-canopy. Exposed rock at surface. Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 3

Stand #: 1

Plot #: 5

Forest Cover Type: Oak

Date: 2/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus velutina</i>					1			2								81, 80.5	3	
2 <i>Quercus alba</i>					2												2	
3 <i>Quercus rubra</i>								2								76.5, 66	2	
4 <i>Prunus serotina</i>			5			1											6	
5 <i>Prunus cerasus</i>						1			1								2	
6 <i>Carya glabra</i>						2											2	
7 <i>Fraxinus americana</i>									1							68	1	
8																	0	
9																	0	
Total Number of Trees per Size Class		5			7			6			0			0				18
Number & Size of Standing Dead Trees					2			1										3
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Prunus serotina</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 5%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus occidentalis, Rubus allegheniensis, Acer pensylvanicum, moss, Lonicera japonica, Berberis thunbergii</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Lonicera japonica</i>						
							C	N	E	S	W	%						
							Y	N	Y	N	Y	60						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, bird species						
Specimen Trees? No							C	N	E	S	W	%						
Historic Sites? No							Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 57.1 acres					
Disease? No																		
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water? All						
Exotic Plants? Yes							C	N	E	S	W	%	Stand corridor/patch?					
Leaf litter? Light							Y	N	Y	Y	Y	80						
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
17		20		212										566				
12		17		64														
14		19		113														
16		15		126														
13		10		51														
Comments: Photo 72							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 1
 Forest Cover Type: Oak Date: 2/29/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus velutina</i>								2								68	2	
2 <i>Quercus palustris</i>								1								65	1	
3 <i>Quercus prinus</i>					3												3	
4 <i>Quercus alba</i>								1								75, 78	1	
5 <i>Quercus rubra</i>					1			1			1					70, 58	3	
6 <i>Acer rubrum</i>												1					1	
7 <i>Betula lenta</i>						1											2	
8 <i>Robinia pseudoacacia</i>						1											1	
9																	0	
Total Number of Trees per Size Class		2			6			5			1			0				14
Number & Size of Standing Dead Trees					2			1										3
List of Woody Plant Species 3'-20': <i>Betula lenta, Robinia pseudoacacia</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 2%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Acer rubrum</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora</i>						
							C	N	E	S	W	%						
							Y	Y	Y	N	Y	80						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer					
Historic Sites?	No						Y	N	Y	N	N	40	Habitat size, location, configuration:					
Disease?	No						Downed Woody Debris:					194.2 acres						
Insects/Infestation?	No						C	N	E	S	W	%	Wildlife cover/food/water?					
Exotic Plants?	Yes						N	N	Y	N	Y	40	All					
Leaf litter?	Light											Stand corridor/patch?						
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
14		10		63			15		12		91			1125				
14		18		113														
16		15		126														
19		22		282														
24		18		450														
Comments: Photo 74							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 2

Forest Cover Type: Oak

Date: 2/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus rubra</i>					1			8			1					75-80	10	
2 <i>Acer rubrum</i>			2														2	
3 <i>Betula lenta</i>			2														2	
4 <i>Carya ovata</i>						1											1	
5 <i>Quercus velutina</i>								1								75-80	1	
6 <i>Quercus prinus</i>					2			1								75-80	3	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		4			4			10			1			0				19
Number & Size of Standing Dead Trees		1			2													3
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum</i>							Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 10%		Plot Successional Stage: Mature					
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Tsuga canadensis, Smilax rotundifolia, Microstegium vimineum, Alliaria petiolata, moss</i>							Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Microstegium vimineum, Alliaria petiolata</i>							
							C	N	E	S	W	%						
							Y	N	N	Y	Y	60						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species					
Historic Sites?	No						N	N	N	Y	N	20	Habitat size, location, configuration:					
Disease?	No											194.2 acres						
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	Yes						C	N	E	S	W	%	All					
Leaf litter?	Light						N	Y	Y	Y	Y	80	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to stream channel											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 2201				
18		20		246			19		26		366							
17		22		233			28		21		720							
15		18		137			15		19		137							
15		14		106			14		17		100							
13		16		81			14		13		75							
Comments: Photo 75							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 4

Forest Cover Type: Oak

Date: 2/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					2			1								80	3	
2 <i>Quercus rubra</i>								5								80	5	
3 <i>Quercus alba</i>		1			1			1								75	3	
4 <i>Carya glabra</i>									1								1	
5 <i>Carya ovata</i>						1											1	
6 <i>Tsuga canadensis</i>			1			1			1								3	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		2			5			9			0			0				16
Number & Size of Standing Dead Trees		4			5													9
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Quercus alba</i>							C	N	E	S	W	%	0%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Betula lenta, moss</i>							C	N	E	S	W	%	---					
							Y	N	N	Y	N	40						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer, bird species					
Historic Sites? No							Y	Y	Y	N	N	60	Habitat size, location, configuration:					
Disease? No												194.2 acres						
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? No							C	N	E	S	W	%	All					
Leaf litter? Light							Y	Y	Y	Y	Y	100	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand							Yes, down woody debris, dead standing trees											
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 1262				
18		22		270			16		19		162							
19		20		282			15		10		76							
17		16		169			12		10		40							
18		14		172														
15		13		91														
Comments: Photo 77							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 5

Forest Cover Type: Oak

Date: 2/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus rubra</i>		1						2								80	3	
2 <i>Quercus alba</i>								3								68, 82	3	
3 <i>Betula lenta</i>			14														14	
4 <i>Quercus velutina</i>								3								74, 83	3	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		15			0			8			0			0				23
Number & Size of Standing Dead Trees		1						3										4
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Betula lenta</i>							C	N	E	S	W	%	3%		Mature			
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Smilax rotundifolia, Rubus allegheniensis, Rosa multiflora, moss</i>							C	N	E	S	W	%	<i>Rosa multiflora</i>					
							Y	Y	N	N	Y	60						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer, bird species					
Historic Sites? No							Y	N	Y	N	N	40	Habitat size, location, configuration:					
Disease? No												194.2 acres						
Insects/Infestation? No							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? Yes							C	N	E	S	W	%	All					
Leaf litter? Light							Y	Y	N	N	Y	60	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees																		
Fire Break locations in stand No																		
DBH (inches)						Length of Log (ft)						Contents in Board Feet						Total Board Feet: 1227
18						21						246						
19						18						254						
16						14						126						
17						16						169						
16						10						90						
Comments: Photo 78							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 6
 Forest Cover Type: Oak Date: 2/29/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>					1			3								80	4
2	<i>Acer rubrum</i>						1											1
3	<i>Quercus rubra</i>								5								85	5
4	<i>Quercus velutina</i>								1									1
5	<i>Prunus serotina</i>						1											1
6	<i>Ailanthus altissima</i>						1											1
7	<i>Liriodendron tulipifera</i>						1											1
8	<i>Betula lenta</i>			2														2
9	<i>Nyssa sylvatica</i>						1											1
10	<i>Carya glabra</i>						1											1
Total Number of Trees per Size Class		2			7			9			0			0				17
Number & Size of Standing Dead Trees					1													1

List of Woody Plant Species 3'-20': <i>Betula lenta</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Rosa multiflora, Betula lenta, Rubus allegheniensis, Smilax rotundifolia, few Quercus saplings</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Ailanthus altissima</i>
	C	N	E	S	W	%	
	Y	N	N	Y	Y	60	

Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, bird species
Specimen Trees?	No	C	N	E	S	W	%	
Historic Sites?	No	N	Y	Y	N	N	40	Habitat size, location, configuration: 194.2 acres
Disease?	No	Downed Woody Debris:						
Insects/Infestation?	No	C	N	E	S	W	%	Wildlife cover/food/water?
Exotic Plants?	Yes	N	N	Y	Y	Y	60	All
Leaf litter?	Light							Stand corridor/patch?
Downed woody debris:	Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1053
15	19	137	14	15	88	
12	14	56	14	16	100	
16	10	90	18	18	221	
13	10	51	17	20	212	
18	8	98				

Comments: Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 7

Forest Cover Type: Oak

Date: 2/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus velutina</i>							1			2								80	3	
2	<i>Quercus alba</i>							1			1								75	2	
3	<i>Tsuga canadensis</i>					1			1			1								3	
4	<i>Betula lenta</i>					15			2											17	
5	<i>Quercus prinus</i>										4								75	4	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		16			5			8			0			0							29
Number & Size of Standing Dead Trees		3						1													4
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:											
				C	N	E	S	W	%	0%		Mature									
				Y	Y	N	Y	Y	80												
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus allegheniensis, Betula lenta</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
				C	N	E	S	W	%	---											
				Y	Y	Y	N	N	60												
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees? No		C N E S W %				Deer, bird species															
Historic Sites? No		Y N Y Y Y 80				Habitat size, location, configuration:															
Disease? No						194.2 acres															
Insects/Infestation? No		Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants? No		C N E S W %				All															
Leaf litter? Light		Y Y Y Y Y 100				Stand corridor/patch?															
Downed woody debris: Yes																					
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No) No																					
Fuel load and type located in stand Yes, down woody debris																					
Fire Break locations in stand No																					
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 776									
15		10		76		12		18		72											
18		8		98		16		20		180											
14		13		75																	
19		13		169																	
17		10		106																	
Comments: Photo 80										Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 9

Forest Cover Type: Oak

Date: 3/1/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>								4					1					71, 64, 60.5	5	
2	<i>Tsuga canadensis</i>					1			3			1							50	5	
3	<i>Quercus alba</i>								2										55	2	
4	<i>Quercus rubra</i>								1											1	
5	<i>Acer rubrum</i>								1											1	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		1			4			8			1			0							14
Number & Size of Standing Dead Trees					1			1													2
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Tsuga canadensis, Quercus prinus, Acer rubrum, Betula lenta</i>				C	N	E	S	W	%	0%				Mature							
				Y	Y	Y	Y	Y	100												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Tsuga canadensis, few Quercus saplings, moss</i>				C	N	E	S	W	%	---											
				N	Y	Y	N	N	40												
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species													
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:													
Disease?	No					194.2 acres															
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants?	No	C	N	E	S	W	%	All													
Leaf litter?	Light	Y	Y	N	N	Y	60	Stand corridor/patch?													
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes, down woody debris, few dead standing trees																			
Fire Break locations in stand		No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet				DBH (inches)	Length of Log (ft)	Contents in Board Feet				Total Board Feet: 1479									
17	18	191				14	16	100													
15	18	137				12	19	72													
16	12	108				26	18	545													
18	22	270																			
12	14	56																			
Comments: Photo 82. Plot located in area previously harvested - open understory. Management Stand 1																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 3

Stand #: 2

Plot #: 10

Forest Cover Type: Oak - Few Hemlocks

Date: 3/1/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Tsuga canadensis</i>			3			1			2							62	6	
2 <i>Quercus velutina</i>								2								58, 70	2	
3 <i>Quercus alba</i>		1						1			1					63	3	
4 <i>Quercus prinus</i>		1						2								63	3	
5 <i>Nyssa sylvatica</i>																	0	
6 <i>Acer rubrum</i>																	0	
7 <i>Quercus rubra</i>					1			1								66	2	
8																	0	
9																	0	
Total Number of Trees per Size Class		5			2			8			1			0				16
Number & Size of Standing Dead Trees					3			2										5
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis, Acer rubrum, Quercus prinus, Quercus alba</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	0%		Mature			
							Y	Y	Y	N	Y	80						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis, Quercus alba, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	---					
							Y	N	N	N	N	20						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species					
Historic Sites?	No						Y	Y	Y	N	Y	80	Habitat size, location, configuration:					
Disease?	No											194.2 acres						
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	No						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	Y	N	Y	Y	80	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris, dead standing trees, hemlock woolly adelgid											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 1020				
12		8		32			24		18		450							
18		10		123			14		12		75							
16		10		90														
15		14		106														
16		17		144														
Comments: Photo 83							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 11
 Forest Cover Type: Oak Date: 3/1/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus rubra</i>							2			2								78, 83	4	
2	<i>Quercus alba</i>							3			2								80, 67, 74	5	
3	<i>Quercus velutina</i>										2								84	2	
4	<i>Carya glabra</i>					1														1	
5	<i>Quercus prinus</i>								1											1	
6	<i>Tsuga canadensis</i>								3											3	
7	<i>Carya ovata</i>								1											1	
8	<i>Betula lenta</i>					3														3	
9																				0	
Total Number of Trees per Size Class		4			10			6			0			0							20
Number & Size of Standing Dead Trees		3						1													4
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis, Carya glabra, Hamamelis virginiana</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:											
				C	N	E	S	W	%	0%		Mature									
				Y	Y	N	N	Y	60												
List of Understory Species 0'-3': <i>Tsuga canadensis, Rubus occidentalis, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
				C	N	E	S	W	%	---											
				Y	Y	Y	Y	N	80												
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?															
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species													
Historic Sites?	No	N	N	N	N	N	0	Habitat size, location, configuration:													
Disease?	No					194.2 acres															
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:				Wildlife cover/food/water?															
Exotic Plants?	No	C	N	E	S	W	%	All													
Leaf litter?	Light	Y	Y	N	N	Y	60	Stand corridor/patch?													
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?										Adjacent to perennial stream											
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, Hemlock Woolly Adelgid																			
Fire Break locations in stand		No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 596											
18	8	98			15	10	76														
17	10	106																			
14	16	100																			
16	14	126																			
16	10	90																			
Comments: Photo 84											Management Stand 1										

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 12
 Forest Cover Type: Oak Date: 3/1/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Average Tree Height (ft)	Total	
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>					8			4								55, 60, 67	12
2	<i>Quercus alba</i>					4			2								67, 65, 69	6
3	<i>Tsuga canadensis</i>			5			1											6
4	<i>Betula lenta</i>																	0
5	<i>Nyssa sylvatica</i>			3			1											4
6	<i>Quercus palustris</i>								2								75	2
7	<i>Quercus velutina</i>								1								58	1
8	<i>Acer rubrum</i>						2											2
9																		0
Total Number of Trees per Size Class		8			16			9			0			0				33
Number & Size of Standing Dead Trees		2			3													5
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta, Nyssa sylvatica</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
				C	N	E	S	W	%	Mature								
				Y	Y	Y	Y	Y	100	0%								
List of Understory Species 0'-3': <i>Tsuga canadensis, Acer rubrum, few Quercus saplings, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%	---								
				Y	N	Y	Y	Y	80									
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species										
Historic Sites?	No	N	N	Y	N	N	20	Habitat size, location, configuration:										
Disease?	No					194.2 acres												
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Moderate	N	Y	Y	N	Y	60	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to vernal pool and perennial stream channel																		
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, Hemlock Woolly Adelgid																
Fire Break locations in stand		No																
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 741								
15	12	91			13	8	41											
15	10	76			12	14	56											
16	8	72			16	16	144											
18	13	147			14	11	63											
13	10	51																
Comments: Photo 85 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 13
 Forest Cover Type: Oak Date: 3/1/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Tsuga canadensis</i>			10			3										35, 40	13	
2 <i>Quercus prinus</i>					2			2								75	4	
3 <i>Quercus alba</i>								1								82	1	
4 <i>Quercus velutina</i>								6								82, 83, 82	6	
5 <i>Nyssa sylvatica</i>			2														2	
6 <i>Acer rubrum</i>						1											1	
7 <i>Betula lenta</i>									1								1	
8																	0	
9																	0	
Total Number of Trees per Size Class		12			6			10			0			0				28
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta, Nyssa sylvatica</i>							Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:					
							C	N	E	S	W	%	0%		Mature			
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3': <i>Tsuga canadensis, Smilax rotundifolia</i>							Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):							
							C	N	E	S	W	%	---					
							N	N	Y	N	Y	40						
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees?	No	C	N	E	S	W	%	Deer, bird species, wood frogs										
Historic Sites?	No	N	N	N	N	N	0	Habitat size, location, configuration:										
Disease?	No						194.2 acres											
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants?	No	C	N	E	S	W	%	All										
Leaf litter?	Light to Moderate	N	N	Y	N	Y	40	Stand corridor/patch?										
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to vernal pond											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1050						
18		20		246		13		14		71								
15		14		106		12		10		40								
19		18		254		12		16		64								
16		12		108		15		11		76								
17		8		85														
Comments: Photo 86							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 14
 Forest Cover Type: Oak Date: 3/1/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus prinus</i>							6			2								72, 69	8	
2	<i>Quercus alba</i>				1						2								68, 67	3	
3	<i>Quercus palustris</i>							1												1	
4	<i>Quercus rubra</i>										1			1					78	2	
5	<i>Acer saccharum</i>					7			2											9	
6	<i>Nyssa sylvatica</i>					2														2	
7	<i>Tsuga canadensis</i>					2			1											3	
8	<i>Betula lenta</i>								1											1	
9	<i>Quercus velutina</i>										1									1	
Total Number of Trees per Size Class		12			11			6			1			0							30
Number & Size of Standing Dead Trees					2			2													4
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:											
<i>Tsuga canadensis, Acer saccharum, Nyssa sylvatica, Betula lenta, Quercus alba</i>				C	N	E	S	W	%	0%		Mature									
				Y	Y	Y	Y	N	80												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Tsuga canadensis, Quercus alba</i> saplings (few), moss				C	N	E	S	W	%	---											
				Y	Y	N	N	N	40												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, bird species, frogs											
Historic Sites?	No			N	N	Y	N	N	20	Habitat size, location, configuration:											
Disease?	No							194.2 acres													
Insects/Infestation?	Hemlock Woolly Adelgid			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	No			C	N	E	S	W	%	All											
Leaf litter?	Light			Y	Y	Y	N	N	60	Stand corridor/patch?											
Downed woody debris:	Yes																				
FUNCTION: Where is stand in relation to sensitive areas on site?																					
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes, down woody debris, dead standing trees, Hemlock Woolly Adelgid																			
Fire Break locations in stand		No																			
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 860											
15	10	76			23	16	361														
11	16	49			15	15	106														
14	13	75																			
17	8	85																			
16	12	108																			
Comments: Photo 87 Management Stand 1																					

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 3

Stand #: 2

Plot #: 16

Forest Cover Type: Oak

Date: 3/1/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					2			4								85, 78	6	
2 <i>Quercus alba</i>								1								88	1	
3 <i>Betula lenta</i>			9			1											10	
4 <i>Quercus rubra</i>					3												3	
5 <i>Acer rubrum</i>			1		1												2	
6 <i>Quercus velutina</i>								5								80, 81, 82	5	
7 <i>Robinia pseudoacacia</i>			1			1											2	
8 <i>Tsuga canadensis</i>																	0	
9																	0	
Total Number of Trees per Size Class		11			8			10			0			0				29
Number & Size of Standing Dead Trees		1			2													3
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum, Robinia pseudoacacia</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	0%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Tsuga canadensis, Acer rubrum, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	---					
							Y	Y	N	Y	Y	80						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species					
Historic Sites?	No						Y	N	Y	N	Y	60	Habitat size, location, configuration:					
Disease?	No											194.2 acres						
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	No						C	N	E	S	W	%	All					
Leaf litter?	Light						N	Y	N	N	N	20	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris, dead standing trees											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
15		12		91			19		20		282			1093				
16		10		90			13		11		51							
18		8		98			15		16		121							
18		16		196			11		8		25							
14		12		75			12		16		64							
Comments: Photo 90							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 17

Forest Cover Type: Oak

Date: 3/1/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Crown Position			Crown Position			Crown Position			Crown Position					
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Betula lenta</i>			9			1			1							55, 70	11	
2 <i>Quercus prinus</i>		2			2				5							63, 57, 70, 60	9	
3 <i>Nyssa sylvatica</i>			3			3											6	
4 <i>Quercus palustris</i>									2							75	2	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		14			6			8			0			0				28
Number & Size of Standing Dead Trees					1													1
List of Woody Plant Species 3'-20': <i>Tsuga canadensis, Betula lenta</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	0%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Tsuga canadensis, Betula lenta, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	---					
							Y	Y	Y	N	Y	80						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, bird species, wood frogs					
Historic Sites?	No						N	Y	N	N	Y	40	Habitat size, location, configuration:					
Disease?	No											194.2 acres						
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	No						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	Y	N	Y	Y	80	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to pond (possibly man-made)											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 969				
16		19		162			11		16		49							
18		11		123			15		14		106							
13		15		71														
17		20		212														
18		21		246														
Comments: Photo 91							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham, Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 18

Forest Cover Type: Oak

Date: 3/1/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Acer rubrum</i>					1											1	
2	<i>Quercus alba</i>								1							82	1	
3	<i>Betula lenta</i>					8			1			5				56, 64	14	
4	<i>Quercus velutina</i>								1							90	1	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		9			1			7			0			0				17
Number & Size of Standing Dead Trees								2										2
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%		Plot Successional Stage: Mature								
				C	N	E	S	W	%									
				Y	Y	N	Y	Y	80									
List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%	---								
				Y	Y	Y	N	N	60									
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		N	N	N	N	Y	20	Habitat size, location, configuration:										
Disease? No						194.2 acres												
Insects/Infestation? Hemlock Woolly Adelgid		Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants? No		C	N	E	S	W	%	All										
Leaf litter? Light to Moderate		N	Y	Y	N	Y	60	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees, Hemlock woolly adelgid																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 329						
19		18		254														
14		12		75														
Comments: Photo 92																		
Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham, Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 3 Stand #: 2 Plot #: 19
 Forest Cover Type: Oak Date: 3/1/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Total		
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD			Other
1	<i>Quercus prinus</i>					2			4								64, 70, 60	6
2	<i>Quercus velutina</i>					1			2								65, 76, 74	3
3	<i>Tsuga canadensis</i>			1														1
4	<i>Betula lenta</i>			19														19
5	<i>Quercus rubra</i>					1											51	1
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		20			4			6			0			0				30
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Betula lenta, Tsuga canadensis</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 0%		Plot Successional Stage: Mature								
				C	N	E	S	W	%									
				Y	N	N	Y	Y	60									
List of Understory Species 0'-3': <i>Tsuga canadensis, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
				C	N	E	S	W	%	---								
				Y	Y	N	Y	N	60									
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees? No		C	N	E	S	W	%	Deer, bird species										
Historic Sites? No		N	N	N	Y	N	20	Habitat size, location, configuration:										
Disease? No						194.2 acres												
Insects/Infestation? Hemlock Woolly Adelgid		Downed Woody Debris:				Wildlife cover/food/water?												
Exotic Plants? No		C	N	E	S	W	%	All										
Leaf litter? Light		Y	Y	Y	Y	Y	100	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, hemlock woolly adelgid																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
12		10		40		12		9		32		532						
18		8		98														
18		14		172														
17		12		127														
14		11		63														
Comments: Photo 89 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 1 Plot #: 1
 Forest Cover Type: Black Birch Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Carya glabra</i>						2			1							83	3
2	<i>Betula lenta</i>	23			9												35, 36, 35	32
3	<i>Acer rubrum</i>			1			1										36	2
4	<i>Carya ovata</i>						1										70	1
5	<i>Prunus serotina</i>			2			1										34, 32	3
6	<i>Nyssa sylvatica</i>																	0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		26			14			1			0			0				41
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum, Prunus serotina</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 10%	Plot Successional Stage: Mid
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Betula lenta, Acer rubrum, Rubus allegheniensis, Rubus phoenicolasius, Berberis thunbergii</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rubus phoenicolasius</i>
	C	N	E	S	W	%	
	Y	Y	N	N	Y	60	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	N	Y	N	60	Habitat size, location, configuration: 51.7 acres
Disease? No	Downed Woody Debris:						
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All
Exotic Plants? Yes	Y	N	Y	N	Y	60	
Leaf litter? Yes							Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes, down woody debris
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 386
25	14	386				

Comments: Photo 94 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 1 Plot #: 2
 Forest Cover Type: Black Birch/ Oak Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Total	
		Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				Average Tree Height (ft)
TREE SPECIES		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Betula lenta</i>			1			8			2							57, 60, 65	11
2	<i>Quercus velutina</i>					1						1					72, 70	2
3	<i>Quercus rubra</i>																	0
4	<i>Acer rubrum</i>					1			1									2
5	<i>Pinus virginiana</i>								1								60	1
6	<i>Quercus alba</i>					2			1								63	3
7	<i>Carya glabra</i>								1									1
8																		0
9																		0
Total Number of Trees per Size Class		1			12			6			1			0				20
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 1%	Plot Successional Stage: Mid
<i>Betula lenta</i>				C	N	E	S		
				Y	N	Y	Y	Y	80
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rubus phoenicolasius</i>	
<i>Tsuga canadensis, Rubus phoenicolasius, few Quercus saplings, moss</i>				C	N	E	S		
				Y	Y	N	N	N	40
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?			
Specimen Trees?	No	C	N	E	S	W	%	Deer, Bird species	
Historic Sites?	No	Y	Y	Y	N	Y	80	Habitat size, location, configuration:	
Disease?	No					51.7 acres			
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?			
Exotic Plants?	Yes	C	N	E	S	W	%	All	
Leaf litter?	Light	Y	N	Y	Y	Y	80	Stand corridor/patch?	
Downed woody debris:	Yes								

FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 695
24	15	600				
14	10	63				
12	8	32				

Comments: Photo 95 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 1 Plot #: 3
 Forest Cover Type: Black Birch / Oak Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Average Tree Height (ft)	Total	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh					
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD			Other
1	<i>Carya ovata</i>						1			1							65, 68	2
2	<i>Quercus alba</i>								2								68, 62	2
3	<i>Betula lenta</i>		21			5			1								55	27
4	<i>Robinia pseudoacacia</i>			1			2										60	3
5	<i>Liriodendron tulipifera</i>			1														1
6	<i>Acer rubrum</i>			1														1
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		24			8			4			0			0				36
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Betula lents, Robinia pseudoacacia, Liriodendron tulipifera, Acer rubrum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 30%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Betula lents, Vitis sp., Rubus allegheniensis, Rosa multiflora, Berberis thunbergii, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	N	N	N	N	20	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	N	Y	Y	N	60	Habitat size, location, configuration: 51.7 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	Y	N	N	Y	40	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 375
14	8	38				
18	20	246				
15	12	91				

Comments: Photo 101 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 1

Plot #: 4

Forest Cover Type: Black Birch

Date: 3/2/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																											
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total												
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other														
1 <i>Betula lenta</i>	51			2												40	53												
2 <i>Robinia pseudoacacia</i>			4			2										40	6												
3 <i>Prunus serotina</i>			1			2										40	3												
4 <i>Acer rubrum</i>						1			1							42	2												
5 <i>Tsuga canadensis</i>						1										35	1												
6 <i>Liriodendron tulipifera</i>						1										45	1												
7																	0												
8																	0												
9																	0												
Total Number of Trees per Size Class	56			9			1			0			0				66												
Number & Size of Standing Dead Trees	1																1												
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer pensylvanicum, Prunus serotina, Robinia pseudoacacia, Acer rubrum</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:															
							C	N	E	S	W	%	1%		Mature														
							Y	Y	N	Y	Y	80																	
List of Understory Species 0'-3': <i>Smilax rotundifolia, Betula lenta, Rosa multiflora, Rubus occidentalis, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):																	
							C	N	E	S	W	%	<i>Rosa multiflora</i>																
							N	Y	Y	N	Y	60																	
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?																	
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species																
Historic Sites?	No						N	Y	Y	N	Y	60	Habitat size, location, configuration:																
Disease?	No											51.7 acres																	
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?																	
Exotic Plants?	Yes						C	N	E	S	W	%	All																
Leaf litter?	Very Light						Y	Y	Y	Y	Y	100	Stand corridor/patch?																
Downed woody debris:	Yes																												
FUNCTION: Where is stand in relation to sensitive areas on site?																													
Fire Management Zone (Yes/No) No																													
Fuel load and type located in stand Yes, down woody debris																													
Fire Break locations in stand No																													
															Total Board Feet:														
<table border="1"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>																		DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet						
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet																								
Comments: Photo 154 Management Stand 1																													

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 1 Plot #: 5
 Forest Cover Type: Black Birch Date: 3/16/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus velutina</i>									1							75	1
2	<i>Quercus alba</i>						1			1							65	2
3	<i>Quercus rubra</i>						1										65	1
4	<i>Prunus serotina</i>						1										75	1
5	<i>Betula lenta</i>	4			1													5
6	<i>Acer rubrum</i>			2														2
7	<i>Liriodendron tulipifera</i>						1			1							70	2
8	<i>Fraxinus americana</i>						1											1
9	<i>Ailanthus altissima</i>			3														3
10	<i>Robinia pseudoacacia</i>						1											1
11	<i>Carya glabra</i>			1														1
Total Number of Trees per Size Class		10			7			3			0			0				20
Number & Size of Standing Dead Trees		2																2

List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Acer rubrum, Betula lenta, Ailanthus altissima, Berberis thunbergii, Sassafras albidum, Carya cordiformis</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	N	Y	80		

List of Understory Species 0'-3': <i>Tsuga canadensis, Rosa multiflora, Rubus occidentalis, Betula lenta, Lonicera japonica, Smilax rotundifolia, Duchesnea indica, Vitis sp., moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica, Ailanthus altissima</i>
	C	N	E	S	W	%	
	Y	Y	Y	N	N	60	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 51.7 acres
Disease? No							
Insects/Infestation? Hemlock Woolly Adelgid	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Moderate	Y	N	Y	Y	Y	80	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream
Fire Management Zone (Yes/No) No
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species
Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1295
15	20	152	8	10	10	
12	18	72				
23	30	677				
19	20	282				
13	20	102				

Comments: Photo 155 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 2 Plot #: 1
 Forest Cover Type: Oak Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Carya alba</i>			9			2										60	11
2	<i>Quercus rubra</i>												1					1
3	<i>Prunus serotina</i>						1											1
4	<i>Carya glabra</i>			1			2											3
5	<i>Liriodendron tulipifera</i>			1			1											2
6	<i>Robinia pseudoacacia</i>			1														1
7	<i>Acer rubrum</i>			1			3										40	4
8	<i>Quercus coccinea</i>								2								75, 70	2
9	<i>Quercus prinus</i>								1								68	1
Total Number of Trees per Size Class		13			9			3			1			0				26
Number & Size of Standing Dead Trees		1																1

List of Woody Plant Species 3'-20': <i>Liriodendron tulipifera, Robinia pseudoacacia, Carya alba, Acer rum, Carya glabra</i>	Canopy Closure: C N E S W % Y Y Y Y Y 100	Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
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List of Understory Species 0'-3': <i>Duchesnea indica, Smilax rotundifolia, Rubus occidentalis, Rosa multiflora, Lonicera japonica, Berberis thunbergii, Carya alba, moss</i>	Understory Cover 3'-20': C N E S W % Y N Y N N 40	List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rosa multiflora, Berberis thunbergii</i>
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Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3': C N E S W % Y Y Y Y Y 100	HABITAT: What species present? Deer, Bird species
Specimen Trees? No	Downed Woody Debris: C N E S W % N Y Y Y Y 80	Habitat size, location, configuration: 50.8 acres
Historic Sites? No		Wildlife cover/food/water? All
Disease? No		Stand corridor/patch?
Insects/Infestation? No		
Exotic Plants? Yes		
Leaf litter? Light		
Downed woody debris: Yes		

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) No
 Fuel load and type located in stand Yes
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 821
15	16	121				
17	14	148				
25	21	552				

Comments: Photo 96 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 2 Plot #: 2
 Forest Cover Type: Tulip Poplar Date: 2/26/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Liriodendron tulipifera</i>								1				1						85	2	
2	<i>Betula lenta</i>								1											1	
3	<i>Juglans nigra</i>											2								2	
4	<i>Robinia pseudoacacia</i>								1										80	1	
5	<i>Sassafras albidum</i>								2											2	
6	<i>Nyssa sylvatica</i>								1											1	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		0			5			3			1			0							9
Number & Size of Standing Dead Trees					1																1

List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Linder a benzoin, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Matures				
C	N	E	S	W	%	N	Y			Y	Y	Y	80
List of Understory Species 0'-3': <i>Lindera benzoin, Blaytonia virginica, Allium vineale, Duchesnea indica, Anemone thalictroides, Pedophyllum peltatum, Viola pensylvanica, Rosa multiflora</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Allium vineale, Rosa multiflora</i>					
C	N	E	S	W	%	Y	Y	Y	Y	Y	100	HABITAT: What species present? Deer, Bird species	
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				Habitat size, location, configuration: 50.8 acres					
Specimen Trees? No				C	N	E	S	W	%	Wildlife cover/food/water? Food, shelter			
Historic Sites? No				Y	Y	Y	Y	Y	100	Stand corridor/patch?			
Disease? No				Downed Woody Debris:									
Insects/Infestation? No				C	N	E	S	W	%				
Exotic Plants? Yes				N	Y	Y	N	N	40				
Leaf litter? Light													
Downed woody debris: Yes													

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody dbris, thick understory, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1337
25	41	1103				
16	10	90				
16	17	144				

Comments: Photo 158 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 2

Plot #: 3

Forest Cover Type: Oak/Hickory

Date: 3/26/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Carya glabra</i>					4			2			3						66, 75	9		
2	<i>Quercus velutina</i>											2						70	2		
3	<i>Acer rubrum</i>								4									35	4		
4	<i>Betula lenta</i>					1													1		
5	<i>Amelanchier arborea</i>					1													1		
6	<i>Liriodendron tulipifera</i>								1										1		
7																			0		
8																			0		
9																			0		
Total Number of Trees per Size Class		6			7			3			2			0						18	
Number & Size of Standing Dead Trees					1															1	
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:							
<i>Betula lenta, Amelanchier arborea, Carya glabra, Cornus florida, Carpinus caroliniana</i>							C	N	E	S	W	%	5%		Mature						
							Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):									
<i>Pedophyllum peltatum, Smilax rotundifolia, Rosa multiflora</i>							C	N	E	S	W	%	<i>Rosa multiflora</i>								
							Y	Y	Y	Y	Y	100									
Rare, etc. Species?		No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?									
Specimen Trees?		No					C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No					Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No										50.8 acres									
Insects/Infestation?		No					Downed Woody Debris:					Wildlife cover/food/water?									
Exotic Plants?		Yes					C	N	E	S	W	%	All								
Leaf litter?		Light					N	N	N	N	Y	20	Stand corridor/patch?								
Downed woody debris:		Yes																			
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to perennial stream														
Fire Management Zone (Yes/No)		No																			
Fuel load and type located in stand		Yes, down woody debris																			
Fire Break locations in stand		No																			
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 2347							
25		30		827																	
24		35		800																	
14		20		126																	
16		33		288																	
16		35		306																	
Comments: Photo 159							Management Stand 1														

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 2

Plot #: 4

Forest Cover Type: Oak

Date: 3/26/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 120		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>		1			2			5			1					60	9	
2 <i>Quercus alba</i>					1			1								75	2	
3 <i>Liriodendron tulipifera</i>			3									1				75	4	
4 <i>Betula lenta</i>			1														1	
5 <i>Carya ovata</i>						1											1	
6 <i>Acer rubrum</i>			3			1											4	
7 <i>Carya glabra</i>			1														1	
8																	0	
9																	0	
Total Number of Trees per Size Class		9			5			7			1			0				22
Number & Size of Standing Dead Trees		1			2													3
List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Betula lenta, Liriodendron tulipifera, Acer rubrum, Quercus prinus</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 15%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Rubus allegheniensis, Liriodendron tulipifera</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>						
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, Bird species											
Specimen Trees? No		C	N	E	S	W	%											
Historic Sites? No		Y	Y	Y	N	N	60	Habitat size, location, configuration: 50.8 acres										
Disease? No																		
Insects/Infestation? No		Downed Woody Debris:					Wildlife cover/food/water? All											
Exotic Plants? Yes		C	N	E	S	W	%											
Leaf litter? Light		Y	Y	N	Y	N	60	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris, few invasive species																		
Fire Break locations in stand No																		
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet: 2613								
28	27	936			16	17	144											
23	21	452			18	23	270											
15	20	152			16	28	252											
18	26	319																
12	22	88																
Comments: Photo 160							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 2 Plot #: 5
 Forest Cover Type: Oak Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus rubra</i>										1						85	1
2 <i>Carya glabra</i>									1							83	1
3 <i>Liriodendron tulipifera</i>			1			2			1							90	4
4 <i>Ailanthus altissima</i>									1								1
5 <i>Acer rubrum</i>						2											2
6 <i>Robinia pseudoacacia</i>									1								1
7 <i>Carya ovata</i>						1											1
8																	0
9																	0
Total Number of Trees per Size Class		1			5			4			1			0			11
Number & Size of Standing Dead Trees		1															1

List of Woody Plant Species 3'-20': <i>Lindera benzoin, Berberis thunbergii, Liriodendron tulipifera, Cercis canadensis</i>	Canopy Closure:							Percent of Invasive Cover per Plot (All Layers): 70%	Plot Successional Stage: Mature
	C	N	E	S	W	%			
	Y	Y	Y	Y	N	80			

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Pedophyllum peltatum, Toxicodendron radicans, Rubus allegheniensis, Rubus phoenicolasius Lonicera japonica</i>	Understory Cover 3'-20':							List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica, Rubus phoenicolasius, Ailanthus altissima</i>
	C	N	E	S	W	%		
	Y	Y	Y	N	Y	80		

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':							HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 50.8 acres	
Disease? No								
Insects/Infestation? No	Downed Woody Debris:							
Exotic Plants? Yes	C	N	E	S	W	%	Wildlife cover/food/water? All Stand corridor/patch?	
Leaf litter? Light	Y	Y	Y	Y	Y	100		
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream
Fire Management Zone (Yes/No) Yes
Fuel load and type located in stand Yes, heavy understory, invasive species, down woody debris
Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1771
22	20	406				
29	20	782				
20	32	512				
13	15	71				

Comments: Photo 169 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 1

Forest Cover Type: Oak

Date: 3/2/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Quercus alba</i>									3									88, 75, 83	3	
2	<i>Acer rubrum</i>					4			5										35, 56	9	
3	<i>Betula lenta</i>					9			1											10	
4	<i>Carya glabra</i>					4			3			1							55	8	
5	<i>Prunus serotina</i>					2			1											3	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		19			10			4			0			0							33
Number & Size of Standing Dead Trees		1																			1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Betula lenta, Acer rubrum, Carya glabra, Prunus serotina</i>				C	N	E	S	W	%	10%				Mature							
				Y	N	N	Y	Y	60												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Smilax rotundifolia, Betula lenta, Berberis thunbergii, Rosa multiflora, Rubus phoenicolasius, Rubus occidentalis</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora, Rubus phoenicolasius</i>											
				Y	Y	Y	N	N	60												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species											
Historic Sites?	No			N	Y	N	N	Y	40	Habitat size, location, configuration:											
Disease?	No							55.3 acres													
Insects/Infestation?	No			Downed Woody Debris:																	
Exotic Plants?	Yes			C	N	E	S	W	%	Wildlife cover/food/water?											
Leaf litter?	Light			Y	Y	Y	Y	N	80	All											
Downed woody debris:	Yes							Stand corridor/patch?													
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream																	
Fire Management Zone (Yes/No)				No																	
Fuel load and type located in stand				Yes, down woody debris, invasive species																	
Fire Break locations in stand				No																	
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:									
18		20		246								529									
15		18		137																	
12		14		56																	
16		10		90																	
Comments: Photo 97				Management Stand 2																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 2
 Forest Cover Type: Oak/Hickory Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus alba</i>					6			1								8
2	<i>Carya glabra</i>												1			65, 80	1
3	<i>Quercus velutina</i>								2							60, 65, 78	5
4	<i>Quercus prinus</i>															85	1
5	<i>Acer rubrum</i>					3			2								5
6	<i>Carya ovata</i>					3			2							80, 78	5
7	<i>Nyssa sylvatica</i>					1			1								2
8																	0
9																	0
Total Number of Trees per Size Class		13			8			5			1			0			27
Number & Size of Standing Dead Trees					1												1
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:							
<i>Carya alba, Acer rubrum, Nyssa sylvatica, Carya ovata</i>				C	N	E	S	W	%	Mature							
				Y	Y	N	N	Y	80	30%							
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):									
<i>Smilax rotundifolia, Rubus occidentalis, Rubus phoenicolasius, Berberis thunbergii, Lonicera japonica</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Lonicera japonica, Rubus phoenicolasius</i>							
				Y	Y	Y	Y	N	80								
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?											
Specimen Trees?	No	C	N	E	S	W	%	Deer, Bird species									
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:									
Disease?	No					55.3 acres											
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?											
Exotic Plants?	Yes	C	N	E	S	W	%	All									
Leaf litter?	Light	Y	Y	Y	Y	Y	100	Stand corridor/patch?									
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																	
Fire Management Zone (Yes/No)		Yes															
Fuel load and type located in stand		Yes, down woody debris, invasive species															
Fire Break locations in stand		No															
DBH (inches)	Length of Log (ft)	Contents in Board Feet		DBH (inches)	Length of Log (ft)	Contents in Board Feet		Total Board Feet:									
15	20	152		27	20	662		1427									
18	18	221															
16	12	108															
14	10	63															
18	19	221															
Comments: Photo 98 Management Stand 2																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 3
 Forest Cover Type: Oak Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus alba</i>								2								65, 70	2
2	<i>Quercus velutina</i>					1											60	1
3	<i>Prunus serotina</i>			1			1											2
4	<i>Betula lenta</i>			18														18
5	<i>Carya alba</i>						2										57	2
6	<i>Tsuga canadensis</i>								1								63	1
7	<i>Acer rubrum</i>						1											1
8	<i>Carya ovata</i>			1													60	1
9	<i>Acer saccharum</i>						1											1
10	<i>Sassafras albidum</i>			1														1
11	<i>Carya glabra</i>						2										55	2
Total Number of Trees per Size Class		21			8			3			0			0				32
Number & Size of Standing Dead Trees					1													1

List of Woody Plant Species 3'-20': <i>Betula lenta, Prunus serotina, Carya ovata, Sassafras albidum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	N	Y	80		

List of Understory Species 0'-3': <i>Tsuga canadensis, Rubus occidentalis, Berberis thunbergii, Rosa multiflora, Duchesnea indica, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	N	N	Y	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	N	Y	Y	N	40	Habitat size, location, configuration: 55.3 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	Y	N	N	N	20	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes - adjacent to plot
 Fuel load and type located in stand Yes, down woody debris, invasive species, thick understory
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 321
18	20	246				
14	12	75				

Comments: Photo 99 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 4
 Forest Cover Type: Oak Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus velutina</i>					2			1								76, 80, 68	3
2	<i>Quercus alba</i>					2											76	2
3	<i>Carya ovata</i>			2					1								82	3
4	<i>Prunus serotina</i>			3			4											7
5	<i>Sassafras albidum</i>			2			2											4
6	<i>Carya alba</i>			2			3										50	5
7	<i>Liriodendron tulipifera</i>								1								70	1
8	<i>Carya glabra</i>			2			4											6
9	<i>Acer rubrum</i>						1											1
10	<i>Nyssa sylvatica</i>			3			6											9
Total Number of Trees per Size Class		14			24			3			0			0				41
Number & Size of Standing Dead Trees		1			2			1										4

List of Woody Plant Species 3'-20': <i>Viburnum prunifolium, Carya ovata, Prunus serotina, Sassafras albidum, Carya alba, Carya glabra</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis, Berberis thunbergii, Lonicera japonica, Rosa multiflora, Claytonia virginica, Vitis sp., moss, few Quercus saplings</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>
	C	N	E	S	W	%	
	Y	N	N	N	N	20	

Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees?	No	C	N	E	S	W	%	
Historic Sites?	No	Y	N	Y	Y	Y	80	Habitat size, location, configuration: 55.3 acres
Disease?	No							
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:						Wildlife cover/food/water?
Exotic Plants?	Yes	C	N	E	S	W	%	All
Leaf litter?	Light to Moderate	Y	Y	N	Y	N	60	Stand corridor/patch?
Downed woody debris:	Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 591
18	19	221				
17	22	233				
15	18	137				

Comments: Photo 100 Management Stand 2

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 5
 Forest Cover Type: Oak/Hickory Date: 3/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Prunus serotina</i>									1						1	70	2
2 <i>Carya ovata</i>			4			4			2							70	10
3 <i>Prunus cerasus</i>						1											1
4 <i>Fraxinus americana</i>			1														1
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	5			5			3			0			1				14
Number & Size of Standing Dead Trees																	0

List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Carya ovata, Fraxinus americana</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 40%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	N	Y	Y	Y	80		
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Lonicera japonica, Microstegium vimineum, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica, Microstegium vimineum</i>	
	C	N	E	S	W	%		
	Y	Y	Y	Y	N	80		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species	
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	N	Y	Y	N	Y	60	Habitat size, location, configuration: 55.3 acres	
Disease? No	Downed Woody Debris:							
Insects/Infestation? No	C	N	E	S	W	%	Wildlife cover/food/water? All	
Exotic Plants? Yes	Y	Y	Y	Y	Y	100		
Leaf litter? Light							Stand corridor/patch?	
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, invasive species

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1178
30	20	846				
12	28	112				
15	21	152				
11	17	49				
9	12	19				

Comments: Photo 145. Previously designated as Hemlock cover type **Management Stand 2**

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 3 Plot #: 6
 Forest Cover Type: Oak/Hickory/Ash Date: 3/15/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Fraxinus americana</i>															80	9	
2	<i>Quercus velutina</i>															30	1	
3	<i>Cercis canadensis</i>					6											6	
4	<i>Prunus serotina</i>					2										40	2	
5	<i>Carya alba</i>															35	1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		8			4			7			0			0				19
Number & Size of Standing Dead Trees		2			1			3										6
List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Cercis canadensis, Carya cordiformis, Betula lenta, Prunus serotina</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:								
				C	N	E	S	W	%	Mature								
				Y	Y	Y	Y	Y	100	70%								
List of Understory Species 0'-3': <i>Rosa multiflora, Lonicera japonica, Rubus phoenicolasius, Smilax rotundifolia, Toxicodendron radicans, Rosa carolina, Vitis sp., moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica, Rubus phoenicolasius</i>										
				C	N	E	S	W	%									
				Y	Y	Y	N	Y	80									
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species								
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?	No							55.3 acres										
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?										
Exotic Plants?	Yes			C	N	E	S	W	%	All								
Leaf litter?	Light			Y	Y	N	Y	Y	80	Stand corridor/patch?								
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?												Close to perennial channel						
Fire Management Zone (Yes/No)												Yes						
Fuel load and type located in stand												Yes, down woody debris, dead standing trees, invasive species, thick understory						
Fire Break locations in stand												No						
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1492						
18		18		221		11		18		56								
18		28		344		13		28		142								
17		19		191		19		18		254								
13		19		92														
20		13		192														
Comments: Photo 146												Management Stand 2						

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 1

Forest Cover Type: Eastern Hemlock

Date: 3/21/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Tsuga canadensis</i>							6									65, 60	6	
2 <i>Quercus alba</i>						3			1							60, 55	4	
3 <i>Quercus rubra</i>									1							65	1	
4 <i>Betula lenta</i>			16			6										50	22	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		16			9			8			0			0				33
Number & Size of Standing Dead Trees		1			2													3
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Betula lenta</i>							C	N	E	S	W	%	2%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Berberis thunbergii, Betula lenta, Smilax rotundifolia, Rubus occidentalis, moss</i>							C	N	E	S	W	%	<i>Berberis thunbergii</i>					
							Y	N	N	N	N	20						
Rare, etc. Species? No							Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees? No							C	N	E	S	W	%	Deer, Bird species					
Historic Sites? No							N	N	N	N	N	0	Habitat size, location, configuration:					
Disease? No												126 acres						
Insects/Infestation? Hemlock Woolly Adelgid							Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants? Yes							C	N	E	S	W	%	All					
Leaf litter? Moderate							Y	Y	Y	Y	N	80	Stand corridor/patch?					
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees, hemlock woolly adelgid infestation																		
Fire Break locations in stand No																		
															Total Board Feet:			
Comments: Photo 102 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 4 Stand #: 4 Plot #: 2
 Forest Cover Type: Eastern Hemlock Date: 3/2/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus alba</i>									2							62, 60	2
2 <i>Carya glabra</i>			2			3			1							64	6
3 <i>Acer rubrum</i>			1														1
4 <i>Robinia pseudoacacia</i>			2														2
5 <i>Carya alba</i>			3						1							66	4
6 <i>Carya ovata</i>						1										65	1
7 <i>Ailanthus altissima</i>			1														1
8 <i>Fraxinus americana</i>			1														1
9 <i>Betula lenta</i>			2			1										50	3
Total Number of Trees per Size Class	12			5			4			0			0				21
Number & Size of Standing Dead Trees																	0

List of Woody Plant Species 3'-20': <i>Betula lenta, Carya glabra, Acer rubrum, Robinia pseudoacacia, Carya alba, Ailanthus altissima, Fraxinus americana</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 5%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Betula lenta, Tsuga canadensis, Smilax rotundifolia, Berberis thunbergii, Rubus phoenicolasius, Caylussacia baccata</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Ailanthus altissima, Berberis thunbergii, Rubus phoenicolasius</i>
	C	N	E	S	W	%	
	Y	N	Y	N	N	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	N	Y	Y	N	N	40	Habitat size, location, configuration: 126 acres
Disease? No							

Insects/Infestation? Hemlock Woolly Adelgid	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	Y	N	Y	Y	Y	80	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, invasive species, hemlock woolly adelgid infestation

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 439
12	17	64				
18	10	123				
16	15	126				
14	20	126				

Comments: Photo 103 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 3

Forest Cover Type: Oak

Date: 3/15/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus prinus</i>					1			2							75	3	
2	<i>Quercus rubra</i>								1							72	1	
3	<i>Betula lenta</i>					12			3			2					17	
4	<i>Carya glabra</i>								1							78	1	
5	<i>Quercus velutina</i>								1							73	1	
6	<i>Acer rubru</i>								1			2					3	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		12			6			8			0			0				26
Number & Size of Standing Dead Trees								2										2
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 10%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	Y	N	Y	Y	80									
List of Understory Species 0'-3': <i>Smilax rotundifolia, Rubus occidentalis, Rosa multiflora, Berberis thunbergii, Vitis sp.</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora</i>										
				C	N	E	S	W	%									
				Y	N	Y	N	N	40									
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, Bird species										
Specimen Trees? No				C	N	E	S	W	%									
Historic Sites? No				Y	Y	Y	Y	N	80									
Disease? No								Habitat size, location, configuration: 126 acres										
Insects/Infestation? No				Downed Woody Debris:				Wildlife cover/food/water? All										
Exotic Plants? Yes				C	N	E	S	W	%									
Leaf litter? Light				Y	Y	Y	Y	N	80	Stand corridor/patch?								
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, dead standing trees																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1208						
13		30		152		15		20		152								
18		18		221		20		18		288								
20		10		160														
14		18		113														
13		25		122														
Comments: Photo 147																		
Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 4

Forest Cover Type: Oak

Date: 3/15/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			2								70	3	
2 <i>Quercus prinus</i>					1			2								80	3	
3 <i>Carya glabra</i>									1							80	1	
4 <i>Betula lenta</i>			8			5			1							65	14	
5 <i>Robinia pseudoacacia</i>			1														1	
6 <i>Acer rubrum</i>						1											1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		9			8			6			0			0				23
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Betula lenta, Acer pensylvanicum, Berberis thunbergii</i>							C	N	E	S	W	%	5%		Mature			
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Tsuga canadensis, Duchesnea indica, Acer pensylvanicum, Lonicera japonica, Rosa multiflora, moss</i>							C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>					
							N	N	Y	N	N	20						
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?									
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		N	Y	Y	N	N	40	Habitat size, location, configuration:								
Disease?		No							126 acres									
Insects/Infestation?		Hemlock Woolly Adelgid		Downed Woody Debris:					Wildlife cover/food/water?									
Exotic Plants?		Yes		C	N	E	S	W	%	Cover, food								
Leaf litter?		Light		Y	N	N	N	N	20	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes - in areas of heavy hemlock die-back																
Fuel load and type located in stand		Yes, down woody debris																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
19		28		394			19		28		394			1546				
17		30		317			14		16		100							
14		20		126			8		12		12							
13		25		122														
13		16		81														
Comments: Photo 148 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 4 Stand #: 4 Plot #: 5

Forest Cover Type: Oak

Date: 3/15/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus Prinus</i>	1			5			7									82	13
2 <i>Liriodendron tulipifera</i>						2										73	2
3 <i>Betula lenta</i>			5			1			1							75	7
4 <i>Quercus rubra</i>				1													1
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	6			9			8			0			0				23
Number & Size of Standing Dead Trees	1						1										2

List of Woody Plant Species 3'-20': <i>Betula lenta, Acer pensylvanicum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 0%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Tsuga canadensis, moss</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): ---
	C	N	E	S	W	%	
	Y	N	N	N	Y	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?
Specimen Trees? No	C	N	E	S	W	%	Deer, Bird species
Historic Sites? No	N	Y	Y	N	N	40	Habitat size, location, configuration: 126 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants? No	C	N	E	S	W	%	
Leaf litter? Light	Y	N	Y	Y	Y	80	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Abuts perennial stream

Fire Management Zone (Yes/No) Yes, certain areas contain thicker understory

Fuel load and type located in stand Yes, down woody debris and dead standing trees

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1575
17	30	317	11	25	74	
11	18	56	13	12	61	
14	25	150	17	20	212	
10	18	41	15	15	106	
11	18	56	10	13	27	
15	22	167	18	20	246	
11	20	62				

Comments: Photo 149. Southern flag is located in middle of channel **Management Stand 1**

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 6

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 50		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			2								70	3	
2 <i>Quercus velutina</i>								1									1	
3 <i>Betula lenta</i>			15			2										30	17	
4 <i>Acer rubrum</i>																	0	
5 <i>Acer pensylvanicum</i>			1														1	
6 <i>Carya glabra</i>						1										60	1	
7 <i>Quercus rubra</i>								1								60	1	
8 <i>Robinia pseudoacacia</i>			2														2	
9																	0	
Total Number of Trees per Size Class		18			4			4			0			0				26
Number & Size of Standing Dead Trees		4																4
List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta, Acer rubrum, Robinia pseudoacacia</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	2%		Mature			
							N	Y	N	Y	Y	60						
List of Understory Species 0'-3': <i>Tsuga canadensis, Rosa multiflora, Betula lenta, Quercus alba</i> saplings, moss							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	Rosa multiflora					
							Y	N	Y	N	Y	60						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species					
Historic Sites?	No						Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease?	No											126 acres						
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	Yes						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	Y	N	Y	Y	80	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Close to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris, dead standing trees											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
15		15		106		11		12		37		882						
21		20		362														
19		15		197														
16		12		108														
12		18		72														
Comments: Photo 150							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 7

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus velutina</i>									1							1	
2	<i>Quercus prinus</i>						1			1							72	2
3	<i>Liriodendron tulipifera</i>																80	2
4	<i>Acer rubrum</i>					2			4			1					65	7
5	<i>Quercus alba</i>									1							78	1
6	<i>Betula lenta</i>					7			2								56	9
7	<i>Prunus serotina</i>					5			2									7
8	<i>Carya glabra</i>					1												1
9																		0
Total Number of Trees per Size Class		15			9			6			0			0				30
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer pensylvanicum, Lindera benzoin, Prunus serotina, Acer rubrum, Carya glabra</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 1%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3': <i>Rosa multiflora, Rubus occidentalis, moss</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora</i>										
				C	N	E	S	W	%									
				N	N	N	N	N	0									
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, Bird species										
Specimen Trees? No				C	N	E	S	W	%									
Historic Sites? No				Y	Y	Y	N	Y	80	Habitat size, location, configuration: 126 acres								
Disease? No				Downed Woody Debris:				Wildlife cover/food/water? All										
Insects/Infestation? No				C	N	E	S	W	%	Stand corridor/patch?								
Exotic Plants? Yes				N	Y	Y	N	Y	60									
Leaf litter? Light																		
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, down woody debris																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1643						
28		12		432		16		15		126								
20		15		224		18		16		196								
16		18		162		19		18		254								
16		15		126														
18		10		123														
Comments: Photo 151																		
Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 8

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>					2			1								65	3
2 <i>Acer rubrum</i>									1							52	1
3 <i>Betula lenta</i>			7			1											8
4 <i>Robinia pseudoacacia</i>						1										50	1
5 <i>Carya ovata</i>						2										63	2
6 <i>Carya glabra</i>			4			3										65	7
7 <i>Nyssa sylvatica</i>			1														1
8 <i>Prunus serotina</i>			2			1											3
9 <i>Quercus alba</i>					1											52	1
Total Number of Trees per Size Class	14			11			2			0			0				27
Number & Size of Standing Dead Trees	2																2
List of Woody Plant Species 3'-20': <i>Betula lenta, Berberis thunbergii, Carya glabra, Nyssa sylvatica, Prunus serotina, Gaylussacia baccata</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:			
							C	N	E	S	W	%	5%		Mature		
							Y	Y	Y	Y	Y	100					
List of Understory Species 0'-3': <i>Pinus strobus, Smilax rotundifolia, Carya glabra, Rosa multiflora, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):					
							C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora</i>				
							N	Y	N	N	N	20					
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?					
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species				
Historic Sites?	No						Y	Y	Y	N	Y	80	Habitat size, location, configuration:				
Disease?	No											126 acres					
Insects/Infestation?	o						Downed Woody Debris:					Wildlife cover/food/water?					
Exotic Plants?	Yes						C	N	E	S	W	%	All				
Leaf litter?	Light						Y	N	Y	N	N	40	Stand corridor/patch?				
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream										
Fire Management Zone (Yes/No)							No										
Fuel load and type located in stand							Yes, down woody debris										
Fire Break locations in stand							No										
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:					
13		18		92		12		20		80		568					
13		25		122													
16		12		108													
16		16		144													
9		15		22													
Comments: Photo 152							Management Stand 1										

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 9

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus alba</i>					1			1								63	2	
2 <i>Acer rubrum</i>									1								1	
3 <i>Quercus rubra</i>					1			1								63	2	
4 <i>Carya glabra</i>			3						1							60	4	
5 <i>Betula lenta</i>			7			1											8	
6 <i>Robinia pseudoacacia</i>			2														2	
7 <i>Tsuga canadensis</i>									1							65	1	
8																	0	
9																	0	
Total Number of Trees per Size Class		12			3			5			0			0				20
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Zanthoxylum clava-herculis, Acer pensylvanicum, Carya glabra, Crataegus sp., Robinia pseudoacacia</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
							C	N	E	S	W	%	5%		Mature			
							Y	Y	N	Y	Y	80						
List of Understory Species 0'-3': <i>Rosa multiflora, Duchesnea indica, Smilax rotundifolia, Berberis thunbergii, Rubus occidentalis, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora</i>					
							Y	N	N	N	N	20						
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species					
Historic Sites?	No						Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease?	No											126 acres						
Insects/Infestation?	Hemlock Woolly Adelgid						Downed Woody Debris:					Wildlife cover/food/water?						
Exotic Plants?	Yes						C	N	E	S	W	%	All					
Leaf litter?	Light						Y	N	N	Y	N	40	Stand corridor/patch?					
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)							No											
Fuel load and type located in stand							Yes, down woody debris, hemlock woolly adelgid infestation											
Fire Break locations in stand							No											
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
21		25		384			17		12		127			916				
13		14		71														
13		20		102														
15		15		106														
14		20		126														
Comments: Photo 153							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 4 Stand #: 4 Plot #: 10

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 150		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>		2			7			6								78	15	
2 <i>Acer rubrum</i>			1						2							75	3	
3 <i>Prunus serotina</i>									1							70	1	
4 <i>Quercus alba</i>					1											70	1	
5 <i>Betula lenta</i>			3														3	
6 <i>Ailanthus altissima</i>						1											1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		6			9			9			0			0				24
Number & Size of Standing Dead Trees		2			2													4

List of Woody Plant Species 3'-20': <i>Acer pensylvanicum, Betula lenta, Quercus prinus, Acer rubrum, Berberis thunbergii</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 20%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Smilax rotundifolia, Rosa multiflora, Tsuga canadensis</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Ailanthus altissima, Berberis thunbergii</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	N	80	

Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?	
Specimen Trees?	No	C	N	E	S	W	%	Deer, Bird species
Historic Sites?	No	Y	N	Y	N	Y	60	Habitat size, location, configuration: 126 acres
Disease?	No							
Insects/Infestation?	Hemlock Woolly Adelgid	Downed Woody Debris:						Wildlife cover/food/water? All Stand corridor/patch?
Exotic Plants?	Yes	C	N	E	S	W	%	
Leaf litter?	Light	Y	Y	N	N	Y	60	
Downed woody debris:	Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris, dead standing trees, hemlock woolly adelgid infestation

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1361
13	23	112	17	12	127	
11	24	74	15	20	152	
14	16	100	13	22	112	
11	20	62	12	25	96	
12	20	80	9	16	25	
13	20	102	10	11	23	
17	28	296				

Comments: Photo 156 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 11

Forest Cover Type: Oak

Date: 3/16/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>								3								72	3	
2 <i>Quercus velutina</i>								2								70	2	
3 <i>Betula lenta</i>			25			3										53	28	
4 <i>Acer rubrum</i>						2											2	
5 <i>Liriodendron tulipifera</i>			1														1	
6 <i>Tsuga canadensis</i>									1							52	1	
7 <i>Carya glabra</i>			2														2	
8																	0	
9																	0	
Total Number of Trees per Size Class		28			5			6			0			0				39
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Betula lenta, Acer rubrum, Carya glabra</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 0%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	N	N	Y	Y	60						
List of Understory Species 0'-3': <i>Betula lenta, moss</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
							C	N	E	S	W	%						
							Y	Y	Y	N	N	60	---					
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?											
Specimen Trees? No		C	N	E	S	W	%	Deer, Bird species										
Historic Sites? No		N	Y	Y	N	N	40	Habitat size, location, configuration:										
Disease? No							126 acres											
Insects/Infestation? Hemlock Woolly Adelgid		Downed Woody Debris:					Wildlife cover/food/water?											
Exotic Plants? No		C	N	E	S	W	%	All										
Leaf litter? Moderate		N	N	N	N	Y	20	Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial stream																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, hemlock woolly adelgid infestation																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 1168				
14		23		112														
17		23		233														
17		27		275														
18		25		294														
17		25		254														
Comments: Photo 157							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 4

Stand #: 4

Plot #: 12

Forest Cover Type: Oak

Date: 3/26/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus prinus</i>					1												1	
2 <i>Quercus alba</i>					2			2								65	4	
3 <i>Acer rubrum</i>			1		4			2								58	7	
4 <i>Betula lenta</i>			11														11	
5 <i>Carya glabra</i>					1			1								70	2	
6 <i>Sassafras albidum</i>					1												1	
7 <i>Quercus velutina</i>					1											60	1	
8																	0	
9																	0	
Total Number of Trees per Size Class		12			10			5			0			0				27
Number & Size of Standing Dead Trees								1										1
List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Acer rubrum, Betula lenta, Hamamelis virginiana</i>					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 5%		Plot Successional Stage: Mature						
					C	N	E	S	W	%								
					Y	Y	Y	N	Y	80								
List of Understory Species 0'-3': <i>Tsuga, Smilax rotundifolia, Rosa multiflora, moss</i>					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Rosa multiflora, Berberis thunbergii</i>								
					C	N	E	S	W	%								
					Y	N	Y	N	N	40								
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':					HABITAT: What species present? Deer, Bird species											
Specimen Trees?	No	C	N	E	S	W	%											
Historic Sites?	No	Y	N	N	Y	N	40	Habitat size, location, configuration: 126 acres										
Disease?	No	Downed Woody Debris:					Wildlife cover/food/water? All											
Insects/Infestation?	Hemlock Woolly Adelgid	C	N	E	S	W	%	Stand corridor/patch?										
Exotic Plants?	Yes	Y	N	Y	Y	N	60											
Leaf litter?	Light																	
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?										Adjacent to perennial stream								
Fire Management Zone (Yes/No)		No																
Fuel load and type located in stand		Yes, down woody debris, hemlock woolly adelgid infestation																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet: 845				
18		13		147			15		17		121							
15		13		91														
14		15		88														
19		22		310														
14		15		88														
Comments: Photo 161										Management Stand 1								

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 2
 Forest Cover Type: Oak Date: 3/26/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																																														
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total																															
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other																																	
1	<i>Quercus velutina</i>										6								85	6																												
2	<i>Quercus prinus</i>				1			4						2					48	7																												
3	<i>Betula lenta</i>					3						1							60	4																												
4	<i>Carya glabra</i>					1														1																												
5																				0																												
6																				0																												
7																				0																												
8																				0																												
9																				0																												
Total Number of Trees per Size Class		5			4			7			2			0							18																											
Number & Size of Standing Dead Trees					2																2																											
List of Woody Plant Species 3'-20': <i>Betula lenta, Quercus prinus, Carya glabra</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:																																						
				C	N	E	S	W	%	0%		Mature																																				
				Y	Y	Y	Y	Y	100																																							
List of Understory Species 0'-3': <i>Betula lenta</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):																																								
				C	N	E	S	W	%	---																																						
				Y	N	N	Y	Y	60																																							
Rare, etc. Species? No		Specimen Trees? No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?																																								
Historic Sites? No		Disease? No		C	N	E	S	W	%	Deer, Bird species																																						
Insects/Infestation? Hemlock Woolly adelgid		Exotic Plants? No		Y	N	N	N	N	20	Habitat size, location, configuration:																																						
Leaf litter? Moderate		Downed woody debris: Yes		Downed Woody Debris:				193.8 acres																																								
Fire Management Zone (Yes/No) Yes		Wildlife cover/food/water?		C	N	E	S	W	%	All																																						
Fuel load and type located in stand Yes, down woody debris, dead standing trees, hemlock woolly adelgid infestation		Stand corridor/patch?		Y	Y	N	Y	N	60	Stand corridor/patch?																																						
Fire Break locations in stand No		FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																																														
<table border="1"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> <th rowspan="5">Total Board Feet: 2222</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>28</td> <td>700</td> <td>15</td> <td>16</td> <td>121</td> </tr> <tr> <td>23</td> <td>30</td> <td>677</td> <td>14</td> <td>15</td> <td>88</td> </tr> <tr> <td>16</td> <td>22</td> <td>198</td> <td></td> <td></td> <td></td> </tr> <tr> <td>14</td> <td>16</td> <td>100</td> <td></td> <td></td> <td></td> </tr> <tr> <td>19</td> <td>25</td> <td>338</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>												DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 2222	24	28	700	15	16	121	23	30	677	14	15	88	16	22	198				14	16	100				19	25	338			
DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 2222																																										
24	28	700	15	16	121																																											
23	30	677	14	15	88																																											
16	22	198																																														
14	16	100																																														
19	25	338																																														
Comments: Photo 163						Management Stand 1																																										

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 3
 Forest Cover Type: Oak Date: 3/26/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus prinus</i>								2							76	2	
2	<i>Quercus velutina</i>					1											1	
3	<i>Quercus rubra</i>								1							76	1	
4	<i>Liriodendron tulipifera</i>			1						1						85	2	
5	<i>Carya ovata</i>			1						1					65	3		
6	<i>Acer rubrum</i>			2			1									3		
7	<i>Carya alba</i>						2									2		
8	<i>Pinus strobus</i>												1			86	1	
9	<i>Tsuga canadensis</i>						1										1	
Total Number of Trees per Size Class		4			5			5			2			0				16
Number & Size of Standing Dead Trees		2			1			1										4
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Liriodendron tulipifera, Acer rubrum, Carya ovata, Betula lenta, Cornus florida</i>							C	N	E	S	W	%	10%		Mature			
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Rosa multiflora, Smilax rotundifolia, Berberis thunbergii, Viola pennsylvanica, Rubus phoenicolasius</i>							C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius</i>					
							Y	N	N	N	N	20						
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?									
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		N	Y	Y	Y	Y	80	Habitat size, location, configuration:								
Disease?		No							193.8 acres									
Insects/Infestation?		Hemlock Woolly Adelgid		Downed Woody Debris:					Wildlife cover/food/water?									
Exotic Plants?		Yes		C	N	E	S	W	%	All								
Leaf litter?		Light		N	Y	Y	Y	N	60	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?							Adjacent to perennial stream											
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, hemlock woolly adelgid infestation																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
21		22		398			16		20		180			2406				
15		16		121			25		25		662							
20		35		344			12		18		72							
19		35		479														
14		25		150														
Comments: Photo 164							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 4

Forest Cover Type: Oak

Date: 3/26/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Carya ovata</i>			1			2			1							78	4	
2 <i>Quercus alba</i>							1									72	1	
3 <i>Fraxinus americana</i>			3			4			2			1				82	10	
4 <i>Acer rubrum</i>			1			1											2	
5 <i>Cercis canadensis</i>			2														2	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		7			7			4			1			0				19
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:				
<i>Berberis thunbergii, Amelanchier arborea, Acer rubrum, Cornus florida, Cercis canadensis, Fraxinus americana, Carya ovata</i>							C	N	E	S	W	%	40%		Mature			
Y							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):						
<i>Rosa multiflora, Toxicodendron radicans, Smilax rotundifolia, Rubus allegheniensis, Anemone thalictroides, Ranunculus sp., Lonicera japonica</i>							C	N	E	S	W	%	<i>Lonicera japonica, Berberis thunbergii, Rosa multiflora</i>					
Y							N	Y	Y	N	60							
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?									
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No							193.8 acres									
Insects/Infestation?		No		Downed Woody Debris:					Wildlife cover/food/water?									
Exotic Plants?		Yes		C	N	E	S	W	%	All								
Leaf litter?		Light		Y	Y	Y	Y	N	80	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?							Ephemeral channel cuts through plot											
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, invasive species																
Fire Break locations in stand		No																
DBH (inches)		Length of Log (ft)		Contents in Board Feet			DBH (inches)		Length of Log (ft)		Contents in Board Feet			Total Board Feet:				
24		25		600			12		18		72			1000				
13		20		102														
13		24		122														
10		15		32														
12		19		72														
Comments: Photo 165							Management Stand 1											

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 5

Forest Cover Type: Oak

Date: 3/26/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>								1								85	1
2 <i>Quercus alba</i>		1			1			3								82	5
3 <i>Carya glabra</i>						1											1
4 <i>Fraxinus americana</i>									1								1
5 <i>Carya alba</i>			1														1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	2			2			5			0			0				9
Number & Size of Standing Dead Trees				1													1
List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Carya alba, Liriodendron tulipifera, Betula lenta</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:			
							C	N	E	S	W	%	45%		Mature		
							Y	Y	Y	Y	N	80					
List of Understory Species 0'-3': <i>Smilax rotundifolia, Lonicera japonica, Rosa multiflora, Rubus allegheniensis</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):					
							C	N	E	S	W	%	<i>Lonicera japonica, Berberis thunbergii, Rosa multiflora</i>				
							Y	N	N	N	N	20					
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?					
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species				
Historic Sites?	No						Y	Y	Y	Y	Y	100	Habitat size, location, configuration:				
Disease?	No											193.8 acres					
Insects/Infestation?	No						Downed Woody Debris:					Wildlife cover/food/water?					
Exotic Plants?	Yes						C	N	E	S	W	%	Food, shelter				
Leaf litter?	Light						Y	Y	Y	Y	Y	100	Stand corridor/patch?				
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																	
Fire Management Zone (Yes/No) Yes																	
Fuel load and type located in stand Yes, down woody debris, dead standing trees, invasive species																	
Fire Break locations in stand No																	
															Total Board Feet: 1583		
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet										
14	30	188															
14	28	176															
17	30	317															
18	25	294															
22	30	608															
Comments: Photo 166. Area recently selected harvested																	
Management Stand 1																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 6
 Forest Cover Type: Oak Date: 3/26/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT														Average Tree Height (ft)	Total		
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh					
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus velutina</i>											2						80	2
2	<i>Liriodendron tulipifera</i>						1											65	1
3	<i>Carya glabra</i>						1											58	1
4																			0
5																			0
6																			0
7																			0
8																			0
9																			0
Total Number of Trees per Size Class		0			2			0			2			0					4
Number & Size of Standing Dead Trees					1														1
List of Woody Plant Species 3'-20': <i>Liriodendron tulipifera, Berberis thunbergii</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 40%		Plot Successional Stage: Mature									
				C	N	E	S	W	%										
				Y	N	Y	Y	Y	80										
List of Understory Species 0'-3': <i>Rubus occidentalis, Rubus allegheniensis, Rosa multiflora, Smilax rotundifolia, Microstegium vimineum, Alliaria petiolata</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Microstegium vimineum, Alliaria petiolata</i>											
				C	N	E	S	W	%										
				Y	N	N	N	Y	40										
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No	C	N	E	S	W	%	Deer, Bird species											
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No					193.8 acres													
Insects/Infestation?	No	Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	Yes	C	N	E	S	W	%	Food, cover											
Leaf litter?	Light	Y	Y	Y	Y	Y	100	Stand corridor/patch?											
Downed woody debris:	Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																			
Fire Management Zone (Yes/No)	Yes																		
Fuel load and type located in stand	Yes, down woody debris, dead standing trees, invasive species																		
Fire Break locations in stand	No																		
	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>	<u>DBH (inches)</u>	<u>Length of Log (ft)</u>	<u>Contents in Board Feet</u>						Total Board Feet:							
	10	15	32									1931							
	29	30	1172																
	26	25	727																
Comments: Photo 167. Recently selected harvested												Management Stand 1							

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 8

Forest Cover Type: Oak

Date: 3/27/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus americana</i>						2			3							90	5	
2 <i>Juglans nigra</i>									1							68	1	
3 <i>Carya ovata</i>									2							88	2	
4 <i>Cercis canadensis</i>			6													30	6	
5 <i>Carya cordiformis</i>						1											1	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		6			3			6			0			0				15
Number & Size of Standing Dead Trees																		0

List of Woody Plant Species 3'-20': <i>Cercis canadensis, Linder benzoin, Berberis thunbergii, Cornus florida, Carya cordiformis, Ailanthus altissima</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 45%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Toxicodendron radicans, Lonicera japonica, Smilax rotundifolia, Allium vineale, Rubus occidentalis, Duchesnea indica, Anemone thalictroides, Rosa multiflora, Ranunculus sp.</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Berberis thunbergii, Lonicera japonica, Rosa multiflora, Ailanthus altissima</i>	
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species	
Specimen Trees? No	C	N	E	S	W	%	Habitat size, location, configuration: 193.8 acres Wildlife cover/food/water? Food, cover Stand corridor/patch?	
Historic Sites? No	Y	Y	Y	Y	Y	100		
Disease? No								
Insects/Infestation? No	Downed Woody Debris:							
Exotic Plants? Yes	C	N	E	S	W	%		
Leaf litter? Light	Y	Y	Y	Y	N	80		
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site?
Fire Management Zone (Yes/No) Yes
Fuel load and type located in stand Yes, down woody debris, invasive species
Fire Break locations in stand Yes, close to access road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1454
20	30	480	20	20	320	
19	10	141	14	20	126	
11	20	62	16	18	162	
12	10	40				
18	10	123				

Comments: Photo 170 **Management Stand 1**

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 9
 Forest Cover Type: Oak/Mostly Ash Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus americana</i>			3									1				68	4	
2 <i>Liriodendron tulipifera</i>									1							78	1	
3 <i>Plantanus occidentalis</i>									1							82	1	
4 <i>Prunus serotina</i>			2														2	
5 <i>Cercis canadensis</i>			1														1	
6 <i>Carya cordiformis</i>			2														2	
7 <i>Juglans nigra</i>			1			3										55	4	
8 <i>Ailanthus altissima</i>			2														2	
9																	0	
Total Number of Trees per Size Class		11			3			2			1			0				17
Number & Size of Standing Dead Trees					2			1										3

List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Linder benzoin, Cercis canadensis, Carya cordiformis, Fraxinus americana, Prunus serotina, Ailanthus altissima</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 45%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	N	N	60		

List of Understory Species 0'-3': <i>Fescue sp., Rubus allegheniensis, Rosa multiflora, Vitis sp., Allium vineale, Rubus phoenicolasius, Lonicera japonica, Rubus occidentalis, Toxicodendron radicans, Stellaria media, Cardamine bulbosa, Ornithogalum umbellatum</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rubus phoenicolasius, Allium vineale, Rosa multiflora, Berberis thunbergii, Ailanthus altissima</i>
	C	N	E	S	W	%	
	N	N	Y	N	Y	40	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 193.8 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? All
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Very Light	Y	Y	N	N	Y	60	Stand corridor/patch?
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to ephemeral channel
Fire Management Zone (Yes/No) Yes
Fuel load and type located in stand Yes, down woody debris, invasive species, thick understory, dead standing trees
Fire Break locations in stand Yes - close to access road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1525
13	15	71				
12	15	56				
22	12	243				
28	30	1080				
14	13	75				

Comments: Photo 171. Bottomland hardwood within oak forest cover Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 10
 Forest Cover Type: Oak Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 40		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Quercus velutina</i>							2			1						85	3	
2 <i>Carya glabra</i>						1											1	
3 <i>Carya alba</i>			1														1	
4																	0	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		1			1			2			1			0				5
Number & Size of Standing Dead Trees		1																1

List of Woody Plant Species 3'-20': <i>Cornus florida, Berberis thunbergii, Carya alba</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 30%	Plot Successional Stage: Mature					
C	N	E	S	W	%	Y	N			N	N	Y	40	
List of Understory Species 0'-3': <i>Rosa multiflora, Rubus allegheniensis, Smilax rotundifolia, Lonicera japonica, Toxicodendron radicans</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>						
C	N	E	S	W	%	Y	N	Y	N	N	40			
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present? Deer, Bird species								
Specimen Trees?	No	C	N	E	S	W	%	Habitat size, location, configuration: 193.8 acres						
Historic Sites?	No	Y	Y	Y	Y	Y	100							
Disease?	No	Downed Woody Debris:				Wildlife cover/food/water? Food, cover								
Insects/Infestation?	No	C	N	E	S	W	%	Stand corridor/patch?						
Exotic Plants?	Yes	Y	N	Y	Y	Y	80							
Leaf litter?	Light													
Downed woody debris:	Yes													

FUNCTION: Where is stand in relation to sensitive areas on site?

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, invasive species

Fire Break locations in stand N

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1311
19	20	282				
21	10	181				
12	25	96				
22	23	446				
16	35	306				

Comments: Photo 172. Recently selected harvested. Spot applications of herbicide on barberry and multiflora rose.
Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 11
 Forest Cover Type: Oak Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>											2					82	2
2 <i>Quercus prinus</i>					1			2			3					85	6
3 <i>Quercus alba</i>					2			1								82	3
4 <i>Betula lenta</i>			19														19
5 <i>Liriodendron tulipifera</i>			1														1
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	20			3			3			5			0				31
Number & Size of Standing Dead Trees																	0

List of Woody Plant Species 3'-20': <i>Betula lenta, Liriodendron tulipifera</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 2%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		
List of Understory Species 0'-3': <i>Rubus allegheniensis, Lonicera japonica, Smilax rotundifolia, Tsuga canadensis, Vitis sp., Rubus phoenicolasius</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rubus phoenicolasius</i>	
	C	N	E	S	W	%		
	Y	N	Y	Y	N	60		
Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species	
Specimen Trees? No	C	N	E	S	W	%		
Historic Sites? No	N	Y	N	N	Y	40	Habitat size, location, configuration: 193.8 acres	
Disease? No								
Insects/Infestation? Hemlock Woolly Adelgid	Downed Woody Debris:						Wildlife cover/food/water? All	
Exotic Plants? Yes	C	N	E	S	W	%		
Leaf litter? Very Light	Y	Y	Y	Y	Y	100	Stand corridor/patch?	
Downed woody debris: Yes								

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream

Fire Management Zone (Yes/No) No

Fuel load and type located in stand Yes, down woody debris, thicker understory outside of plot

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 4123
27	25	794	25	20	552	
24	30	750	29	20	782	
18	18	221	18	25	294	
12	14	56	24	20	500	
16	15	126	12	12	48	

Comments: Photo 173. spot treat invasive species with herbicide **Management Stand 1**

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 13
 Forest Cover Type: Oak Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Prunus serotina</i>						1										39	1	
2 <i>Robinia pseudoacacia</i>						4			2							65	6	
3 <i>Fraxinus americana</i>			4			3						1				62	8	
4 <i>Ailanthus altissima</i>						1											1	
5 <i>Celtis occidentalis</i>			2														2	
6 <i>Carya cordiformis</i>			1														1	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		7			9			2			1			0				19
Number & Size of Standing Dead Trees		2																2

List of Woody Plant Species 3'-20': <i>Lindera benzoin, Berberis thunbergii, Cornus florida, Fraxinus americana, Celtis occidentalis, Carya cordiformis, Ailanthus altissima</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 45%	Plot Successional Stage: Mature				
C	N	E	S	W	%	N	Y			Y	Y	N	60
List of Understory Species 0'-3': <i>Toxicodendron radicans, Lonicera japonica, Rosa multiflora, Smilax rotundifolia, Allium vineale, Rubus occidentalis, Claytonia virginica</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Rosa multiflora, Allium vineale, Lonicera japonica, Ailanthus altissima</i>					
C	N	E	S	W	%	Y	Y	Y	Y	N	80	HABITAT: What species present? Deer, Bird species	
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				100				Habitat size, location, configuration: 193.8 acres			
Specimen Trees?	No	C	N	E	S	W	%	Wildlife cover/food/water? Food, cover					
Historic Sites?	No	Y	Y	Y	Y	Y	100	Stand corridor/patch?					
Disease?	No	Downed Woody Debris:				60							
Insects/Infestation?	No	C	N	E	S	W	%						
Exotic Plants?	Yes	N	Y	Y	N	Y	60						
Leaf litter?	Light												
Downed woody debris:	Yes												

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to farm/agricultural field

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, down woody debris, thick understory, invasive species, dead standing trees

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 562
24	20	500				
11	20	62				

Comments: Photo 175 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 5

Stand #: 1

Plot #: 14

Forest Cover Type: Oak

Date: 3/27/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus americana</i>			4			1			3							62	8	
2 <i>Robinia pseudoacacia</i>						1											1	
3 <i>Prunus serotina</i>			2			2			1							70	5	
4 <i>Acer rubrum</i>						1										50	1	
5 <i>Quercus alba</i>						1										70	1	
6 <i>Cercis canadensis</i>			1														1	
7 <i>Carya cordiformis</i>						2											2	
8 <i>Quercus velutina</i>						2											2	
9 <i>Ailanthus altissima</i>						1											1	
Total Number of Trees per Size Class		7			11			4			0			0				22
Number & Size of Standing Dead Trees		4			2													6
List of Woody Plant Species 3'-20':					Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:						
<i>Berberis thunbergii, Carya alba, Carya cordiformis, Ailanthus altissima, Cercis canadensis, Fraxinus americana, Prunus serotina</i>					C	N	E	S	W	%	45%		Mature					
					Y	Y	N	Y	Y	80								
List of Understory Species 0'-3':					Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):								
<i>Toxicodendron radicans, Rosa multiflora, Lonicera japonica, Rubus allegheniensis, Smilax rotundifolia, Rubus phoenicolasius, Anemone thalictroides, Allium vineale, Rubus occidentalis, Ranunculus sp., Vitis sp., Stellaria media, Corydalis flavula</i>					C	N	E	S	W	%	<i>Allium vineale</i>							
					N	N	N	N	N	0	<i>Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius, Lonicera japonica, Ailanthus altissima</i>							
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?									
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No							193.8 acres									
Insects/Infestation?		No		Downed Woody Debris:					Wildlife cover/food/water?									
Exotic Plants?		Yes		C	N	E	S	W	%	Cover, food								
Leaf litter?		Light		Y	Y	Y	Y	Y	100	Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, invasive species, thick understory																
Fire Break locations in stand		Yes, access road																
DBH (inches)	Length of Log (ft)	Contents in Board Feet					DBH (inches)	Length of Log (ft)	Contents in Board Feet					Total Board Feet: 562				
12	19	72																
18	20	246																
12	20	80																
12	19	72																
13	18	92																
Comments: Photo 176 Management Stand 1																		

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 16
 Forest Cover Type: Oak Date: 3/27/2012
 Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>									1							88	1
2 <i>Liriodendron tulipifera</i>						1			3			1				85	5
3 <i>Carya cordiformis</i>			1			2											3
4 <i>Prunus serotina</i>			1														1
5 <i>Ailanthus altissima</i>									1							75	1
6 <i>Carya alba</i>			1														1
7 <i>Acer rubrum</i>			1														1
8																	0
9																	0
Total Number of Trees per Size Class	4			3			5			1			0				13
Number & Size of Standing Dead Trees	1																1

List of Woody Plant Species 3'-20': <i>Berberis thunbergii, Cornus florida, Lindera benzoin, Prunus serotina, Carya cordiformis, Carya alba, Acer rubrum</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 80%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	Y	Y	100		

List of Understory Species 0'-3': <i>Lonicera japonica, Vitis sp., Rosa multiflora, Claytonia virginica, Allium vineale, Duchesnea indica, Anemone thalictroides, Rubus phoenicolasius</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Ailanthus altissima, Berberis thunbergii, Lonicera japonica, Rubus phoenicolasius, Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	N	Y	Y	Y	80	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	
Historic Sites? No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration: 193.8 acres
Disease? No							
Insects/Infestation? No	Downed Woody Debris:						Wildlife cover/food/water? Cover, food Stand corridor/patch?
Exotic Plants? Yes	C	N	E	S	W	%	
Leaf litter? Light	N	N	N	Y	Y	40	
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site?
 Fire Management Zone (Yes/No) Yes
 Fuel load and type located in stand Yes, down woody debris, invasive species, thick understory
 Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1983
18	18	221				
18	35	418				
21	36	650				
14	20	126				
22	28	568				

Comments: Photo 178 Management Stand 1

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 5 Stand #: 1 Plot #: 18

Forest Cover Type: Oak

Date: 3/27/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 50		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																			
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total				
	Crown Position			Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other						
1	<i>Juglans nigra</i>					1						2							60	3	
2	<i>Fraxinus americana</i>					3			2										35	5	
3	<i>Robinia pseudoacacia</i>					1			1											2	
4																				0	
5																				0	
6																				0	
7																				0	
8																				0	
9																				0	
Total Number of Trees per Size Class		5			3			2			0			0							10
Number & Size of Standing Dead Trees					1			1													2
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:									
<i>Berberis thunbergii, Robinia pseudoacacia, Celtis occidentalis, Fraxinus americana, Linder benzoin</i>				C	N	E	S	W	%	15%				Mature							
Y				Y	Y	Y	N	N	60												
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):													
<i>Lamium purpureum, Stellaria media, Corydalis flavula, Vitis sp., Matteuccia struthiopteris</i>				C	N	E	S	W	%	<i>Allium vineale, Berberis thunbergii</i>											
N				N	N	N	Y	Y	40												
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?													
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species											
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:											
Disease?	No							193.8 acres													
Insects/Infestation?	No			Downed Woody Debris:				Wildlife cover/food/water?													
Exotic Plants?	Yes			C	N	E	S	W	%	All											
Leaf litter?	No			Y	N	N	N	Y	40	Stand corridor/patch?											
Downed woody debris:	Yes - Light																				
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial stream																	
Fire Management Zone (Yes/No)				No																	
Fuel load and type located in stand				Yes, down woody debris																	
Fire Break locations in stand				No																	
DBH (inches)	Length of Log (ft)	Contents in Board Feet		DBH (inches)	Length of Log (ft)	Contents in Board Feet		Total Board Feet:													
23	15	316						463													
18	12	147																			
Comments: Photo 180				Management Stand 1																	

**LETTERKENNY ARMY DEPOT
FOREST STAND DELINEATION
Field Sampling Data Sheet**

Property: Letterkenny Army Depot Prepared By: Cockerham/Harden
 Project #: 62387DA03 Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 1
 Forest Cover Type: Unknown Date: 3/28/2012
 Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
		Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
TREE SPECIES		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Prunus serotina</i>			7			8										45	15
2	<i>Acer rubrum</i>			3			1										45	4
3	<i>Ailanthus altissima</i>			1			1			1							50	3
4	<i>Carya cordiformis</i>			2														2
5	<i>Sassafras albidum</i>			3			4						1				45	8
6	<i>Prunus cerasus</i>			1														1
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		17			14			1			1			0				33
Number & Size of Standing Dead Trees		2			1													3

List of Woody Plant Species 3'-20': <i>Rosa multiflora, Berberis thunbergii, Linder benzoin, Prunus serotina, Sassafras albidum, Prunus cerasus, Acer rubrum, Ailanthus altissima</i>	Canopy Closure: C N E S W % Y Y Y Y Y 100	Percent of Invasive Cover per Plot (All Layers): 70%	Plot Successional Stage: Mid
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List of Understory Species 0'-3': <i>Smilax rotundifolia, Toxicodendron radicans, Lonicera japonica, Rosa multiflora, Rubus allegheniensis, Vitis sp.</i>	Understory Cover 3'-20': C N E S W % N Y Y N N 40	List of Major Invasive Species per Plot (All Layers): <i>Lonicera japonica, Rosa multiflora, Berberis thunbergii, Ailanthus altissima</i>
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Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':	HABITAT: What species present?
Specimen Trees? No	C N E S W %	Deer, Bird species, Pipistrellus subfavius
Historic Sites? No	Y Y Y Y Y 100	Habitat size, location, configuration:
Disease? No		127 acres
Insects/Infestation? No	Downed Woody Debris:	Wildlife cover/food/water?
Exotic Plants? Yes	C N E S W %	All
Leaf litter? Light	N N Y N Y 40	Stand corridor/patch?
Downed woody debris: Yes		

FUNCTION: Where is stand in relation to sensitive areas on site? Close to perennial channel

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, thick understory, invasive species, down woody debris, dead standing trees

Fire Break locations in stand No

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet:

Comments: Photo 186. Bat observed within spring house, close to location of plot **Management Stand 1**

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 2

Forest Cover Type: Oak

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Crown Position	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
		Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1	<i>Quercus prinus</i>							3									75	3
2	<i>Betula lenta</i>			1													75	4
3	<i>Acer rubrum</i>						2										35	2
4	<i>Liriodendron tulipifera</i>						1										65	1
5	<i>Ailanthus altissima</i>			3														3
6	<i>Prunus serotina</i>			2														2
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		6			3			6			0			0				15
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):				Plot Successional Stage:						
<i>Betula lenta, Acer rubrum, Liriodendron tulipifera, Berberis thunbergii, Ailanthus altissima, Prunus serotina</i>				C	N	E	S	W	%	25%				Mature				
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Pedophyllum peltatum, Berberis thunbergii, Rubus allegheniensis, Smilax rotundifolia, Tsuga canadensis, Rosa multiflora, Lonicera japonica</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Rosa multiflora, Lonicera japonica</i>								
				N	Y	N	N	Y	40									
Rare, etc. Species?	No	Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?												
Specimen Trees?	No	C	N	E	S	W	%	Deer, Bird species										
Historic Sites?	No	Y	Y	Y	Y	Y	100	Habitat size, location, configuration:										
Disease?	No	Downed Woody Debris:				127 acres												
Insects/Infestation?	Hemlock woolly adelgid	C	N	E	S	W	%	Wildlife cover/food/water?										
Exotic Plants?	Yes	Y	N	Y	Y	N	60	All										
Leaf litter?	Moderate	Stand corridor/patch?																
Downed woody debris:	Yes																	
FUNCTION: Where is stand in relation to sensitive areas on site?												Close to perennial stream						
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, thick understory outside of plot, invasive species																
Fire Break locations in stand		Yes - Close to pipeline right-of-way																
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet:						
21		13		217		15		25		182		1882						
18		18		221		19		22		310								
19		20		282														
22		28		568														
13		20		102														
Comments: Photo 187												Management Stand 1						

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 3

Forest Cover Type: Oak

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Quercus velutina</i>							2			1						75	3
2 <i>Quercus alba</i>	2						4									75	6
3 <i>Acer rubrum</i>						1											1
4 <i>Carya alba</i>						1											1
5 <i>Liriodendron tulipifera</i>									1							88	1
6 <i>Carya glabra</i>			1			2											3
7 <i>Nyssa sylvatica</i>			1			1											2
8 <i>Betula lenta</i>									1								1
9 <i>Quercus prinus</i>				1													1
Total Number of Trees per Size Class	4			6			8			1			0				19
Number & Size of Standing Dead Trees																	0
List of Woody Plant Species 3'-20':				Canopy Closure:						Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:					
<i>Betula lenta, Liriodendron tulipifera, Berberis thunbergii, Carya glabra, Hamamelis virginiana</i>				C	N	E	S	W	%	5%		Mature					
				Y	Y	Y	Y	Y	100								
List of Understory Species 0'-3':				Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers):							
<i>Tsuga canadensis, Pinus strobus, Lonicera japonica, moss</i>				C	N	E	S	W	%	<i>Lonicera japonica, Berberis thunbergii</i>							
				Y	Y	Y	N	N	60								
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?							
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species							
Historic Sites?	No			N	Y	Y	Y	Y	80	Habitat size, location, configuration:							
Disease?	No			Downed Woody Debris:						127 acres							
Insects/Infestation?	Hemlock woolly adelgid									Wildlife cover/food/water?							
Exotic Plants?	Yes			C	N	E	S	W	%	All							
Leaf litter?	Light			N	N	Y	N	Y	40	Stand corridor/patch?							
Downed woody debris:	Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																	
Fire Management Zone (Yes/No)				Yes													
Fuel load and type located in stand				Yes, down woody debris, invasive species, thick understory, hemlock woolly adelgid infestation													
Fire Break locations in stand				No													
DBH (inches)	Length of Log (ft)	Contents in Board Feet			DBH (inches)	Length of Log (ft)	Contents in Board Feet			Total Board Feet:							
15	27	197			15	16	121			2337							
25	28	772			12	16	64										
18	35	418															
20	35	544															
18	18	221															
Comments: Photo 188 Management Stand 1																	

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 4

Forest Cover Type: Oak

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Quercus alba</i>				1			3				2					78	6
2	<i>Carya cordiformis</i>										1						75	1
3	<i>Carya glabra</i>										2							2
4	<i>Acer saccharum</i>			3														3
5	<i>Betula lenta</i>			1														1
6	<i>Carya ovata</i>										1							1
7	<i>Prunus serotina</i>			1			1											2
8																		0
9																		0
Total Number of Trees per Size Class		5			4			5			2			0				16
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 15%		Plot Successional Stage: Mature						
<i>Lindera benzoin, Betula lenta, Liriodendron tulipifera, Acer saccharum, Prunus serotina</i>				C	N	E	S	W	%									
				Y	Y	Y	Y	Y	100									
List of Understory Species 0'-3':				Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers):								
<i>Rubus allegheniensis, Pedophyllum peltatum, Smilax rotundifolia, Rubus occidentalis, Berberis thunbergii, Lonicera japonica, Rosa multiflora</i>				C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Lonicera japonica</i>								
				Y	N	Y	N	N	40									
Rare, etc. Species? No		Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?										
Specimen Trees? No		C N E S W %						Deer, Bird species										
Historic Sites? No		Y Y Y Y Y 100						Habitat size, location, configuration:										
Disease? No								127 acres										
Insects/Infestation? No		Downed Woody Debris:						Wildlife cover/food/water?										
Exotic Plants? Yes		C N E S W %						All										
Leaf litter? Moderate		N N N N N 0						Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No) No																		
Fuel load and type located in stand Yes, few down woody debris																		
Fire Break locations in stand No																		
DBH (inches)						Length of Log (ft)						Contents in Board Feet						Total Board Feet: 2151
20						19						288						
16						15						126						
26						22						666						
17						20						212						
17						12						127						
Comments: Photo 189 Management Stand 1																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 5

Forest Cover Type: Tulip Poplar

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Liriodendron tulipifera</i>			5			7									85, 100	12	
2	<i>Prunus serotina</i>																5	
3	<i>Cercis canadensis</i>			2												25	2	
4	<i>Quercus velutina</i>			1													1	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		8			5			7			0			0				20
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):			Plot Successional Stage:							
<i>Lindera benzoin, Prunus serotina, Cercis canadensis, Quercus velutina, Carya cordiformis</i>				C	N	E	S	W	%	40%			Mature					
				N	Y	Y	Y	Y	80									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Stellaria media, Smilax rotundifolia, Lonicera japonica, Allium vineale, Rubus allegheniensis, Rubus occidentalis, Impatiens capensis, Rosa multiflora, Asplenium platyneuron, Rubus phoenicolasius, Berberis thunbergii</i>				C	N	E	S	W	%	<i>Allium vineale, Lonicera japonica, Berberis thunbergii, Rubus phoenicolasius, Rosa multiflora</i>								
				Y	Y	Y	Y	Y	100									
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No		Downed Woody Debris:				127 acres										
Insects/Infestation?		No		C	N	E	S	W	%	Wildlife cover/food/water?								
Exotic Plants?		Yes		N	Y	Y	Y	Y	80	All								
Leaf litter?		Very Light		Stand corridor/patch?														
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, thick understory, invasive species																
Fire Break locations in stand		No																
DBH (inches)			Length of Log (ft)			Contents in Board Feet			DBH (inches)			Length of Log (ft)			Contents in Board Feet			Total Board Feet: 3028
18			25			294			10			15			32			
19			26			366			14			20			126			
16			20			180			24			35			850			
12			15			56			17			22			233			
21			45			891												
Comments: Photo 190 Management Stand 1																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 6

Forest Cover Type: Tulip Poplar

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Liriodendron tulipifera</i>			1	3			1						3				85	8
2 <i>Juglans nigra</i>									1						1		75	2
3 <i>Fraxinus americana</i>			1			2											55	3
4																		0
5																		0
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		2			5			2			4			0				13
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Lindera benzoin, Liriodendron tulipifera, Fraxinus americana</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 15%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Pedophyllum peltatum, Allium vineale, Rosa multiflora, Stellaria media, Corydalis flavula, Rubus phoenicolasius</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Rosa multiflora, Rubus phoenicolasius</i>						
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
Rare, etc. Species?		No					Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?						
Specimen Trees?		No					C	N	E	S	W	%	Deer, Bird species					
Historic Sites?		No					Y	Y	Y	Y	Y	100	Habitat size, location, configuration:					
Disease?		No					Downed Woody Debris:					127 acres						
Insects/Infestation?		No					C	N	E	S	W	%	Wildlife cover/food/water?					
Exotic Plants?		Yes					Y	Y	Y	Y	Y	100	All					
Leaf litter?		Light										Stand corridor/patch?						
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes,, down woody debris, thick understory																
Fire Break locations in stand		No - close to pipeline right-of-way (vegetated)																
DBH (inches)			Length of Log (ft)			Contents in Board Feet			DBH (inches)			Length of Log (ft)			Contents in Board Feet			Total Board Feet: 2552
20			18			288			21			32			579			
16			16			144			11			25			74			
25			38			1048												
14			15			88												
25			12			331												
Comments: Photo 191 Management Stand 1																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 7

Forest Cover Type: Tulip Poplar

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 70		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																	
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total		
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other				
1 <i>Liriodendron tulipifera</i>							2			1						78	3		
2 <i>Carya glabra</i>									1							75	1		
3 <i>Carya cordiformis</i>									1							81	1		
4 <i>Cercis canadensis</i>			2														2		
5 <i>Fraxinus americana</i>						1			1								2		
6 <i>Acer rubrum</i>						1											1		
7 <i>Prunus serotina</i>			1														1		
8																	0		
9																	0		
Total Number of Trees per Size Class	3			2			5			1			0				11		
Number & Size of Standing Dead Trees	2			3													5		
List of Woody Plant Species 3'-20':							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:					
<i>Lindera benzoin, Berberis thunbergii, Cercis canadensis, Prunus serotina</i>							C	N	E	S	W	%	70%		Mature				
							Y	Y	Y	Y	Y	100							
List of Understory Species 0'-3':							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):							
<i>Rosa multiflora, Lonicera japonica, Smilax rotundifolia, Rubus phoenicolasius, Allium vineale, Impatiens capensis, Stellaria media, Viola sp.</i>							C	N	E	S	W	%	<i>Berberis thunbergii, Lonicera japonica, Rosa multiflora, Rubus phoenicolasius, Allium vineale</i>						
							N	Y	Y	Y	Y	80							
Rare, etc. Species?	No						Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?							
Specimen Trees?	No						C	N	E	S	W	%	Deer, Bird species (woodcock, northern flicker)						
Historic Sites?	No						Y	Y	Y	Y	Y	100	Habitat size, location, configuration:						
Disease?	No						Downed Woody Debris:					127 acres							
Insects/Infestation?	No						C	N	E	S	W	%	Wildlife cover/food/water?						
Exotic Plants?	Yes						Y	Y	Y	N	N	60	All						
Leaf litter?	Light											Stand corridor/patch?							
Downed woody debris:	Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site?																			
Fire Management Zone (Yes/No) Yes																			
Fuel load and type located in stand Yes, down woody debris, invasive species,, thick understory, dead standing trees																			
Fire Break locations in stand No																			
												Total Board Feet:							
DBH (inches)			Length of Log (ft)			Contents in Board Feet			DBH (inches)			Length of Log (ft)			Contents in Board Feet			421	
14			15			88													
21			15			253													
12			20			80													
Comments: Photo 192 Management Stand 1																			

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 8

Forest Cover Type: Tulip Poplar

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 80		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1	<i>Liriodendron tulipifera</i>						4									89	4	
2	<i>Fraxinus americana</i>					1			2							78	5	
3	<i>Robinia pseudoacacia</i>						1		1							84	2	
4																	0	
5																	0	
6																	0	
7																	0	
8																	0	
9																	0	
Total Number of Trees per Size Class		1			3			7			0			0				11
Number & Size of Standing Dead Trees					1			1										2
List of Woody Plant Species 3'-20':				Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 45%		Plot Successional Stage: Mature						
<i>Berberis thunbergii, Sindera benzoin, Fraxinus americana, Liriodendron tulipifera</i>				C	N	E	S	W	%									
				Y	N	N	Y	Y	60									
List of Understory Species 0'-3':				Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers):								
<i>Lonicera japonica, Rosa multiflora, Allium vineale, Duchesnea indica, Stellaria media, Toxicodendron radicans, Rubus phoenicolasius, Smilax rotundifolia, Pedophyllum peltatum, Corydalis flavula</i>				C	N	E	S	W	%	<i>Rosa multiflora, Berberis thunbergii, Rubus phoenicolasius, Lonicera japonica</i>								
				Y	Y	Y	Y	N	80									
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':						HABITAT: What species present?								
Specimen Trees?		No		C	N	E	S	W	%	Deer, Bird species								
Historic Sites?		No		Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?		No		Downed Woody Debris:						127 acres								
Insects/Infestation?		No		C	N	E	S	W	%	Wildlife cover/food/water?								
Exotic Plants?		Yes		N	Y	N	N	Y	40	All								
Leaf litter?		Light								Stand corridor/patch?								
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site?																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, invasive species, thick understory, dead standing trees																
Fire Break locations in stand		Yes, access road																
DBH (inches)			Length of Log (ft)			Contents in Board Feet			DBH (inches)			Length of Log (ft)			Contents in Board Feet			Total Board Feet: 1200
14			18			113												
22			25			486												
20			22			352												
16			23			198												
13			10			51												
Comments: Photo 193 Management Stand 1																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 9

Forest Cover Type: Oak

Date: 3/28/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 90		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total																	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other																			
1 <i>Quercus velutina</i>										2						84	2																	
2 <i>Fraxinus americana</i>									1							82	1																	
3 <i>Carya glabra</i>						2			1							75	3																	
4 <i>Robinia pseudoacacia</i>									1							85	1																	
5 <i>Prunus serotina</i>			7			2										65	9																	
6 <i>Carya cordiformis</i>			2														2																	
7 <i>Cercis canadensis</i>			1														1																	
8 <i>Acer rubrum</i>			1						1								2																	
9 <i>Carya ovata</i>						1			1								2																	
Total Number of Trees per Size Class	11			5			5			2			0				23																	
Number & Size of Standing Dead Trees				1			1										2																	
List of Woody Plant Species 3'-20':				Canopy Closure:					Percent of Invasive Cover per Plot (All Layers):		Plot Successional Stage:																							
<i>Liriodendron tulipifera, Lindera benzoin, Prunus serotina, Cercis canadensis, Carya cordiformis, Berberis thunbergii</i>				C	N	E	S	W	%	45%		Mature																						
List of Understory Species 0'-3':				Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers):																									
<i>Stellaria media, Lonicera japonica, Rubus phoenicolasius, Smilax rotundifolia, Rosa multiflora, Rubus allegheniensis, Toxicodendron radicans</i>				C	N	E	S	W	%	<i>Berberis thunbergii, Lonicera japonica, Rubus phoenicolasius, Rosa multiflora</i>																								
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':					HABITAT: What species present?																									
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species																								
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:																								
Disease?	No			Downed Woody Debris:					127 acres																									
Insects/Infestation?	No			C	N	E	S	W	%	Wildlife cover/food/water?																								
Exotic Plants?	Yes			N	N	Y	Y	N	40	All																								
Leaf litter?	Light								Stand corridor/patch?																									
Downed woody debris:	Yes																																	
FUNCTION: Where is stand in relation to sensitive areas on site? Close to vernal pool																																		
Fire Management Zone (Yes/No) Yes																																		
Fuel load and type located in stand Yes, down woody debris, invasive species, thick understory																																		
Fire Break locations in stand No																																		
												Total Board Feet:		1365																				
<table border="1"> <thead> <tr> <th>DBH (inches)</th> <th>Length of Log (ft)</th> <th>Contents in Board Feet</th> </tr> </thead> <tbody> <tr> <td>21</td> <td>20</td> <td>362</td> </tr> <tr> <td>14</td> <td>12</td> <td>75</td> </tr> <tr> <td>16</td> <td>15</td> <td>126</td> </tr> <tr> <td>24</td> <td>15</td> <td>350</td> </tr> <tr> <td>23</td> <td>20</td> <td>452</td> </tr> </tbody> </table>												DBH (inches)	Length of Log (ft)	Contents in Board Feet	21	20	362	14	12	75	16	15	126	24	15	350	23	20	452					
DBH (inches)	Length of Log (ft)	Contents in Board Feet																																
21	20	362																																
14	12	75																																
16	15	126																																
24	15	350																																
23	20	452																																
Comments: Photo 194 Management Stand 1																																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 6

Stand #: 1

Plot #: 10

Forest Cover Type: Tulip Poplar

Date: 3/29/2012

Plot Size: 1/10 Acre (37.5' radius)

TREE SPECIES	SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT															Average Tree Height (ft)	Total
	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh				
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other		
1 <i>Liriodendron tulipifera</i>	1			3			7									75	11
2 <i>Ailanthus altissima</i>			1			1										70	2
3 <i>Carpinus caroliniana</i>			3			1											4
4																	0
5																	0
6																	0
7																	0
8																	0
9																	0
Total Number of Trees per Size Class	5			5			7			0			0				17
Number & Size of Standing Dead Trees																	0

List of Woody Plant Species 3'-20': <i>Lindera benzoin, Berberis thunbergii, Liriodendron tulipifera, Carpinus caroliniana, Ailanthus altissima, Carya cordiformis</i>	Canopy Closure:						Percent of Invasive Cover per Plot (All Layers): 30%	Plot Successional Stage: Mature
	C	N	E	S	W	%		
	Y	Y	Y	N	Y	80		

List of Understory Species 0'-3': <i>Pedophyllum peltatum, Allium vineale, Lonicera japonica, Viola sp., Smilax rotundifolia, Rosa multiflora, Corydalis flavula, Rubus phoenicolasius</i>	Understory Cover 3'-20':						List of Major Invasive Species per Plot (All Layers): <i>Berberis thunbergii, Lonicera japonica, Ailanthus altissima, Rubus phoenicolasius, Rosa multiflora</i>
	C	N	E	S	W	%	
	Y	Y	Y	Y	Y	100	

Rare, etc. Species? No	Herbaceous & Woody Cover 0'-3':						HABITAT: What species present? Deer, Bird species
Specimen Trees? No	C	N	E	S	W	%	Habitat size, location, configuration: 127 acres
Historic Sites? No	Y	Y	Y	Y	Y	100	
Disease? No	Downed Woody Debris:						Wildlife cover/food/water? All
Insects/Infestation? o	C	N	E	S	W	%	Stand corridor/patch?
Exotic Plants? Yes	Y	N	Y	N	N	40	
Leaf litter? Light							
Downed woody debris: Yes							

FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream

Fire Management Zone (Yes/No) Yes

Fuel load and type located in stand Yes, Down woody debris, invasive species, thick understory

Fire Break locations in stand No - close to access road

DBH (inches)	Length of Log (ft)	Contents in Board Feet	DBH (inches)	Length of Log (ft)	Contents in Board Feet	Total Board Feet: 1792
19	8	113	17	25	254	
12	10	40	16	28	252	
16	18	162	17	26	275	
20	30	480				
16	25	216				

Comments: Photo 195 Management Stand 1

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 11

Forest Cover Type: Ash

Date: 3/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 110		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus americana</i>				2						3						88	5	
2 <i>Prunus serotina</i>						5			3							83	8	
3 <i>Acer rubrum</i>						3											3	
4 <i>Carya alba</i>			1														1	
5 <i>Ailanthus altissima</i>						1											1	
6 <i>Betula lenta</i>						2										42	2	
7 <i>Carya ovata</i>			1														1	
8 <i>Prunus cerasus</i>						1											1	
9																	0	
Total Number of Trees per Size Class		2			14			3			3			0				22
Number & Size of Standing Dead Trees		1			1													2
List of Woody Plant Species 3'-20': <i>Lindera benzoin, Berberis thunbergii, Ailanthus altissima, Carya alba, Carya ovata</i>				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers): 30%				Plot Successional Stage: Mature						
				C	N	E	S	W	%									
				Y	Y	N	N	Y	60									
List of Understory Species 0'-3': <i>Rubus allegheniensis, Lonicera japonica, Rosa multiflora, Pedophyllum peltatum, Allium vineale, Rubus phoenicolasius, Smilax rotundifolia, Vitis sp.</i>				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Rubus phoenicolasius, Lonicera japonica, Berberis thunbergii, Ailanthus altissima, Rosa multiflora</i>										
				C	N	E	S	W	%									
				N	Y	Y	Y	N	60									
Rare, etc. Species? No				Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees? No				C	N	E	S	W	%	Deer, Bird species								
Historic Sites? No				Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease? No				Downed Woody Debris:				127 acres										
Insects/Infestation? No				C	N	E	S	W	%	Wildlife cover/food/water?								
Exotic Plants? Yes				Y	Y	N	Y	Y	80	All								
Leaf litter? Light								Stand corridor/patch?										
Downed woody debris: Yes																		
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No) Yes																		
Fuel load and type located in stand Yes, down woody debris, thick understory, invasive species																		
Fire Break locations in stand No																		
DBH (inches)		Length of Log (ft)		Contents in Board Feet		DBH (inches)		Length of Log (ft)		Contents in Board Feet		Total Board Feet: 1923						
24		30		750														
24		18		450														
12		14		56														
18		18		221														
22		22		446														
Comments: Photo 196 Management Stand 1																		

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2 Compartment #: 6 Stand #: 1 Plot #: 12

Forest Cover Type: Ash/Walnut

Date: 3/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 100		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Fraxinus americana</i>	3			6													9	
2 <i>Juglans nigra</i>				2			3			1							70	6
3 <i>Prunus serotina</i>						1			1									2
4 <i>Carya cordiformis</i>			1						1								74	2
5 <i>Cercis canadensis</i>			1															1
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		5			9			5			1			0				20
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20':				Canopy Closure:				Percent of Invasive Cover per Plot (All Layers):			Plot Successional Stage:							
<i>Lindera benzoin, Cercis canadensis, Prunus serotina, Fraxinus americana, Liriodendron tulipifera</i>				C	N	E	S	W	%	20%			Mature					
Y				Y	Y	Y	N	Y	80									
List of Understory Species 0'-3':				Understory Cover 3'-20':				List of Major Invasive Species per Plot (All Layers):										
<i>Corydalis flavula, Stellaria media, Allium vineale, Rosa multiflora, Festuca sp., Lamium purpureum, Lamium amplexicaule, Rubus allegheniensis, Vitis sp</i>				C	N	E	S	W	%	<i>Lonicera japonica, Allium vineale, Rosa multiflora</i>								
N				N	N	Y	N	Y	40									
Rare, etc. Species?	No			Herbaceous & Woody Cover 0'-3':				HABITAT: What species present?										
Specimen Trees?	No			C	N	E	S	W	%	Deer, Bird species (brown-headed cow bird, goldfinch)								
Historic Sites?	No			Y	Y	Y	Y	Y	100	Habitat size, location, configuration:								
Disease?	No			127 acres														
Insects/Infestation?	No			Downed Woody Debris:														
Exotic Plants?	Yes			C	N	E	S	W	%	Wildlife cover/food/water?								
Leaf litter?	Very Light			N	N	N	N	Y	20	All								
Downed woody debris:	Yes			Stand corridor/patch?														
FUNCTION: Where is stand in relation to sensitive areas on site?				Adjacent to perennial channel														
Fire Management Zone (Yes/No)				Yes														
Fuel load and type located in stand				Yes, down woody debris, thick understory, invasive species														
Fire Break locations in stand				No														
DBH (inches)	Length of Log (ft)	Contents in Board Feet		DBH (inches)	Length of Log (ft)	Contents in Board Feet				Total Board Feet:								
20	12	192								456								
12	12	48																
13	15	71																
11	12	37																
16	12	108																
Comments: Photo 197				Management Stand 1														

Property: Letterkenny Army Depot

Prepared By: Cockerham/Harden

Project #: 62387DA03

Zone #: 2

Compartment #: 6

Stand #: 1

Plot #: 13

Forest Cover Type: Ash/Walnut/Poplar

Date: 3/29/2012

Plot Size: 1/10 Acre (37.5' radius)

Basal Area in Square Feet per Acre: 60		SIZE CLASS OF TREES >20' HEIGHT WITHIN SAMPLE PLOT																
TREE SPECIES	Number of Trees 2-5.9" dbh			Number of Trees 6-11.9" dbh			Number of Trees 12-19.9" dbh			Number of Trees 20-29.9" dbh			Number of Trees >30" dbh			Average Tree Height (ft)	Total	
	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other			
1 <i>Juglans nigra</i>							1						2				84	3
2 <i>Liriodendron tulipifera</i>				1												1	98	2
3 <i>Fraxinus americana</i>	6																30	6
4 <i>Ailanthus altissima</i>			2			1												3
5 <i>Celtis occidentalis</i>			4															4
6																		0
7																		0
8																		0
9																		0
Total Number of Trees per Size Class		12			2			1			2			1				18
Number & Size of Standing Dead Trees																		0
List of Woody Plant Species 3'-20': <i>Lindera benzoin, Berberis thunbergii, Ailanthus altissima, Celtis occidentalis, Fraxinus americana</i>							Canopy Closure:					Percent of Invasive Cover per Plot (All Layers): 25%		Plot Successional Stage: Mature				
							C	N	E	S	W	%						
							Y	Y	Y	Y	Y	100						
List of Understory Species 0'-3': <i>Lonicera japonica, Rosa multiflora, Stellaria media, Allium vineale, Rubus phoenicolasius, Pedophyllum peltatum, Vitis sp., Viola sp.</i>							Understory Cover 3'-20':					List of Major Invasive Species per Plot (All Layers): <i>Allium vineale, Berberis thunbergii, Ailanthus altissima, Lonicera japonica, Rosa multiflora, Rubus phoenicolasius</i>						
							C	N	E	S	W	%						
							N	Y	Y	Y	Y	80						
Rare, etc. Species?		No		Herbaceous & Woody Cover 0'-3':							HABITAT: What species present?							
Specimen Trees?		No									Deer, Bird species							
Historic Sites?		No									Habitat size, location, configuration:							
Disease?		No									127 acres							
Insects/Infestation?		No		Downed Woody Debris:							Wildlife cover/food/water?							
Exotic Plants?		Yes									All							
Leaf litter?		Very Light									Stand corridor/patch?							
Downed woody debris:		Yes																
FUNCTION: Where is stand in relation to sensitive areas on site? Adjacent to perennial stream																		
Fire Management Zone (Yes/No)		Yes																
Fuel load and type located in stand		Yes, down woody debris, thick understory, invasive species																
Fire Break locations in stand		No																
DBH (inches)			Length of Log (ft)			Contents in Board Feet			DBH (inches)			Length of Log (ft)			Contents in Board Feet			Total Board Feet: 2773
21			35			615												
22			18			365												
29			43			1641												
15			20			152												
Comments: Photo 198 Management Stand 1																		

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APPENDIX F
INTEGRATED WILDLAND FIRE MANAGEMENT PLAN

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Integrated Wildland Fire Management Plan Letterkenny Army Depot Chambersburg, Pennsylvania

Prepared for:

Letterkenny Army Depot,
Pennsylvania

Prepared by:

U.S. Army Corps of Engineers
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November 2012

DRAFT

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CHAPTER 1 - INTRODUCTION

1.1 BACKGROUND AND EXISTING CONDITIONS

Letterkenny Army Depot (LEAD) is a ~~17,793~~18,200-acre Army ammunition depot, located approximately 5 miles north of Chambersburg, in Franklin County, Pennsylvania. The area around LEAD is served by Interstate 81 (I-81), U.S. Highway No. 11 (US 11), and U.S. Highway No. 30 (US 30). Direct access to LEAD is provided by State Route (SR) 997 and SR 433. The intersection of these two routes occurs at the primary entrance to LEAD.

The Depot boundaries are marked by a non-deer proof chain-link and wire fence. It is surrounded by agricultural lands, with the exception of the state forest and state game management land to the west. There are several scattered unincorporated residential and commercial developments contiguous to LEAD. A commercial strip along US 11 services the residential areas near LEAD and Chambersburg.

The majority of the Depot is characterized by gently rolling hills; however, the western portions, which include the eastern slopes of Broad Mountain, are relatively steep. The site ranges in elevation from 680 to 2,280 feet. The majority of the site lies within the Cumberland Valley Sequence and is underlain by the Ordovician Martinsburg Formation, Chambersburg Formation, and the St. Paul Group, which are characterized by gray to dark gray shale and cobbly limestone with impure sandstone interbeds. The upper slopes of Broad Mountain are underlain by the Silurian Tuscarora Formation and Clinton Group. These are characterized by light olive gray to medium gray sandstone and fossiliferous shale.

The Local Reuse Authority is continuing to develop the 1,450 acres of property in the cantonment area that was excessed following the 1995 BRAC Commission recommendations. The community's reuse plan consists of a mixture of land use activities similar to the activities performed by the Army to include: industrial, office, administrative, community/open space; warehouse/distribution; light industrial; and highway-oriented industrial distribution. The plan has been developed to ensure that future uses of the excess property will be compatible with LEAD's remaining mission.

Letterkenny Army Depot employs ~~nearly 2,000~~over 3,600 employees including civilian personnel, ~~three~~ military personnel, and ~~497~~ contractor personnel. The depot includes ~~19,243~~18,200 acres and 1,780 buildings with 8.4 million square feet of floor space. Letterkenny Army Depot's annual operating budget is \$220 million, with an annual payroll of \$66 million and local procurement totaling \$9.6 million.

The installation is generally divided into three areas—ammunition storage (Zone I), buffer zones (Zone II), and cantonment. Other land use activities occurring at LEAD include some administrative and maintenance functions, outdoor recreation, and agricultural outleasing. Land cover types for LEAD and the surrounding area are presented in Figure 1-1.

Ammunition Storage Area: This area is under the control of the Letterkenny Munitions Center (LEMC), part of Crane Army Ammunition Activity (CAAA). LEMC's ammunition mission

occupies 12,000 acres, with more than 2.2 million square feet of floor space, as well as 902 earth-covered igloos, 10 above-ground igloos, and 100 inert storage locations. In addition to the receipt, storage, and issue of ammunition, LEAD has the capability to perform maintenance on munitions components, surveillance on ammunition and guided missiles, and disposal of up to 10,000 lbs. of ammunition per day through demilitarization, burning, or processing through a deactivation furnace.

Buffer Area: About 4,792 acres of open space makes up the buffer zone between the ammunition activities and the off-post adjacent land uses. This safety zone between the Ammunition Storage Area and the neighboring landowners is a mix of open fields and woodlands. Activities occurring in the safety zone include controlled hunting and fishing and agricultural outleases.

Cantonment Area: The cantonment area consists of 1,179 acres in the southeastern portion of LEAD used for administrative and maintenance activities.

Agricultural Outleases: LEAD has approximately 9,600 acres of land in the Ammunition Storage Area and Buffer Area that are leased to area farmers for crop production.

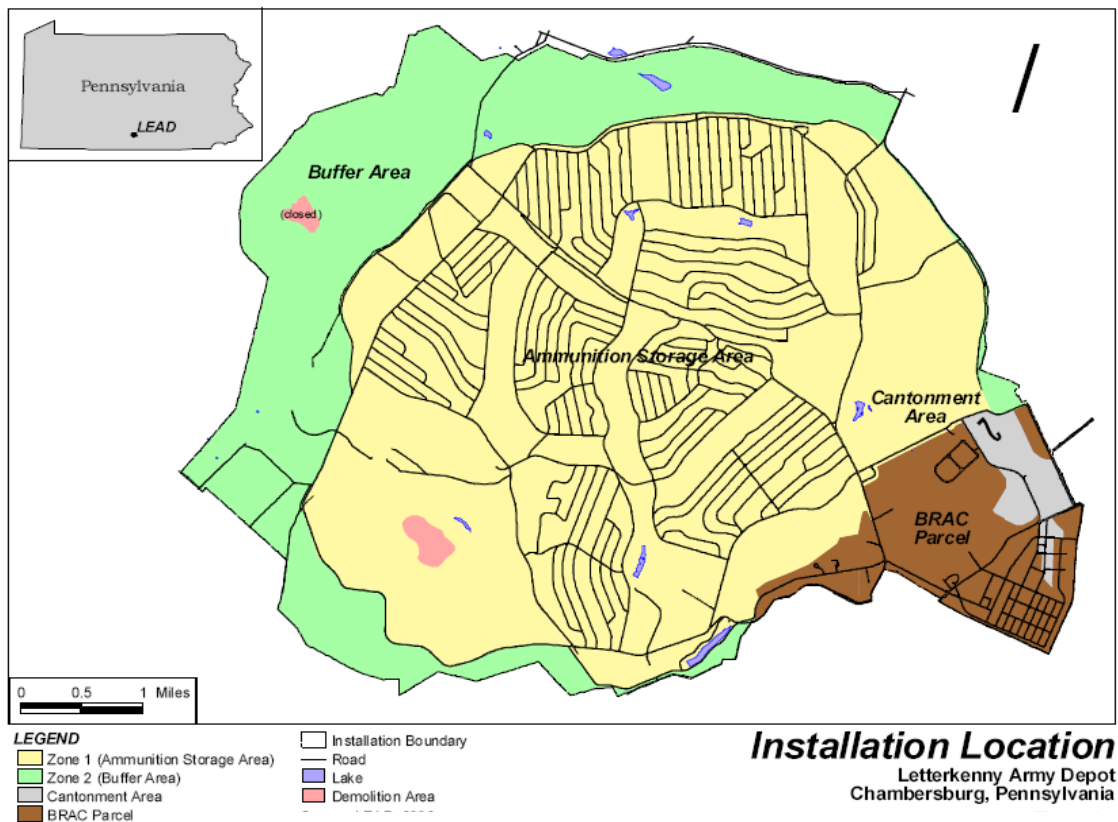


Figure 1-1: Installation Land Use Zones of LEAD

1.2 PURPOSE AND SCOPE

The Integrated Wildland Fire Management Plan provides the planning framework for all fire management decision-making, and specifies the uses of fire, which are consistent with and can enhance land management objectives. This document provides guidance and direction to establish an effective wildland fire management program that fulfills interagency guidelines. This document identifies responsibilities and standard practices for fuels management, preparedness, prevention, and suppression while supporting military preparedness.

The IWFMP covers all lands administered by LEAD. Army Wildland Fire Management Policy directs that the Integrated Wildland Fire Management Plan must include goals and objectives, organizational structure and responsibilities, interagency cooperation and mutual aid agreements, smoke management and air quality, safety and emergency operations, risk assessment/decision analysis processes, wildland fire history, natural and cultural resource considerations, mission considerations, wildland fuel factors, monitoring requirements, public relations, funding requirements, personnel training and certification standards, opportunities for maintenance of current knowledge on the science of fire and fire management and to take advantage of new technology, and programmatic environmental assessment.

1.3 APPLICABLE REGULATIONS AND GUIDANCE

This Integrated Wildland Fire Management Plan (IWFMP) has been developed in accordance with the 2002 Department of Army (DA) Wildland Fire Policy Guidance. It presents the standards by which the Letterkenny wildland fire control and prescribed burning programs will be conducted. This plan is intended to be an integral component of the Integrated Natural Resources Management Plan (INRMP) for the installation and would be linked to the Forest Management Plan annex to the INRMP. The plan would also be integrated with other plans at LEAD, including, but not limited to the Integrated Cultural Resources Management Plan.

This plan shall be in compliance with:

- Army Regulation (AR) 420-90, 4 October 2006, Fire and Emergency Services
- AR 200-1, 28 Sep 2007, Environmental Protection and Enhancement
- Code of Federal Regulations (CFR) 32 Part 651
- DOD Instruction 6055.6, 10 Oct 00, DoD Fire and Emergency Services Program
- Army Memorandum, 04 Sep 2002, Army Wildland Fire Policy Guidance
- Federal Wildland Fire Management Policy (Federal Fire Policy) 2001
- National Wildfire Coordination Group (NWCG) Wildland Fire Qualifications Subsystem Guide, PM 310-1, November 2011
- NFPA Standard 295 – Standard for Wildfire Control
- NFPA Standard 299 – Standard for Protection of Life and Property from Wildfire
- NFPA Standard 1051 - Standard for Wildland Fire Fighter Professional Qualifications

The forest management program at LEAD also must fully comply with all applicable federal laws, policies, and regulations pertaining to forest management. Federal laws, policies, and regulations that have the potential to affect forest management at LEAD include AR 200-1; Public Law 86-797, the Sikes Act, as amended (16 U.S.C. § 670); 10 U.S.C. § 2665 (Sale of

certain interest in land: logs); DoD Inst 7310.5 (Accounting for production and sale of lumber and timber products); Executive Order 11990 (Protection of Wetlands), ESA of 1973, as amended (16 U.S.C. §§ 1531 et seq.); and the National Forest Management Act of 1976 (16 U.S.C. §§ 1601 et seq.). In additions, this plan shall be in compliance with the installation plans included, but not limited to: Integrated Natural Resource Management Plan (INRMP), Integrated Cultural Resource Management Plan, Fire and Emergency Services Plan.

LEAD has a current Forest Management Plan, the *Report on Forestlands of Letterkenny Army Depot*, created in 1995 (Appendix E). This plan covers the examination of approximately 2,500 acres of forestland on LEAD, divided into two Zones. Zone 1 was subdivided into four stands. Zone 2 was divided into seven compartments, which were further divided into individual stands, according to timber type. Stands are designed to be tracked and operated individually for timber production, but no timbering has occurred in any stand since the creation of the 1995 plan. This plan is currently being updated by LEAD.

1.4 GOALS AND OBJECTIVES

This IWFMP reduces wildland fire potential, effectively protects and enhances valuable natural and cultural resources, integrates applicable state and local permit and reporting requirements and implements ecosystem management goals and objectives on LEAD lands. As a component of the INRMP, it will be reviewed and updated annually and revised at a minimum once every five years. The IWFMP directly supports U.S. Army missions and is consistent with LEAD emergency operations plans, while being integrated into the INRMP, the LEAD's fire and emergency services plan, and the Integrated Cultural Resources Management Plan.

The goal of the LEAD IWFMP is to establish fire management procedures and protocols to provide LEAD the capability to complete its mission to maintain combat readiness and fulfill resource management intent. Implementation of this IWFMP maintains and enhances the health, productivity, and biological diversity of LEAD lands. Fire management policy for Letterkenny was developed to support the following goals:

- Provide for the safety of fire crews on every wildland fire management activity.
- Reduce wildfire potential on the installation and suppress undesired wildfires to protect lives, property, and natural and cultural resources in a cost-effective manner.
- Establish fire management qualifications for all firefighters and fire managers and insure all personnel assigned to those positions are trained to a level appropriate for their expected duties.
- Complete, update, and maintain this Integrated Wildland Fire Management Plan.
- Ensure economically viable fire management programs and activities are based on values to be protected, costs, and risk management.
- Incorporate public health and environmental quality considerations into fire management planning and execution.
- Examine and identify resource requirement and availability at each organizational level, to provide needed suppression and support. Establish suppression measures and determine the appropriate management response.

- Continually evaluate and improve upon fire management policies and procedures with the goal of constantly improving the level of fire protection.

Objectives of the IWFMP include:

1. Provide a system that ensures timely notification of wildfire
2. Use fire regulation guidance (AR 490-90) to prevent wildfires from occurring.
3. Maintain fuel loads at levels appropriate for the prevention of major wildfires from occurring at LEAD.
4. Comply with smoke management and air quality requirements regarding wildland fires.
5. Communicate within the fire management hierarchy to improve practices and policies.
6. Communicate and educate other departments to facilitate a reduction in fire starts.
7. Update interagency agreements as necessary to ensure prompt and complete cooperation during wildland fire incidents.
- 7.8. [Begin the process to develop a prescribed burning operation at LEAD...](#)

1.5 WILDLAND FIRE HISTORY

Prior to 2012, several small brush fires had been handled at LEAD. No major wildfires have been reported over the past several years on the installation.

1.6 THE THREAT OF WILDFIRE TO THE MISSION AND NATURAL RESOURCES

Because of the material storage mission of LEAD, fire management consists of preventing fires. Regular mowing, some of which is conducted by lessees in the agricultural lease program, is conducted around igloos and along roads. Any fire at the installation could pose a serious risk to both installation personnel and the public in the surrounding area.

1.7 KEY DEFINITIONS

Wildland: An area in which development is essentially nonexistent, except for roads, railroads, power lines and similar transportation facilities. Structures, if any, are widely scattered.

Wildland Fire: Any non-structure fire occurring in the wildland that is not meeting management objectives and thus requires a suppression response.

Wildland Fire Use: The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives in pre-defined designated areas outlined in Fire Management Plans.

Wildfire: An unplanned, unwanted wildland fire, including unauthorized human caused fires, naturally occurring wildland fires, and escaped prescribed fires, where the objective is to put out the fire.

Prescribed Fire: Controlled, purposeful application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be

confined to a predetermined area and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.

CHAPTER 2 - PROGRAM OVERVIEW

The primary goal of the fire management program at LEAD is to prevent fire to the extent possible and, in the event of a fire, to protect human health and safety and to prevent unacceptable damage to natural resources. Because of the materiel storage mission of LEAD, fire management consists of preventing [uncontrolled wild](#) fires. Regular mowing, some of which is conducted by lessees in the agricultural lease program, is conducted around igloos and along roads. Any fire at the installation could pose a serious risk to both installation personnel and the public in the surrounding area. ~~Also, because of the materiel storage mission, P~~prescribed fire is [cuurently](#) not a management measure for the forest management program.

2.1 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

Controlling wildfires will be in an aggressive manner utilizing all the man power that can be summoned. Slow moving ground fires can be easily contained through the use of backpack water tanks carried on a person's back. High intensity fires will best be controlled using a dozer equipped with fireplow usually located at the nearest Bureau of Forestry office. Helicopters supplied with drop buckets may be necessary on larger wildfires. Also, campfires will not be permitted within Zone 2 during periods when the fire danger rating as indicated on the sign within Zone 1 near Gate 1 moderate to high.

Wildland fire management at LEAD falls under the responsibility of the following:

Safety Office

Directorate of Risk Management - Fire Department

[Natural Resources Management personnel](#)

2.2 PERSONNEL

Personnel in fire management activities include members of the LEAD Fire Department.

The Incident Commander is-(who???)

2.3 THE USE OF PRESCRIBED FIRE ON THE INSTALLATION

Because of the materiel storage mission, prescribed fire has not been used as a management measure at LEAD. It is possible that prescribed fires may be used in the future at LEAD. Should prescribed fires be utilized they be in accordance with the Pennsylvania Prescribed Burning Practices Act (2009) will follow the guidance provided by the Pennsylvania DCNR. As part of this a burn plan would be prepared by LEAD. A template for the plan is located in Appendix A. Written notification of the intent to conduct a prescribed fire, including *three copies* of the burn plan must be sent or the Pennsylvania Department of Conservation and Natural Resources, Division of Forest Fire Protection, Attn: Chief Forest Fire Warden, P.O. Box 8552, Harrisburg, PA 17105-8552 at least 25 working days prior to the earliest possible date that a burn could occur. Written notification must again be made to the Chief Forest Fire Warden no more than 5 working days after the prescribed fire has been completed. This notification must

include the date(s) that the fire occurred, ownership of the land burned, county, township and final acreage. Full guidance from the DCNR can be found at:

http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/dcnr_003984.pdf

2.4 INTERAGENCY COOPERATION AND MUTUAL AID AGREEMENTS

Several outside agencies are available to assist LEAD in the case of wildland fire at the installation. **These include:**

- US Forest Service Northeastern Area State and Private Forestry Headquarters Northeastern Area Office, Office of the Director, 11 Campus Boulevard, Suite 200, Newtown Square, PA 19073. Phone: 610-557-4103.
- US Forest Service Mid-Atlantic States, Morgantown Field Office, 180 Canfield Street, Morgantown, WV 26505. Phone: 304-285-1542
- Pennsylvania Forest Service District 2 (Buchanan). 440 Buchanan Trail, McConellsburg, PA 17232-8204. Phone – (717) 485-3148.
- Franklin County Franklin County Department of Emergency Services, 390 New York Ave, Chambersburg PA 17201, Phone: 717-264-2813. Emergency Management Coordinator: David Donohue, dkdonohue@co.franklin.pa.us
- Chambersburg Fire Department- Headquarters Fire Station, 130 North Second Street Chambersburg, PA 17201-1640, 717-263-5872. Emergency Services Chief: William M. FitzGerald, wfitzgerald@chambersburgfire.com, Phone: 717-261-3230

Mutual Aid Agreements (MAA) with these entities have not been entered into. Need info on this—if there are agreements of any kind—need to reference them here and may want to include as an appendix.

2.5 RESPONSIBILITIES

Protection of natural resources on LEAD lands, to include forests, is the task of the garrison commander using appropriated funds. Protection of Army's forests from fires will be done by assigned personnel trained and equipped to control forest fires.

The Installation Wildland Fire Program Manager is responsible for development of the Integrated Wildland Fire Management Plan. Additionally, the Wildland Fire Program Manager reviews and approves burn plans for prescribed fires to insure consistency with the Integrated Wildland Fire Management Plan, the Integrated Natural Resource Management Plan, and the [Alaska Interagency Wildland Fire Management Plan](#). The Joint Director of Military Support is responsible for deployment of military firefighters and equipment. In the implementation of this

policy guidance, activities should ensure compliance with their statutory labor relations obligations.

2.6 VALUES TO BE PROTECTED

The values to be protected on Army lands from wildland fire include human safety, built up improvements (structures, ammunition storage, electronic weaponry, and targets) natural resources, and cultural resources. Unauthorized structures will be allowed to burn during wildland fire.

2.6.1 Human Safety

The primary concern during any fire is human safety and protection. Neighboring towns and industrial areas provide additional priority protection considerations. Additionally, firefighters on the line, in the air, and at the command post must all be properly trained, outfitted, and informed of all threats and safety measures. Fire management safety concerns on military lands include threats posed by fire and smoke to local residents, employed personnel, and wildland firefighters.

Letterkenny Army Depot employs nearly ~~2,000~~3,600 employees including civilian personnel, ~~three~~ military personnel, and ~~497~~ contractor personnel.

2.6.2 Structures and Infrastructure

The depot includes ~~19,243~~18,200 acres and 1,780 buildings with 8.4 million square feet of floor space, and a total land and improvement value of well over \$1 billion.

2.6.3 Natural and Cultural Resource Considerations

Sensitive natural resources and historic properties addressed in this IWFMP are defined as those that are either known to be directly affected by fire, have close ties with the identity of the installation, or are rare or uncommon. These considerations are discussed in more detail in Chapter 6 of this report.

2.6.3.1 Endangered Species Act

The Endangered Species Act (ESA) of 1973 requires all federal agencies to carry out programs for the conservation of endangered and threatened species. In addition, each agency shall insure that any action authorized, funded or carried out, is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. Wildfire, as well as suppression and pre-suppression activities, can have significant deleterious effects on endangered species. Fire has both direct and indirect impacts on endangered species. The direct effect is mostly considered negative, as it could kill the species. Indirect effects include destruction or modification of habitat and a change in the species composition. As required by the ESA, LEAD shall conduct Section 7 consultation with the USFWS on fire management actions that may affect listed species. Endangered species and natural resources sensitive areas are identified in the INRMP and will be

avoided by firefighting person when maintaining and constructing firebreaks or other soil-disturbing activities.

2.6.3.2 National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966, as amended, requires installation commanders to identify, evaluate, and take into account the effects of undertakings on historic properties. Section 106 also requires consultation with the State Historic Preservation Officer when an agency action may have an adverse impact on eligible and historic properties. Known cultural resources at LEAD are identified and mapped in the ICRMP. As soil is an excellent insulator, fires are unlikely to affect any resource that is buried by 2 or more inches of soil. Fire suppression activities, however, especially tractor plow lines and to a lesser degree, hand lines, can severely damage cultural resources. In the case of a wildland fire, the LEAD archeologist will be consulted. Fire crews will take special care to avoid anything that may represent a cultural resource when they are in the vicinity of cultural resources.

2.7 SMOKE MANAGEMENT AND AIR QUALITY

All wildland fire management activities will comply with the Clean Air Act and all State of Pennsylvania requirements.

2.7.1 Sensitive Smoke Receptors

There are numerous sensitive smoke receptors on and around LEAD, including the cantonment area and the neighboring residences and businesses.

2.7.2 Wildfire Smoke Management

As an emergency action, wildfires do not fall under the scope of the Clean Air Act. Smoke from wildfires will be managed to the extent that the Incident Commander deems feasible and necessary. Smoke management will not trump other safety or containment priorities or objectives.

2.8 MISSION CONSIDERATIONS

Fires not only affect ecosystems, they also affect the military's ability to accomplish its mission. LEAD supports several missions and is also the home of several tenant activities. LEAD's current primary missions are maintenance activities, ammunition support, and base operations. LEAD provides maintenance that cannot be provided at the unit or the installation level. Maintenance activities include the repair, overhaul, and modification of weapons systems, vehicles, and support equipment. LEAD receives, stores, maintains, and issues ammunition and general supplies as part of its ammunition mission. The depot handles a wide variety of munitions, ranging from small arms ammunition, to large bombs and missiles.

2.9 MONITORING REQUIRMENTS

2.9.1 Wildfire Monitoring

There are no requirements for monitoring wildfires at LEAD, other than those measures typically associated with wildfire suppression. However, each wildland fires would be evaluated by the DPW/~~Forester~~[Natural Resources Manager](#)/Fire Department to determine the extent of damages to resources.

2.9.2 Prescribed Fire Monitoring

There are no requirements for monitoring prescribed fires at LEAD, as no prescribed fires are [currently](#) performed at the installation. Should these measures be taken in the future, prescribed fires would be evaluated to determine if the objectives of the burn were attained and to ensure desired results in futures burns.

2.9.3 Fuels Reduction Monitoring

There are numerous methods to achieve this end, however, using photo series is a good way to minimize the time and cost involved. The Fuel and Fire Effects Monitoring Guide, which was developed by the U.S. Fish and Wildlife Service may be a useful reference when designing fuels monitoring methods. Regardless of the methods used, every fuels monitoring program must be designed to measure whether fuel reduction objectives have been met. It may also be desirable to evaluate other measurable objectives, such as invasive species cover or overstory mortality.

2.10 PUBLIC RELATIONS

The Sikes Act requires that military installations provide for public awareness of natural resource use to the extent that public access is appropriate and consistent with the military mission. Only the Public Affairs Office may interact with the public. If a wildfire situation require public notification, the information will be forwarded to the LEAD command staff.

Public relations within LEAD such as newspaper articles and announcements over the Commander's Channel (local television channel, played in some offices on base on a continuous rotation) are also completed through the Public Affairs Office (PAO). Should a prescribed burn be implemented, the information will be provided to the command staff and the PAO.

Off-post agencies, such as local fire departments, will be directly contacted when necessary. Though not a requirement, it is recommended that the WFPM or designee notify the Public Affairs Office of any fire. This will simplify the PAO's job by giving them the information they need to answer the inevitable public questions about smoke.

2.11 FUNDING REQUIRMENTS

Funding for the control and suppression of wildland fires at LEAD would be directly supported by the installation. Fires generated by tenants of LEAD will be funded by Operations and Maintenance funds. Prescribed burning would be funded by the proponent of the prescribed burns.

2.12 PERSONNEL TRAINING AND CERTIFICATION STANDARDS AND RECORDS

This program establishes training and qualification requirements for wildland firefighting personnel, planning, prevention, suppression, and supervision duties. The Wildland Firefighter Qualification Program is established to provide standardization for directorates and organizations that are responsible for wildfire duties under the Wildfire Management Program. Any LEAD organization or directorate intending to supply human resources to wildfire incidents will be expected to meet the requirements described in this program.

Training records and certifications for the DPW personnel will be maintained by the LEAD forester. Training records and certifications for the Fire Department personnel will be maintained by the LEAD Fire Department. All records will be periodically reviewed to ensure that firefighting personnel are current in required aspects of training and certification.

2.12.1 Firefighter Training

LEAD will adopt the standard training requirements as outlined in the 310-1, Wildland Fire Qualifications Guide. All LEAD personnel engaged in suppression and prescribed fire responsibilities are required to meet the standards set in this plan. At a minimum, personnel will receive basic wildland fire training courses:

- I-100 Introduction to the Incident Command System
- S-130 Firefighter Training
- S-190, Introduction to Wildland Fire Behavior

S-130/S-190 are the basic wildland fire training courses given to all U.S. firefighters before they can work on the fire lines.

The LEAD Fire Department, or outside cooperating agencies shall meet the required wildland training and physical fitness requirements outlined within each respective agency's established policies or training program.

Individuals will not be assigned to duties for which they lack training and/or certified experience. All personnel dispatched or assigned to wildfires or prescribed fires will be qualified for the fire position assigned, unless assigned as trainees under the direct supervision of higher qualified personnel at all times.

When responding to a wildfire incident on LEAD, the responding cooperative agency's wildfire qualifications are accepted at the firefighter level, and for internal agency supervision (within their own organization), while on the fire.

2.12.2 Physical Fitness Standards

Personnel assigned to wildfire duties are required to meet the following standards for physical fitness. Annual medical exams administered through Occupations Health will be conducted and documentation of the exams shall be placed in the employee's official personnel folders as well as documented on the fire qualification card, known as the red card. Fire personnel shall receive an annual physical as prescribed by NFPA requirements and records will be maintained by the LEAD Health Clinic.

The fitness level that personnel shall meet depends on what position they are assigned. There are four levels as described below:

1. Arduous. Duties involve fieldwork requiring physical performance, over an extended period of time, calling for above-average endurance and superior conditioning. These duties may include a demand for extraordinarily strenuous activities in emergencies under adverse environmental conditions and over extended periods of time. Requirements include running, walking, climbing, jumping, twisting, bending, and lifting more than 50 pounds; the pace of work typically is set by the emergency situation.
2. Moderate. Duties involve field work requiring complete control of all physical faculties and may include considerable walking over irregular ground, standing for long periods of time, lifting 25 to 50 pounds, climbing, bending, stooping, squatting, twisting, and reaching. Occasional demands may be required for moderately strenuous activities in emergencies over long periods of time. Individuals usually set their own work pace.
3. Light. Duties mainly involve office type work with occasional field activity characterized by light physical exertion. Activities may include climbing stairs, standing, operating a vehicle, and long hours of work, as well as some bending, stooping, or light lifting. Individuals almost always can govern the extent and pace of their physical activity.
4. None. Duties are normally performed in a controlled environment, such as an incident base or camp.

CHAPTER 3 - WILDLAND FUELS AND MODELS

3.1 WILDLAND FUEL FACTORS

Vegetation is the fuel for any wildland fire. Petroleum based fuels, wood products, and plastics that are associated with human development can be found in some areas of LEAD and can help spread any wildland fires that may occur.

Fuel conditions are directly related to moisture patterns and seasonal rainfall. During short periods of no or low moisture, the burning potential of vegetation can persist throughout the year. Fluctuations in precipitation can also result in short periods of vegetation green up followed by periods of drying. Dry conditions contribute to an increase in dead foliage and litter in plant communities.

3.2 VEGETATION AS A FUEL

Vegetation is the fuel for any wildfire. All vegetation is either already a fuel source or is a potential fuel source under specific conditions. The dry dead foliage, or litter, produced by all vegetation creates fuel for fire. Living vegetation becomes a viable fuel source when drought conditions dry the living plants sufficiently or when, during a wildfire, they are dried by the convective or radiant heat of the fire itself. Fuels are a combination of the dead vegetative litter, dry or flammable standing foliage, and the live vegetation that can be dried and become a fire fuel. Fuels can be defined as the portion of the biomass, which is likely to burn if ignited.

Within the forested acreage, the timber is primarily hardwood. Approximately 90 percent of the forest is of the oak-hickory type, with the remaining 10 percent being pine-oak habitat. Dominant tree species on the property include red oak, black oak, white oak, chestnut oak, yellow poplar, white ash, hickories, and red maple.

3.3 FUEL MOISTURE HOUR RATING (TIME LAG)

Dead fuel moisture responds solely to ambient environmental conditions and is critical in determining fire potential. Dead fuel moistures are classed by timelag. This time lag is the amount of time for a substance to lose or gain approximately two-thirds of the moisture above or below its equilibrium moisture content. The shorter the time lag the more responsive the fuels are to changes in environmental moisture. A fuel's timelag is proportional to its diameter and is loosely defined as the time it takes a fuel particle to reach 2/3's of its way to equilibrium with its local environment. Dead fuels in NFDRS fall into four classes:

1. 1-hour, less than 1/4" diameter. Fine flashy fuels that respond quickly to weather changes. Computed from observation time temperature, humidity, and cloudiness.
2. 10-hour, 1/4 to 1" diameter. Computed from observation time temperature, humidity, and cloudiness. Or can be an observed value, from a standard set of "10-Hr Fuel Sticks" that are weighed as part of the fire weather observation.

3. 100-hour, 1 to 3" diameter. Computed from 24-hour average boundary condition composed of day length, hours of rain, and daily temperature/humidity ranges.
4. 1000-hour, 3 to 8 " diameter. Computed from a 7-day average boundary condition composed of day length, hours of rain, and daily temperature/humidity ranges.

The 1-hour classes of fuels are considered to be "fine fuels" and the most sensitive to ignitions and fluctuations in the relative humidity. Calculation of the current moisture content of the fine or 1-hour fuels is based on weather conditions. These calculations are used to monitor the level of flammability of the fine fuels based on the amount of moisture they are estimated to contain. Careful monitoring of the estimated fine fuel moisture level will provide an accurate indication of fuel combustibility. It should be noted that these moisture percentages can change rapidly (within minutes) depending upon temperature and relative humidity readings. In fuel types dominated by 1-hour fuels, fine fuels become the most critical concern of a fire manager. This size class reacts rapidly to changes in weather conditions, and is the primary carrier of fire, especially in wind driven conditions.

3.4 FIRE BEHAVIOR

Wildland fire behavior is affected by weather, fuel characteristics, and topography. Weather influences fire through wind and moisture. Wind increases the fire spread in the wind direction, higher temperature makes the fire burn faster, while higher relative humidity, and precipitation (rain or snow) may slow it down or extinguish it altogether. Weather involving fast wind changes can be particularly dangerous, since they can suddenly change the fire direction and behavior. Such weather includes cold fronts, thunderstorm downdrafts, breezes, and diurnal slope winds.

Wildfire fuel includes grass, wood, and anything else that can burn. Small dry twigs burn faster while large logs burn slower; dry fuel ignites more easily and burns faster than wet fuel.

Topography factors that influence wildfires include the orientation toward the sun, which influences the amount of energy received from the sun, and the slope (fire spreads faster uphill). Fire can accelerate in narrow canyons and it can be slowed down or stopped by barriers such as creeks and roads.

These factors act in combination. Rain or snow increases the fuel moisture, high relative humidity slows the drying of the fuel, while winds can make fuel dry faster. Wind can change the fire-accelerating effect of slopes to effects such as downslope windstorms (called Santa Annas, foehn winds, East winds, depending on the geographic location). Fuel properties may vary with topography as plant density varies with elevation or aspect with respect to the sun.

It has long been recognized that "fires create their own weather." That is, the heat and moisture created by the fire feed back into the atmosphere, creating intense winds that drive the fire behavior. The heat produced by the wildfire changes the temperature of the atmosphere and creates strong updrafts, which can change the direction of surface winds. The water vapor released by the fire changes the moisture balance of the atmosphere. The water vapor can be carried away, where the latent heat stored in the vapor is released through condensation.

3.5 FUEL LOAD

Fuel load is described as the amount (weight) of flammable biomass in a given area at a specific time. Fuel loading is normally measured in tons of biomass per acre. The total fuel load is sometimes broken out into the component parts (1 hour, 10 hour, etc.). Fuel loads in a given area can vary greatly depending on fuel types and environmental conditions, particularly soil moisture and soil quality.

Fuel loads are constantly in flux, and the more variable the vegetation type over time, the more difficult it is to assess the fuel conditions. Herbaceous fuels are the most difficult to estimate over time because they change so readily with alterations in climate.

Fuel loading is one of the primary factors in the fire behavior fuel models and the National Fire Danger Rating System (NFDRS) fuel models. Surveys of fuel loading may be used to the extent possible to monitor fuel conditions.

The Letterkenny Army Depot Forest Management Report provides limited information on fuel loads within the western portion of the installation.

3.6 FIRE MANAGEMENT UNIT# 1

This FMU is the ammunition storage area and consists of approximately 12,000 acres of land with a mixture of woods, grass, and approximately 902 storage igloos containing sensitive ammunition. Wildland fire suppression activities in this area requires extreme caution. Fires within this area are managed by LEMC.

3.7 FIRE MANAGEMENT UNIT# 2

The buffer area surrounding the FMU 1 is the buffer area to the west consisting of wooded areas, agricultural outleasings, and maintained grassed areas. This area is divided into two zones. Zone 1 is located on the western side of the ammunition area and Zone 2 is located west of Zone 1 at the foot and on the eastern slopes of Broad Mountain. Zone 1 is approximately 418 acres and Zone 2 is approximately 2,191 acres. Fuel loading, in the form of dead standing and fallen timber, within Zone 1, are relatively low and pose a low threat for wildfire. Zone 2, however, has a large amount of dead standing and newly fallen timber in several of the compartments. In addition, many currently living eastern hemlock trees are in the advanced stages of infestation by hemlock wooly adelgid (*Adelges tsugae*) (HWA) and will likely add to the fuel load in the near future. These areas pose a high risk for wildfire.

Controlled burns, to thin understory and remove dense invasive plant stands and removal of excessive dead plant material, mostly hemlock in Zone 2, will decrease fuel loads within the forests of LEAD, thereby decreasing the potential of wild fire frequency and severity.

3.8 FIRE MODELS

Wildfire modeling attempts to reproduce fire behavior, such as how quickly the fire spreads, in which direction, how much heat it generates. The fire behavior modeled can also include whether the fire transitions from the surface (a "surface fire") to the tree crowns (a "crown fire"), as well as extreme fire behavior including rapid rates of spread, fire whirls, and tall well-developed convection columns. Fire modeling also attempts to estimate fire effects, such as the ecological and hydrological effects of the fire, fuel consumption, tree mortality, and amount and rate of smoke produced.

Several fire models have been developed for assessing the risk for fire in a given area and are based on using unique combinations of existing vegetation type, cover, and height. The criteria for choosing a fuel model includes the fact that the fire burns in the fuel stratum best conditioned to support the fire. This means situations will occur where one fuel model represents rate of spread most accurately and another best depicts fire intensity. In other situations, two fuel conditions may exist, so the spread of fire across the area must be weighted by the fraction of the area occupied by each fuel. Fuel models are simply tools to help the user realistically estimate fire behavior. The user must maintain a flexible frame of mind and an adaptive method of operating to totally utilize these aids. For this reason, the fuel models are described in terms of both expected fire behavior and vegetation.

Like all models in computational science, fire models need to strike a balance between fidelity, availability of data, and fast execution. Wildland fire models span a vast range of complexity, from simple cause and effect principles to the most physically complex presenting a difficult supercomputing challenge that cannot hope to be solved faster than real time. Generally models fall into two broad categories: empirical and physical.

Empirical models are conceptual models from experience and intuition from past fires can be used to anticipate the future. Many semi-empirical fire spread equations as in [11], [12], and [3] and [4] for Australasian fuel complexes have been developed for quick estimation of fundamental parameters of interest such as fire spread rate, flame length, and fireline intensity of surface fires at a point for specific fuel complexes, assuming a representative point-location wind and terrain slope. Based on the work in [5] and [6] the quasi-steady equilibrium spread rate calculated for a surface fire on flat ground in no-wind conditions was calibrated using data of piles of sticks burned in a flame chamber/wind tunnel to represent other wind and slope conditions for the fuel complexes tested.

3.8.1 40 Scott and Burgan Fire Behavior Fuel Models

The 40 Scott and Burgan Fire Behavior Fuel Model (FBFM40) layer represents distinct distributions of fuel loading found among surface fuel components (live and dead), size classes, and fuel types. This set contains more fuel models in every fuel type (grass, shrub, timber, slash) than Anderson's set of 13. The number of fuel models representing relatively high dead fuel moisture content increased, and fuel models with an herbaceous component are now dynamic, meaning that loads shift between live and dead (to simulate curing of the herbaceous component) rather than remaining constant.

FBFM40 was produced through a series of workshops held across the nation with fire and fuels specialists to determine surface fuel model rule sets using unique combinations of existing vegetation type, cover, and height. The resultant spatial arrangement of surface fuel models are known as the calibrated FBFM40 layer.

3.8.2 13 Anderson Fire Behavior Fuel Models

These original 13 standard fire behavior fuel models serve as input to Rothermel's mathematical surface fire behavior and spread model. The 13 Anderson Fire Behavior Fuel Model (FBFM13) layer represents distinct distributions of fuel loading found among surface fuel components (live and dead), size classes, and fuel types. The fuel models are described by the most common fire-carrying fuel type (grass, brush, timber litter, or slash), loading and surface area-to-volume ratio by size class and component, fuelbed depth, and moisture of extinction.

These were developed through a series of workshops held across the nation with fire and fuels specialists to determine surface fuel model rule sets using unique combinations of existing vegetation type, cover, and height.

3.8.3 Fuel Characteristic Classification System Fuelbeds

The Fuel Characteristic Classification System Fuelbeds (FCCS) layer describes the physical characteristics of a relatively uniform unit on a landscape that represents a distinct fire environment. FCCS provides standardized descriptions of fuelbeds and fire hazard. The system is designed to provide land managers, regulators, and scientists with a nationally consistent and durable procedure to characterize and classify fuel.

The FCCS layer was created with default fuelbeds provided by the FCCS software. FCCS facilitates the mapping of fuel characteristics and fire hazard assessments, and landscape level spatial fire effects simulations.

3.8.4 Fuel Loading Models

The Fuel Loading Model (FLM) surface fuel classification system characterizes wildland surface fuel. FLMs provide a simple and consistent way for managers to describe onsite fuel for input into fire behavior and effects software. FLMs contain representative loading for each fuel component (e.g., woody and non-woody) for typical vegetation classification systems. They characterize fuel loading across all vegetation and ecological types.

To develop FLM classes, maximum soil surface heating and total PM_{2.5} emissions were simulated for a large set of surface fuelbeds sampled across the contiguous United States. The simulated effects were then grouped into ten Effects Groups using a statistical clustering routine. Finally, classification tree analysis was used to predict duff, litter, fine woody debris (FWD) and log load that resulted in the soil heating and emissions seen in each of the Effects Groups.

WFDS (Wildland-urban interface Fire Dynamics Simulator) is an extension of NIST's structural fire dynamics simulator (FDS) to fuels that include vegetation. WFDS uses computational fluid dynamics methods to solve the governing equations for buoyant flow, heat transfer, combustion, and the thermal degradation of vegetative fuels. The solution method makes use of large eddy simulation (LES) techniques to solve the gas-phase equations on computational grids that are too coarse to directly resolve the detailed physical phenomena

CHAPTER 4 - SAFETY

4.1 SAFETY AND EMERGENCY OPERATIONS

The on-site Incident Commander will ensure that all firefighter and public safety precautions are taken and are the highest priority in wildland fire management. Except in the event of a threat to human life, no wildland fire situation will require a firefighter or other responder and equipment to be placed in extreme danger.

The original ten Standard Firefighting Orders were developed in 1957 by a task force commissioned by the USDA-Forest Service Chief Richard E. McArdle. The task force reviewed the records of 16 tragedy fires that occurred from 1937 to 1956. The Standard Firefighting Orders were based in part on the successful "General Orders" used by the United States Armed Forces. The Standard Firefighting Orders are organized in a deliberate and sequential way to be implemented systematically and applied to all fire situations.

Shortly after the Standard Firefighting Orders were incorporated into firefighter training, the 18 Situations That Shout Watch Out were developed. These 18 situations are more specific and cautionary than the Standard Fire Orders and described situations that expand the 10 points of the Fire Orders. If firefighters follow the Standard Firefighting Orders and are alerted to the 18 Watch Out Situations, much of the risk of firefighting can be reduced.

10 STANDARD FIRE ORDERS

Fight fire aggressively but provide for safety first.

Initiate all action based on current and expected fire behavior.

Recognize current weather conditions and obtain forecasts.

Ensure instructions are given and understood

Obtain current information on fire status

Remain in communication with crew members, your supervisor and adjoining forces.

Determine safety zones and escape routes

Establish lookouts in potentially hazardous situations

Retain control at all times

Stay Alert, keep calm, think clearly, act decisively

18 WATCHOUT SITUATIONS

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communication link with crewmembers/supervisors.
8. Constructing line without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and the fire.
12. Cannot see main fire, not in contact with anyone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather is getting hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make escape to safety zones difficult.
18. Taking a nap near the fire line.

4.2 EQUIPMENT

It is mandatory that all firefighting personnel be equipped with the proper PPE for fighting wildfires and those identified by the Job Hazard Analysis. Table 4-1 provides a checklist for equipment. Employees must be trained to use safety equipment properly and effectively. Wildland firefighters must be intimately familiar with the tools used and PPE worn. Knowledge of proper selection, use, and care of the various tools used in wildland firefighting aids firefighters in performing their job as efficiently and effectively as possible. Likewise, knowledge of the proper donning, care, capabilities, and limitations of PPE, gives firefighters a better sense of which situations are tenable and which are not. Firefighting personnel will ensure that proper PPE is worn at all times when actively engaged in firefighting duties. All PPE must

meet or exceed NFPA 1977 Standard on Protective Clothing and Equipment for Firefighters (current edition).

Table 4-1: Wildland Firefighter’s Gear Checklist

PERSONAL CLOTHING	SUGGESTED PACK ITEMS
<ul style="list-style-type: none"> • Helmet with chinstrap • Nomex or 100% cotton long sleeved shirt • Nomex or 100% cotton pants • Leather work gloves • Cotton undergarments • Wildland Fire boots • Leather boot laces • Goggles and hearing protection 	<ul style="list-style-type: none"> • Fire Shelter • MREs • Trailmix/energy bars • Warm shirt or jacket • Watch cap • Two canteens (minimum) • First Aid kit • Headlamp • Mini flashlight • Extra Batteries • Extra Gloves • Compass • Flagging tape • Sunglasses (safety) • Bandanna • Pocket knife • Fusees • Extra pair of socks • Signal mirror and whistle

Additional requirements for the equipment include the following:

- All firefighters will wear a hard hat while on the fireline that meets safety standard ANSI Z89.1-1997.
- All firefighters will wear 8-inch high, laced, all-leather boots with slip and melt resistant toes and heels (Vibram type).
- All firefighters will wear flame-resistant clothing while on the fireline and when flying in helicopters. Other types of clothing, including undergarments made of synthetic materials, could burn and melt to the skin. Sleeves should always be rolled down to the wrist.
- All firefighters will wear leather gloves to protect their hands.
- All firefighters will utilize eye and face protection that complies with ANSI Z87.1-1989 whenever there is a danger of material being thrown back in your face.
- All firefighters will determine and comply with the host agency’s requirements regarding fire shelters on fireline suppression assignments or their own agency’s requirements if those are more restrictive. The fire shelter is a tool of last resort, not to be used tactically.
- All firefighters will utilize hearing protection when working with high noise-level firefighting equipment, such as chainsaws, pumps, helicopters, air tankers, etc.
- Sawyers and swampers will wear additional safety equipment including approved chaps, gloves, hard hat, and eye and ear protection when operating chainsaws.

- An approved dust/smoke mask is recommended when in heavy smoke and dust environments. Use of a dust/smoke mask is not a PPE requirement.
- Nomex face and neck protection (shrouds) are not required PPE. If used they must meet standard NFPA 1977. They should be deployed only in impending flash fuel or high radiant heat situations and not routinely worn throughout the operational period, due to an unacceptable increase in physiological heat stress.
- PPE clothing will be cleaned or replaced whenever soiled, particularly with oils. PPE will be replaced when the fabric is so worn as to reduce the fire resistance capability of the garment.

Appendix B provides a equipment checklist that all wildland firefighter have.

4.3 WILDLAND FIREFIGHTING STANDARDS ON CLOTHING AND PROTECTIVE EQUIPMENT

The National Fire Protection Association (NFPA) was asked to come up with a standard on clothing and protective equipment worn during firefighting while on wildland firefighting operations. The NFPA formed a committee in 1989 to look into establishing a standard for this equipment. The goal of this standard was to provide thermal protection for the wildland firefighter against external heat sources with flame-resistant clothing and equipment, while not inducing an extraordinary internal heat stress load. NFPA reached this goal after research showed the majority of injuries to wildland firefighters were due to heat stress. This standard encompasses the clothing and protective apparel worn during normal exposure limits.

The standard states the minimum design, performance, testing and certification requirements for protective clothing, helmets, gloves, footwear, face/neck shroud, cold weather outerwear, chainsaw protectors, load carrying equipment and goggles that are designed to protect firefighters during a wildland firefighting operation. Also written into the 2005 edition are the optional visibility standards for the clothing.

Every product that is used for wildland firefighting must be labeled as such and contain all pertinent information regarding that product. The following label must be attached to the article of personal protective equipment:

“THIS WILDLAND FIRE-FIGHTING PROTECTIVE (GARMENT, HELMET, GLOVE, FOOTWEAR, FACE/NECK SHROUD, CHAINSAW PROTECTOR, or LOAD CARRYING EQUIPMENT) MEETS THE REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2005 EDITION. DO NOT REMOVE THIS LABEL”

Goggles must bear this statement:

“THIS WILDLAND FIRE-FIGHTING PROTECTIVE GOGGLE MEETS THE REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2005 EDITION”

In addition the manufacturer must provide the following information to be written on the label:

- Manufacturer's name, identification, or designation
- Manufacturer's address
- Country of Manufacture
- Manufacturer's (garment, helmet, glove, footwear, or face/neck shroud) identification number, lot number, or serial number
- Month and year of manufacture (not coded)
- Model or style name, number, or design
- Size or size range
- Garment materials and percent content/Nominal weight of the helmet (this is only for garments and helmets)
- Cleaning precautions

The goggle and the protective face/shroud information are different. The manufacturer must provide the following for the face/shroud:

- Manufacturer's name, identification, or designation
- Manufacturer's address
- Manufacture's identification number, lot number, or serial number
- Date of manufacture (not coded)
- Identification of the compliant helmet or helmets with which the face/shroud was certified

The manufacturer of the goggles must provide the following information:

- Manufacturer's name, identification, or designation
- Manufacturer's address
- Date of manufacture (not coded)
- Cleaning instructions and precautions

The manufacturer must also provide the user the following information:

- Pre-use information
- Preparation for use
- Inspection frequency and details
- Don/doff
- Proper use consistent with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and Title 29, *Code of Federal Regulations*, Part 1910.132, "Personal Protective Equipment" (this is not needed for chainsaw protectors)
- Maintenance and cleaning (this is not needed for chainsaw protectors)
- Retirement and disposal criteria and considerations

For all of the above personal protective items, the appropriate sizing charts and conversion tables, where applicable, must be provided to the purchaser from the manufacturer upon request.

A number of design requirements, specific to each item, are also stated in the standard. The type of thread, openings and the associated closures, statements relating to the collar and cuffs of a garment, all fasteners and zippers, and what part of the garment is allowed to come into contact with the user are just some examples of the detail covered in the standard. All of the personal protective equipment that is covered under this standard must pass a battery of tests. In order to be certified the testing and certification of these items is completed by an independent testing agency. Any item, or part of that item, that does not meet the requirements will not be certified under this standard.

All of the personal protective equipment is subjected to preconditioning. This is set up so all of the equipment is at the same temperature, humidity level, and etc. so that the standard can be applied equally to all manufacturers.

The garments and face/neck shroud is then put through the following tests:

- Radiant protective performance test
- Flame resistance test
- Heat and thermal shrinkage resistance test
- Total heat loss test (not for face/shroud)
- Tear resistance test
- Burst strength test
- Cleaning shrinkage resistance test
- Seam breakage strength test
- Thread heat resistance test
- Label durability and legibility test one
- Retroreflectivity and fluorescence test, if applicable (not for face/shroud)

And the helmet goes through the following tests:

- Thread heat resistance test
- Top impact resistance test
- Helmet physical penetration resistance test
- Helmet antiglare flammability test
- Heat and thermal shrinkage resistance test
- Suspension system retention test
- Retroreflectivity and fluorescence test
- Retention system test
- Goggle and headlamp clip attachment test
- Label durability and legibility test two

The gloves must pass the following tests:

- Heat and thermal shrinkage resistance test
- Protective glove flame resistance test
- Conductive heat resistance test
- Thermal protective performance test

- Dexterity test
- Grip test
- Label durability and legibility test one
- Thread heat resistance test

Glove and footwear are put through these tests:

- Cut resistance test
- Puncture resistance test

Footwear is put through the following tests:

- Heat and thermal shrinkage resistance test
- Corrosion resistance test
- Footwear conductive heat resistance test
- Eyelet and stud post attachment test
- Protective footwear abrasion test
- Flame resistance test for footwear
- Label durability and legibility test one
- Thread heat resistance test

Protective goggles must meet the following tests:

- Heat and thermal shrinkage resistance test
- Thread heat resistance test

Chainsaw protector must meet the following performance requirements:

- Chainsaw cut resistance test
- Heat and thermal shrinkage resistance test
- Thread heat resistance test

Load carrying protective equipment must meet the following performance requirements:

- Heat and thermal shrinkage resistance test
- Thread heat resistance test
- Retroreflectivity and fluorescence test

CHAPTER 5 - WILDLAND FIRE MANAGEMENT

This chapter discusses general procedures for wildland fire management, including wildland fire use and suppression strategies. The fire management goals and objectives presented in Chapter 1 guide employment of these strategies at LEAD; protection of life and property remains the highest priority through all activities.

5.1 FIRE PREVENTION

Most wildfires are caused by lightning during extreme dry or drought weather conditions. However, an alarming number of fires are ignited by acts of human carelessness.

By following several installation-wide and personnel tips, the risks of fires can be minimized:

- Don't park vehicles on dry grass.
- At the first sign of a wildfire, leave area immediately by established trails or roads. Notify the LEAD fire department as soon as possible.
- Store flammable liquid containers in a safe place.
- If off-road vehicle use is allowed, internal combustion equipment requires a spark arrester.

5.2 FUELS MANAGEMENT

As prescribed burns are not used at LEAD, fuel management consists mainly of mowing of grasses and trimming and removal of dead vegetation. In keeping with the moisture content of vegetation and weather conditions, fuels management activities would be monitored.

5.3 FIRE SUPPRESSION

Fire suppression to combat a wildland fire can be in the form of a direct attack or indirect attack.

Direct attack is any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel. This includes the work of urban and wildland fire engines, fire personnel and aircraft applying water or fire retardant directly to the burning fuel. For most agencies, the objective is to construct a fireline around all fire meant to be suppressed.

Preparatory suppression tactics used a distance away from the oncoming fire are considered indirect. Firelines may be built in this manner as well. Fuel reduction, indirect firelines, contingency firelines, backburning and wetting unburnt fuels are examples. This method may allow for more effective planning. It may allow for more ideally placed firelines in lighter fuels using natural barriers to fire and for safer firefighter working conditions in less smoke filled and

cooler areas. However, it may also allow for more burned acreage, larger hotter fires, and the possibility of wasted time constructing unused firelines.

Attempts to control wildfires may also include by controlling the area that it can spread to by creating *control lines*: boundaries that contain no combustible material. These may be constructed by physically removing combustible material with tools and equipment, or portions may be naturally occurring. Lines may also be created by *backfiring*: creating small, low-intensity fires using driptorches or flares. The resultant fires are extinguished by firefighters or, ideally, directed in such a way that they meet the main fire front, at which point both fires run out of flammable material and are thus extinguished. Additionally, the use of long-term fire retardants, fire-fighting foams, and superabsorbent polymer gels may be used. Such compounds reduce the flammability of materials by either blocking the fire physically or by initiating a chemical reaction that stops the fire.

The threat of wildfires does not cease after the flames have passed, as smoldering heavy fuels may continue to burn unnoticed for days after flaming. It is during this phase that either the burn area exterior or the complete burn area of a fire is cooled so as to not reignite another fire.

Constructed firelines, breaks, safety zones and other items may damage soil systems, encouraging erosion from surface run-off and gully formation. The loss of plant life from the fire also contributes to erosion. Construction of waterbars, the addition of plants and debris to exposed soils and other measures help to reduce this.

5.4 WEATHER CONDITIONS

The Lower Atmosphere Stability Index, or Haines Index, was developed for fire weather use. It is used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire. It is calculated by combining the stability and moisture content of the lower atmosphere into a number that correlates well with large fire growth. The stability term is determined by the temperature difference between two atmospheric layers; the moisture term is determined by the temperature and dew point difference. This index has been shown to be correlated with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior. The Haines Index is computed from the morning (12Z) soundings from RAOB stations across North America. The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the index.

- 2: Very Low Potential -- (Moist Stable Lower Atmosphere)
- 3: Very Low Potential
- 4: Low Potential
- 5: Moderate Potential
- 6: High Potential ----- (Dry Unstable Lower Atmosphere)

In the case of prescribed fires, weather conditions should be reviewed. The National Weather Service Forecast Office in State College (<http://www.erh.noaa.gov/ctp/fire.php>) provides information on current conditions, fuel moisture, fire danger classification, and long-term moisture. Another information source is the National Fire Weather Page (<http://radar.srh.noaa.gov/fire/>).

5.5 FIRE DANGER RATING

The US Forest Service uses the following scale for rating the fire danger. It is based upon a number of factors, including fuel moisture content (described in Chapter 3—Section 3-3) and weather conditions, discussed above.

Low	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may bum freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
High	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

5.6 DECISION PROCESS FOR INCIDENT MANAGEMENT TRANSITION

Criteria for the need to transition from initial attack to extended attack include situations where:

- the fire cannot be contained with initial attack resources within 2 operational periods of fire detection
- fire behavior exceeds capability of initial attack resources to contain the fire
- the fire threatens any installation's natural or cultural resource for which there may be legal protection requirements

Criteria for the need to transition from extended attack to Type 1 or Type 2 incident management include situations where:

- fire behavior exceeds the capability of extended attack resources to contain the fire
- the fire threatens any installation natural or cultural resource for which there may be legal protection requirements
- firefighter and public safety has the potential to be significantly compromised.

5.7 PREPAREDNESS ACTIVITIES

Preparedness actions include fire prevention activities, community education, annual training needs assessment, fire readiness, fire weather and fire danger assessments, index-trend monitoring and seasonally adjusting staffing. The Fort Huachuca prevention program consists of a combination of public education, regulations enforcement, safety inspections, hazard fuel reduction, and related maintenance activities. The annual work plan for the Fire Department specifies activities for the coming fire season. Table 6-1 lists routine tasks and responsibilities for them.

CHAPTER 6 - PROGRAMATIC ENVIRONMENTAL ASSESSMENT

The Proposed Action is the implementation of this Integrated Wildland Fire Management Plan and requires an assessment of the environmental effects as required by 32 CFR 651 *Environmental Effects of Army Action*, and the National Environmental Policy Act of 1969.

As part of the assessment, the No-Action alternative is also reviewed for its potential to impact the environment. Under this alternative there would be no change to the current system for managing wildland fires at LEAD.

6.1 GENERAL ENVIRONMENTAL CONDITIONS AND CONSEQUENCES

6.1.1 Geology and Topography

LEAD is located in the Ridge and Valley Province of the Appalachian Mountains. The eastern section of the depot is underlain primarily by limestones and western section of the depot is underlain primarily by shales. The majority of LEAD's topography consists of gently rolling terrain ranging in elevation from a low of 609 feet above mean sea level (MSL) to a high of 790 feet above MSL except for the northwest portion of the installation, where the elevation increases abruptly to more than 2,300 feet above mean sea level in the vicinity of Broad Mountain. A portion of the depot includes 2,900 acres of mountainous wooded land along Blue or North Mountain with elevations ranging from 700 feet to 2,300 feet above sea level. Slopes rising in excess of 40 percent are found on Broad Mountain and are restricted in use to forest managed timbered areas.

Proposed Action: Implementation of the Proposed Action would have no impact on geology or topography at LEAD.

No-Action: Under the No-Action alternative, there would be no change to the existing geologic or topographic conditions.

6.1.2 Air Quality

The EPA has identified Franklin County as a non-attainment zone for 8-hour ozone (EPA, 2008). This county is in attainment for all other criteria air pollutants. Pennsylvania's air quality classifications are identical to those used by the EPA.

Proposed Action: Implementation of the Proposed Action would have no impact on air quality at LEAD. Should prescribed burns be implemented at LEAD, they would be conducted in accordance with USFWS guidelines and applicable Pennsylvania and county regulations. Smoke from prescribed burns would cause short-term minor adverse impacts to local air quality.

No-Action: Under the No-Action alternative, there would be no change to the existing air quality conditions at LEAD.

6.1.3 Climate

LEAD is in the Lower Susquehanna climatic division, and the climate is classified as humid continental, with a mean annual temperature of 53 degrees Fahrenheit (°F). Average annual snowfall is 28 inches per year, which falls fairly evenly throughout the winter, but there has been a wide variation from one winter to another. Average total precipitation is 42 inches, with about 57 percent of that falling during spring and summer. May through August are the wettest months (USDA, 1975).

Proposed Action: Implementation of the Proposed Action would have no impact.

No-Action: Under the No-Action alternative there would be no impacts on climate.

6.1.4 Noise

An Installation Compatible Use Zone (ICUZ) program was developed and approved for LEAD in 1989 and was updated in 1993. The sources of noise originating at LEAD include demolition activities, firing ranges, vehicular traffic, rail equipment, the combat vehicle test track, the helipad. According to this program, Zone II noise levels, considered “normally unacceptable” by Army Regulation 200-1, do not extend beyond LEAD’s boundary. Three Zone II noise zones identified at LEAD are: the functional firing range, inactive demolition ground on the mountain, and the demolition ground.

Proposed Action: Implementation of the Proposed Action would not increase noise at LEAD.

No-Action: Under the No-Action alternative, there would be no change to the existing noise conditions.

6.1.5 Soils

Based on the Franklin County Soil Survey (USDA, 1975), three soil associations containing 24 soil series occur on LEAD (beyond the cantonment area). The Weikert-Berks-Beddington soil association covers most of LEAD and are characterized as shallow to deep and well-drained soils. The Laidig-Very Stony Land-Buchanan association is also acidic and deep, and somewhat poorly to well drained. The Murrill-Laidig association is less acidic, deep, well- drained soils formed from colluvium at the base of the eastern side of Broad Mountain. None of the soil series at LEAD have been identified as highly erodible by the USDA Natural Resources Conservation Service (USDA, 1975).

Proposed Action: Implementation of the Proposed Action would have no impact.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.6 Water Resources

Natural surface water features at LEAD include seven named streams, and numerous unnamed streams. Lehman Run, Keasey Run (a tributary of Lehman Run), Muddy Run, and Rowe Run occur within the northeastern portion of LEAD and drain to the Susquehanna River. Dennis Creek, Back Creek, Rocky Spring Branch, and Conococheague Creek lie within the southwest portion of the installation, and drain to the Potomac River. In addition to named streams, a number of small unnamed runs dissect LEAD.

Nine manmade lakes, ranging from 3 to 17 acres in size, are located on LEAD. Lakes include Bud's Lake, Rocky Springs Lake, and Lake Letterkenny; ponds include Shirley's Pond, Cole's Pond, and Henry's Pond. Of these, Rocky Springs Lake is the most significant impoundment, since it is the center of a developed recreational site. The 129-acre Letterkenny Reservoir, from which the Depot draws its drinking water, is located 8 miles to the north of the Depot (John Milner Associates, 1981). Wallys Pond and two waterfowl ponds are located in Zone II. The installation is divided into three areas—ammunition storage (Zone I), buffer zones (Zone II), and cantonment (see Section 6.1 *Landuse*)

The depot is above Conococheague Creek's 100-year floodplain. None of the other waterbodies on the post are subject to flooding. LEAD is not susceptible to major flooding.

Proposed Action: Implementation of the Proposed Action would have no impact to water resources.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.7 Vegetation

According to the USDA (USDA, 1975), Franklin County originally had a dense cover of trees, but cutting and clearing has eliminated all or nearly all of the old growth forests. Existing forested and wooded stands represent second- and third-growth forests. Existing woody species are primarily of the Oak-Hickory Association, including red oak (*Quercus rubra*), black oak (*Quercus velutina*), white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), and various hickory species (*Carya* spp.), with lesser numbers of yellow poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), and red maple (*Acer rubrum*).

Non-forested areas in the County are principally old-field type successional areas, dominated by grass species. Other species occupying this habitat type include goldenrods (*Solidago* spp.), asters (*Aster* spp.), white clover (*Trifolium repens*), Indian strawberry (*Duchesnea indica*) and lesser numbers of other broad-leafed herbaceous species.

The majority of the terrestrial habitat on LEAD consists of open fields and second- or third-growth forest. Of the total 17,793 acres on LEAD, approximately 35 percent is forested and 52 percent is open fields, 1 percent is water, and the remaining 12 percent is mostly developed with scattered vegetation.

Proposed Action: Implementation of the Proposed Action would have no impact.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.8 Wetlands

Seven wetland types are present at LEAD: lacustrine, palustrine aquatic bottom, palustrine emergent, palustrine forested, palustrine open water, palustrine scrub shrub, palustrine unconsolidated bottom, and riverine. Previous estimations indicated that there are approximately 300 acres of wetlands on LEAD, predominantly in the Ammunition Storage Area and Buffer Area along streambeds and pond or lake sides. Wetland habitat supports a wide diversity of vegetation, invertebrates, amphibians, reptiles, and mammals. The wetland habitat at LEAD is considered to be in good condition because these areas have been conserved from development. However, invasive species, particularly reed canary grass (*Phalaris arundinacea*), have been found throughout the wetlands of LEAD and have been noted as a particular problem in several wetlands. Reed canary grass has been encroaching on native wetland species and becoming a dominant plant in several areas.

Proposed Action: Implementation of the Proposed Action would have no impact to wetlands.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.9 Wildlife Resources

The (INRMP) provides information on the diverse community of wildlife (reptiles and amphibians, birds, mammals, and fish) species present at LEAD. Two venomous snakes are also found on LEAD: the northern copperhead (*Agkistrodon contortrix mokeson*), and timber rattlesnake (*Crotalus horridus*). Over one hundred species of birds and twenty species of mammals can be found at the Depot. LEAD is a stopover for migratory species such as warblers and vireos.

Proposed Action: Implementation of the Proposed Action would have no impact to wildlife resources.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.10 Threatened and Endangered Species and Sensitive Habitats

The INRMP identifies the potential for three federally listed species. LEAD is within the known range of the federally-threatened bog turtle; however, no potential bog turtle habitat on the installation. No Indiana bats have been found on the installation, however, it cannot be concluded that Indiana bats are not on the installation, only that there is no evidence to date that

they occur on the installation. Viable habitat for the Northeastern bulrush also exists on the installation, but no evidence of this species has been observed.

Some state-listed species have been identified on or near the installation, and several species that might be present on the installation include the Allegheny Woodrat, the Henslow's Sparrow, the upland sandpiper, the lance-leaved loosestrife, and the brown sedge.

A small number of vernal pool habitats have been identified through surveys conducted as a joint effort by LEAD Natural Resources Office and Shippensburg University. Vernal pools are, as the name suggests, small, discrete areas that are wet in the spring. They are special aquatic sites, and are generally higher in the landscape and not directly tied to a source of hydrology like typical wetland areas are. Vernal pools provide critical breeding habitat for amphibians, which use them as egg-laying locations free of fish and bird predators and dangerous currents.

Proposed Action: Implementation of the Proposed Action would have no impact. Consultation with the LEAD Natural Resource Manager would be required prior to the use of prescribed burns or activities that could disturb listed species. Endangered species and natural resources sensitive areas identified in the INRMP will be avoided by firefighting person when maintaining and constructing firebreaks or other soil-disturbing activities.

No-Action: Under the No-Action alternative, there would be no change to the existing conditions.

6.1.11 Cultural Resources

Known cultural resources at LEAD are identified and mapped in the ICRMP. Cultural resources can be found in various locations throughout LEAD.

Proposed Action: Implementation of the Proposed Action would have no impact. In the case of a wildland fire, including any potential prescribed fires, the LEAD archeologist will be consulted. Fire crews will take special care to avoid anything that may represent a cultural resource when they are in the vicinity of cultural resources.

No-Action: Under the No-Action alternative, there would be no impacts to cultural resources.

6.1.12 Socioeconomic Resources and Environmental Justice

LEAD lies mostly in Letterkenny Township, with smaller portions in Greene Township to the east and Hamilton Township to the southwest with Chambersburg being the closest city approximately 5 miles away. In 2009, Chambersburg had a per capita personal income (PCPI) of \$28,208, below the national average of \$33,050 (city-data, 2011).

The population was identified as mainly white (92.1%) with approximately 9.6% of the population was below the poverty level. The area is not considered to be considered to be an area of concentrated minority population or an area of concentrated poverty.

Proposed Action: Implementation of the Proposed Action would have no impact on socioeconomic conditions at LEAD. Implementation of the Proposed Action would not be expected to impact the socioeconomic conditions or create to disproportionately high adverse human health concerns for minority or low-income populations at LEAD or in the surrounding community.

No-Action: Under the No-Action alternative, there would be no impacts to socioeconomic resources or environmental justice at or near LEAD.

6.2 CONCLUSION

The Proposed Action is not expected to have significant adverse impacts on natural or cultural resources at LEAD. Coordination with the Natural Resource Manager and Cultural Resource Manager would be conducted prior to any activities that could impact these resources.

CHAPTER 7 - REFERENCES

Fire models: website: <http://www.firemodels.org/>

Land fire, 2012. Website: <http://www.landfire.gov/NationalProductDescriptions12.php>

Natioanl Fire Protection Association (NFPA), 2012 standards. Website: http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp?cookie%5Ftest=1

National Wildfire Coordinating Group, 2012 PMS 310-1.
Website: <http://www.nwcg.gov/pms/docs/docs.htm>

National wildland fire assessment system, 2012. Website: <http://wfas.net/>

National Weather Service Fire Weather. 2012. Website: <http://radar.srh.noaa.gov/fire/>

Pensylvania Wildland Fire Management Components. 2012. Website: http://www.dcnr.state.pa.us/forestry/sfrmp/documents/Fire_Draft_Wildland_Fire_Management_Section.pdf

Pennsylvania Prescribed Fire Council (PPFC), 2012. PA Prescribed Fire Standards. Website: http://www.dcnr.state.pa.us/ucmprd2/groups/public/documents/document/dcnr_003984.pdf

Appendix A
Prescribed Fire Plan Form

Appendix B
Wildland Firefighter Equipment List

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APPENDIX G
PRESCRIBED BURN PROJECT PLAN

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Prescribed Burn Project Plan

Project Site: Letterkenny Army Depot

Project Name: LEAD Prescribed Fire Plan

Burn Plan Authors:

Name: Craig M. Kindlin
Title: Natural Resources Manager



Signature

21 MAR 2017
Date

Burn Boss:

Name: John Wakefield
Title: Chief, Wildland Fire
Agency: PA Game Commission

Signature

Date

Technical Review:


Name: Ben Jones
Title: Habitat Division Chief
Agency: PA Game Commission

Signature

Date

Letterkenny Munitions Center Review:

Name: Jeff McCrady
Title: Explosives Safety Specialist

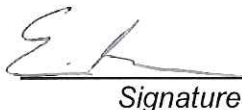


Signature

21 MAR 2017
Date

Letterkenny Safety Office Review:

Name: Erin Shoemaker
Title: Explosives Safety Specialist



Signature

21 MAR 17
Date

Letterkenny Fire Department Review:

Name: William Durfee
Title: Fire Chief



Signature

22 MAR 2017
Date

Letterkenny Army Depot

Agency Administrator:
Name: COL Edward D. Maddox
Title: Commander



Signature

20170405
Date

Pennsylvania Game Commission

Executive Director:
Name: Matt Hough

Signature

Date

Plan expires 3 years from the date of the latest approval signature, or when the project is completed; whichever comes first. Units may be burned multiple times under this plan.

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1. LOCATION:

Municipalities: Letterkenny and Greene Townships
USGS Quad Map(s): Chambersburg, Roxbury and Fannettsburg
County: Franklin
State: Pennsylvania
DCNR Forest District: 2
Ownership: US Army

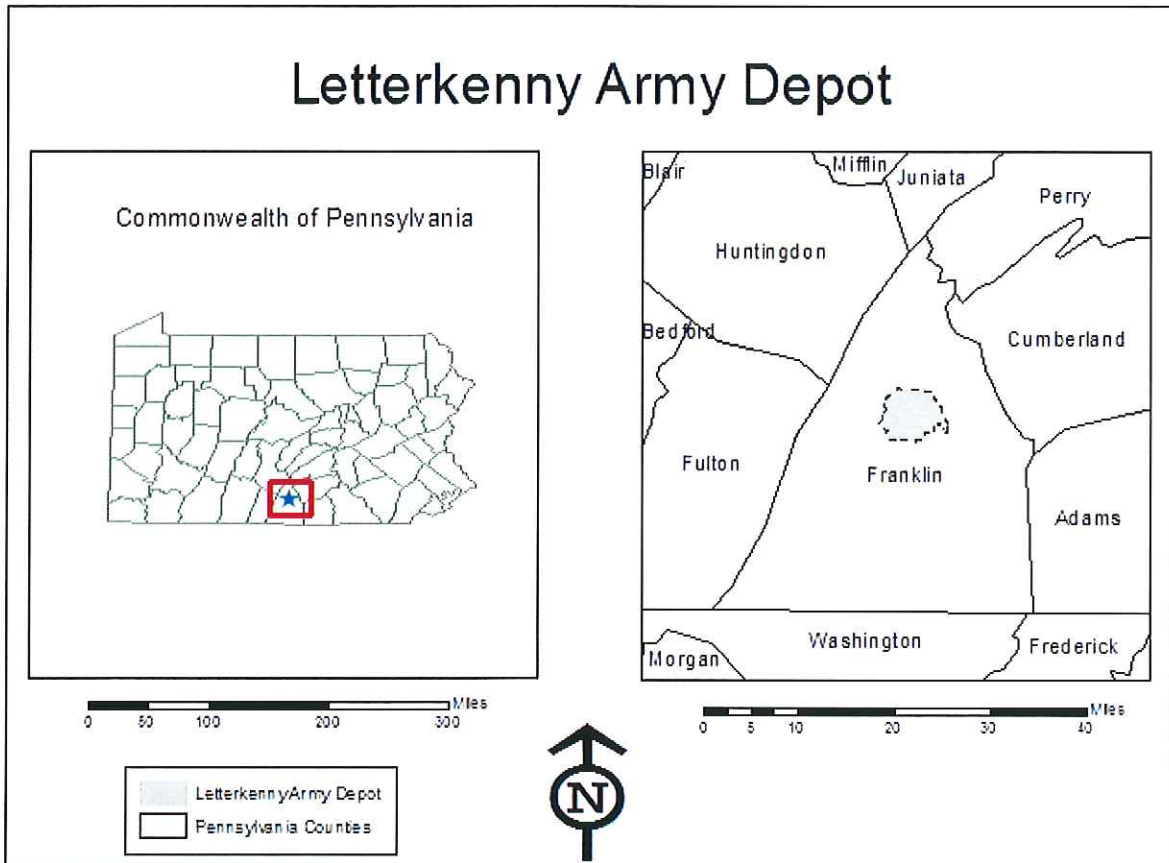


Figure 1: Site Location Map

LEAD Management Compartments

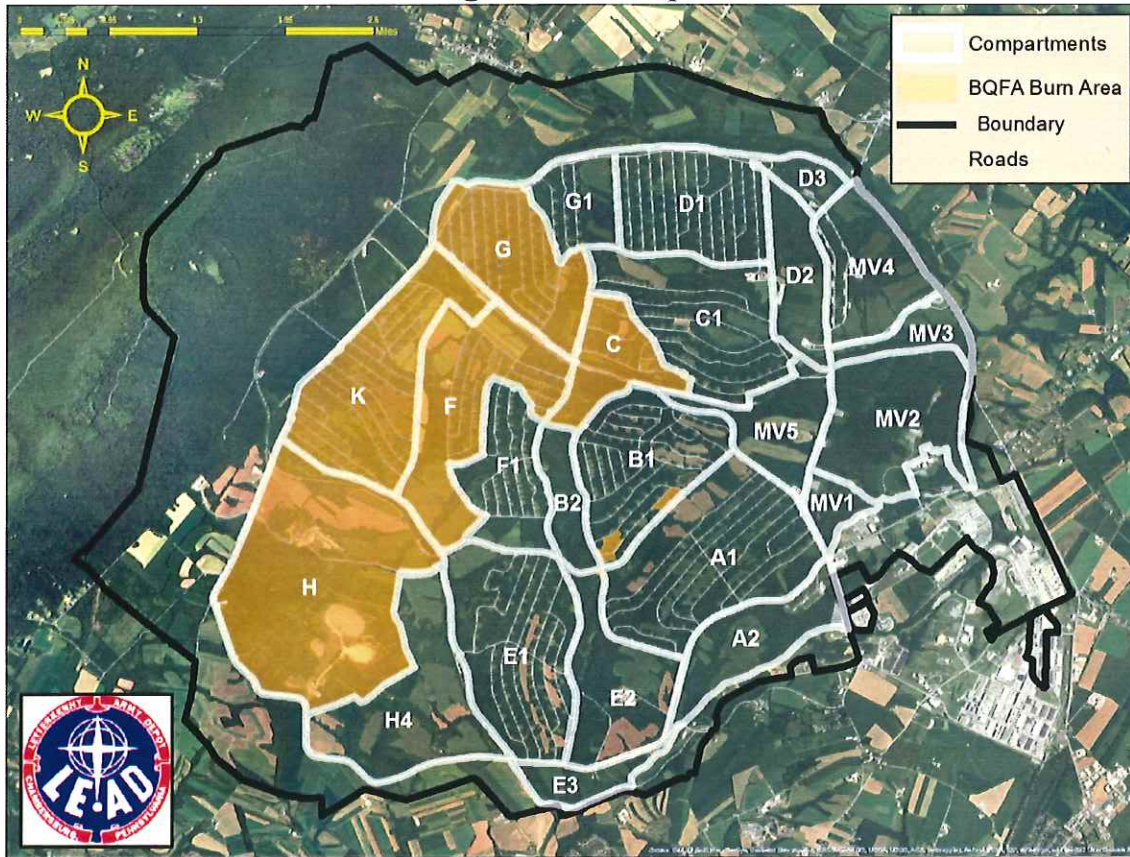


Figure 2: Letterkenny Army Depot Prescribed Fire Area Map

Compartment	Units	Acreage
B	3	33
C	7	306
F	11	694
G	15	531
H	14	1,347
K	16	765
Total	55	3,676

2. SOURCES OF EMERGENCY ASSISTANCE:

- Fire: LEAD Fire Dept. (717) 267-9101 or by radio
 DCNR District 2 Fire Supervisor – Ray Miller – Bravo 10, (717) 830-3687
 DCNR District 2 Office (717) 485-3148
- EMS: Franklin County Dispatch (717) 263-3172
- Police: LEAD Police Dept. (717) 267-8800

Cell service is available across the entire project area.

3. NOTIFICATIONS:

Burn Day Notifications:

LEAD: Command Office	(717) 267-8300	
Public Affairs Office	(717) 267-9741	Janet Gardener
DES – Police	(717) 267-8800	
DES- Fire	(717) 267-9101	
Safety Office	(717) 267-8855	Erin Shoemaker
DPW	(717) 267-9456	Damian Bess
LEMC	(717) 267-9126	Jeff McCrady

Outside Agencies:

When	Resource and Location	Point of Contact	Phone Number/Email
Day Before Burn	PA DEP Region 3 Air Quality Ops Chief	Kelley Matty	717-705-4830 (o) kmatty@pa.gov
Day Of Burn	Forest District #2 (Buchanan)	Ray Miller-Fire Supervisor	717-485-3148 (O) 717-830-3687 (C1) 717-860-2703 (C2)
		District Office	717-485-3148 (O)
	Franklin County EMA	Fire and EMS Dispatch	717-263-3172
	PGC SC Region Office	Dispatch	814-643-1831

Per the requirement of the PA Prescribed Fire Standards, the burn plan will be submitted 25 days prior to the first burn for review by DCNR Bureau of Forestry and DEP Bureau of Air Quality

The Letterkenny Army Depot Public Affairs Office will complete a press release before each burn season.

4. BURN UNIT AREA DESCRIPTION

The project area is a mix of agricultural lands being cropped or hayed, and woods ranging from wetter ash/poplar to drier oak/hickory/pine composition. The understory of the woods is primarily invasive shrub with little fuel underneath to carry the fire. Munition bunkers, or magazines, line the roads in much of the burn area. The magazines are covered with dirt and vegetated with grass that is mowed short. The short grass will likely carry fire in the dormant season.

Topography is gently rolling hills with the steepest slopes occurring in the network of stream drainages that are scattered across the installation. Surrounding fuels and topography are similar. Several ponds and stream crossings can be used to supply water.

The installation is divided into management compartments. Within the project area, these compartment are divided into multiple burn units mainly defined by road infrastructure. Maps of each compartment are attached for reference.

Prescribed burns within earth-covered magazine storage areas are authorized per Army regulations. This authorization includes the combustible vegetation on the earth cover as

well. When burning vegetation on or near the earth covering, magazine vents will be closed and the rear vent will be covered. The windows, doors, and ventilators of all magazines and/or operating buildings within 100 feet of controlled burns will be closed. Prescribed burns are not allowed within 100 feet of military munitions operating buildings containing open (exposed) explosives or of open storage pads. This is a minimum distance and consideration should be given to increasing the distance based on local conditions (for example, fuel load of the area being burned, weather conditions, and so forth).

Compartment Descriptions

B – Units in this compartment are dense warm season grass fields that have been maintained in the past by mowing. These units will benefit from a growing season burn to target woody encroachment and reduce thatch. Unit breaks will be roads and mow/disk lines.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Warm Season Grass: Over 3 feet tall	3	100	0-5	South

C – Most of the area will need mechanical treatment to remove trees and shrubs prior to burning. Unit breaks are paved roads.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Grass: 1-3 feet	1	20	0-10	All
Mowed Grass, fescue, lawn grass, shrub leaf litter	8	70	0-10	All
Oak/Hickory Leaf Litter	9	10	0-10	All

F – Areas of F1, F2, and F3 could be burned immediately. All of the wooded areas need mechanical treatment. A large portion of this compartment is being farmed. Unit breaks are paved roads.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Grass: 1-3 feet	1	30	0-10	All
Mowed Grass, fescue, lawn grass, shrub leaf litter	8	30	0-10	All
Oak/Hickory Leaf Litter	9	5	0-10	All

G – G0 through G3 have a strong native grass component. G4-G10 will need mechanical treatment. Unit breaks on the north and west side of G12 and G13 are trails. All other unit breaks are paved roads.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Grass: 1-3 feet	1	10	0-5	All
Warm Season Grass: Over 3 feet tall	3	20	0-5	All
Mowed Grass, fescue, lawn grass, shrub leaf litter	8	70	0-5	All

H – Units H1 and H2 have portions that could be burned now, but most of the area needs mechanical treatment prior to fire. Units H3-H13 surround the demolition grounds. All critical infrastructure on the grounds is protected by bare ground or a wide area of mowed grass. The woods is heavy to brush, rubus, and greenbriar with a consistent herbaceous and leaf litter component on the ground to carry a fire. Fire breaks consist of paved roads, stone trails, and a 50' wide mowed grass strip that borders units H6, H9, H10, H11, and H12.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Grass: 1-3 feet	1	20	0-5	All
Dormant Brush	6	30	0-5	All
Mowed Grass, fescue, lawn grass, invasives	8	25	0-5	All
Oak/Hickory Leaf Litter	9	10	0-10	All
Bare Ground	N/A	15	N/A	N/A

K – This area has the largest grass component and needs the least amount of mechanical treatment to achieve the desired open vegetation condition. Western sections of K3 through K10 have a strong oak/hickory component with scattered pitch and shortleaf pine. These stands will be thinned to increase light levels and burned frequently to encourage pine regeneration. Unit breaks are paved roads.

Vegetation Type	Fuel Model	% of Unit Area	% Slope	Aspect
Grass: 1-3 feet	1	60	0-5	All
Mowed Grass, fescue, lawn grass, shrub leaf litter	8	25	0-5	All
Oak/Hickory Leaf Litter	9	15	0-10	All

5. PRESCRIBED FIRE GOALS AND OBJECTIVES

Compartments C, F, G, H, and K make up the Bobwhite Quail Focus Area. The goal is create suitable habitat for quail that will be released on site in the next few years. Though this area has a focus on quail, numerous other wildlife species will benefit from the habitat change. Units in Compartment B will be burned during the growing season to target wood encroachment and reduce thatch.

Goal 1: Safety of the crew and the public

Objectives

1. Adhere to SOPs and guidelines in this burn plan
2. Provide thorough briefings and encourage participation in after action reviews

Goal 2: Use prescribed fire in conjunction with mechanical treatment as an efficient means for manipulating habitat. Areas not being farmed will be put on a 3-5 year fire return interval.

Objectives:

1. Control invasive plant species competing with native species important to quail habitat.
2. Suppress woody growth and decrease thatch in grasslands.
3. Encourage native warm season grass establishment for nesting cover.
4. Encourage forb diversity for brood rearing cover.

Goal 3: Manage fuel loading on the installation, specifically around the munitions disposal site in Compartment H, to improve safety and ease of suppression in the event of a wildfire.

Objectives

1. Burn all of unit H3 by 2019.
2. Burn at least portions of H3 every 3 years on average
3. Expand the use of fire outside the BQFA especially in areas with high fuel loading

Goal 4: Regenerate remnant shortleaf pine in Compartment K. Central Pennsylvania is the northern extent of shortleaf's historic range. Hardwood dominance in shortleaf stands, largely due to fire suppression, prevents regeneration.

Objectives

1. Thin stands to 60 sqft. BA and burn frequently to target undesirable hardwood regeneration and to prevent the litter layer from accumulating.

Goal 5: Develop crew cohesiveness from multiple agencies, organizations, and experience levels

Objectives

1. Provide training opportunities whenever possible
2. Provide variation in assignments so crew can gain experience working with fire and with different people

Other Alternatives Considered

Mechanical Only – Expensive, Slow

Herbicide – Expensive, doesn't reduce fuels, negative impacts secondary to its use

6. FUEL AND WEATHER PRESCRIPTION

Parameters:	Max	Min
Air Temperature (°F)	85	32
Relative Humidity (%)	65	20
20 Foot Wind Speed (mph)	15	0**
Eye-Level/Mid-flame Wind Speed (mph)	6	0
Wind Directions	Any	
1-Hour Fuel Moisture (%)	12	5
10-Hour Fuel Moisture (%)***	14	7
100-Hour Fuel Moisture (%)***	16	9
Atmospheric Mixing Height (ft)	No Max	1,000

**Controlled burns will not be conducted if the wind speed is higher or lower than allowed by local ordinance requirements, or is less than 5 miles per hour or exceeds 15 miles per hour, whichever is more restrictive.

***10 and 100 hour fuel moisture parameters are provided as a rule of thumb guideline for using BEHAVE modeling software. These parameters are not easily measured in the field and therefore are not relevant to a Go/No Go decision based on prescription.

7. FIRE BEHAVIOR PRESCRIPTION AND NARRATIVE

Fuel Model	Parameters	Head Fire		Backing Fire	
		Max	Min	Max	Min
1	Rate of Spread	145	3	6	1
	Flame Length	6	1	1	<1
3	Rate of Spread	164	16	7	4
	Flame Length	16	5	4	3
6	Rate of Spread	46	1	2	1
	Flame Length	7	1	2	1
8	Rate of Spread	3	<1	<1	<1
	Flame Length	1	<1	<1	<1
9	Rate of Spread	8	1	<1	<1
	Flame Length	3	1	1	<1
		MAX		MIN	
All	Probability of Ignition	70		20	

Low to moderate fire behavior will be adequate for achieving most of the objectives. The fire behavior outputs in the chart above support the prescription parameters in section 4. Aside from weather and fuel moisture conditions, seasonality and firing techniques will alter fire behavior and influence fire effects.

8. SMOKE MANAGEMENT PLAN

Before each burn day, the air quality index will be checked at www.airnow.gov. When the level is 101 or above, no prescribed fire operations will take place.

List downwind/down drainage smoke sensitive areas (give distance):

The distance to areas of concern is provided from the closest burn unit.

Upper Strasburg community and Route 533 – 0.9 miles North of G Units

Pleasant Hall community – 2.6 miles Northwest of G Units
 Route 997 — 2.3 miles East of G Units
 Borough of Chambersburg and Interstate 81 — 5.2 miles Southeast of H Units
 LEAD Cantonment Area — 2.8 miles East/Southeast of B Units
 LEAD Child Daycare Center — 1.8 miles East of B Units
 Grandview Elementary School — 3.9 miles Southeast of B Units
 Hamilton Heights Elementary School — 3.2 miles Southeast of H Units
 Homes along Mountain Road – 1 mile West of H Units

Describe desirable smoke behavior and smoke management actions:

The burn boss will evaluate surface wind direction, transport wind direction, and mixing height during the Go/No Go decision process as factors for smoke lift and dispersal. Ideally, convective heat from the fire will push smoke up in the sky before being transported away and dispersing. At higher surface wind speeds, smoke is pushed horizontally and not allowed to lift, which increases the risk for smoke impacts. Residual smoke from heavy fuels and snags burning can lead to smoke issues during the overnight hours, so it is important for the burn boss to consider nighttime weather conditions following a burn in heavy fuels.

The goal is to have little to no impact from smoke to any of the areas listed above. However, in the event that significant impacts do occur, mitigation measures can be taken depending on the nature of the issue. Examples include adjusting ignition tactics, finishing the current unit and not continuing operations, or more intensive mop up. The burn boss will determine the best course of action based on the situation. The public affairs office could also be used for messaging to the public if needed.

9. BURN SCHEDULING

Units may be burned at any time during year. While a few units have acceptable conditions for growing season fire, most of these units will be burned during the dormant season, at least for the initial entry. All units in this burn plan will be completed in one operational period. Residual smoke should be expected following a burn as interior fuels are allowed to smolder to meet objectives.

Scheduling conflicts may arise due to other LEAD activities. Those situations will be identified prior to burn day by the LEAD Natural Resources Manager.

10. ICS ORGANIZATION

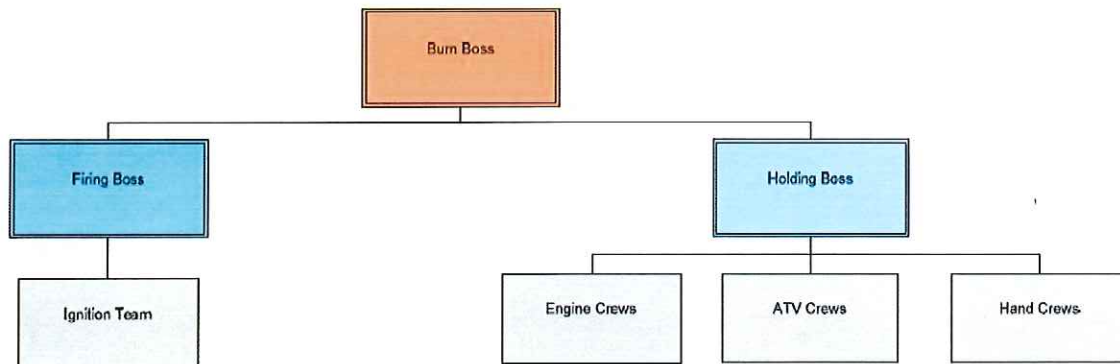


Figure 3: Sample ICS organization chart for a prescribed burn. The actual organization used on burn day will be determined by the burn boss.

11. ASSIGNED PERSONNEL AND EQUIPMENT

Minimum Crew: 7

Personnel	Number
Burn Boss (RXB2)	1
Firing Boss (FIRB)	1
FFT1 (Serving as Holding Specialist)	1
FFT2	4
Equipment	Number
Engines (Type 6 or 7)	3

12. PRE-BURN CONSIDERATIONS

Firebreak preparations:

The majority of the firebreaks are paved roads or trails. Unit boundaries internal to Compartment H are a combination of 50 foot wide mowed grass breaks and two track trails accessible by Type 6 engine. Other internal mow or disk lines can be installed as needed by Natural Resources staff.

Crew Access/Badging:

LEAD is a secure facility. Anyone participating on the burn crew must obtain an access badge in cantonment prior to entering the project area. Fire personnel should complete an Access Control Application in advance to prevent delays in accessing the facility on burn day

Fire sensitive areas:

The most important fire sensitive area from a safety perspective are the numerous magazines located in all compartments except Compartment H. These structures are covered with dirt and vegetated with grass that is typically mowed to within a few inches of the ground. Fire sensitive concerns include

- 1) Smoke and embers entering the magazines through air intakes/vents
 - a. LEAD Natural Resources staff will wrap vents with foil structure wrap – the same material used in western states to protect remote cabins from wildfires. This technique has been used successfully by Bluegrass Army Depot in Kentucky.
- 2) Heat from the fire melting electronics on the outside of magazines in Compartment K
 - a. Burns crews will apply a wetline and burnout around the electronics if it's determined that the electronics are at risk to fire exposure on burn day

Structures and cemeteries located within burn units will have to be protected by burnout, wet lines, or cutting a fireline directly around the objects. Though most will not be affected by fire, all known cultural sites within the burn units will be identified, prepped appropriately and briefed to the crew prior to the burn.

Potential hazards to crew:

Operating on smoky roads – roads in the vicinity of the burn operation will be barricaded for the day. Roads that cannot be barricaded that may be obstructed by smoke, will be monitored for traffic by LEAD Police/security during the burn to ensure fire crew safety.

13. TEST FIRE

The purpose of the test fire is to verify that the prescribed fire behavior characteristics will meet management objectives and to verify smoke dispersal. The test fire will be conducted on the downwind flank of a burn unit at a suitable anchor point which also possesses representative fuels of the main unit. The test fire will be evaluated based on observed fire behavior and the ability to control the fire once it is lit. If it is determined that the fire will not meet the objectives of the burn, or the fire behavior is extreme, the burn will be called off until the next suitable burn opportunity. The results of the test fire will be documented in the Burn Boss's personal notes.

14. FIRING PLAN

Ignition will be done primarily from roads using drip torches and potential a Pyroshot gun. Interior ignition will be done where necessary. Ignition will start on the downwind side of the first unit and progress into wind as adequate defensible black is built. Multiple units will likely be burned during the same operational period so headfire may be adequate on subsequent units. Igniters will burn out around magazine components. Fire will be allowed to carry over the magazines.

15. HOLDING PLAN

Most of the firebreaks are wide paved roads. The main concern when burning these units is spotting and prep work around the magazines. For efficiency with a small crew, it is likely that all personnel will be assigned to a vehicle whether it be a UTV, ATV, or truck. Mowed breaks can also be wet-lined prior to ignition for added protection and to allow ignition to proceed without interruption.

Holding and firing resources will coordinate on a plan for burning around magazines.

After the firing operation, the holding team will continue to patrol the flanks of the fire looking for any slop-overs or spot fires outside of the burn unit. If any of these situations are encountered, the holding team will notify the Burn Boss and suppress these fires unless otherwise instructed by the Burn Boss.

Mop up standards for around the perimeter of the area burned in 1 operational period (may include multiple units): hot spots within 25 feet of hard lines and 50 feet of soft lines will be extinguished. Anything burning over 10 feet high will be addressed within 100 feet of the line.

16. MONITORING

Fire behavior and weather monitoring:

Fire weather data will be taken every hour starting with 1 hour before the burn and 1 hour after ignition is complete. Weather data can be taken at any time as the situation may dictate. Other conditions to be monitored will include: fire behavior, fuel conditions, and smoke dispersal.

Fire Effects

Fire effects will be monitored by Natural Resources and PGC staff primarily during site visits but photo monitoring plots may also be established to track changes in vegetation. Monitoring will be a continual process throughout this project.

17. COMMUNICATIONS PLAN

All crew members will have a portable radio with them at all times. If there are not enough portable radios for all crew members, then personnel without radios will be teamed up with personnel possessing radios. VHF high band direct communication will be the primary radio network used. The Burn Boss will have radio communication with DCNR and Franklin County Dispatch on the PA Statewide Radio Network 800mhz OpenSky system. A communications plan with specific talk groups and/or frequencies listed for the day of the burn will be attached to the Incident Action Plan.

18. CONTINGENCY PLAN

a. Fire Outside Operational Period Boundaries

Fire outside operational period boundaries can be expected and these situations are typically handled by on site crew using direct attack methods. When direct attack is not effective, crews will go to the next road and burn the adjacent unit to contain the fire when that option is there. If fire gets well established outside containment lines where no close secondary lines exist or if crews can't hold fire to an adjacent unit, the Burn Boss will call LEAD Fire Dept.** to assist with containment. LEAD Fire can be on site at the burn units in 10-15 minutes. If the fire continues to exceed containment efforts, the prescribed fire will be converted to a wildfire. See Wildfire Conversion Section.

Secondary containment lines are abundant throughout the installation. Other opportunities for containment include agricultural fields, drainages, and areas of bare ground. Secondary lines specific to an operational period will be identified by the Burn Boss and briefed to the crew prior to ignition.

b. Smoke Impacts to the Surrounding Area

See Smoke Management Section

**Letterkenny Fire Dept. is a paid department staffed 24/7. In the event additional support other than the LEAD Fire Dept. is required, an outside fire company may be brought in at the discretion of the Fire Chief or Officer in Charge.

19. WILDFIRE CONVERSION

Once a prescribed fire is converted to a wildfire, the Burn Boss will transition to a unified command structure with LEAD Fire Dept. The intent of this structure is to blend expertise and to facilitate communications between assigned resources. The Bureau of Forestry, Game Commission, and appropriate LEAD staff will be notified of the incident.

20. MEDICAL PLAN

Any injury that occurs during a burn must be relayed to the Burn Boss. Injuries will be evaluated as on site care or EMS response. If needed, the Burn Boss will request EMS through Franklin County Dispatch. First aid kits with burn dressings and an AED will be available on site. A more detailed medical plan with nearest intersection will be included in the IAP. Any need for air medical response will be determined by EMS and coordinated through LEAD Fire Department.

20. EVALUATION

The Burn Boss will evaluate conditions during the burn and immediately upon completion. Post burn evaluations will be conducted for all burn units no more than one month after a burn has been completed. Certain objectives cannot be evaluated one month post burn, if deemed necessary successive post burn evaluations will need to be done to evaluate the fire's impact on the landscape. Post burn evaluations will be used to determine if the prescribed fire goals and objectives have been met. All data will be documented by the LEAD Natural Resources Office.

21. BURN UNIT MODIFICATION

LEAD reserves the right to create smaller subunits within identified burn units as determined appropriate to support the military training mission or facilitate the use of different ignition devices and methods without the need for a formal burn plan amendment.

PENNSYLVANIA PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

Site: Letterkenny Army Depot	Unit: All	Agency: LEAD	Date: 2/24/17
Complexity Score (circle)			
<i>Low (44-80 pts)</i>	<i>Moderate (81-150 pts)</i>	<i>High (151-220 pts)</i>	

Weighting Factor x Complexity Value = Total points. Sum of Total points = Complexity Score. Assign each complexity value as a 1, 2, 3, 4, or 5.

Complexity Element	Weighting Factor	Complexity Value	Total Points	Rationale and/or Mitigation Procedures (Use for clarification of rationale and/or Complexity Value.)
1. Safety	5	5	25	Burning around and over the magazines is a major safety concern however measures are being taken to mitigate risk. Vents will be closed and wrapped and wetlines will be used to protect electronics. Bluegrass Army Depot has successfully burned around their magazines using the same precautions.
2. Difficulty of Containment	5	2	10	Wide paved roads and established trails are easily accessible by engine. Numerous secondary control lines are available around all units.
3. Fuels and Fire Behavior	5	3	15	Pockets of heavy fuel are located throughout the site. Intense fire behavior is common when burning model 3 however that will be mitigated by burning during the growing season.
4. Wildland / Urban Interface	5	5	25	While not to the extent of burning along a highway or against a community, plenty of WUI exists in the form of storage buildings and field offices that are internal to several units. There will also be plenty of visibility and interest from Chambersburg area residents and commuters.
5. Objectives	4	2	8	Objectives will not be particularly challenging to meet. Objectives do not conflict.
Sub Total (Page 1)			83	

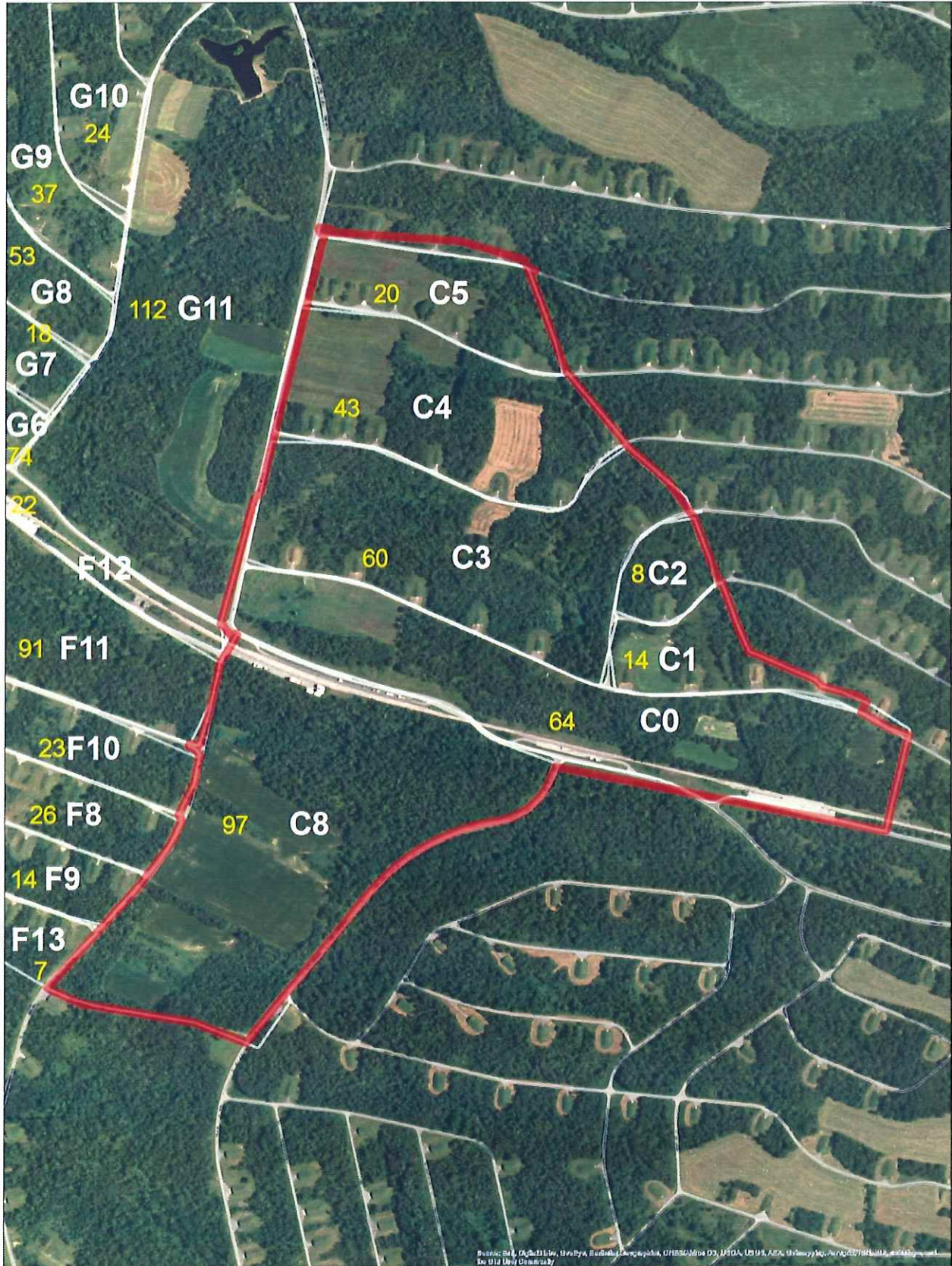
Rationale and/or Mitigation Procedures

Complexity Element	Weighting Factor	Complexity Value	Total Points	Rationale and/or Mitigation Procedures
6. Management Organization	4	1	4	ICS will be very basic given the small crew size.
7. Contingency Planning and Resources	4	2	8	LEAD Fire Dept will provide contingency support. In the event that they are not available during a burn, a transfer company will be standing by on station. Transfer companies will be made at the discretion of the LEAD Fire Chief or Officer in Charge.
8. Natural, Cultural, Social Values	3	4	12	Several cemeteries are scattered across the installation. A few of these are adjacent to old church sites with groves of large diameter oak trees that are likely several hundred years old. These sites are obviously important to protect and maintain for cultural and historical value. The 4 rating recognizes the occurrences but these sites are easily accessible and protection measures will be taken prior to a burn.
9. Air Quality Values	3	3	9	Units are relatively small and are not directly adjacent to any residences. However, smoke management is a top priority especially since this is a new program on the installation and a fairly new practice in the Chambersburg area.
10. Logistics	3	5	15	Logistics will be a challenge for the first few operational periods due to badging, security check points, finding appropriate staging areas, wrapping magazine vents, and evaluating site conditions. This rating is likely to come down in future plans.
11. Tactical Operations	2	4	8	While having roads as unit breaks is great for containment, it presents a challenge for ignition. Vehicle mounted torches will almost be a necessity. Tactical coordination will also be needed for burning around the magazines.
12. Cooperator Coordination	1	3	3	LEAD and PGC are just beginning their partnership with fire. Burn coordination will be new to the NR staff. PGC will need to coordinate resources from the SC Region, Harrisburg HQ, and partners in the local area.
Sub Total	Page 2	59	83	Additional Comments:
	Page 1	142		
Complexity Score				MODERATE Rated by: John Wakefield, PGC Burn Boss

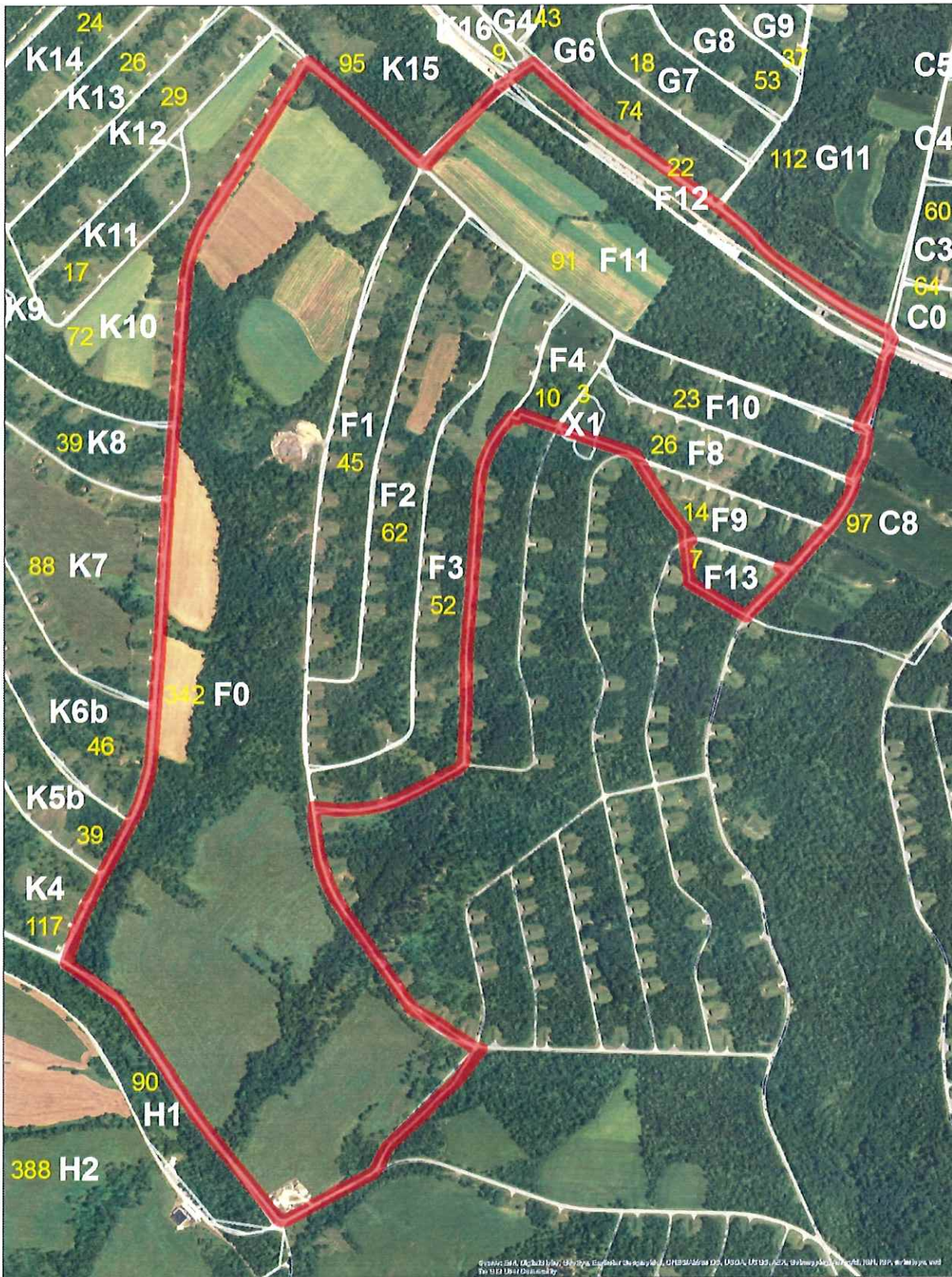
LEAD Compartment B1 Burn Units



LEAD Compartment C Burn Units



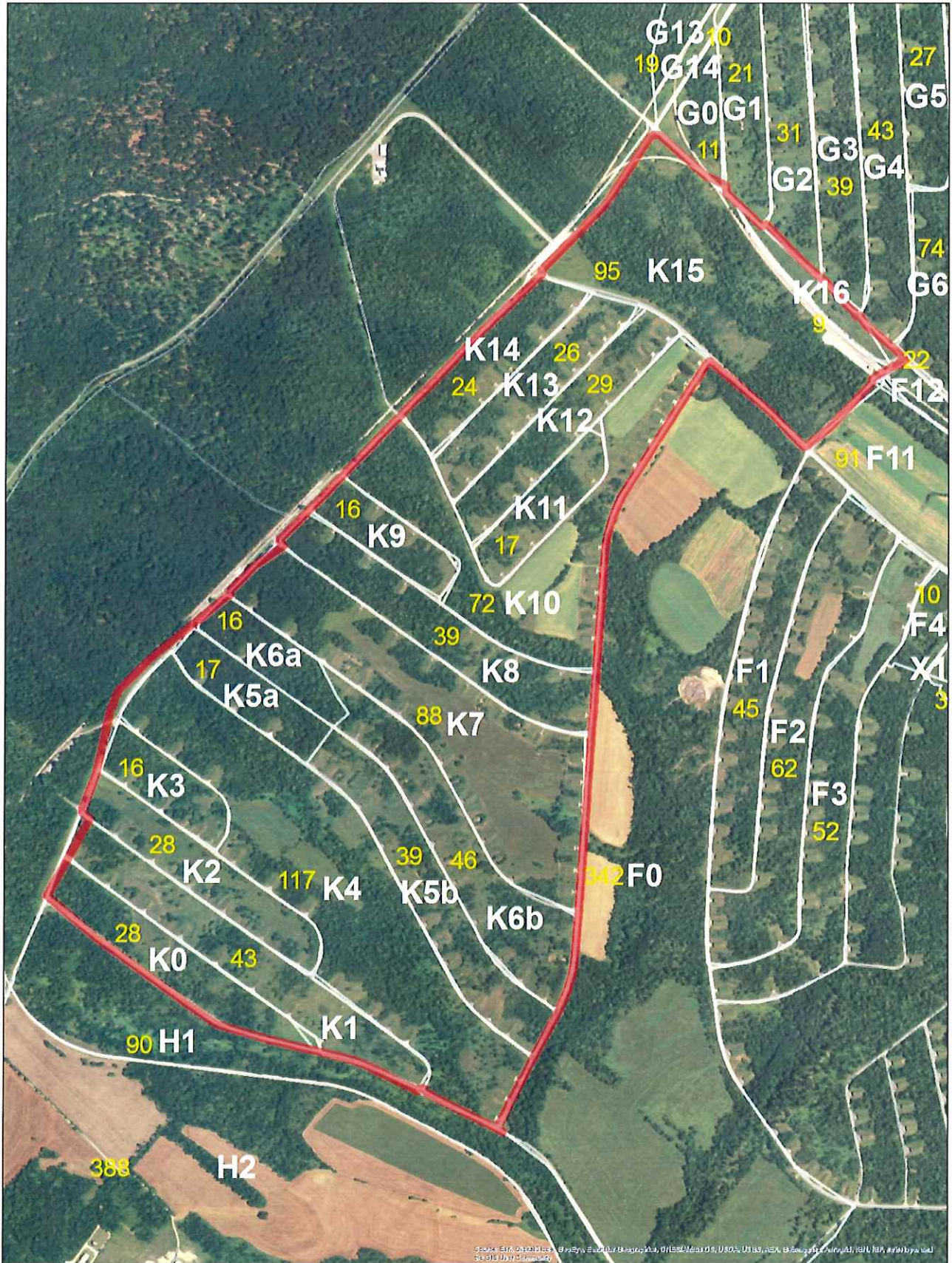
LEAD Compartment F Burn Units



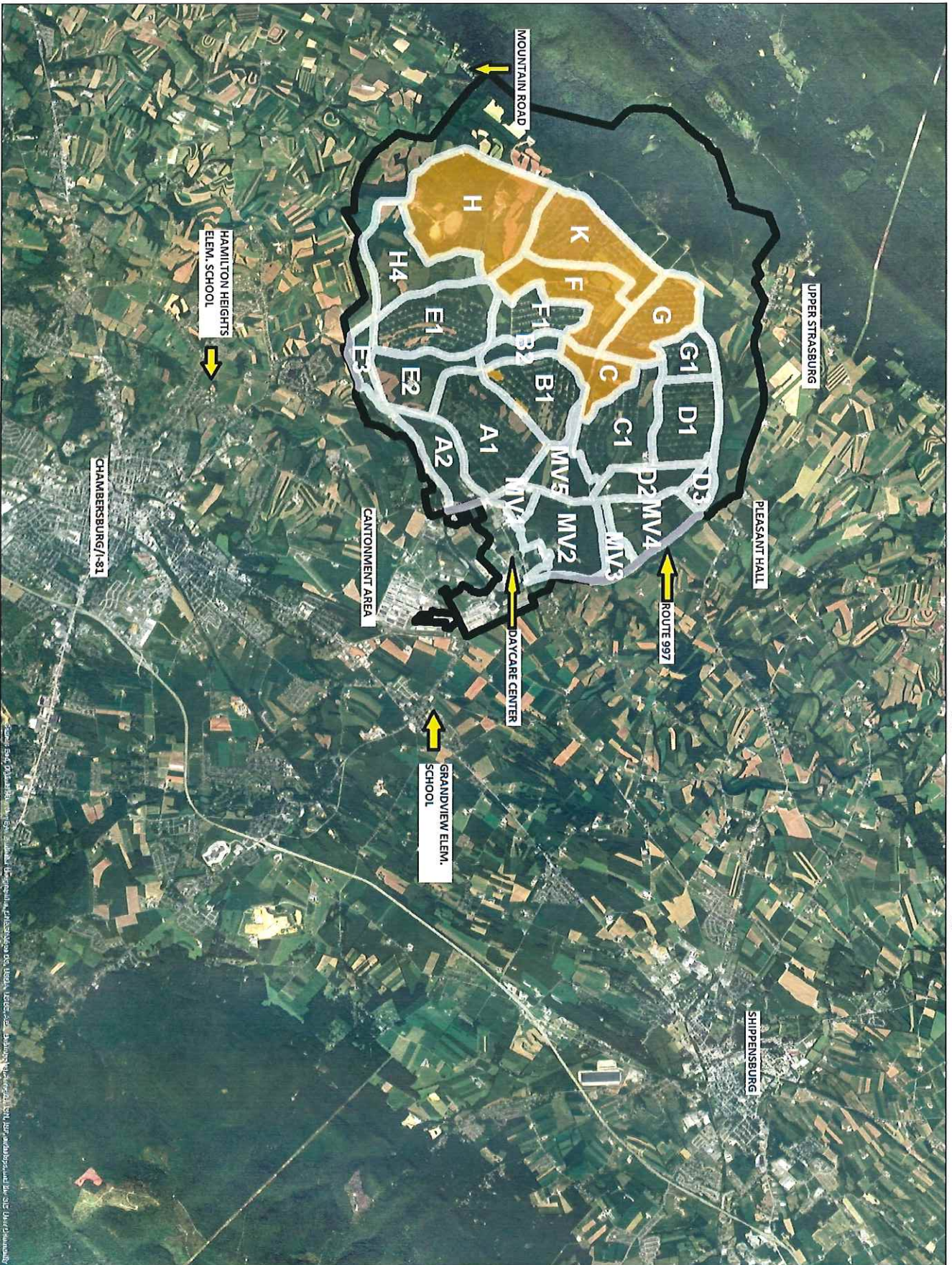
LEAD Compartment G Burn Units



LEAD Compartment K Burn Units



LEAD Smoke Management Map

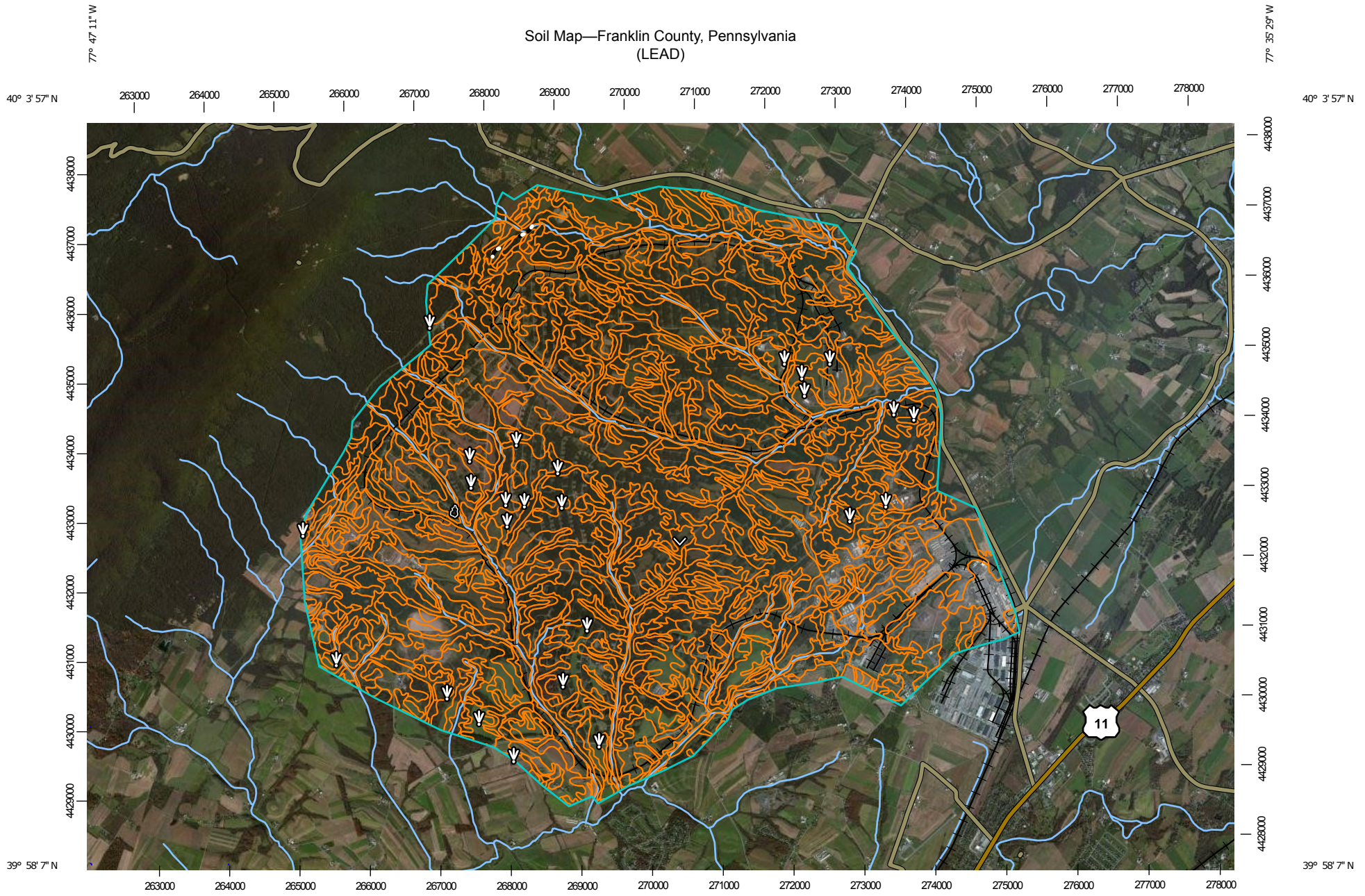


APPENDIX H
SOILS

Franklin County Online Web Soil Survey (2019)
Soils PLS (2008)

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Soil Map—Franklin County, Pennsylvania
(LEAD)



Map Scale: 1:76,100 if printed on A landscape (11" x 8.5") sheet.


0 1000 2000 4000 6000 Meters

0 3500 7000 14000 21000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Pennsylvania

Survey Area Data: Version 12, Sep 19, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 18, 2010—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

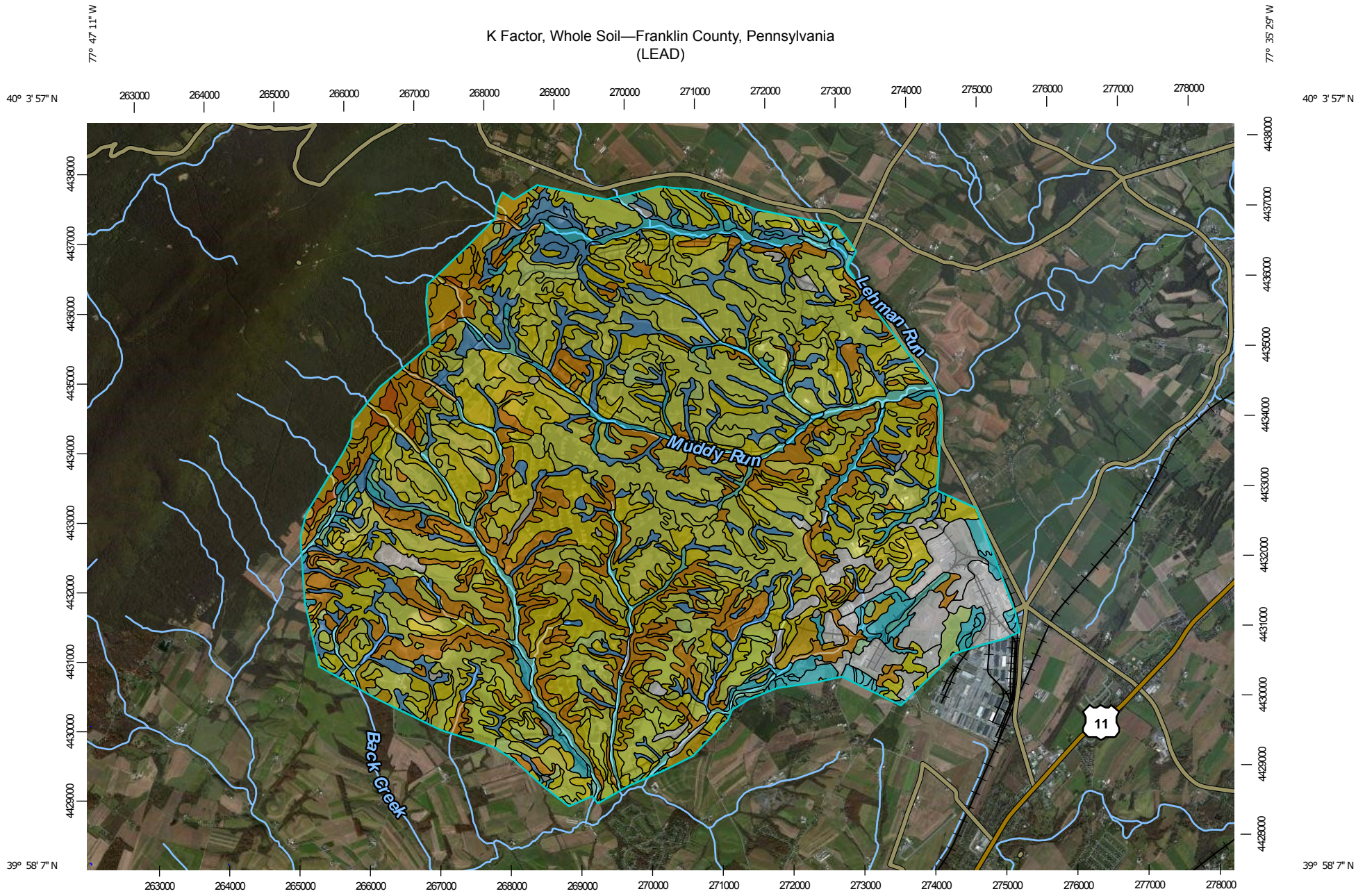
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgB	Allegheny loam, 3 to 8 percent slopes	3.6	0.0%
AnB	Andover gravelly loam, 3 to 8 percent slopes	57.7	0.4%
AoB	Andover gravelly loam, 0 to 8 percent slopes, very stony	13.3	0.1%
As	Atkins silt loam	441.4	2.8%
BhB	Bedington channery silt loam, 3 to 8 percent slopes	127.6	0.8%
BkB	Berks channery silt loam, 3 to 8 percent slopes	4,191.2	26.8%
BkC	Berks channery silt loam, 8 to 15 percent slopes	196.4	1.3%
BIA	Blairton channery silt loam, 0 to 3 percent slopes	80.6	0.5%
BIB	Blairton channery silt loam, 3 to 8 percent slopes	242.0	1.5%
BrA	Brinkerton silt loam, 0 to 3 percent slopes	697.8	4.5%
BrB	Brinkerton silt loam, 3 to 8 percent slopes	797.7	5.1%
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	129.8	0.8%
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	2.6	0.0%
BxB	Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony	30.2	0.2%
CoB	Carbo silty clay loam, 3 to 8 percent slopes	73.2	0.5%
CsA	Clarksburg silt loam, 0 to 3 percent slopes	15.8	0.1%
CtB	Clearbrook channery silt loam, 0 to 8 percent slopes	910.9	5.8%
DAM	Dam	0.5	0.0%
DbE	Dekalb-Bagtown complex, 25 to 65 percent slopes, extremely stony	1.1	0.0%
Dm	Deposit gravelly loam, 0 to 8 percent slopes, very stony	22.2	0.1%
DrB	Dryrun gravelly loam, 3 to 8 percent slopes	87.8	0.6%
Du	Dunning silt loam	4.1	0.0%

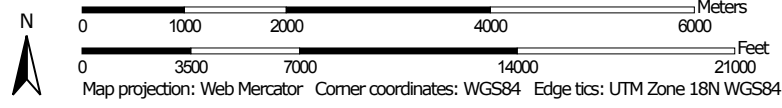
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EeB	Edom-Carbo silty clay loams, 3 to 8 percent slopes	57.4	0.4%
ErB	Ernest silt loam, 3 to 8 percent slopes	207.1	1.3%
Fu	Funkstown silt loam	0.9	0.0%
HaA	Hagerstown silt loam, 0 to 3 percent slopes	65.9	0.4%
HaB	Hagerstown silt loam, 3 to 8 percent slopes	124.4	0.8%
HaC	Hagerstown silt loam, 8 to 15 percent slopes	0.0	0.0%
HbB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes	10.9	0.1%
HbD	Hagerstown-Carbo silty clay loams, 15 to 25 percent slopes	3.1	0.0%
HcB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes, very rocky	6.1	0.0%
HcC	Hagerstown-Carbo silty clay loams, 8 to 15 percent slopes, very rocky	5.1	0.0%
HkB	Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	26.0	0.2%
HkD	Hagerstown-Rock outcrop complex, 8 to 35 percent slopes	6.7	0.0%
Jg	Jugtown silt loam	18.0	0.1%
Mb	Maurertown silt loam	263.2	1.7%
Me	Melvin silt loam	49.4	0.3%
MoB	Monongahela silt loam, 3 to 8 percent slopes	5.6	0.0%
MrA	Murrill gravelly loam, 0 to 3 percent slopes	2.0	0.0%
MrB	Murrill gravelly loam, 3 to 8 percent slopes	167.9	1.1%
MrC	Murrill gravelly loam, 8 to 15 percent slopes	3.4	0.0%
MuB	Murrill cobbly sandy loam, 3 to 8 percent slopes	68.4	0.4%
MvB	Murrill gravelly loam, 3 to 8 percent slopes, extremely stony	153.0	1.0%
MvD	Murrill gravelly loam, 8 to 25 percent slopes, extremely stony	39.6	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Pg	Penlaw silt loam, 0 to 3 percent slopes	16.1	0.1%
Q	Quarries	121.9	0.8%
SeB	Sideling gravelly loam, 3 to 8 percent slopes	17.9	0.1%
SrB	Sideling gravelly loam, 0 to 8 percent slopes, extremely stony	3.7	0.0%
SrD	Sideling gravelly loam, 8 to 25 percent slopes, extremely stony	2.2	0.0%
SwB	Swanpond-Edom complex, 0 to 8 percent slopes	40.2	0.3%
UbB	Urban land-Berks complex, 0 to 8 percent slopes	227.7	1.5%
UhB	Urban land-Hagerstown complex, 0 to 8 percent slopes	220.9	1.4%
Uu	Urban land-Udorthents complex, 0 to 25 percent slopes	241.1	1.5%
W	Water	35.2	0.2%
WeB	Weikert channery silt loam, 3 to 8 percent slopes	2,505.7	16.0%
WeC	Weikert channery silt loam, 8 to 15 percent slopes	450.0	2.9%
WeD	Weikert channery silt loam, 15 to 25 percent slopes	205.4	1.3%
WkB	Weikert very channery silt loam, 3 to 8 percent slopes	861.5	5.5%
WkC	Weikert very channery silt loam, 8 to 15 percent slopes	1,043.0	6.7%
WkD	Weikert very channery silt loam, 15 to 25 percent slopes	196.5	1.3%
WkF	Weikert very channery silt loam, 25 to 65 percent slopes	35.4	0.2%
Totals for Area of Interest		15,636.4	100.0%

K Factor, Whole Soil—Franklin County, Pennsylvania
(LEAD)




Map Scale: 1:76,100 if printed on A landscape (11" x 8.5") sheet.



K Factor, Whole Soil—Franklin County, Pennsylvania
(LEAD)
















MAP LEGEND

Area of Interest (AOI)







 Area of Interest (AOI)










Soils

Soil Rating Polygons
















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-  .49
-  .55
-  .64
-  Not rated or not available

Soil Rating Lines








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-  .43
-  .49
-  .55
-  .64
-  Not rated or not available

Soil Rating Points

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-  .15
-  .17
-  .20
-  .24
-  .28
-  .32
-  .37
-  .43
-  .49
-  .55
-  .64
-  Not rated or not available

Water Features

-  Streams and Canals
- Transportation**
-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background**
-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Pennsylvania
Survey Area Data: Version 12, Sep 19, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 18, 2010—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgB	Allegheny loam, 3 to 8 percent slopes	.28	3.6	0.0%
AnB	Andover gravelly loam, 3 to 8 percent slopes	.20	57.7	0.4%
AoB	Andover gravelly loam, 0 to 8 percent slopes, very stony	.17	13.3	0.1%
As	Atkins silt loam	.32	441.4	2.8%
BhB	Bedington channery silt loam, 3 to 8 percent slopes	.17	127.6	0.8%
BkB	Berks channery silt loam, 3 to 8 percent slopes	.20	4,191.2	26.8%
BkC	Berks channery silt loam, 8 to 15 percent slopes	.17	196.4	1.3%
BIA	Blairton channery silt loam, 0 to 3 percent slopes	.20	80.6	0.5%
BIB	Blairton channery silt loam, 3 to 8 percent slopes	.24	242.0	1.5%
BrA	Brinkerton silt loam, 0 to 3 percent slopes	.43	697.8	4.5%
BrB	Brinkerton silt loam, 3 to 8 percent slopes	.43	797.7	5.1%
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	.10	129.8	0.8%
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	.10	2.6	0.0%
BxB	Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony	.15	30.2	0.2%
CoB	Carbo silty clay loam, 3 to 8 percent slopes	.37	73.2	0.5%
CsA	Clarksburg silt loam, 0 to 3 percent slopes	.37	15.8	0.1%
CtB	Clearbrook channery silt loam, 0 to 8 percent slopes	.20	910.9	5.8%
DAM	Dam		0.5	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DbE	Dekalb-Bagtown complex, 25 to 65 percent slopes, extremely stony	.15	1.1	0.0%
Dm	Deposit gravelly loam, 0 to 8 percent slopes, very stony	.10	22.2	0.1%
DrB	Dryrun gravelly loam, 3 to 8 percent slopes	.10	87.8	0.6%
Du	Dunning silt loam	.32	4.1	0.0%
EeB	Edom-Carbo silty clay loams, 3 to 8 percent slopes	.24	57.4	0.4%
ErB	Ernest silt loam, 3 to 8 percent slopes	.37	207.1	1.3%
Fu	Funkstown silt loam	.32	0.9	0.0%
HaA	Hagerstown silt loam, 0 to 3 percent slopes	.37	65.9	0.4%
HaB	Hagerstown silt loam, 3 to 8 percent slopes	.37	124.4	0.8%
HaC	Hagerstown silt loam, 8 to 15 percent slopes	.37	0.0	0.0%
HbB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes	.28	10.9	0.1%
HbD	Hagerstown-Carbo silty clay loams, 15 to 25 percent slopes	.28	3.1	0.0%
HcB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes, very rocky	.28	6.1	0.0%
HcC	Hagerstown-Carbo silty clay loams, 8 to 15 percent slopes, very rocky	.28	5.1	0.0%
HkB	Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	.32	26.0	0.2%
HkD	Hagerstown-Rock outcrop complex, 8 to 35 percent slopes	.28	6.7	0.0%
Jg	Jugtown silt loam	.32	18.0	0.1%
Mb	Maurertown silt loam	.37	263.2	1.7%
Me	Melvin silt loam	.43	49.4	0.3%
MoB	Monongahela silt loam, 3 to 8 percent slopes	.32	5.6	0.0%
MrA	Murrill gravelly loam, 0 to 3 percent slopes	.15	2.0	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MrB	Murrill gravelly loam, 3 to 8 percent slopes	.15	167.9	1.1%
MrC	Murrill gravelly loam, 8 to 15 percent slopes	.15	3.4	0.0%
MuB	Murrill cobbly sandy loam, 3 to 8 percent slopes	.05	68.4	0.4%
MvB	Murrill gravelly loam, 3 to 8 percent slopes, extremely stony	.15	153.0	1.0%
MvD	Murrill gravelly loam, 8 to 25 percent slopes, extremely stony	.15	39.6	0.3%
Pg	Penlaw silt loam, 0 to 3 percent slopes	.37	16.1	0.1%
Q	Quarries		121.9	0.8%
SeB	Sideling gravelly loam, 3 to 8 percent slopes	.15	17.9	0.1%
SrB	Sideling gravelly loam, 0 to 8 percent slopes, extremely stony	.15	3.7	0.0%
SrD	Sideling gravelly loam, 8 to 25 percent slopes, extremely stony	.15	2.2	0.0%
SwB	Swanpond-Edom complex, 0 to 8 percent slopes	.37	40.2	0.3%
UbB	Urban land-Berks complex, 0 to 8 percent slopes		227.7	1.5%
UhB	Urban land-Hagerstown complex, 0 to 8 percent slopes		220.9	1.4%
Uu	Urban land-Udorthents complex, 0 to 25 percent slopes		241.1	1.5%
W	Water		35.2	0.2%
WeB	Weikert channery silt loam, 3 to 8 percent slopes	.17	2,505.7	16.0%
WeC	Weikert channery silt loam, 8 to 15 percent slopes	.17	450.0	2.9%
WeD	Weikert channery silt loam, 15 to 25 percent slopes	.15	205.4	1.3%
WkB	Weikert very channery silt loam, 3 to 8 percent slopes	.10	861.5	5.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WkC	Weikert very channery silt loam, 8 to 15 percent slopes	.10	1,043.0	6.7%
WkD	Weikert very channery silt loam, 15 to 25 percent slopes	.10	196.5	1.3%
WkF	Weikert very channery silt loam, 25 to 65 percent slopes		35.4	0.2%
Totals for Area of Interest			15,636.4	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

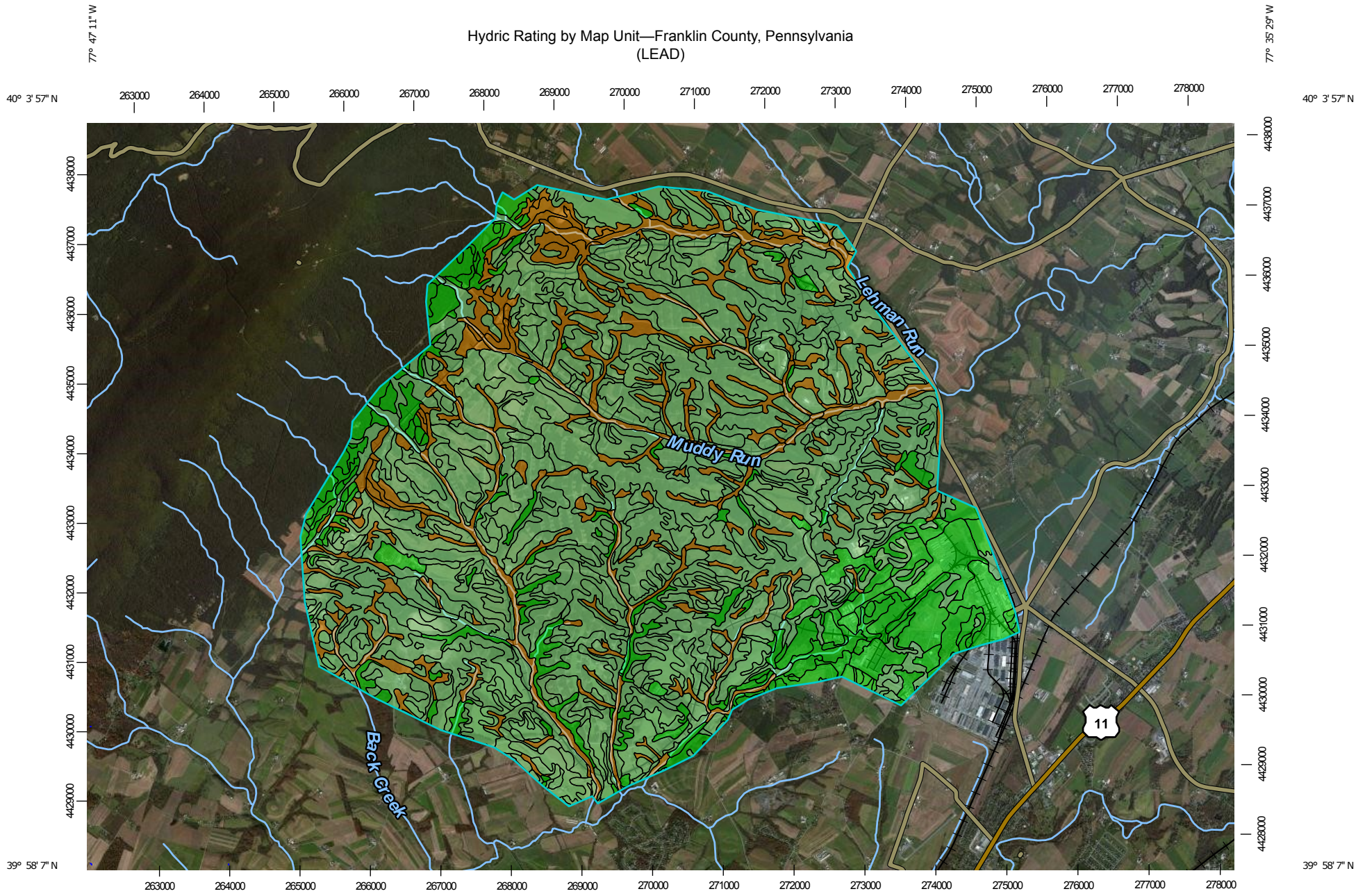
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Hydric Rating by Map Unit—Franklin County, Pennsylvania
(LEAD)



Map Scale: 1:76,100 if printed on A landscape (11" x 8.5") sheet.

0 1000 2000 4000 6000 Meters


0 3500 7000 14000 21000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Hydric Rating by Map Unit—Franklin County, Pennsylvania
(LEAD)







MAP LEGEND

Area of Interest (AOI)







 Area of Interest (AOI)

Soils







Soil Rating Polygons

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


Soil Rating Lines

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available






Soil Rating Points

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Pennsylvania
Survey Area Data: Version 12, Sep 19, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 18, 2010—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgB	Allegheny loam, 3 to 8 percent slopes	0	3.6	0.0%
AnB	Andover gravelly loam, 3 to 8 percent slopes	81	57.7	0.4%
AoB	Andover gravelly loam, 0 to 8 percent slopes, very stony	79	13.3	0.1%
As	Atkins silt loam	88	441.4	2.8%
BhB	Bedington channery silt loam, 3 to 8 percent slopes	0	127.6	0.8%
BkB	Berks channery silt loam, 3 to 8 percent slopes	5	4,191.2	26.8%
BkC	Berks channery silt loam, 8 to 15 percent slopes	5	196.4	1.3%
BIA	Blairton channery silt loam, 0 to 3 percent slopes	6	80.6	0.5%
BIB	Blairton channery silt loam, 3 to 8 percent slopes	4	242.0	1.5%
BrA	Brinkerton silt loam, 0 to 3 percent slopes	86	697.8	4.5%
BrB	Brinkerton silt loam, 3 to 8 percent slopes	78	797.7	5.1%
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	6	129.8	0.8%
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	6	2.6	0.0%
BxB	Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony	5	30.2	0.2%
CoB	Carbo silty clay loam, 3 to 8 percent slopes	0	73.2	0.5%
CsA	Clarksburg silt loam, 0 to 3 percent slopes	0	15.8	0.1%
CtB	Clearbrook channery silt loam, 0 to 8 percent slopes	5	910.9	5.8%
DAM	Dam	0	0.5	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DbE	Dekalb-Bagtown complex, 25 to 65 percent slopes, extremely stony	0	1.1	0.0%
Dm	Deposit gravelly loam, 0 to 8 percent slopes, very stony	8	22.2	0.1%
DrB	Dryrun gravelly loam, 3 to 8 percent slopes	0	87.8	0.6%
Du	Dunning silt loam	85	4.1	0.0%
EeB	Edom-Carbo silty clay loams, 3 to 8 percent slopes	0	57.4	0.4%
ErB	Ernest silt loam, 3 to 8 percent slopes	7	207.1	1.3%
Fu	Funkstown silt loam	0	0.9	0.0%
HaA	Hagerstown silt loam, 0 to 3 percent slopes	0	65.9	0.4%
HaB	Hagerstown silt loam, 3 to 8 percent slopes	0	124.4	0.8%
HaC	Hagerstown silt loam, 8 to 15 percent slopes	0	0.0	0.0%
HbB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes	0	10.9	0.1%
HbD	Hagerstown-Carbo silty clay loams, 15 to 25 percent slopes	0	3.1	0.0%
HcB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes, very rocky	0	6.1	0.0%
HcC	Hagerstown-Carbo silty clay loams, 8 to 15 percent slopes, very rocky	0	5.1	0.0%
HkB	Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	0	26.0	0.2%
HkD	Hagerstown-Rock outcrop complex, 8 to 35 percent slopes	0	6.7	0.0%
Jg	Jugtown silt loam	5	18.0	0.1%
Mb	Maurertown silt loam	88	263.2	1.7%
Me	Melvin silt loam	85	49.4	0.3%
MoB	Monongahela silt loam, 3 to 8 percent slopes	3	5.6	0.0%
MrA	Murrill gravelly loam, 0 to 3 percent slopes	0	2.0	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MrB	Murrill gravelly loam, 3 to 8 percent slopes	0	167.9	1.1%
MrC	Murrill gravelly loam, 8 to 15 percent slopes	0	3.4	0.0%
MuB	Murrill cobbly sandy loam, 3 to 8 percent slopes	0	68.4	0.4%
MvB	Murrill gravelly loam, 3 to 8 percent slopes, extremely stony	0	153.0	1.0%
MvD	Murrill gravelly loam, 8 to 25 percent slopes, extremely stony	0	39.6	0.3%
Pg	Penlaw silt loam, 0 to 3 percent slopes	10	16.1	0.1%
Q	Quarries	0	121.9	0.8%
SeB	Sideling gravelly loam, 3 to 8 percent slopes	0	17.9	0.1%
SrB	Sideling gravelly loam, 0 to 8 percent slopes, extremely stony	0	3.7	0.0%
SrD	Sideling gravelly loam, 8 to 25 percent slopes, extremely stony	0	2.2	0.0%
SwB	Swanpond-Edom complex, 0 to 8 percent slopes	0	40.2	0.3%
UbB	Urban land-Berks complex, 0 to 8 percent slopes	0	227.7	1.5%
UhB	Urban land-Hagerstown complex, 0 to 8 percent slopes	0	220.9	1.4%
Uu	Urban land-Udorthents complex, 0 to 25 percent slopes	0	241.1	1.5%
W	Water	0	35.2	0.2%
WeB	Weikert channery silt loam, 3 to 8 percent slopes	1	2,505.7	16.0%
WeC	Weikert channery silt loam, 8 to 15 percent slopes	1	450.0	2.9%
WeD	Weikert channery silt loam, 15 to 25 percent slopes	0	205.4	1.3%
WkB	Weikert very channery silt loam, 3 to 8 percent slopes	3	861.5	5.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WkC	Weikert very channery silt loam, 8 to 15 percent slopes	3	1,043.0	6.7%
WkD	Weikert very channery silt loam, 15 to 25 percent slopes	0	196.5	1.3%
WkF	Weikert very channery silt loam, 25 to 65 percent slopes	0	35.4	0.2%
Totals for Area of Interest			15,636.4	100.0%

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

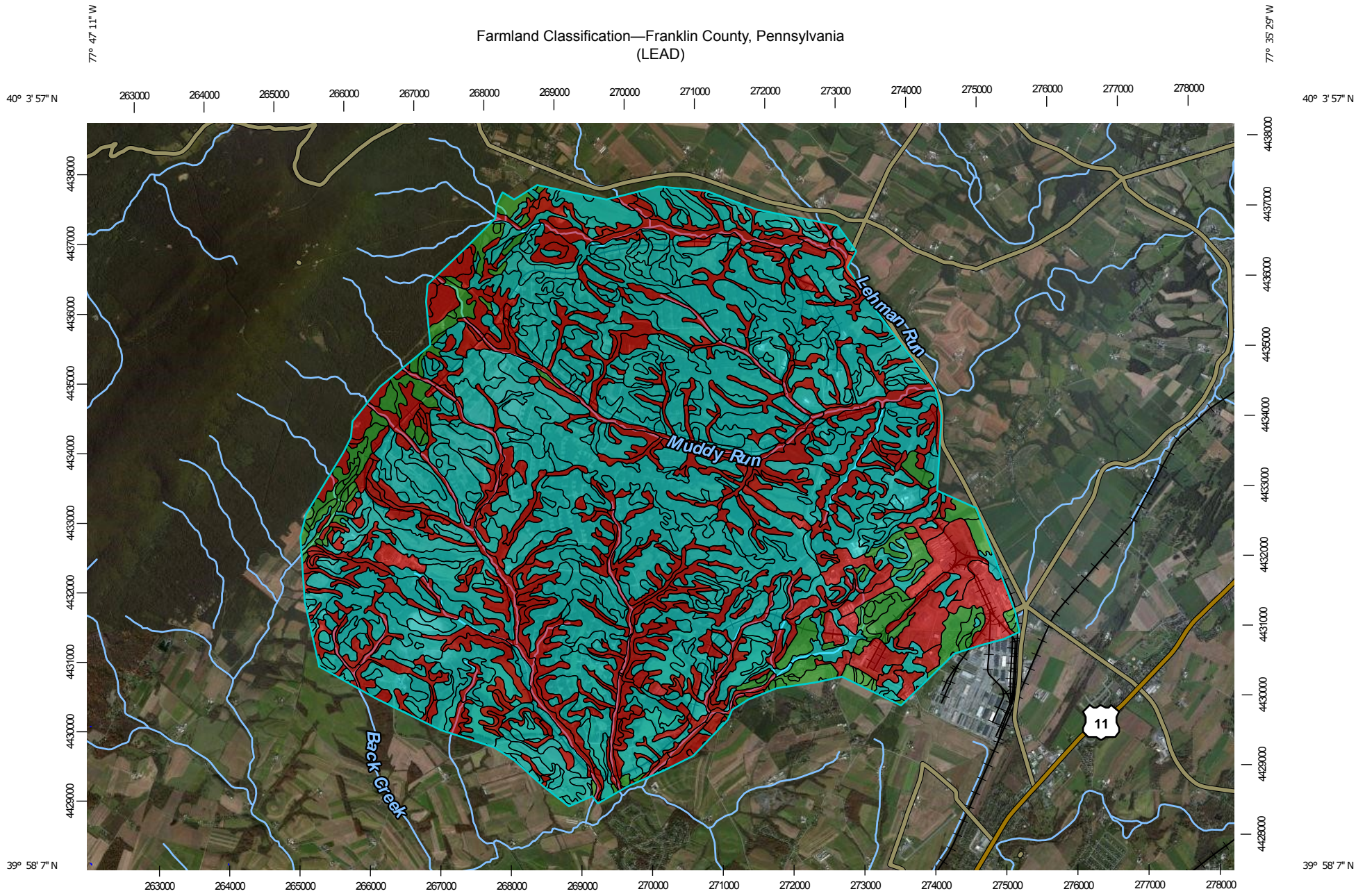
Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Farmland Classification—Franklin County, Pennsylvania
(LEAD)



Map Scale: 1:76,100 if printed on A landscape (11" x 8.5") sheet.

0 1000 2000 4000 6000 Meters

0 3500 7000 14000 21000 Feet


Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 18N WGS84



Farmland Classification—Franklin County, Pennsylvania
(LEAD)









MAP LEGEND








Area of Interest (AOI)

 Area of Interest (AOI)




Soils








Soil Rating Polygons






-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available







Soil Rating Lines










-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained

-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available

Soil Rating Points

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available


Water Features

MAP INFORMATION

 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Pennsylvania

Survey Area Data: Version 12, Sep 19, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 18, 2010—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgB	Allegheny loam, 3 to 8 percent slopes	All areas are prime farmland	3.6	0.0%
AnB	Andover gravelly loam, 3 to 8 percent slopes	Not prime farmland	57.7	0.4%
AoB	Andover gravelly loam, 0 to 8 percent slopes, very stony	Not prime farmland	13.3	0.1%
As	Atkins silt loam	Not prime farmland	441.4	2.8%
BhB	Bedington channery silt loam, 3 to 8 percent slopes	All areas are prime farmland	127.6	0.8%
BkB	Berks channery silt loam, 3 to 8 percent slopes	Farmland of statewide importance	4,191.2	26.8%
BkC	Berks channery silt loam, 8 to 15 percent slopes	Farmland of statewide importance	196.4	1.3%
BIA	Blairton channery silt loam, 0 to 3 percent slopes	Farmland of statewide importance	80.6	0.5%
BIB	Blairton channery silt loam, 3 to 8 percent slopes	Farmland of statewide importance	242.0	1.5%
BrA	Brinkerton silt loam, 0 to 3 percent slopes	Not prime farmland	697.8	4.5%
BrB	Brinkerton silt loam, 3 to 8 percent slopes	Not prime farmland	797.7	5.1%
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	All areas are prime farmland	129.8	0.8%
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	Farmland of statewide importance	2.6	0.0%
BxB	Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony	Not prime farmland	30.2	0.2%
CoB	Carbo silty clay loam, 3 to 8 percent slopes	All areas are prime farmland	73.2	0.5%
CsA	Clarksburg silt loam, 0 to 3 percent slopes	All areas are prime farmland	15.8	0.1%
CtB	Clearbrook channery silt loam, 0 to 8 percent slopes	Farmland of statewide importance	910.9	5.8%
DAM	Dam	Not prime farmland	0.5	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DbE	Dekalb-Bagtown complex, 25 to 65 percent slopes, extremely stony	Not prime farmland	1.1	0.0%
Dm	Deposit gravelly loam, 0 to 8 percent slopes, very stony	Not prime farmland	22.2	0.1%
DrB	Dryrun gravelly loam, 3 to 8 percent slopes	Farmland of statewide importance	87.8	0.6%
Du	Dunning silt loam	Not prime farmland	4.1	0.0%
EeB	Edom-Carbo silty clay loams, 3 to 8 percent slopes	All areas are prime farmland	57.4	0.4%
ErB	Ernest silt loam, 3 to 8 percent slopes	Farmland of statewide importance	207.1	1.3%
Fu	Funkstown silt loam	All areas are prime farmland	0.9	0.0%
HaA	Hagerstown silt loam, 0 to 3 percent slopes	All areas are prime farmland	65.9	0.4%
HaB	Hagerstown silt loam, 3 to 8 percent slopes	All areas are prime farmland	124.4	0.8%
HaC	Hagerstown silt loam, 8 to 15 percent slopes	Farmland of statewide importance	0.0	0.0%
HbB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes	All areas are prime farmland	10.9	0.1%
HbD	Hagerstown-Carbo silty clay loams, 15 to 25 percent slopes	Not prime farmland	3.1	0.0%
HcB	Hagerstown-Carbo silty clay loams, 3 to 8 percent slopes, very rocky	All areas are prime farmland	6.1	0.0%
HcC	Hagerstown-Carbo silty clay loams, 8 to 15 percent slopes, very rocky	Not prime farmland	5.1	0.0%
HkB	Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	Not prime farmland	26.0	0.2%
HkD	Hagerstown-Rock outcrop complex, 8 to 35 percent slopes	Not prime farmland	6.7	0.0%
Jg	Jugtown silt loam	All areas are prime farmland	18.0	0.1%
Mb	Maurertown silt loam	Not prime farmland	263.2	1.7%
Me	Melvin silt loam	Farmland of statewide importance	49.4	0.3%
MoB	Monongahela silt loam, 3 to 8 percent slopes	All areas are prime farmland	5.6	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MrA	Murrill gravelly loam, 0 to 3 percent slopes	All areas are prime farmland	2.0	0.0%
MrB	Murrill gravelly loam, 3 to 8 percent slopes	All areas are prime farmland	167.9	1.1%
MrC	Murrill gravelly loam, 8 to 15 percent slopes	Farmland of statewide importance	3.4	0.0%
MuB	Murrill cobbly sandy loam, 3 to 8 percent slopes	All areas are prime farmland	68.4	0.4%
MvB	Murrill gravelly loam, 3 to 8 percent slopes, extremely stony	Not prime farmland	153.0	1.0%
MvD	Murrill gravelly loam, 8 to 25 percent slopes, extremely stony	Not prime farmland	39.6	0.3%
Pg	Penlaw silt loam, 0 to 3 percent slopes	Farmland of statewide importance	16.1	0.1%
Q	Quarries	Not prime farmland	121.9	0.8%
SeB	Sideling gravelly loam, 3 to 8 percent slopes	All areas are prime farmland	17.9	0.1%
SrB	Sideling gravelly loam, 0 to 8 percent slopes, extremely stony	Not prime farmland	3.7	0.0%
SrD	Sideling gravelly loam, 8 to 25 percent slopes, extremely stony	Not prime farmland	2.2	0.0%
SwB	Swanpond-Edom complex, 0 to 8 percent slopes	All areas are prime farmland	40.2	0.3%
UbB	Urban land-Berks complex, 0 to 8 percent slopes	Not prime farmland	227.7	1.5%
UhB	Urban land-Hagerstown complex, 0 to 8 percent slopes	Not prime farmland	220.9	1.4%
Uu	Urban land-Udorthents complex, 0 to 25 percent slopes	Not prime farmland	241.1	1.5%
W	Water	Not prime farmland	35.2	0.2%
WeB	Weikert channery silt loam, 3 to 8 percent slopes	Farmland of statewide importance	2,505.7	16.0%
WeC	Weikert channery silt loam, 8 to 15 percent slopes	Not prime farmland	450.0	2.9%
WeD	Weikert channery silt loam, 15 to 25 percent slopes	Not prime farmland	205.4	1.3%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WkB	Weikert very channery silt loam, 3 to 8 percent slopes	Farmland of statewide importance	861.5	5.5%
WkC	Weikert very channery silt loam, 8 to 15 percent slopes	Not prime farmland	1,043.0	6.7%
WkD	Weikert very channery silt loam, 15 to 25 percent slopes	Not prime farmland	196.5	1.3%
WkF	Weikert very channery silt loam, 25 to 65 percent slopes	Not prime farmland	35.4	0.2%
Totals for Area of Interest			15,636.4	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

SOILS PLS

Soil Associations

Based on the Franklin County Soil Survey (USDA, 1975), three soil associations containing 24 soil series occur on LEAD (beyond the cantonment area). The Table below lists the soil series and provides general characteristics of each. Drainage characteristics, landforms, and some potential limitations associated with the soils are provided. The Weikert-Berks-Beddington soil association covers most of LEAD. Characterized as shallow to deep and well-drained, these acidic soils are weathered from shale, siltstone, and acid sandstone. They are prevalent in valley bottoms. The Laidig-Very Stony Land-Buchanan association is also acidic and deep, and somewhat poorly to well drained. These soils are formed in colluvium from sandstone on Broad Mountain along the western border of the Depot. The Murrill-Laidig association is less acidic, deep, well- drained soils formed from colluvium at the base of the eastern side of Broad Mountain (TNC, 1992). Detailed descriptions of soil series and phases occurring on LEAD can be found in the Franklin County Soil Survey (USDA, 1975).

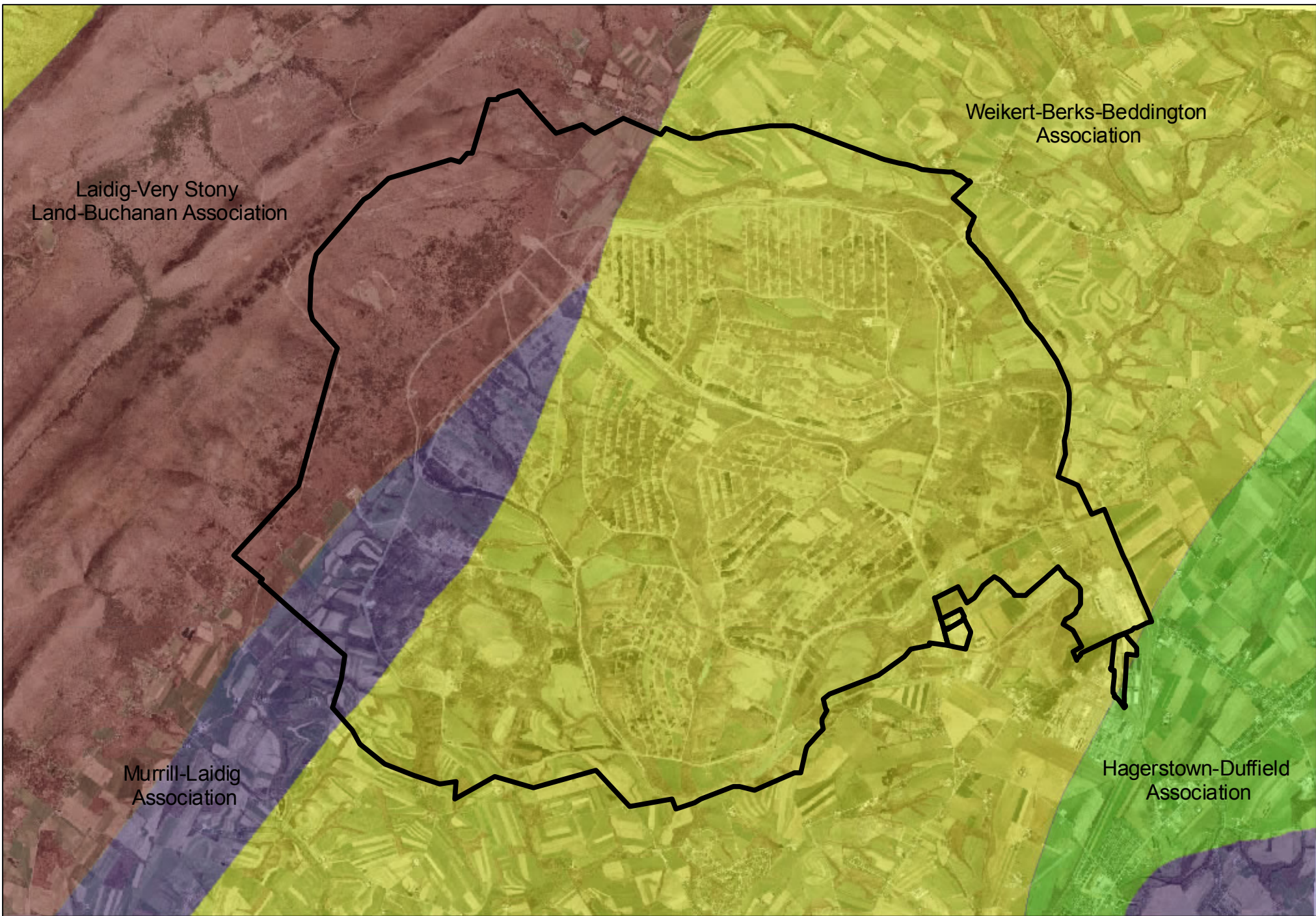
SOIL SERIES ON LEAD

Soil Unit Name	Slopes (percent)	Symbol	Drainage Class	Prime Farmland (Federal or State)	Erosion Hazard (Kw)	Hydric	Acres on LEAD
Allegheny Loam	3 to 8	AgB	Well Drained	No	0.28	No	9.2
Andover Gravelly Loam	3 to 8	AnB	Poorly Drained	No	0.17	Yes	114.5
Andover Gravelly Loam, Very Stony	0 to 8	AoB	Poorly Drained	No	0.17	Yes	70.2
Atkins Silt Loam	--	As	Poorly Drained	No	0.32	Yes	487.5
Bedington Channery Silt Loam	3 to 8	BhB	Well Drained	Federal	0.28	No	144.9
Bedington Channery Silt Loam	8 to 15	BhC	Well Drained	State	0.28	No	1.5
Berks Channery Silt Loam	3 to 8	BkB	Well Drained	State	0.20	No	4,427.4
Berks Channery Silt Loam	8 to 15	BkC	Well Drained	State	0.20	No	227.5
Blairton Channery Silt Loam	0 to 3	BIA	Moderately Well Drained	State	0.32	No	80.7
Blairton Channery Silt Loam	3 to 8	BIB	Moderately Well Drained	State	0.32	No	271.5
Brinkerton Silt Loam	0 to 3	BrA	Poorly Drained	No	0.20	Yes	702.1
Brinkerton Silt Loam	3 to 8	BrB	Poorly Drained	No	0.32	Yes	890.3
Buchanan Gravelly Loam	3 to 8	BuB	Moderately Well Drained	Federal	0.24	No	236.4
Buchanan Gravelly Loam	8 to 15	BuC	Moderately Well Drained	State	0.17	No	2.6
Buchanan Cobbly Loam	0 to 8	BxB	Moderately Well Drained	No	0.17	No	249.2
Buchanan Cobbly Loam, Extremely Stony	8 to 25	BxD	Moderately Well Drained	No	0.17	No	153.7
Carbo Silty Clay Loam	3 to 8	CoB	Well Drained	Federal	0.24	No	77.3
Clarksburg Silt Loam	0 to 3	CsA	Moderately Well Drained	Federal	0.37	No	20.4
Clearbrook Channery Silt Loam	0 to 8	CtB	Somewhat Poorly Drained	State	0.28	No	945.4
Dams	--	DAM	--	--	--	--	0.5
Dekalb and Hazleton Soils, Rubbly	25 to 75	DEF	Well Drained	No	0.15 to 0.17	No	265.6
Deposit Gravelly Loam	0 to 8	Dm	Moderately Well Drained	No	0.20	No	37.0
Dryrun Gravelly Loam	3 to 8	DrB	Moderately Well Drained	State	0.28	No	116.7
Dunning Silt Loam	--	Du	Very Poorly Drained	No	0.28	Yes	4.1
Edom-Carbo Silty Clay Loams	3 to 8	EeB	Well Drained	Federal	0.17 to 0.37	No	107.3
Edom-Carbo Silty Clay Loams	8 to 15	EeC	Well Drained	State	0.17 to 0.24	No	5.8
Ernest Silt Loam	3 to 8	ErB	Moderately Well Drained	State	0.43	No	216.4
Funkstown Silt Loam	--	Fu	Moderately Well Drained	Federal	0.32	No	5.6
Hagerstown Silt Loam	0 to 3	HaA	Well Drained	Federal	0.28	No	82.4
Hagerstown Silt Loam	3 to 8	HaB	Well Drained	Federal	0.32	No	179.4
Hagerstown Silt Loam	8 to 15	HaC	Well Drained	State	0.28	No	2.4
Hagerstown-Carbo Silty Clay Loams	3 to 8	HbB	Well Drained	Federal	0.24 to 0.32	No	45.2
Hagerstown-Carbo Silty Clay Loams	15 to 25	HbD	Well Drained	No	0.24 to 0.28	No	3.1

Soil Unit Name	Slopes (percent)	Symbol	Drainage Class	Prime Farmland (Federal or State)	Erosion Hazard (Kw)	Hydric	Acres on LEAD
Hagerstown-Carbo Silty Clay Loams, Very Rocky	3 to 8	HcB	Well Drained	State	0.28 to 0.37	No	76.8
Hagerstown-Carbo Silty Clay Loams, Very Rocky	15 to 25	HcC	Well Drained	No	0.24 to 0.32	No	6.0
Hagerstown-Rock Outcrop Complex	3 to 8	HkB	Well Drained	No	0.28	No	44.7
Hagerstown-Rock Outcrop Complex	8 to 35	HkD	Well Drained	No	0.32	No	6.5
Hazleton and Dekalb Soils, Extremely Stony	0 to 8	HRB	Well Drained	No	0.15 to 0.17	No	48.4
Hazleton and Dekalb Soils, Extremely Stony	8 to 25	HRD	Well Drained	No	0.15 to 0.17	No	174.3
Hazleton and Dekalb Soils, Extremely Stony	25 to 75	HRF	Well Drained	No	0.15 to 0.17	No	352.6
Jugtown Silt Loam	--	Jg	Moderately Well Drained	Federal	0.32	No	51.1
Laidig Gravelly Loam	0 to 8	LbB	Well Drained	State	0.17	No	1.9
Laidig Gravelly Loam	8 to 25	LbD	Well Drained	No	0.17	No	71.1
Laidig and Hazleton Soils, Extremely Stony	25 to 60	LCE	Well Drained	No	0.15 to 0.17	No	112.8
Markes Channery Silt Loam	0 to 8	Ma	Poorly Drained	No	0.20	Yes	3.3
Maurertown Silt Loam	--	Mb	Poorly Drained	No	0.43	Yes	284.0
Melvin Silt Loam	--	Me	Poorly Drained	No	0.43	Yes	65.6
Monongahela Silt Loam	3 to 8	MoB	Moderately Well Drained	State	0.43	No	2.9
Murrill Gravelly Loam	0 to 3	MrA	Well Drained	Federal	0.28	No	9.2
Murrill Gravelly Loam	3 to 8	MrB	Well Drained	Federal	0.28	No	259.7
Murrill Gravelly Loam	8 to 15	MrC	Well Drained	State	0.28	No	3.4
Murrill Cobbly Sandy Loam	3 to 8	MuB	Well Drained	Federal	0.28	No	116.9
Murrill Cobbly Sandy Loam	8 to 15	MuC	Well Drained	State	0.24	No	40.6
Murrill Gravelly Loam, Extremely Stony	3 to 8	MvB	Well Drained	No	0.28	No	450.1
Murrill Gravelly Loam, Extremely Stony	8 to 25	MvD	Well Drained	No	0.24	No	278.3
Penlaw Silt Loam	0 to 3	Pg	Somewhat Poorly Drained	State	0.24	No	25.2
Quarries	--	Q	--	--	--	--	127.3
Sideling Gravelly Loam	3 to 8	SeB	Moderately Well Drained	Federal	0.15	No	58.0
Sideling Gravelly Loam	8 to 15	SeC	Moderately Well Drained	State	0.15	No	20.4
Sideling Gravelly Loam, Extremely Stony	0 to 8	SrB	Moderately Well Drained	No	0.15	No	88.4
Sideling Gravelly Loam, Extremely Stony	8 to 15	SrD	Moderately Well Drained	No	0.15	No	745.6
Sideling and Hazelton Soils, Extremely Stony	25 to 60	SSF	Moderately Well Drained to Well Drained	No	0.15 to 0.20	No	116.2
Swanpond-Edom Complex	0 to 8	SwB	Moderately Well Drained to Well Drained	Federal	0.28 to 0.32	No	48.8
Urban Land-Berks Complex	0 to 8	UbB	Well Drained	No	0.20	No	234.0

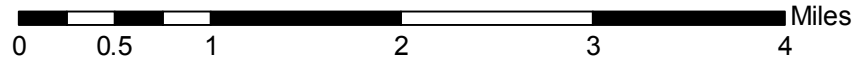
Soil Unit Name	Slopes (percent)	Symbol	Drainage Class	Prime Farmland (Federal or State)	Erosion Hazard (Kw)	Hydric	Acres on LEAD
Urban Land-Hagerstown Complex	0 to 8	UhB	Well Drained	No	0.32	No	222.8
Urban Land-Udorthents Complex	0 to 25	Uu	--	No	0.28	No	587.0
Water	--	W	--	--	--	--	33.5
Weikert Channery Silt Loam	3 to 8	WeB	Well Drained	State	0.20	No	2,591.5
Weikert Channery Silt Loam	8 to 15	WeC	Well Drained	No	0.20	No	560.1
Weikert Channery Silt Loam	15 to 25	WeD	Well Drained	No	0.20	No	261.6
Weikert Very Channery Silt Loam	3 to 8	WkB	Well Drained	State	0.20	No	908.7
Weikert Very Channery Silt Loam	8 to 15	WkC	Well Drained	No	0.20	No	1,066.7
Weikert Very Channery Silt Loam	15 to 25	WkD	Well Drained	No	0.20	No	273.1
Weikert Very Channery Silt Loam	25 to 60	WkF	Well Drained	No	0.20	No	179.5

Source: USDA Soil Data Mart, <http://soildatamart.nrcs.usda.gov/Report.aspx?Survey=PA055&UseState=Pennsylvania>



Soil Associations on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS STATSGO (1994)

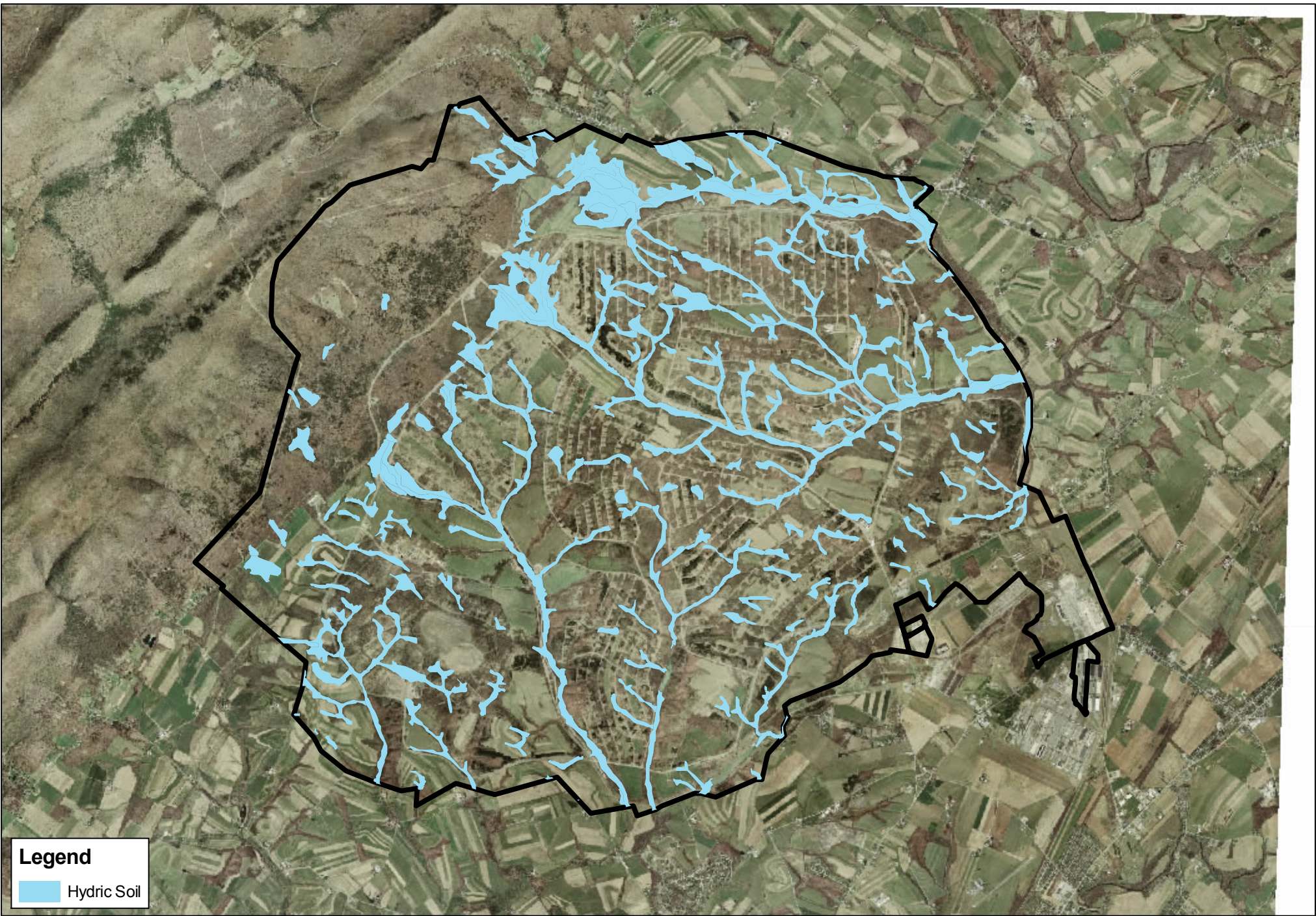


Hydric Soils


Eight soil mapping units designated as hydric are found on the Depot: Andover very stony loam, 0 to 8 percent slopes; Andover gravelly silt loam, 2 to 8 percent slopes; Atkins and Melvin silt loams; Atkins silty clay loam, clayey subsoil variant; Brinkerton silt loam, 0 to 3 percent slopes; Brinkerton silt loam, 3 to 8 percent slopes; Dunning silty clay loam; and Markes shaly silt loam, 2 to 8 percent slopes. In addition, 22 soil mapping units on the Depot have hydric inclusions. Hydric soils are soils that are saturated, flooded, or ponded for long enough during the growing season to develop anaerobic (oxygen- deficient) conditions in their upper part. Anaerobic soil conditions are conducive to the establishment of vegetation that is adapted for growth under oxygen-deficient conditions and is typically found in wetlands (hydrophytic vegetation). The presence of hydric soils is one of three criteria (hydric soils, hydrophytic vegetation, wetland hydrology) used to determine the presence of USACE jurisdictional wetlands (LEAD, 1995; USDA, 1980a).

HYDRIC SOILS ON LEAD

SOIL UNIT NAME	SLOPES (PERCENT)	SYMBOL	DRAINAGE CLASS	ACRES ON LEAD
USDA Listed Hydric Soils				
Andover Gravelly Loam	3 to 8	AnB	Poorly Drained	114.5
Andover Gravelly Loam, Very Stony	0 to 8	AoB	Poorly Drained	70.2
Atkins Silt Loam	--	As	Poorly Drained	487.5
Brinkerton Silt Loam	0 to 3	BrA	Poorly Drained	702.1
Brinkerton Silt Loam	3 to 8	BrB	Poorly Drained	890.3
Dunning Silt Loam	--	Du	Very Poorly Drained	4.1
Markes Channery Silt Loam	0 to 8	Ma	Poorly Drained	3.3
Maurertown Silt Loam	--	Mb	Poorly Drained	284.0
Melvin Silt Loam	--	Me	Poorly Drained	65.6
Soil With Potential Hydric Inclusions				
Urban Land-Udorthents Complex	0 to 25	Uu	--	587.0
TOTAL ACREAGE				3208.6



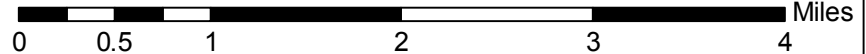
Legend

 Hydric Soil



Hydric Soils on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).



Prime Farmland Soils

Several soil series that occur on LEAD are considered to be of quality that matches specifications for prime farmland soils or farmland soils of statewide importance (see Table 4-1). Prime farmland soils are defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. The soil qualities, growing season, and moisture supply are those needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. (The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water.) A farmland soil of statewide importance includes land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, and oilseed crops. Criteria for defining and delineating this land are determined by the appropriate state agency or agencies (USDA, 1980b).

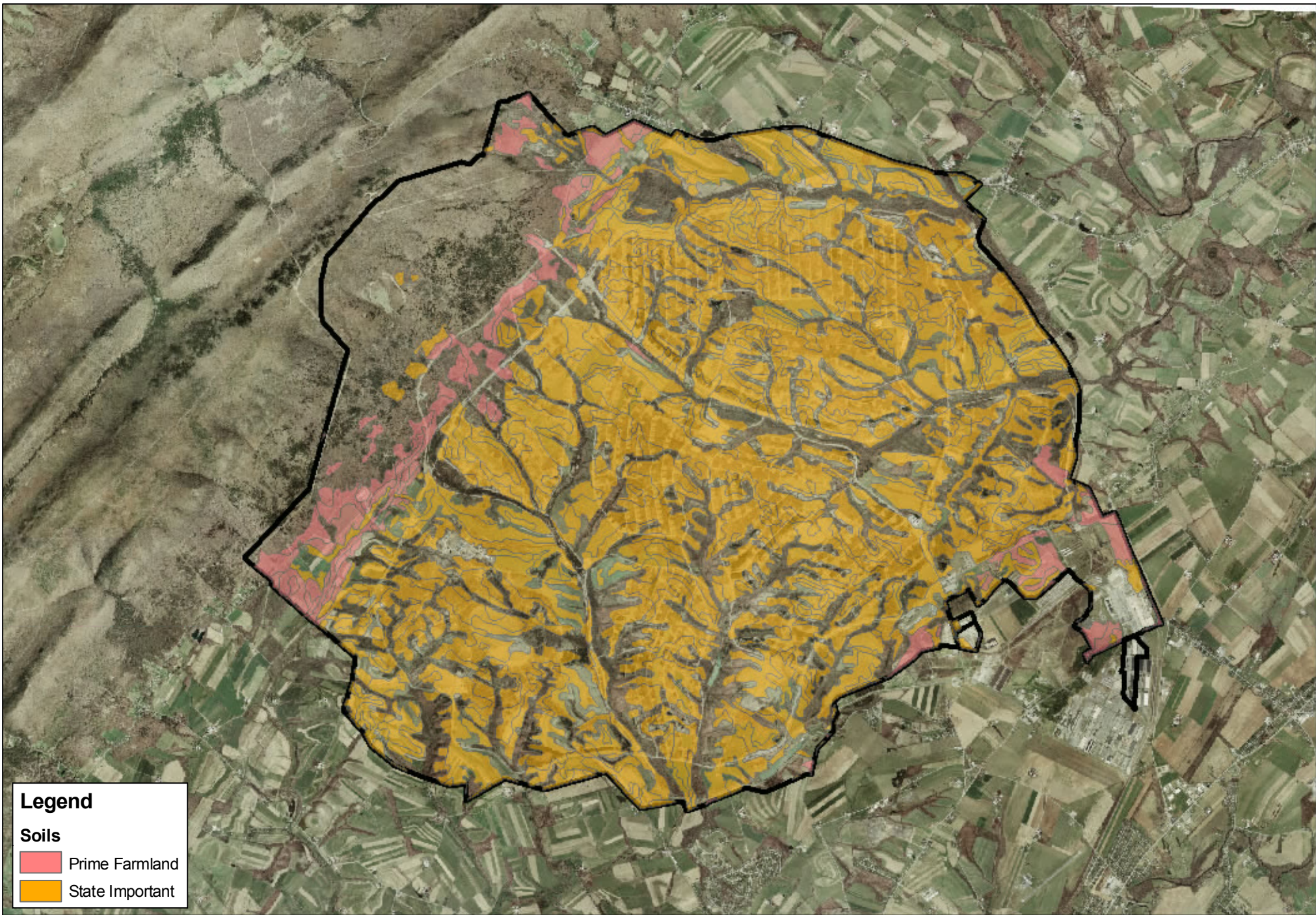
Prime farmland soils are protected under the Farmland Protection Policy Act (FPPA) of 1981. The intent of the act is to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland soils to nonagricultural uses. The act also ensures that federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the act (see 7 CFR Part 658, July 5, 1984). It should be noted, however, that although these soils match the quality of prime farmland soils, the designation of prime farmland soils and protection measures do not apply to DOD installations.

PRIME FARMLAND SOILS ON LEAD (FEDERALLY LISTED)

SOIL UNIT NAME	SLOPES (PERCENT)	SYMBOL	DRAINAGE CLASS	ACRES ON LEAD
Bedington Channery Silt Loam	3 to 8	BhB	Well Drained	144.9
Buchanan Gravelly Loam	3 to 8	BuB	Moderately Well Drained	236.4
Carbo Silty Clay Loam	3 to 8	CoB	Well Drained	77.3
Clarksburg Silt Loam	0 to 3	CsA	Moderately Well Drained	20.4
Edom-Carbo Silty Clay Loams	3 to 8	EeB	Well Drained	107.3
Funkstown Silt Loam	--	Fu	Moderately Well Drained	5.6
Hagerstown Silt Loam	0 to 3	HaA	Well Drained	82.4
Hagerstown Silt Loam	3 to 8	HaB	Well Drained	179.4
Hagerstown-Carbo Silty Clay Loams	3 to 8	HbB	Well Drained	45.2
Jugtown Silt Loam	--	Jg	Moderately Well Drained	51.1
Murrill Gravelly Loam	0 to 3	MrA	Well Drained	9.2
Murrill Gravelly Loam	3 to 8	MrB	Well Drained	259.7
Murrill Cobbly Sandy Loam	3 to 8	MuB	Well Drained	116.9
Sideling Gravelly Loam	3 to 8	SeB	Moderately Well Drained	58.0
Swanpond-Edom Complex	0 to 8	SwB	Moderately Well Drained to Well Drained	48.8
TOTAL ACREAGE				1,442.5

SOILS OF STATEWIDE IMPORTANCE ON LEAD

SOIL UNIT NAME	SLOPES (PERCENT)	SYMBOL	DRAINAGE CLASS	ACRES ON LEAD
Bedington Channery Silt Loam	8 to 15	BhC	Well Drained	1.5
Berks Channery Silt Loam	3 to 8	BkB	Well Drained	4,427.4
Berks Channery Silt Loam	8 to 15	BkC	Well Drained	227.5
Blairton Channery Silt Loam	0 to 3	BIA	Moderately Well Drained	80.7
Blairton Channery Silt Loam	3 to 8	BIB	Moderately Well Drained	271.5
Buchanan Gravelly Loam	8 to 15	BuC	Moderately Well Drained	2.6
Clearbrook Channery Silt Loam	0 to 8	CtB	Somewhat Poorly Drained	945.4
Dryrun Gravelly Loam	3 to 8	DrB	Moderately Well Drained	116.7
Edom-Carbo Silty Clay Loams	8 to 15	EeC	Well Drained	5.8
Ernest Silt Loam	3 to 8	ErB	Moderately Well Drained	216.4
Hagerstown Silt Loam	8 to 15	HaC	Well Drained	2.4
Hagerstown-Carbo Silty Clay Loams, Very Rocky	3 to 8	HcB	Well Drained	76.8
Laidig Gravelly Loam	0 to 8	LbB	Well Drained	1.9
Monongahela Silt Loam	3 to 8	MoB	Moderately Well Drained	2.9
Murrill Gravelly Loam	8 to 15	MrC	Well Drained	3.4
Murrill Cobbly Sandy Loam	8 to 15	MuC	Well Drained	40.6
Penlaw Silt Loam	0 to 3	Pg	Somewhat Poorly Drained	25.2
Sideling Gravelly Loam	8 to 15	SeC	Moderately Well Drained	20.4
Weikert Channery Silt Loam	3 to 8	WeB	Well Drained	2,591.5
Weikert Very Channery Silt Loam	3 to 8	WkB	Well Drained	908.7
TOTAL ACREAGE				9,969.2



Legend

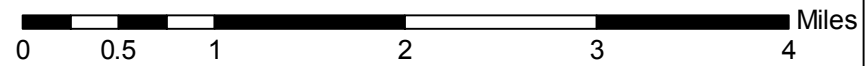
Soils

- Prime Farmland
- State Important



Prime Farmland Soils and Soils of Statewide Importance on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).



1 inch equals 1 miles



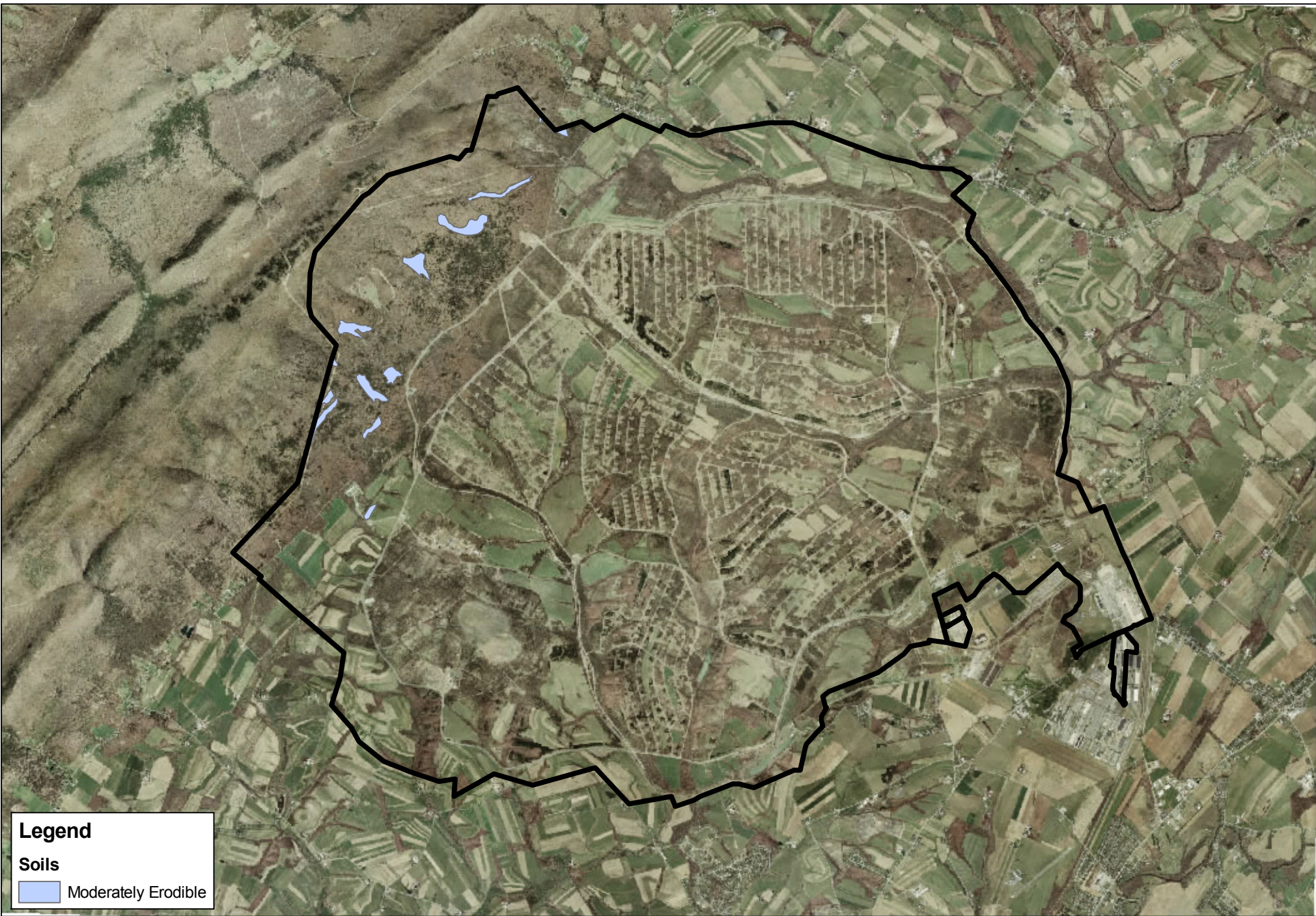
Erodible Soils

None of the soil series at LEAD have been identified as highly erodible by the USDA Natural Resources Conservation Service (USDA, 1975). However, two soil series on LEAD have been identified as moderately erodible. These series are: Buchanan extremely stony loam, 8 to 25 percent slopes, and Hagerstown-Rock Outcrop Complex, 8 to 35 percent slopes. The USDA defined these soils as having a moderate erosion hazard based on presumed use for timbering. The definition of moderate erosion hazard is, "erosion control measures are needed on skid and logging roads during and immediately after the harvesting of wood products." Generally, these soils are stony or silty, and are located on steep slopes. Their erodibility makes them unsuited for many activities, including any activities that would involve intense or repeated use of the erodible area (e.g. footpaths, unpaved roads, earthmoving).

MODERATELY ERODIBLE SOILS AT LEAD


Name	Symbol	Acres
Buchanan cobbly loam, 8 to 25 percent slopes, extremely stony	BxD	153.6
Hagerstown-Rock Outcrop complex, 8 to 35 percent slopes	HkD	6.5
TOTAL		160.1

SOURCE: USDA, 1975



Legend

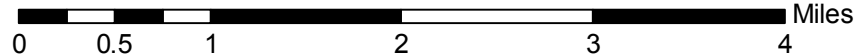
Soils

 Moderately Erodible



Moderately Erodible Soils on LEAD

Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).

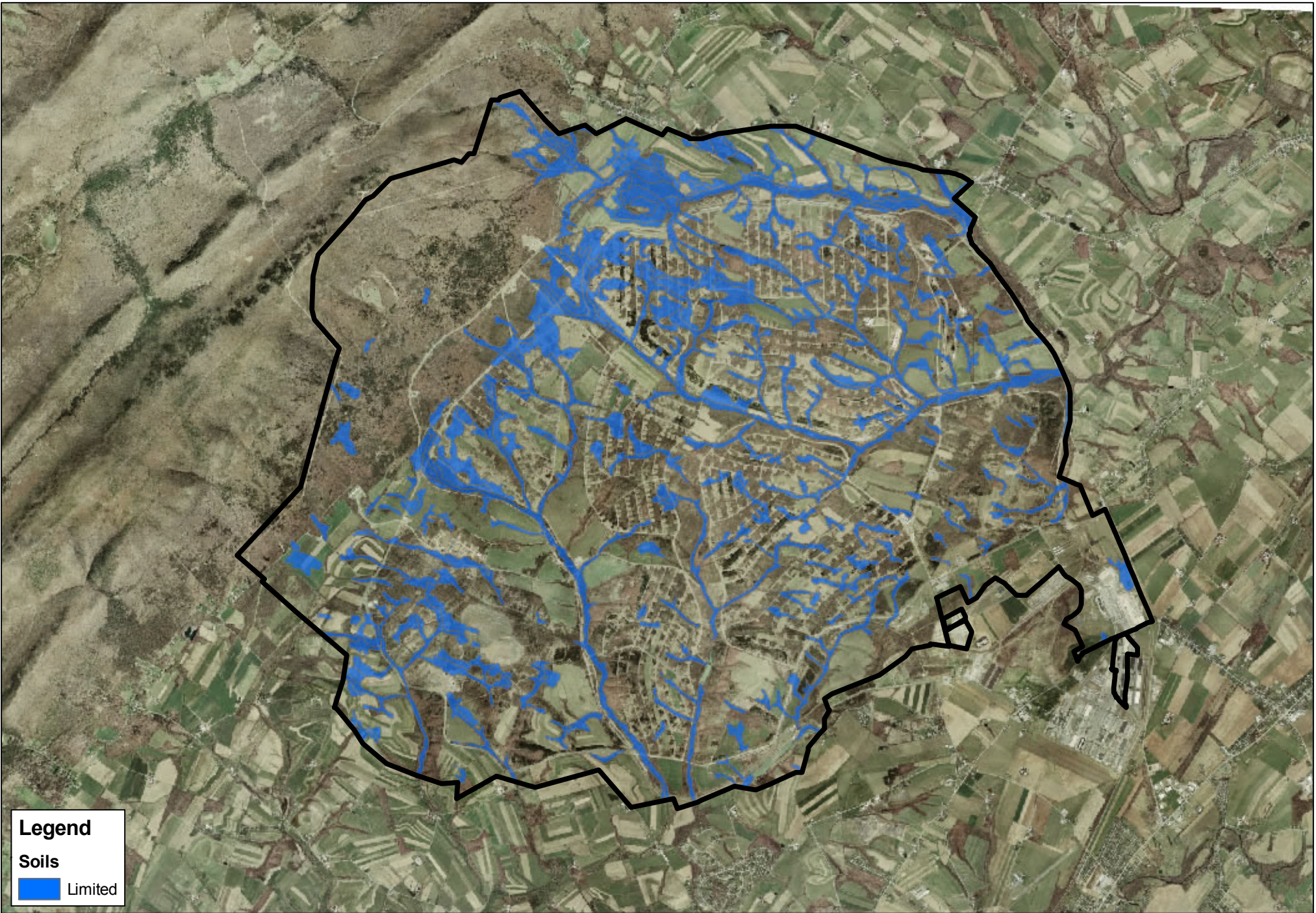


Soil Limitations

In addition to erodibility, the soils at LEAD present other limitations to construction, roads, and other uses. The following tables present soils with limitations based on hydrology (depth to saturation and/or frequency of flooding), slope (often with accompanying stoniness), and likelihood of water erosion.


SOILS LIMITED BY DEPTH TO SATURATION AND/OR FREQUENCY OF FLOODING

Soil Unit Name	Slopes (percent)	Symbol	Limitations	Acres
Andover Gravelly Loam	3 to 8	AnB	Saturation Depth, Stony (Very)	114.5
Andover Gravelly Loam, Very Stony	0 to 8	AoB	Saturation Depth, Stony (Very)	70.2
Atkins Silt Loam	--	As	Saturation Depth, Flooding (Very)	487.5
Brinkerton Silt Loam	0 to 3	BrA	Saturation Depth (Very)	702.1
Brinkerton Silt Loam	3 to 8	BrB	Saturation Depth (Very)	890.3
Clearbrook Channery Silt Loam	0 to 8	CtB	Saturation Depth (Somewhat)	945.4
Deposit Gravelly Loam	0 to 8	Dm	Stony, Flooding (Very)	37.0
Dunning Silt Loam	--	Du	Saturation Depth, Flooding (Very)	4.1
Funkstown Silt Loam	--	Fu	Flooding (Somewhat)	5.6
Markes Channery Silt Loam	0 to 8	Ma	Saturation Depth (Very)	3.3
Maurertown Silt Loam	--	Mb	Saturation Depth, Flooding (Very)	284.0
Melvin Silt Loam	--	Me	Saturation Depth, Flooding (Very)	65.6
Penlaw Silt Loam	0 to 3	Pg	Saturation Depth (Very)	25.2
TOTAL ACREAGE				3634.8



Legend

Soils

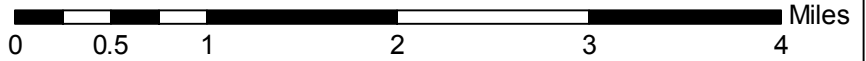
 Limited



Soils Limited by Depth to Saturation and/or Frequency of Flooding

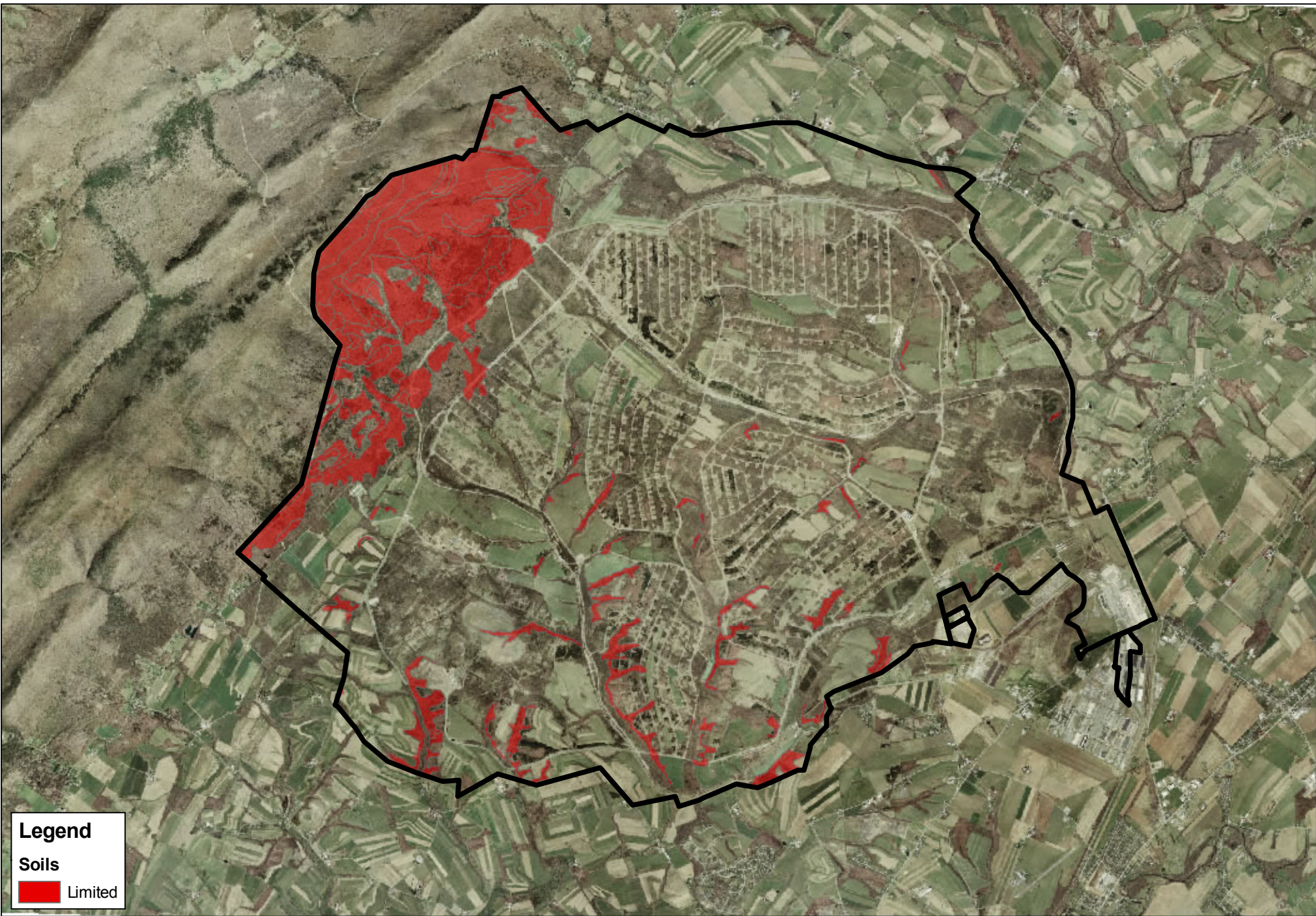
Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).

1 inch equals 1 miles




SOILS LIMITED BY SLOPE

Soil Unit Name	Slopes (percent)	Symbol	Limitations	Acres
Hagerstown-Rock Outcrop Complex	8 to 35	HkD	Slope (Somewhat)	6.5
Weikert Channery Silt Loam	15 to 25	WeD	Slope (Somewhat)	261.6
Weikert Very Channery Silt Loam	15 to 25	WkD	Slope (Somewhat)	273.1
Dekalb and Hazleton Soils, Rubbly	25 to 75	DEF	Slope (Very)	265.6
Weikert Very Channery Silt Loam	25 to 60	WkF	Slope (Very)	179.5
Buchanan Cobbly Loam, Extremely Stony	8 to 25	BxD	Slope, stony (Very)	153.7
Hazleton and Dekalb Soils, Extremely Stony	0 to 8	HRB	Slope, stony (Very)	48.4
Hazleton and Dekalb Soils, Extremely Stony	8 to 25	HRD	Slope, stony (Very)	174.3
Hazleton and Dekalb Soils, Extremely Stony	25 to 75	HRF	Slope, stony (Very)	352.6
Laidig Gravelly Loam	0 to 8	LbB	Slope, stony (Very)	1.9
Laidig Gravelly Loam	8 to 25	LbD	Slope, stony (Very)	71.1
Laidig and Hazleton Soils, Extremely Stony	25 to 60	LCE	Slope, stony (Very)	112.8
Murrill Gravelly Loam, Extremely Stony	3 to 8	MvB	Slope, stony (Very)	450.1
Murrill Gravelly Loam, Extremely Stony	8 to 25	MvD	Slope, stony (Very)	278.3
Sideling Gravelly Loam, Extremely Stony	0 to 8	SrB	Slope, stony (Very)	88.4
Sideling Gravelly Loam, Extremely Stony	8 to 15	SrD	Slope, stony (Very)	745.6
Sideling and Hazleton Soils, Extremely Stony	25 to 60	SSF	Slope, stony (Very)	116.2
TOTAL ACREAGE				3579.7



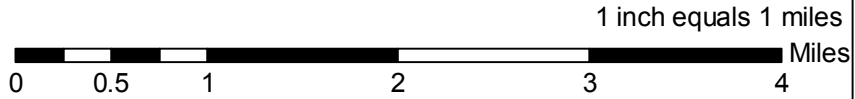
Legend

Soils

 Limited

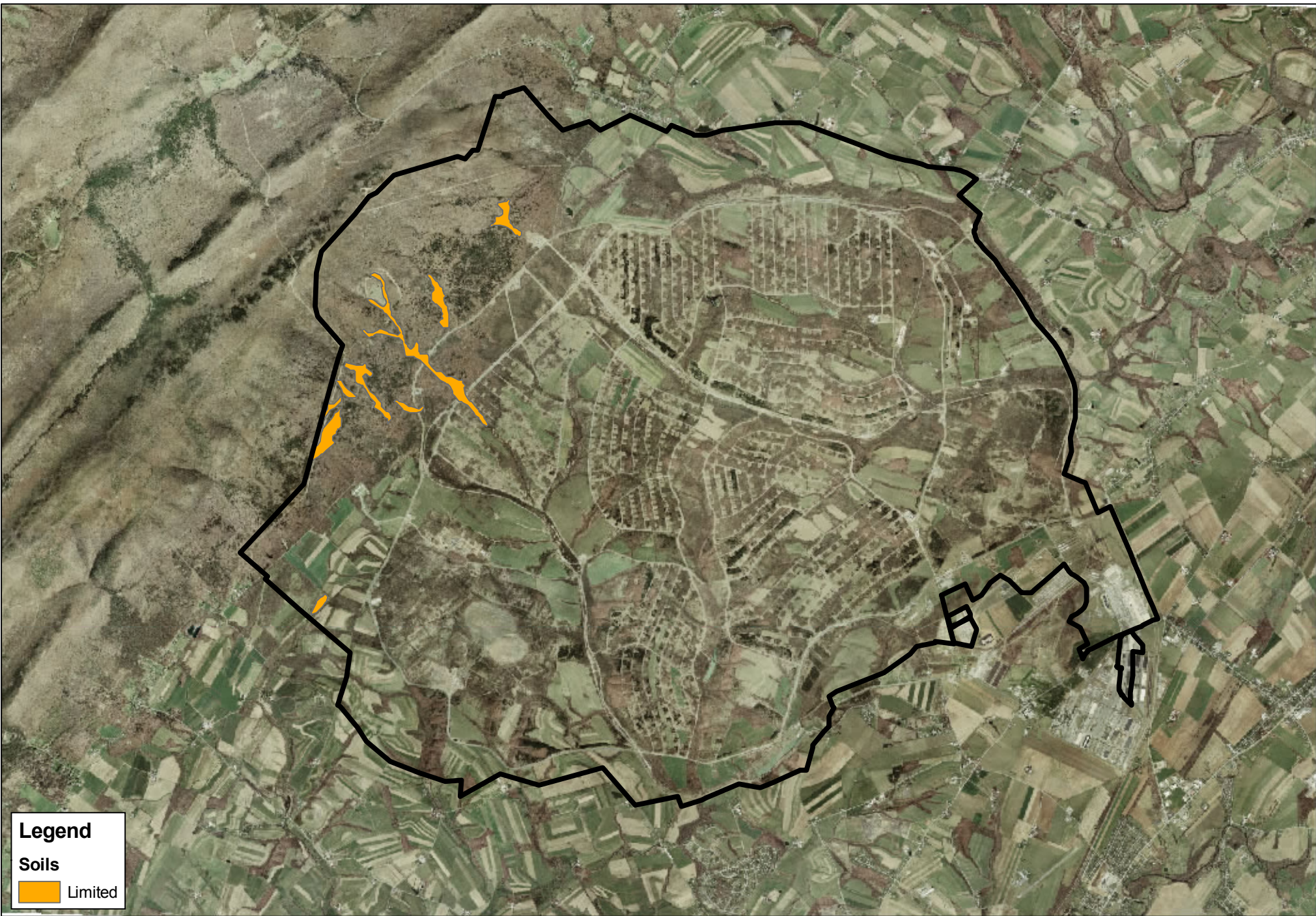



Soils Limited by Slope
Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).



SOILS LIMITED BY POTENTIAL FOR WATER EROSION

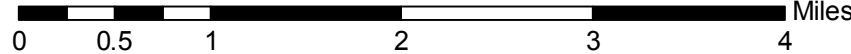
Soil Unit Name	Slopes (percent)	Symbol	Limitations	Acres
Hagerstown-Carbo Silty Clay Loams	15 to 25	HbD	Slope, Water Erosion (Very)	3.1
Edom-Carbo Silty Clay Loams	8 to 15	EeC	Water Erosion (Very)	5.8
Hagerstown-Carbo Silty Clay Loams, Very Rocky	15 to 25	HcC	Water Erosion (Very)	6.0
Buchanan Cobbly Loam	0 to 8	BxB	Stony (Very)	249.2
TOTAL ACREAGE				264.1



Legend
Soils
 Limited



Soils Limited by Potential for Water Erosion
Source: USGS High Resolution Orthoimage, Pennsylvania South (2004). Soils: NRCS SSURGO (2007).



1 inch equals 1 miles



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***APPENDIX I
WORK PLANS***

(Work Plans will be inserted by LEAD when completed.)

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APPENDIX J
BOBWHITE QUAIL FOCUS AREA
MOU AND MANAGEMENT PLAN

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**MEMORANDUM OF UNDERSTANDING (MOU)
BETWEEN
THE PENNSYLVANIA GAME COMMISSION (PGC)
AND
LETTERKENNY ARMY DEPOT (LEAD)**

Subject: This is an MOU between the PGC and LEAD. When referred to collectively, the PGC and LEAD are referred to as the "Parties".

1. Purpose: To create a new Bobwhite Quail Focus Area (BQFA) on approximately 3,680 acres of land located on LEAD (End. 1) with 1,500 acres of said recovery area being established as year-round quail habitat.

2. Authorities: Authority to execute this agreement on behalf of PGC and LEAD is vested in the respective executive leadership of both activities, and their designated representatives, pursuant to authority contained in the Sikes Act 670a (section 101), Cooperative Plan For Conservation and Rehabilitation.

3. Reference: Department of Defense Instruction (DODi) 4715.03, Natural Resources Conservation Program, March 18, 2011. Enclosure 3 PARA 2, Partnerships, allows DOD installations to enter in cooperative agreements with states, local governments, non-governmental organizations and individuals to provide for the maintenance and improvement of natural resources or conservation research on or off DOD installations.

4. Definitions:

a. Conservation: Planned management, use, and protection of natural and cultural resources to provide sustainable use and continued benefit for present and future generations, and the prevention of exploitation, destruction, waste, and neglect.

b. INRMP. An integrated plan focused, to the maximum extent practicable, on ecosystem-based management that shows the interrelationships of individual components of natural resources; management (e.g., fish and wildlife, forestry, land management, outdoor recreation) to mission requirements and other land use activities affecting an installation's natural resources. INRMPs ensure natural resources conservation programs and military operations are integrated and consistent with stewardship and legal requirements through cooperation among DOD, USFWS, and State fish and wildlife agencies.

c. Installation. An installation includes any land or interest in land owned by the United States and administered by the Secretary of Defense or the Secretary of a military department, except land under the jurisdiction of the U.S. Army Corps of Engineers, Civil Works, as described in the Sikes Act.

d. Military mission. Military testing, operations, training, or other military activity or military construction.

e. Native species. With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs naturally in that ecosystem

f. Rehabilitation. The process of restoring a degraded environment to improve ecological function and increase suitability for habitation.

g. Restoration. The process of reestablishing or returning to the former, original, or unimpaired condition, to the extent possible, to reestablish a functional ecosystem.

11. Stewardship. The management of resources entrusted to DOD care in a way that preserves and enhances the resources and their benefits for present and future generations.

5. Background:

a. The Northern Bobwhite Quail is a wild, native bird of Pennsylvania and has been declared to be extirpated (no known existing wild populations) in Pennsylvania by the PGC.

b. LEAD, an Army installation encompassing over 18,200 acres in south-central Pennsylvania, was one of the last known locations to have a wild native bobwhite quail population.

c. LEAD provides good stewardship of its natural resources and manages its diverse wildlife resources and their habitats on the installation in compliance with state and federal statutes and regulations and as outlined in the installation's INRMP while maintaining optimal environmental conditions on the facility to support the military mission and activities.

d. The PGC's mission is to conserve and enhance wildlife resources within the Commonwealth and specifically the restoration of the Northern Bobwhite Quail as a native species to the landscape.

e. LEAD, in partnership with the PGC, will enter into an agreement to create a BQFA on approximately 3,680 acres of land, including a variety of habitat types containing diverse wildlife and plant species, located on LEAD (Encl 1) with 1,500 acres of said recovery area being year-round quail habitat meeting the objectives of the INRMP and mission of the PGC.

6. Scope: Provisions of this MOU are applicable as shown on the map of the BQFA (Encl 1) although the boundaries of the focus area may change due to LEAD mission requirements or inclusion of additional supporting habitat.

7. Responsibilities:

a. LEAD agrees:

(1) To provide advance notice to PGC of all major events or changes in mission requirements relating to the focus area.

(2) That PGC, its employees or agents, at their own respective risks, shall have the right to ingress to and egress from the BQFA, or any part thereof, with vehicles, tools, and/or equipment reasonably necessary to carry out agreed upon management activities with close coordination of LEAD Natural Resources Office and subject to the safety and security requirements of LEAD.

(3) To provide assistance to rehabilitate the land to meet the wildlife habitat objectives of the BQFA using Natural Resources staff and volunteer support.

(4) To conduct prescribed burning on the BQFA as needed to keep habitat in an early successional state conducive to northern bobwhite and other native habitat related wildlife species.

b. PGC agrees:

(1) To use best efforts to ensure that the conversion of habitat to that which is needed by Northern bobwhite quail will not inhibit current and future LEAD military mission and/or objectives.

(2) To provide conservation technical expertise and assistance in the management of the BQFA.

(3) To provide assistance with site preparation to convert property to wildlife habitat to meet the objectives of the BQFA.

(4) To conduct prescribed burning on the BQFA as needed to keep habitat in an early successional state conducive to Northern bobwhite quail and other related native wildlife species.

c. Both Parties agree:

(1) To enter into a partnership to create a new BQFA on approximately 3,680 contiguous acres located on LEAD (Encl 1). Of the 3,680 acres, 1,500 acres will be managed for year-round quail habitat. PGC and LEAD shall publicly recognize this partnership when appropriate.

(2) To develop a LEAD BQFA Management Plan that outlines habitat management, translocation, and monitoring, to which all parties will agree to abide by.

(3) To keep the BQFA in wildlife habitat for the length of the management plan barring compromise of LEAD mission.

(4) That LEAD shall give PGC necessary access to the BQFA to effectuate this MOU.

(5) That LEAD and the PGC shall promote the other's organization to the greatest extent reasonably possible.

- (6) To prohibit the release of any wildlife species other than wild bobwhite quail within the focus area without the agreement of all parties.
- (7) To prohibit all dog training, hunter retriever field trials, or hunt tests that might harm or disturb wildlife within the BQFA.
- (8) To prohibit quail and pheasant hunting within the BQFA.
- (9) To collaborate on conservation funding and research opportunities designed to further each organizations mission at the BQFA.
- (10) To give permission to PGC biologists in partnership with LEAD Natural Resources staff to monitor wildlife species of interest within the BQFA.
- (11) To prohibit mowing/haying within the BQFA annually from 1 May–15 July unless doing so prohibits meeting objectives of the LEAD mission.
- (12) To manage land within the BQFA based on recommendations of LEAD Natural Resources Staff and PGC biologists.
- (13) That if any provision of this MOU or the application thereof to any person or circumstances is held invalid, the remainder of this MOU and the application of such provision to other persons or circumstances shall not be affected thereby.
- (14) That where required by law, the parties of this agreement shall comply with all applicable state and federal statutes relating to nondiscrimination.
- (15) That the terms and conditions of this agreement shall be binding upon and shall insure to the benefit of the parties and their successors and assigns. This provision shall not be construed to permit assignment by any party of any of its rights and duties under this agreement, which assignment shall be prohibited except with the prior written consent of all parties. Such consent shall not be unreasonably withheld.
- (16) To provide assistance, funding, and/or other available resources to manage wildlife habitat within the Focus Area. No funding or other assistance is guaranteed or committed by this MOU, but will need to be committed by separate agreement signed by all necessary parties including the Pennsylvania Office of Attorney General and the Office of the Comptroller.

8. General Provisions:

- a. Effective period. This MOU is effective upon signature by all Parties and expires 9 years from the effective date.
- b. Review/modification/termination. The Parties shall review and evaluate the MOU annually or around the anniversary date. This MOU is open to amendments on the agreement of all Parties. The Parties shall have the right to cancel this MOU with or without cause upon 30

days' written notice to the other parties. The Parties that this agreement sets forth the entire understanding of the parties with respect to the subject matter hereof, supersedes all existing agreements among them concerning the subject matter hereof, and may be modified only by a written instrument duly executed by each of the parties.

c. Disputes. Any disputes relating to this MOU will, subject to any applicable law, Executive Order, Directive or Instruction, be resolved by consultation between the Parties or be elevated through the Parties respective chains of command for resolution.

d. Transferability. This MOU is not transferable except with the written consent of the Parties.

9. Functionality primary points of contact are:

Letterkenny Army Depot
1 Overcash Avenue
AMLD-EN (Natural Resources Office)
Chambersburg, Pennsylvania 17201
Phone: 717-267-8832

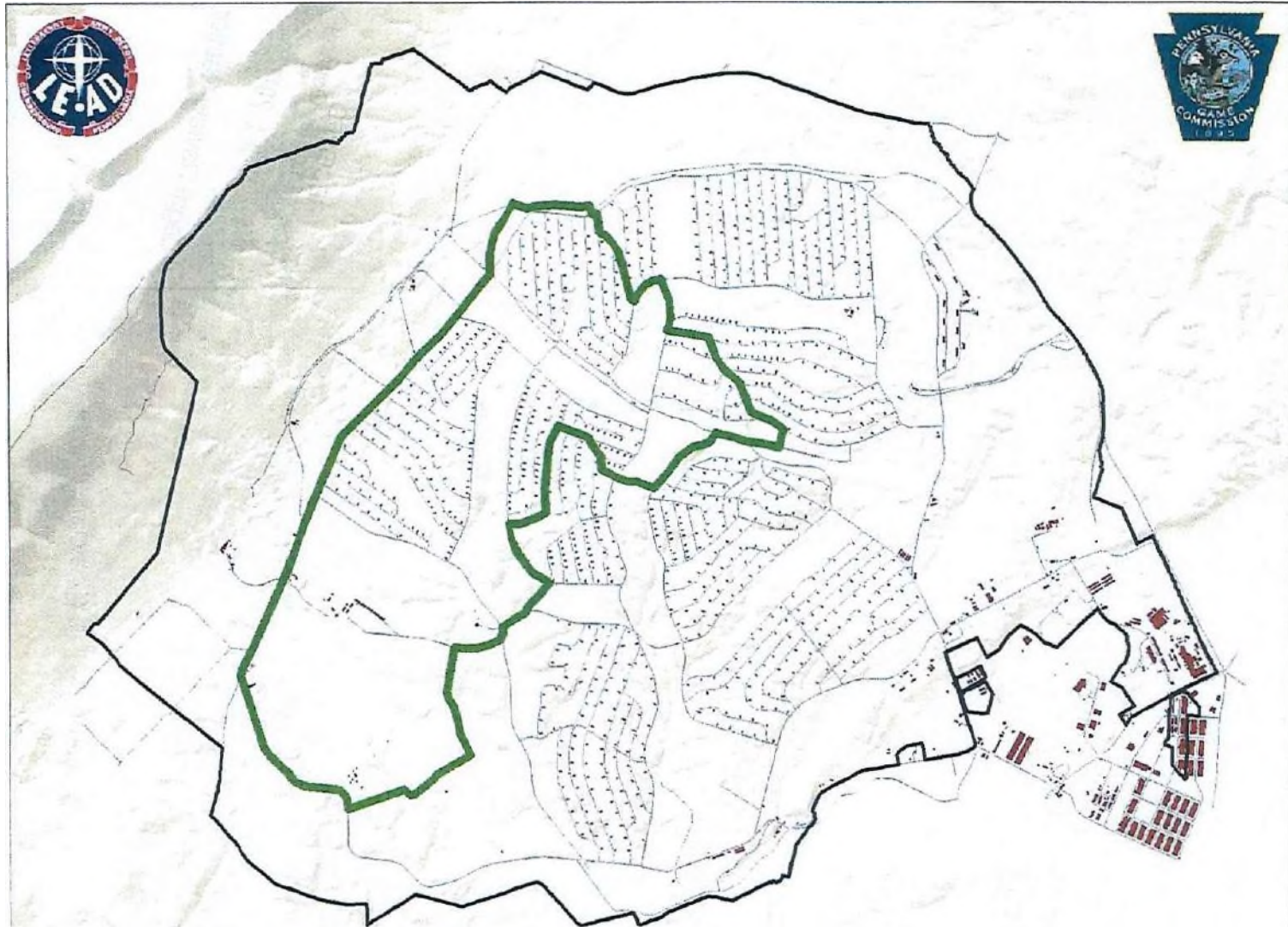
Pennsylvania Game Commission 2001
Elmerton Avenue
Harrisburg, Pennsylvania 17110
Phone: 717-787-5529

10. Agreed:

Colonel Edward D Maddox
Commander, Letterkenny Army Depot
U.S. Department of the Army

Bryan J. Burhans
Executive Director
Pennsylvania Game Commission

Letterkenny Army Depot Bobwhite Quail Focus Area



Estimated Acreage = 3,680

End 1

Letterkenny Army Depot Bobwhite Quail Focus Area

Management Plan

2017-2027

PURPOSE

This plan has been created in conjunction with the newly formed partnership between Letterkenny Army Depot (LEAD), the Pennsylvania Game Commission (PGC), and Quail Forever (QF) to restore wild northern bobwhite quail to Pennsylvania at the Letterkenny Army Depot, northcentral Franklin County, Pennsylvania. A 3,679-acre Bobwhite Quail Focus Area (BQFA) has been established within the boundaries of the depot (Appendix A). This plan serves as a guiding tool for managers of this project. It provides a summary of the project, habitat and management objectives, and a proposed timeline for completion spanning the initial 11 years of the project.

GOAL

To establish a self-sustaining wild northern bobwhite quail population at Letterkenny Army Depot.

OBJECTIVES

- Establish at least 1,500 acres of year-round suitable quail habitat within the focus area as expeditiously as resources will allow to accommodate translocation.
- Maintain established suitable habitat through 2027.
- Translocate wild quail from partner state(s) for release into the focus area once sufficient suitable habitat has been established.
- Measure project progress and success through monitoring vegetation, quail population dynamics, and other similar habitat specialist surveys (American woodcock, grassland passerines, etc.).

FOUNDATION

1. Memorandums of Understanding

A Memorandum of Understanding (MOU) will be developed between LEAD and the PGC. A separate MOU will also be developed between PGC and QF. These MOU's will outline the general responsibilities of each party in implementing quail restoration work within Pennsylvania. Once reviewed and approved these MOU's will be signed by all listed parties. There are several points within the LEAD/PGC MOU that should be highlighted within this document:

- Prohibition of wildlife species release excepting wild bobwhite quail within the focus area
- Prohibition of dog training within the focus area

- Prohibition of quail and pheasant hunting within the focus area

2. Project Management Plan (this document)

This plan will include initial planning, habitat management surveying, general translocation, monitoring, and a proposed timeline of tasks, accomplishments, monitoring, and reporting. This plan will provide specific habitat management objectives and strategies for the life of the project. The plan will be developed in close coordination with LEAD personnel and reviewed by both internal and external partners.

3. Cover Mapping

A series of habitat cover, or resource conditions maps will be developed to assist with monitoring and habitat management planning. Initially a general map will be developed using desktop resources to identify broad habitat categories. Ultimately, a dynamic finer-scale map will be developed through on-the-ground surveying. This map will permit measuring habitat management progress throughout the project.

4. Habitat Assessment

The use of cover mapping and habitat surveys conducted at random points throughout the focus area will enable managers to assess and monitor habitat suitability throughout the life of the project. This will inform decisions regarding translocation and assist in determining the feasibility of its timing.

SURVEYS & MONITORING

1. Monitoring Points (Pre- & Post-Release)

Monitoring will be based upon the National Bobwhite Conservation Initiative's (NBCI) Coordinated Implementation Program (CIP) manual (bringingbackbobwhites.oredownloadinbci-coordinated-implementation-program-2016/), a successful protocol that has already been instituted with positive results on project areas in other states. Monitoring points, and adjacent habitat measurements, will allow for evaluation of monitoring habitat changes throughout the life of the project. Habitat evaluation will be conducted using a combination of resources but will likely rely on external partners for implementation. Vegetation sampling will occur within a 250-m radius of the spring call count survey locations (Appendix B). Additional monitoring locations may be established dependent upon available resources.

Photo points will also be established throughout the focus area to visually represent change in habitat through time and provide relative changes to previous vegetative structure. A minimum of 65 photo points will be established with at least one found within each management unit.

2. Fall Covey Call Counts (Reference Points Pre- & Post-Release)

Using a minimum of 4 randomly selected points within the LEAD focus area, annual fall covey call count surveys will be conducted between late-September and early-November,

as recommended by NBCI CIP protocol. Survey methods will follow NBCI protocol within the CIP manual. Primarily LEAD & PGC staff will conduct fall surveys although this responsibility may shift if external partner resources become available.

3. Spring Call Counts (Reference Points Pre- & Post-Release)

Using a minimum of 15 randomly selected points within the LEAD focus area, annual spring call count surveys will be conducted within the peak calling period (approximately June) as recommended by NBCI CIP protocol. Survey methods will follow NBCI protocol within the CIP manual. Primarily LEAD & PGC staff will conduct spring surveys although this responsibility may shift if external partner resources become available.

4. Post-Release Survival and Mortality

Radio telemetry will be conducted post-release to monitor or quantify survival, nesting habitat use, nesting habitat relations, nest success, sources of mortality, dispersal and home range. Methods or protocols used for telemetry will follow current best management practices to ensure optimal bird health and survival success. Telemetry will be conducted through a combination of resources, but with a focus on finding an external funding and personnel source such as academia, grant funding or a partnership funded position.

5. Multi-Species Monitoring

Additional surveys will be implemented annually to measure effects of habitat change on other species and evaluate habitat quality. The two primary surveys to be completed are Breeding Bird Surveys (BBS) to measure non-game passerines (Eastern Meadowlark, Grasshopper Sparrow, etc.) as well as an American Woodcock Singing Ground Survey (SGS) route. A second SGS route is established outside of the focus area for comparison (Appendix B). Woodcock SGS routes will follow current US Fish & Wildlife Service protocol. A pre-existing BBS survey route will continue to be surveyed for the life of this plan. In addition, and dependent upon available resources, Breeding-bird point-counts will be completed at the 15 random points established for quail surveys. Primarily LEAD & PGC staff will conduct these surveys although this responsibility may shift if external partner resources become available. Other surveys such as pollinator, herpetofauna, or small mammal surveys could be conducted should they complement project objects and additional resources would become available. Continued hunter harvest surveys of both white-tailed deer and wild turkey will also occur.

[Note: Survey protocols will be provided separately from this document.]

TRANSLOCATION

1. Planning & Strategy

Prior to translocation, all current research pertaining to the subject will be closely considered as well as consulting with experts within this field to carefully craft a plan and/or strategy to increase the likelihood of long-term success.

2. Request Packet

A generic request packet will be drafted by PGC Bureau of Wildlife Management and approved by the PGC Executive Office. This packet will include a request letter, along with supporting documentation such as the site-specific management plan and annual progress reports or updates highlighting completed survey and monitoring work. This packet, will not only provide a request to potential translocation partners, but will also serve as initial documentation to prospective partners that suitable habitat has been established within the focus area.

3. Donor States

PGC staff will contact state agencies within the quail range that might be willing and able to provide a source of wild quail for translocation. Negotiations will occur to

determine timelines, resource needs, and other requirements of the source agency.

4. Timeline

A prospective timeline will be developed for each potential donor state. This will be dependent on current population levels within the donor state, resource availability, and the suitability of habitat within the LEAD focus area.

5. Quantity & Timing

The total number of wild quail translocated from any given location will largely be dependent on focus area habitat suitability and resource requirements by the donor state as well as their population levels at that time. Eighty quail per year is recommended as a minimum number (Henry, J.J. 1993. *Bobwhite Trap and Transfer evaluation*. ODNR pub.) to be released into the focus area having a sex ratio of 1:1 and consisting of adults as the majority although most recent research should be considered (such as Martin et al. 2017 *Translocation as a Population Restoration Technique for Northern Bobwhites: A Review and Synthesis*. Quail 8 pub.). If more quail are available per year, a maximum number of 200 birds should be obtained for translocation and be released if habitat conditions will support larger numbers. Multiple donor states should be pursued each year to ensure greater success in reaching translocation goals and increasing genetic diversity of resulting progeny. A minimum release period of 3 consecutive years should be anticipated.

HABITAT MANAGEMENT

Property History

The land that now makes up the 18,486-acre parcel known as Letterkenny Army Depot was once used primarily for cropland and pastureland. Originally 20,508 acres were acquired in 1942 for the construction of the Letterkenny Ordnance Depot (now Letterkenny Army Depot). Over time some land was transferred to various state agencies for public use. A portion of that land was turned over to the Pennsylvania Game Commission and now makes up State Game Lands 235.

Land Use

Land use within the depot has changed over time, but the primary usage is semi-subterranean weapons storage facilities. A small portion is an industrial/developed area with large above-ground parking areas for vehicle storage. Most of the property is a mixture of forested areas with agricultural field openings and some brushy areas. Many of the agricultural fields are currently under lease agreements with local farmers. Most of the leased cropland is comprised of perennial hay operations. A minority of the fields and openings are managed by LEAD Natural Resources staff for wildlife food and cover. In one area of the base, open ground persists as this is used for munitions destruction. There are currently two zones making up the LEAD facility. The first, Zone 1, is the inner most area which is surrounded by fence and is highly secure and inaccessible. Zone 2 surrounds Zone 1 and although permission is needed, this area is open to recreation such as hunting and fishing on a limited basis.

Focus Area

Approximately 3,679 acres of Zone 1 has been selected and designated as the Letterkerry Army Depot Bobwhite Quail Focus Area. The location and size of the focus area was selected based primarily on a combination of habitat type and lands available to management. The focus area is situated on the western portion of the facility, at the base of the North Mountain. The focus area encompasses a variety of habitat types including reverting fields, woodlands, ponds and watercourses, as well as some buildings and the demolition area. The focus area is largely bounded by existing roads, but in some cases the boundary is not clearly distinguished without the aid of a map. It is located furthest from the developed area, and is least utilized, except for the demolition area.

Habitat Categorization

Landcover has been evaluated at a cursory level through desktop satellite imagery analysis and classified into 7 fields or types (Appendix C). Acreage is approximate and some overlap occurs. Percentages of these are as follows:

Cover Type	Acres	Percentage
Woodland	1,936	54%
Leased Ag Fields	555.97	16.7%
Food Plots	71	2.1%
Open	637	18%
Roads	186	5%
Urban	168	5%
Ponds	3	<1%

The *Woodland* cover type represents a vast collection of differing stand types and sizes. It is defined as being greater than 12 feet in height and having anywhere crowns are in contact with other crowns forming a canopy that inhibits light from reaching the ground. It should be noted that this definition is often used when describing 'Forestland', but in this case the terms 'Forestland' and 'Woodland' are used interchangeably. *Leased Ag Fields* cover type represent openings that have been cleared of rocks and stumps and are being manipulated in some way through agricultural production or mowing. *Food Plots* are fields cleared of rocks and stumps and are being planted annually with unharvested crops to be utilized by wildlife. *Open* areas are those open spaces having grass, forbs, or early successional woody growth cover less than

12 feet in height. The *Roads* cover type is any area where pavement or black top has been laid for travel or vehicle storage. *Urban* cover type includes buildings, mowed areas around buildings and the demolition area. The *Pond* cover type accounts for two small ponds found within the focus area.

Detailed cover maps currently are unavailable; therefore, it is difficult to determine how much suitable habitat is currently available. Habitat suitability within the focus area has not been measured or assessed. As the project begins, we will conduct intensive habitat monitoring to answer that question using partnership resources. Following National Bobwhite Conservation Initiative (NBCI) habitat monitoring protocol, we will measure current suitable habitat and continue monitoring throughout the life of the project to ensure management objectives are being met. Habitat monitoring will occur annually if external funding or personnel resources can be obtained. If this is not the case than habitat monitoring will occur years 1, 5, and 10 which is the minimum effort found in the CIP manual.

Habitat Management Practices/Techniques

1. Prescribed Fire

Prescribed fire will be used as a habitat management tool with multiple objectives. The two primary objectives will be to control invasive vegetation and to thin and maintain native grass stands and perennial and annual forb stands. Opening stands at ground level is critical for quail movement. Another benefit will be to reduce coarse woody debris left over from tree clearing. Slowing succession is a vital role for prescribed burning. Prescribed burning will be conducted primarily by PGC personnel with close cooperation and participation by LEAD staff. In concert with additional habitat inventories, a prescribed fire cover map (Appendix D) will be used to identify areas currently suitable for the application of controlled burns and other areas requiring mechanical or other preparatory treatments prior to fire.

2. Disking

The use of disking to manage and enhance habitat for bobwhites has been used successfully throughout the species range. Disking will be used to thin stands of native grasses and promote forb growth within fields or along border edges. Disking will be conducted by LEAD staff and their designated volunteers.

3. Chemical Application

Herbicide use within the focus area will assist in the creation and maintenance of quail habitat by controlling undesirable plants while establishing native forbs and grasses. Chemical application will be conducted by LEAD staff and their designated volunteers.

4. Mechanical Management

Mechanical means (not including discs) will be used within the focus area to manage bobwhite habitat. These tools will be used primarily to remove overstory, maintain shrub cover, and control non-native vegetation. Both heavy machinery, and hand tools will be used by contractors, LEAD staff and their designated volunteers. Commercial timber harvest would also fall under this category.

5. Plantings & Regeneration

Both planting and allowing natural regeneration will be used within the focus area for suitable quail habitat establishment. These strategies will focus primarily on annual/perennial forbs, native warm-season grasses, and shrubs. Plantings will primarily be led by LEAD staff and designated volunteers but may receive external funding or volunteer resources.

Desired Future Resource Condition

The overall habitat management goal is to establish, manage, and maintain a mixed mosaic of early successional habitats that incorporate the three primary habitat needs of bobwhite quail:

1. **Nesting Cover** — Suitable nesting habitat shows a lot of variation, as quail have the ability to nest in a variety of habitat types. Typically, this nesting habitat consists of clump or bunch grasses where females can burrow underneath and use the grass for overhead protection. Native warm-season grass varieties generally are considered ideal for this cover, but spacing is important. Best spacing for clumps should be one 12-inch bunch per four square feet with a height of 6-18 inches. Warm-season grasses interspersed with some forb stands provide most of the resources needed for a nesting female and her newly hatched brood. Nesting cover is best provided broadly as opposed to linear stands to enhance nest success and reduce nest predation.
2. **Brood Habitat** — Brood habitat in Pennsylvania has historically consisted of old-field growth. Fallow fields support a diversity of native forbs that provide food throughout the year for quail. Many legume type forbs attract insects in the summer when young chicks need large amounts of protein. An important aspect of brood cover is the amount of vegetation at ground level. This means 25-75% bare ground is needed under a largely herbaceous canopy which allows for quail chick movement while utilizing the overhead concealment. [Note: Throughout fall and winter, many seed-producing forbs provide an important food staple for quail when other food sources are unavailable.]
3. **Protective Habitat** — Often referred to as the 'Headquarters', shrubs offer many benefits to bobwhites throughout the year. Headquarters provide escape cover from predators, cool areas for loafing and rest during the summer, and cover that they can be used to avoid snow and ice throughout the northern winters. In some parts of the bobwhite's range, multiflora rose and *Rubus* spp. may serve as headquarters. To provide optimal protective habitat for bobwhite, these areas should include woody shrubs along fence rows and field borders. Because of this, historically most shrubby cover has been found in a linear array, but things such as loose brush piles or islands of shrubs can also provide this important habitat type. Density is important when considering what suitable shrub cover for quail is. Protective habitat must be thin enough to allow quail to fly in and through, but dense enough to keep out most avian predators such as cooper's hawks or goshawks and discourage terrestrial predators such as fox, raccoons, and skunks. A dense upper level with an open understory is best when considering shrub cover. Where brushy cover is primarily saplings, management is required to keep succession at that level or earlier.

Not only is understanding the makeup of the three core quail habitat types crucial, but the placement and relative location of these different habitat components in relation to one another and their interspersion is extremely important. Ensuring these elements are found adjacent to each other and dispersed throughout the focus area will provide secure cover increasing survival and reproductive success. The NBCI CIP manual focuses specifically on habitat structure and should be referenced continuously throughout the establishment and maintenance of habitat within the focus area. Brood habitat should comprise most of the existing habitat, followed by nesting habitat and then protective habitat. All are equally important however, and without one type, the focus area would not be suitable for quail survival and success.

Desired future cover within the focus area can be seen in Appendix E. To provide a more precise figure for habitat management objectives, urban and road (353.6 acres) cover types were removed from projected potential habitat (3,325.4 acres). It is broken down in the following table by acreage and percentage:

Cover Type	Acreage	% Cover
Forbs/Annual Weeds	1,923.85	57.9
Leased Ag. Fields	555.97	16.7
Shrubs	387	11.6
Warm Season Grass	292.8	8.8
Food Plots	71	2.1
Oak Savannah	52	1.6
Woodlands	42.8	1.3

Forestlands:

The overall goal for this habitat type is to maintain and enhance mature forest stand structure and long-term integrity of forest ecosystem processes.

Two primary forested habitats are desired within the focus area. The **first** is an Oak Savannah type system where basal area is reduced and a strong herbaceous component is allowed to grow within the understory. This system will provide both a hard mast food source as well as nesting and brood habitat within the understory. The **second** is found along stream corridors and riparian areas, providing shade needed to maintain important water temperatures to support a variety of aquatic life. Forestland management will affect only a small amount of acreage within the focus area but is nonetheless important.

Strategy 1: Conduct silvicultural treatments that include clearing to open canopy and allow sunlight to the forest floor promoting herbaceous growth to create nesting and brood rearing habitat. Implementation of treatments will depend on stand analyses through periodic habitat surveys.

Implementation Action 1: Use commercial or, if applicable, non-commercial felling to cut oak stands to reduce and maintain a basal area of 20–40 sq. feet/acre to achieve less than 30% canopy closure. This treatment should be implemented once in each compartment during this 11-year planning cycle. Following treatment, stands will be re-evaluated for future management.

Units (Appendix F):

Years 2017-2020: n/a

Years 2021-2024: Compartment K: K5a, K6a; designated portions of K7, K8, K9
Years 2025-2027: n/a

Implementation Action 2: Use prescribed fire to control woody growth and to promote native warm season grass and annual forb growth within forest understory. Prescribed fire should be conducted during dormant season when fuel load is heaviest or during growing season although timing may be dependent on weather, available fuels, and vegetation growth.

Units:

Years 2017-2020: Compartment K: K5a, K6a; designated portions of K7, K8, K9
Years 2021, 2024 & 2027: Compartment K: K5a, K8
Years 2022 & 2025: Compartment K: K6a, K9
Years 2023 & 2026: Compartment K: K7

Shrublands: The overall goal for this habitat type is to increase and enhance shrubland acreage along forested stand edges, surrounding agricultural fields, and throughout both native warm-season grass and forb stands. Shrub habitat within the focus area provides escape cover, thermal cover, and loafing areas for quail throughout the year. Existing shrub habitat beneath the current canopy will be utilized when considering the below strategies.

Strategy 1: Use commercial or non-commercial tree felling and mulching techniques to enhance, increase, or delineate existing shrub cover for bobwhite quail and other associated species adjacent to brooding and nesting cover. Maintenance of shrub habitat is crucial to continued efficacy. Shrublands should be maintained through mechanical treatment as well as prescribed fire throughout the life of the project. The use of herbicide to control invasive shrub species and promote native trees and shrubs should also be considered as an effective tool.

Implementation Action 1: Use commercial or non-commercial felling, dozing, or mulching techniques along designated 50' shrub corridors in order to remove 80-100% of forested overstory canopy to allow for early successional shrub layer. Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: all units except K16; Compartment F: F1, F2, F3;
Compartment G: G0, G1, G2, G3, G4, G5
Years 2021-2024: Compartment F: FO, F8, F9, F11, F13; Compartment G: G6, G7, G8, G9,
G10, G11; Compartment C: CO, C1, C2, C3, C4, C5, C8
Years 2025-2027: Compartment H: all units except 117, 1113

Implementation Action 2: Use commercial or non-commercial felling, dozing, or mulching techniques along designated forest stand edges to cut back 30-50' from edge removing 80-100% of forested overstory canopy. Half the cut-back area nearest the forest should be established in shrubs while the other half closest to the field should be established in forbs/annual weeds (See *Terrestrial Herbaceous Openings, Strategy 2, Implementation Action 3* below). Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: K5a, K6a, K7, K8, K9,
Years 2021-2024: Compartment F: FO
Years 2025-2027: Compartment H: 111

Implementation Action 3: Use commercial or non-commercial felling, dozing, or mulching techniques within designated shrub patches or 'thickets' to reduce forested overstory canopy by 80-100%. Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: K1, K4, K5b, K6b, K7, K12; Compartment F: F4
Years 2021-2024: Compartment F: FO; Compartment G: G9, G11; Compartment C: C8
Years 2025-2027: n/a

Herbaceous Openings: The overall goal for this habitat type is to create and maintain herbaceous openings to provide a mosaic of both nesting and brood rearing habitat. The two primary herbaceous cover types are native warm season grasses and annual/perennial forbs. Two additional types found within the focus area are food plots, which will be managed to provide annual winter forage, and the agricultural leases.

Strategy 1: Warm Season Grasses. Establish, maintain and enhance warm-season grass habitat structure and vigor as well as control invasive species through disking, prescribed fire, mowing, herbicide treatment and/or reestablishment plantings.

Implementation Action 1: Establish warm season grass stands through commercial or non-commercial felling, dozing, or mulching techniques to remove 100% of the canopy and woody cover. Slash or coarse woody debris associated with the removal of woody cover can be used in creating loose brush piles or linear rows (wind rows) to provide temporary shrub habitat and protective cover for quail. Other options would be piling for burning or cutting and allowing to lay where felled.

Units:

Years 2017-2020: Compartment K: K15; Compartment F: F1; Compartment G: G0, G1, G2, G3, G14
Years 2021-2024: Compartment G: G9 Compartment F: F8, F9 Years 2025-2027: Compartment H: 113, 114, 115, 116, 1111

Implementation Action 2: Establish warm season grass stands through the removal of cool season grass/fescue by way of prescribed fire, heavy disking, or herbicide treatment. These units should then be followed with successive treatments to prevent cool season/fescue from returning and eventual plantings. Planting rates should follow current best management practices and/or research findings.

Units:

Years 2017-2020: Compartment K: K2, K3, K6b, K7; Compartment F: F1, F2;
Compartment G: G3, G5, G6, G8, G12, G14
Years 2021-2024: Compartment C: CO, C3, C4
Years 2025-2027: Compartment H: 112, 113

Implementation Action 3: Maintain warm season grass stands through disking, prescribed fire, mowing, or selective herbicide treatments to reduce woody invasion, thatch layer, and high density of plants within the stand as well as increase bare ground at ground level (50-70% bare ground needed). Optimal density of warm season grass stands should maintain one 12-inch clump per 4 square feet. Prescribed fire and disking should be used within a 3-year rotation on designated warm season grass units. If disking is the primary technique, units should be broken

into thirds, with a third being disked each year within the 3-year rotation. Any technique used should occur outside of the nesting season and between the months of October - March post-release of quail. Timing is of less concern pre-release.

Units (units will be placed in rotation as they become available):

Year 2017: Compartment G: G0, G1, G2, G3, G4; Compartment K: K16
Years 2018, 2021, 2024 & 2027: Compartment K: K7, K10; Compartment F: F8;
Compartment G: G1, G14; Compartment H: 112, 115
Years 2019, 2022 & 2025: Compartment F: F1, F9; Compartment G: G2, G5, G8, G12;
Compartment C: C4; Compartment H: 113, 116, 1111
Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K15, K16; Compartment F: F2;
Compartment G: G0, G3, G6, G9; Compartment C: C3, C0; Compartment H: 114

Strategy 2: Annual/Perennial Forbs. Establish, maintain and enhance forb growth, habitat structure and vigor as well as control invasive species through disking, prescribed fire, mowing, herbicide treatment and fallowing.

Implementation Action 1: Establish forb stands through commercial or noncommercial felling, dozing, or mulching techniques to remove 100% of the canopy and woody cover. Slash or coarse woody debris associated with the removal of woody cover can be used in creating loose brush piles or linear rows (wind rows) to provide temporary shrub habitat for quail. Other options would be piling for burning or cutting and allowing to lay where felled.

Units:

Years 2017-2020: Compartment K: all units except K5a, K6a, K16; Compartment F: F1, F2, F3; Compartment G: G1, G2, G3, G4, G5
Years 2021-2024: Compartment F: F0, F8, F9, F11, F12, F13; Compartment G: G6, G7, G8, G9, G10, G11, G12, G13; Compartment C: C0, C1, C2, C3, C4, C5, C8
Years 2025-2027: Compartment H: all units

Implementation Action 2: Establish forb stands through the removal of cool season grass/fescue by way of prescribed fire, disking, or herbicide treatment. These units should then be followed with successive treatments if needed to prevent cool season/fescue from returning and fallowed to allow existing seeds to sprout.

Units:

Years 2017-2020: Compartment K: K0, K1, K2, K3, K5b, K6b, K7, K11, K12, K13;
Compartment F: F1, F2, F3; F12; Compartment G: G1, G2, G3, G4, G5, G12, G14;
Compartment H: 113, 114, 115, 116, 118, 119, 1110, 1111, 1112
Years 2021-2024: As needed
Years 2025-2027: As needed

Implementation Action 3: Establish forb borders along field border cut-backs. Where tree removal has occurred along forested edges (See *Shrublands, strategy 1, implementation action 2* above), half of the cut-back area should be converted to forb stands nearest the field edge.

Units:

Years 2017-2020: Compartment K: K5a, K6a, K7, K8, K9,
Years 2021-2024: Compartment F: F0

Years 2025-2027: Compartment H: H1

Implementation Action 4: Maintain forb stands through disking, prescribed fire, or mowing to reduce woody invasion, thatch layer, and high density of plants within the stand as well as increase bare ground at ground level (25-75% bare ground needed). Prescribed fire and disking should be used within a 3 year rotation on designated forb stand units. If disking is the primary technique, units should be broken into thirds, with a third being disked each year within the 3 year rotation. Techniques used for maintaining this cover should be used late fall, through winter, and into early spring (March - April) post-release of quail.

Units (units will be placed in rotation as they become available):

Years 2018, 2021, 2024 & 2027: Compartment K: KO, K4, K7, K10, K13; Compartment F: FO, F3, F8, F12; Compartment G: G1, G4, G7, G10, G13; Compartment C: C2, C5, C8; Compartment H: 112, 115, 119, 1112

Years 2019, 2022 & 2025: Compartment K: K1, K5b, K8, K11, K14; Compartment F: F1, F4, F9, F11; Compartment G: G2, G5, G8, G11, G12; Compartment C: C4, C1; Compartment H: 113, 116, 118, 1111

Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K9, K12, K15; Compartment F: F2, F10, F13; Compartment G: G3, G6, G9; Compartment C: C0, C3; Compartment H: 111, 114, 1110, 1113

Strategy 3: Food Plots. Maintain established non-leased agricultural areas as annual winter forage plots.

Implementation Action 1: Seed designated food plots on a rotational basis, with annual grains. Crops should be left standing, pushed over, or mowed >15" above ground level and not removed or tilled until immediately prior to replanting the unit. Suggested crop species are milo, sorghum, wheat, corn, soybeans, Egyptian wheat, German foxtail millet, sunflower, or proso millet. Limited herbicide usage should occur and only if necessary for the success of the crop. Insecticides should not be used. [Note: Examine past herbicide applications to assist in determining plantings due to potential carryover.]

Units:

All Years: Compartment K: K4, K5b; Compartment F: F4, F8; Compartment G: G9, G10, G11; Compartment C: C0, C1, C3, C8; Compartment H: 116

Strategy 4: Agricultural Leases. Because agricultural leases cannot be considered year-round quail habitat, any available habitat creation within these areas should be pursued such as field border edges through government set-aside programs.

Implementation Action 1: Evaluate all agricultural leases to determine eligibility to enroll lessees in FSA CP-33 field border practices. Investigate cropping history, natural resources concern, and lessee interest. If fields would qualify, enroll and establish maximum acreage of field borders (30 —120' with 80' being optimal) within leased fields. Field borders should consist of native warm season grasses and be managed as such under strategy one above. As leases expire, consider building in field border edges to successive lease. [Note: Examine past herbicide applications to assist in determining plantings due to potential carryover.]

Units:

Years 2017-2020: Compartment K: KO, K1, K2, K4, K5b, K7, K10; Compartment F: FO, F2, F3, F11

Years 2021-2024: Compartment C: C4, C5

Years 2025-2027: Compartment H: 112, 114

Strategy 5: Igloo Management. Munitions storage facilities, often referred to as 'Igloos' are built with 2' of concrete and then covered with 2' of soil. Igloo surface must be managed to prevent any and all woody growth from occurring. Currently igloos are largely covered with cool season grasses, with some having a mix of cool and warm season, while others have a mix of cool season and forbs. These areas are best managed as and utilized by quail as brood habitat.

Implementation Action 1: Igloo management should focus on 2- to 3-year rotational burning as the primary control of woody intrusion. If prescribed fire cannot be achieved within the needed rotation, then mowing or herbicide treatments should be used to set back woody succession. Treatments can occur any time pre-release but should be conducted between October and March post-release of quail.

Years 2018, 2021, 2024 & 2027: Compartment K: K4, K7, K10, K13;

Compartment F: F3, F8; Compartment G: G1, G4, G7, G10; Compartment C: C2, C5

Years 2019, 2022 & 2025: Compartment K: K1, K5a, K5b, K8, K11, K14; Compartment F: F1, F4, F9; Compartment G: G2, G5, G8; Compartment C: C4, C1

Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K9, K12; Compartment F: F2, F10, F13; Compartment G: G3, G6, G9; Compartment C: C3

RESOURCES

1. Letterkenny Army Depot

- Staff (3 parttime) & Volunteers (-12 parttime)
- Equipment (tractors, implements, skid steer w/forestry head, loader & dozer)
- Expertise on federal land management & security

2. Pennsylvania Game Commission

- Staff (1 parttime)
- Rx Fire (full complement of staff as well as needed equipment, fuel, etc.)
- Limited funds for negotiating translocation
- Expertise on species management & plan writing
- Project coordination

3. Quail Forever

- Staff (1 parttime)
- Expertise on habitat management & seed mix availability
- Coordination of USDA set-aside programs
- Chapter funding

[Note: Potential partnerships and associated resources exist such as academia, other NGO's, etc. and will be pursued for the life of the project.]

COST

(TBD — Cost will be determined throughout the life of the project this being the first focus area in PA)

CHALLENGES

1. Translocation

With the bobwhite range shrinking, donor states will be reluctant to provide quail. Although current bobwhite populations have recently increased within mid-western states, the future of those populations is unknown and could possibly reverse dependent upon weather and other factors.

Solution: Continue open dialog with potential donor states and form a consortium of translocation experts to assist in project planning and strategy.

2. Funding

Due to financial constraints, neither agency will be able to provide a large amount of funding specifically for this project, beyond the personnel commitments outlined above. This may change in future years but would be most beneficial at its inception.

Solution: Pursue both internal sources such as timber revenue and external partnership resources such as grants, academia, pollinator initiatives, and multi-species project funding.

3. Competing Objectives

Competing stakeholder interests could negatively impact implementation of this plan through:

- The desire to release quail prior to the necessary establishment of suitable habitat.
- The re-direction of resources during habitat establishment and translocation throughout the life of the plan.

Solution: Continued communication and solicitation of input from stakeholders to encourage project ownership, collaboration, and commitment.

TIMELINE

- **Annually** (tasks completed every year - not listed under years below)
 - Conduct LEAD BQFA Partners Meeting (January)
 - Complete AMWO SGS (April)
 - Complete BBS surveys (May)
 - Complete spring call counts (June)
 - Complete photo point surveys within units following habitat management (June)
 - Complete habitat circle vegetation surveys (July-August)
 - Complete fall covey call counts (October)
- **2017**
 - Complete LEAD BQFA Management Plan (April)
 - Complete LEAD/PGC MOU & QF/PGC MOU (May)
 - Begin implementing habitat management practices on core area of focus area (April — in continuation)
 - Send translocation commitment request letters to potential donor agencies (Summer/Fall)
 - Complete initial Rx burn (Spring-Fall)

- **2018**
 - Begin planning & strategy coordination with translocation experts (January — in continuation)
 - Begin coordination of trapping efforts in donor state(s) (January)
 - Continue habitat management practices (January — in continuation)
- **2019**
 - Coordinate trapping effort in donor state(s) (January — Dependent on habitat suitability)
 - Continue habitat management practices (January — in continuation)
- Complete release of wild quail (March — Dependent on habitat suitability)
- Complete telemetry monitoring of released quail (March — in continuation)
- **2020**
 - Coordinate trapping effort in donor state (January — Dependent on habitat suitability)
 - Continue habitat management practices (January — in continuation)
 - Complete release of wild quail (March — Dependent on habitat suitability)
 - Complete telemetry monitoring of released quail (March — in continuation)
- **2021**
 - Continue habitat management practices (January — in continuation)
 - Complete release of wild quail (March — Dependent on habitat suitability)
 - Complete telemetry monitoring of released quail (March — in continuation)
- **2022**
 - If needed to achieve desired total releases, coordinate trapping effort in donor state and release at focus area (in continuation until desired release amounts achieved)
 - Continue habitat management practices (January — in continuation)
- **2023**
 - Continue habitat management practices (January — in continuation)
- **2024**
 - Continue habitat management practices (January — in continuation)
- **2025**
 - Continue habitat management practices (January — in continuation)
- **2026**
 - Continue habitat management practices (January — in continuation)
- **2027**
 - Continue habitat management practices (January — in continuation)
 - Evaluate project effectiveness and report
 - Complete revised management plan for the following time period

Note: This timeline represents the proverbial 'best case scenario' when considering the establishment of habitat and translocation timing. **Quail should not be translocated into the focus area until the needed amount of suitable habitat has been established.** Although presently pursuing additional external resources for the project, due to current project budget constraints there is the potential that all timeline objectives may not be reached, and the possibility is likely that some will need to be moved to future years. Original planning incorporated initial release in 2018, but most reviewers recommended 2019 at the earliest to allow additional planning and habitat establishment.

This timeline represents the initial 11 years of the project. Following year 2027 the project should be re-evaluated to assist in guiding it into the future. Should any party decide any part of

the plan requires reconsideration or revision, that party should notify all other partners to begin discussions on such changes.

LIVING DOCUMENT

It is of great importance for users of this document to understand that although it should be used as a tool to help guide operations and management of the focus area, it is a living document and it must retain the ability to change throughout the life of the project in order to best reflect current conditions, and incorporate new tools, techniques, strategies, and information produced here and elsewhere concerning quail management. Changing resources, vegetation response, updated technology, and additional information will all play a critical in guiding future management and in order to be successful, managers should maintain an attitude of flexibility, ingenuity, and continued dedication to the primary objectives.

APPENDIX K
ENDANGERED SPECIES MANAGEMENT PLAN
FOR
NORTHERN LONG-EARED BAT

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FINAL
Endangered Species Management Plan
for the Northern Long-Eared Bat
2019–2024

Letterkenny Army Depot, PA

Prepared for:
Letterkenny Army Depot
Chambersburg, PA

Prepared by:
Tetra Tech, Inc.
Fairfax, VA

December 2019



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FINAL
Endangered Species Management Plan for the
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2019–2024

Letterkenny Army Depot, PA

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Fairfax, VA

December 2019

Recommended citation:

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Prepared for Letterkenny Army Depot, Chambersburg, PA, by Tetra Tech, Inc., Fairfax, VA.

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**ENDANGERED SPECIES MANAGEMENT PLAN
FOR THE NORTHERN LONG-EARED BAT
2019–2024
LETTERKENNY ARMY DEPOT, PA**

This Endangered Species Management Plan has been developed on behalf of Letterkenny Army Depot, Pennsylvania, in cooperation with the U.S. Department of the Interior, U.S. Fish and Wildlife Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, and Pennsylvania Game Commission. The signature below indicates the agreement of the signing party concerning the conservation, protection, and management of the northern long-eared bat as presented in the Plan.

PLAN APPROVAL

Gregory K. Gibbons
Colonel, U.S. Army
Commander
Letterkenny Army Depot, PA

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ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
AWWI	American Wind Wildlife Institute
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
FMP	Forest Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
LEAD	Letterkenny Army Depot
NLEB	northern long-eared bat
NMFS	National Marine Fisheries Service
<i>Pd</i>	<i>Pseudogymnoascus destructans</i>
PGC	Pennsylvania Game Commission
PWAP	Pennsylvania Wildlife Action Plan
SGCN	Species of Greatest Conservation Need
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WNS	white-nose syndrome

EXECUTIVE SUMMARY

Background: Army Regulation 200-1, *Environmental Quality: Environmental Protection and Enhancement* requires the preparation and implementation of Endangered Species Management Plans for listed species occurring on U.S. Army lands. All Army land uses are subject to that regulation. Compliance involves coordination with other federal agencies responsible for the protection of those species. Failure to implement this management plan can lead to violation of the Endangered Species Act of 1973 (ESA) (Title 16 of the United States Code § 1531 *et seq.*) and result in the costly disruption of military operations.

Current Species Status: The northern long-eared bat (NLEB) was listed as federally threatened in 2015 with an Endangered Species Act section 4(d) rule, special regulations for threatened species, taking effect in 2016 by the U.S. Fish and Wildlife Service (USFWS 2015, 2016a). NLEBs have been documented on Letterkenny Army Depot (LEAD; Installation) in Franklin County, PA, in both 2000 and 2015 (PNHP & WPC 2015). The primary threat against the species is white-nose syndrome, which is caused by a fungal pathogen that interrupts hibernation and leads to large-scale mortality (USFWS 2016a). Pennsylvania documented a 99 percent decline in populations of NLEB during winter surveys since white-nose syndrome began killing cave bats in the state in 2009 (PGC 2014a, 2014b).

Habitat Requirements and Limiting Factors: The NLEB prefers closed-canopy forest habitat with flyways and open water (USFWS 2015). Limiting factors can include a lack of suitable roost trees, although NLEBs are flexible in the species and characteristics of trees in which they roost (USFWS 2015).

Management Objectives and Conservation Actions: Establishing management objectives and implementing conservation actions will help protect and enhance existing populations of NLEB on the Installation and help LEAD personnel gain a better understanding of NLEB populations and their use of LEAD. Detail on management objectives and conservation actions is provided in section 3.

Monitoring Plan: Research is critical to monitoring bat populations and activity levels. Repeating surveys on a predictable 5-year interval will allow for comparisons over time to be made and might indicate declining or increasing activity levels or species absence. Details on a recommended voluntary monitoring plan are provided in section 4.

Total Estimated Cost of Conservation Actions and Monitoring Activities: *LEAD will provide this section after USFWS review and agreement.*

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1.0 INTRODUCTION

This Endangered Species Management Plan (ESMP) is for the federally listed threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB) on Letterkenny Army Depot (LEAD, or Installation) in Franklin County, PA. The purposes of this ESMP are to (1) aid LEAD in effectively preserving and managing the NLEB and its habitat, (2) comply with applicable federal and state permit and reporting requirements, and (3) implement NLEB management goals and objectives at the Installation.

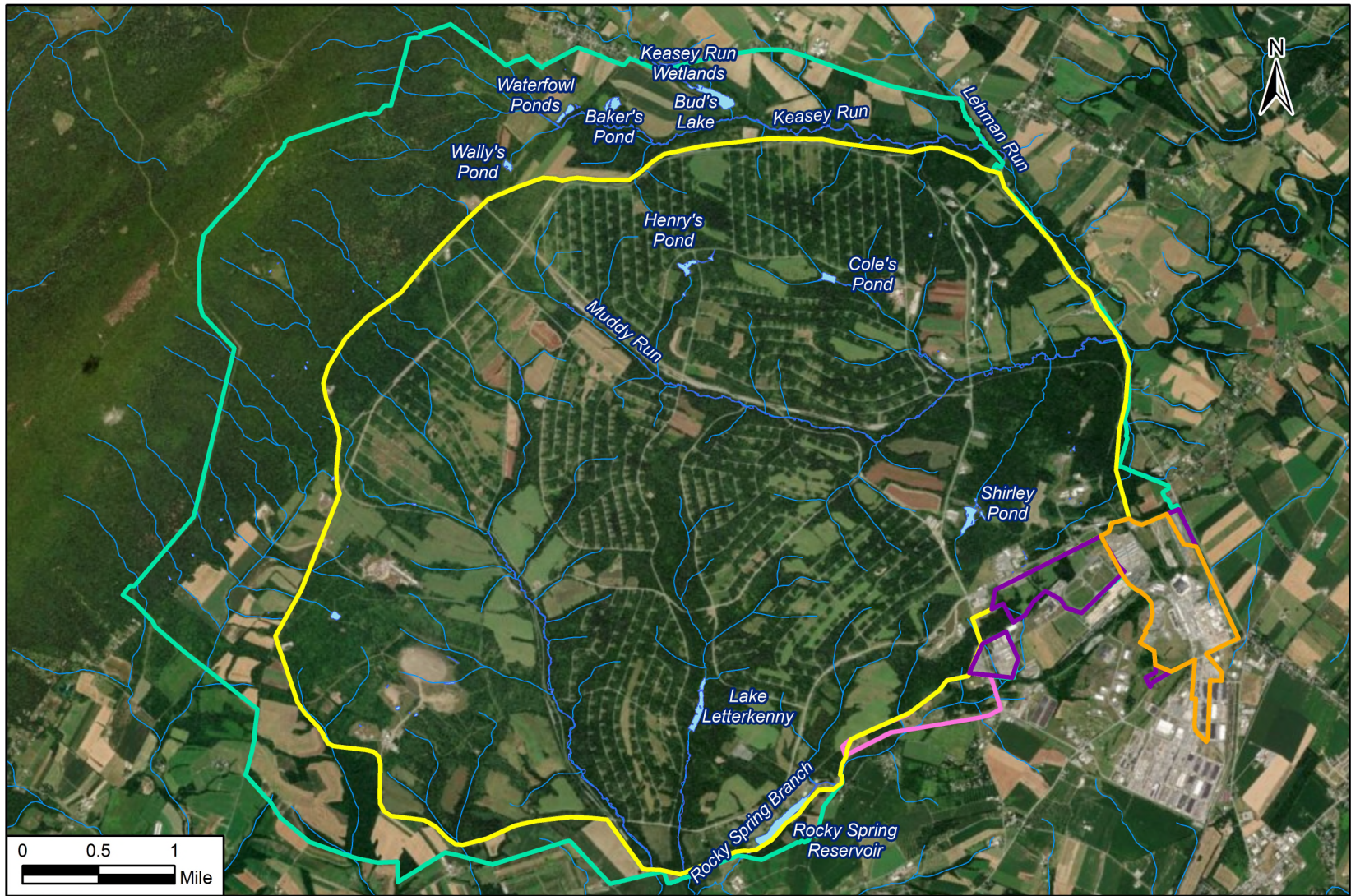
The NLEB is a cave-hibernating bat that prefers large contiguous forests. The species is distributed across the eastern and midwestern United States and into Canada. The NLEB was federally listed as threatened in 2015 because of declining populations resulting from the spread of a fungal pathogen (*Pseudogymnoascus destructans* [Pd]) that causes white-nose syndrome (WNS). WNS disrupts hibernation and leads to large-scale mortality (USFWS 2015).

This ESMP addresses (1) conservation actions required to adhere to the Endangered Species Act of 1973 (ESA) (Title 16 of the *United States Code* § 1531 *et seq.*) and minimize negative impacts to the NLEB and its habitat, and (2) previous bat survey results and an NLEB monitoring plan. Implementing the ESMP will not compromise the military mission. The plan is compliant and integral with LEAD's existing Integrated Natural Resources Management Plan (INRMP), Integrated Pest Management Plan (IPMP), Forest Management Plan (FMP), and Integrated Cultural Resources Management Plan (LEAD 2013). The ESMP also complies with the ESA and Army Regulation (AR) 200-1, *Environmental Quality: Environmental Protection and Enhancement*.

1.1 SITE DESCRIPTION

LEAD occupies approximately 18,486 acres in Franklin County, PA. It is in the Cumberland Valley of the south-central part of the state, about 55 miles southwest of Harrisburg. LEAD's mission is to provide the Army and other Armed Forces with worldwide, reliable, responsive, and cost-effective depot-level maintenance, field support, systems integration, and product support integration for weapon systems, components, and ancillary equipment to ensure the readiness, sustainability, and safety of those forces during the full spectrum of operational environments (Tetra Tech 2013).

LEAD is generally divided into three areas—ammunition storage, a buffer zone, and the cantonment (Figure 1) (Tetra Tech 2013). The ammunition storage area is about 12,335 acres and is used for conventional ammunition storage, tactical missile storage and assembly, open burning/open detonation, a functional firing range, agricultural outleasing, wildlife management, and recreation (hunting and fishing). The buffer zone is about 4,750 acres and is used for agricultural outleasing, forestry management, wildlife management, and recreation (hunting and fishing). The cantonment area is about 1,180 acres and is used for light industrial activities, maintenance activities, administrative functions, and tenant organizations.



Letterkenny Army Depot Layout and Water Resources

Figure 1

Source: LEAD GIS 2013.

Gently rolling hills predominate the LEAD landscape with relatively steep eastern slopes of Broad Mountain in the western section of the Installation. Most of the terrestrial habitat on LEAD is open fields and second- or third-growth forest. Of the total 18,486 acres on LEAD, approximately 52 percent is open fields, 34 percent is forested, 1 percent is water, and the remaining 13 percent is mostly developed with scattered vegetation (Figure 2) (Tetra Tech 2013). The forests in the western buffer zone are predominantly mature or late-successional mixed oak. Forests and woodlands at LEAD support forestry management and outdoor recreation (hunting). Forested areas have the potential to absorb the spread of debris from explosions in the storage bunkers, although no explosions have ever occurred on LEAD.

Many short ephemeral or intermittent streams are spread across LEAD. The main streams on LEAD—Lehman Run, Keasey Run, Muddy Run, and Rocky Spring Branch—are permanent (Figure 1) (Shippensburg University 1995, Tetra Tech 2013). Ephemeral natural pools are scattered throughout the forested lower elevations of the buffer zone. The Keasey Run wetlands are located along the northern border of LEAD (Figure 1) (USACE 2012a).

LEAD is in a region of Pennsylvania with an abundance of state-owned land (Figure 3). More than 40 percent of the land in Franklin County is wooded (Tetra Tech 2013). Land use immediately bordering LEAD is primarily forest and pasture/grassland (EP&D 2012). The 85,000-acre Michaux State Forest sits on the east side of LEAD, between Chambersburg and Shippensburg and portions of the Buchanan State Forest are on the west side of the Installation. Both forests are managed for timber production, and Michaux State Forest also is managed for water quality benefits. On the north and west sides of LEAD are large tracts used as State Game Land 76 (4,324 acres) and State Game Land 235 (6,277 acres). Those lands are managed for wildlife, including both game and nongame species of mammals and birds. Management methods on those tracts include prescribed fire, planting cover and food species, and implementing controlled hunting programs.

2.0 SPECIES INFORMATION

2.1 DESCRIPTION

The NLEB is a medium-sized, insectivorous bat about 3.0–3.7 inches from head to tail with a wingspan of 9–10 inches (Harvey et al. 2011). As its name suggests, the bat's distinguishing characteristic is its long ears that extend 0.16 inch beyond its nose when laid forward with a long, sharply pointed tragus (a flap inside the ear that aids in receiving echolocation signals) (Kays and Wilson 2009). The species has a noticeable bareness around the ears and muzzle and weighs 0.2–0.3 ounce with a forearm length of about 1.25–1.5 inches (Harvey et al. 2011, Kays and Wilson 2009). As with most North American insectivorous bats, the NLEB forages for flying insects using echolocation.

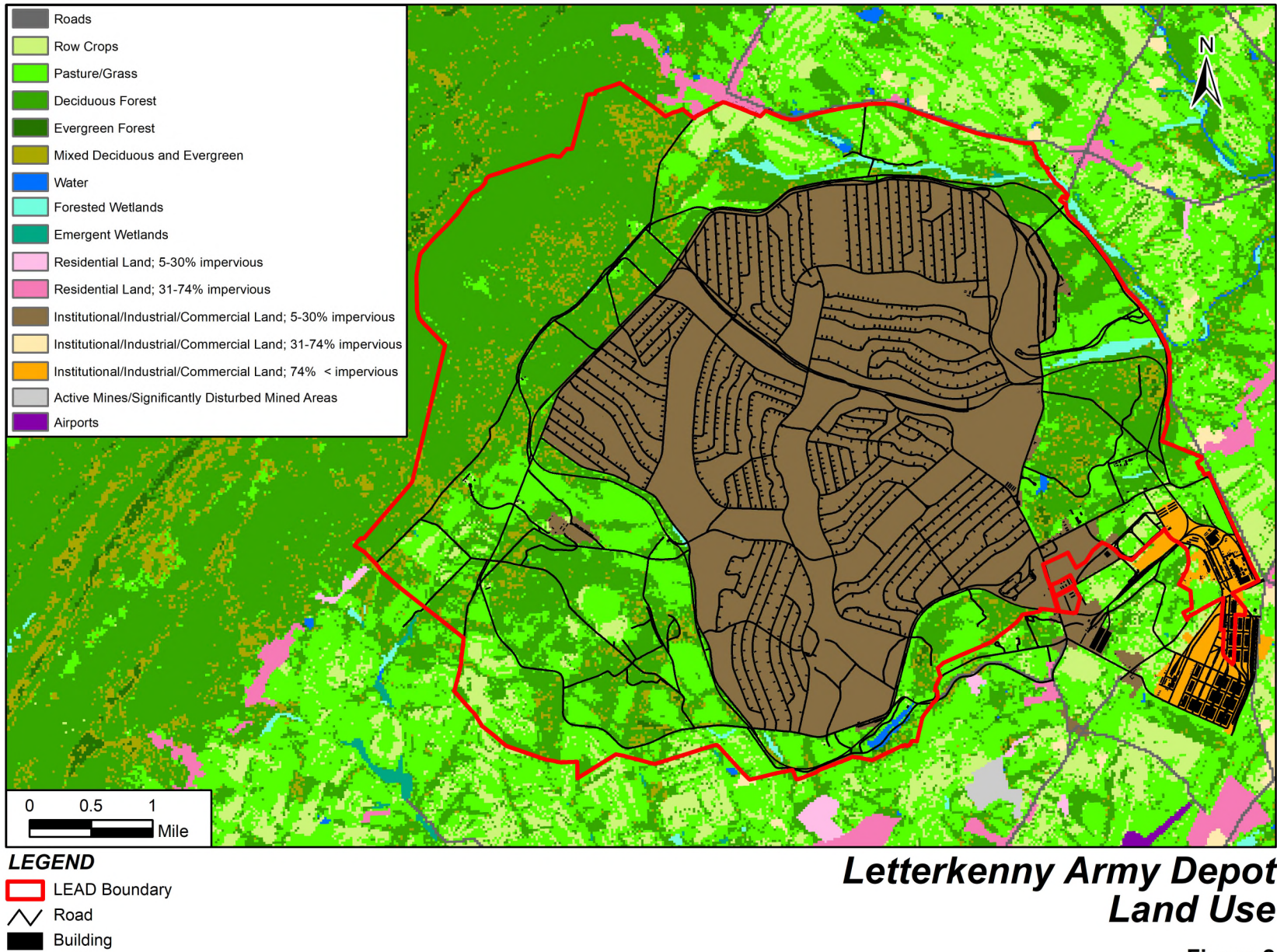
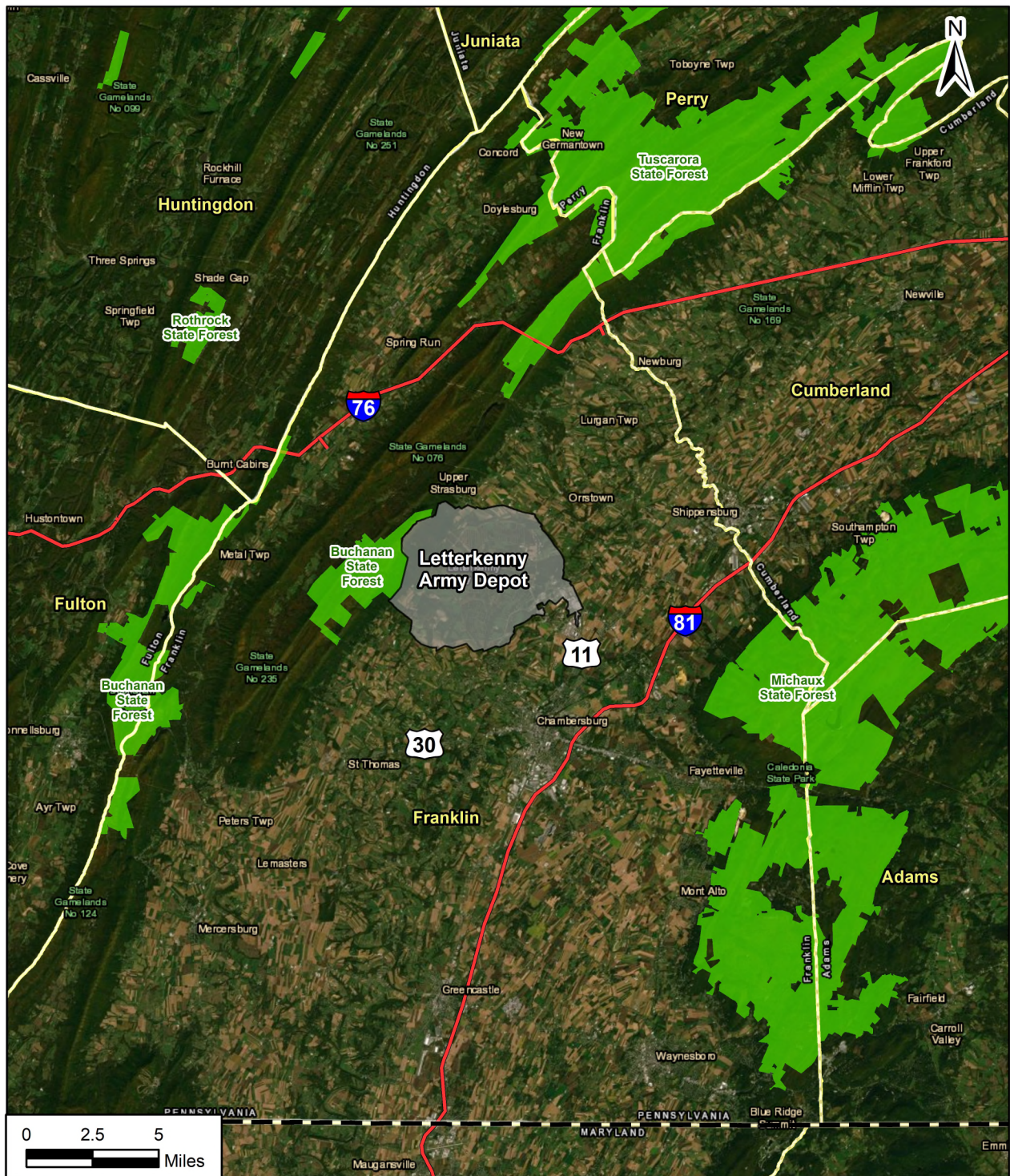


Figure 2

Source: LEAD GIS 2013; PASDA 2005.



LEGEND

State Boundary	Interstate Highway
County Boundary	U.S. Route
State Forest Land	

State Owned Land near Letterkenny Army Depot

Figure 3

2.2 DISTRIBUTION

The NLEB can be found in forested portions of the northeastern and midwestern United States—including 38 states and the District of Columbia—and in eastern, central, and northern Canada (USFWS 2014). Historically, the species was patchily distributed and less common in the southern and western portions of its range. The population density seems to have been highest in the northern portion of the species' range, which includes much of the eastern United States (USFWS 2015).

Historically in Pennsylvania, the NLEB has been found in both summer and winter surveys across the state (PGC 2014b). NLEBs have been found in 112 hibernacula, including two with large historical numbers (USFWS 2015). Species presence has been documented across the state (PGC 2015).

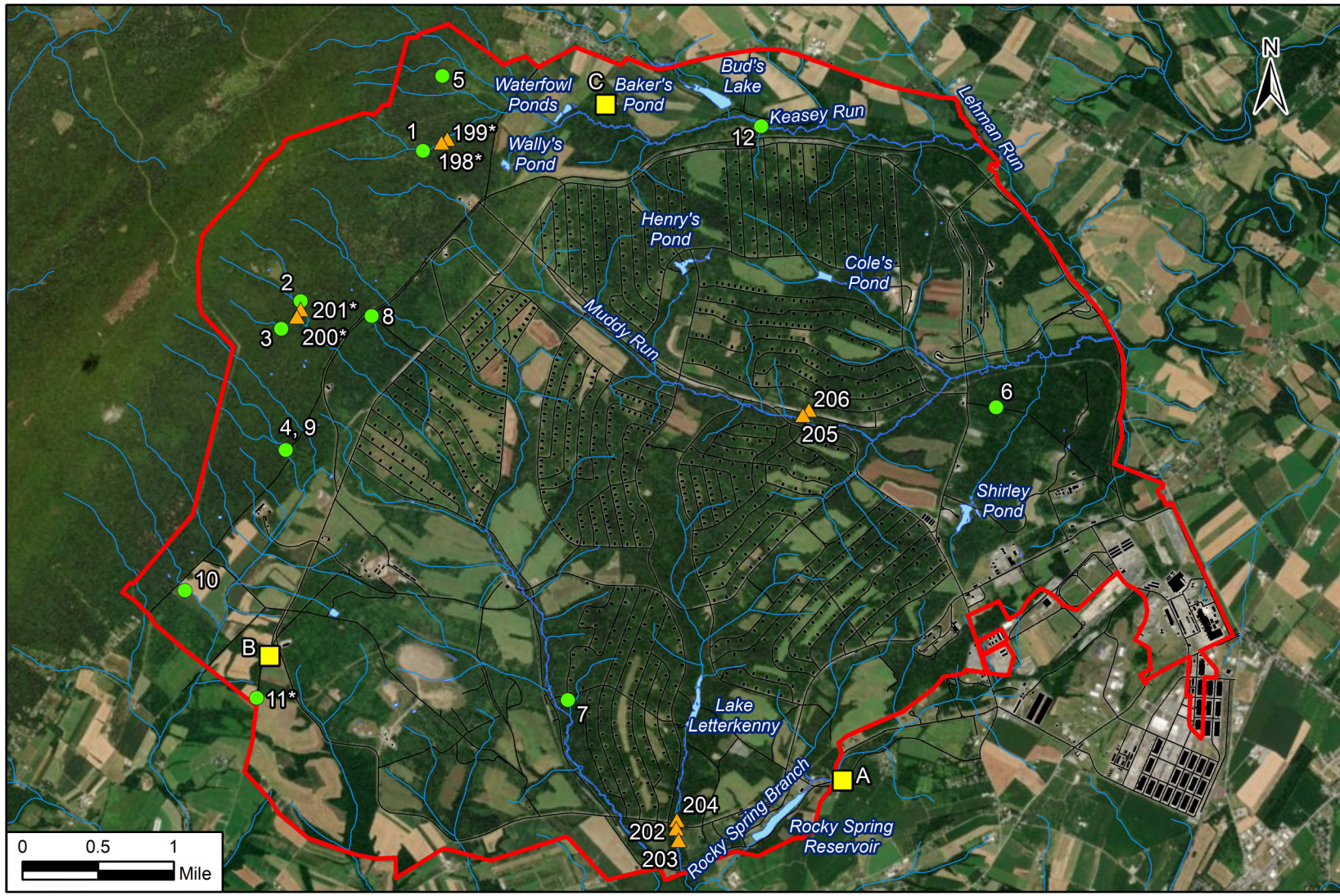
The NLEB was documented on LEAD during the 2000 and 2015 mist net surveys (Figure 4) (PNHP and WPC 2015). During the 2000 mist net survey, one lactating female NLEB was caught in a stream corridor and nine NLEBs were caught in upland areas of the Installation. During the 2015 mist net survey, one adult male NLEB was caught on the Massachusetts Avenue Extension site at boundary gate #13 (PNHP and WPC 2015).

2.3 HABITAT/ECOSYSTEM

NLEBs are an obligate forest-dwelling species adapted to gleaning and hawking for insects in the subcanopy in northern deciduous and mixed forests (USFWS 2015). Foraging primarily occurs within forested areas but is not restricted to mature forests. NLEBs forage below the canopy in the understory or in subcanopy shrub layers. Foraging is often concentrated in forested upland areas and hillsides rather than in riparian areas. Foraging also can occur in forest clearings, above roadways and trails, or near water (USFWS 2014). The NLEB's habitat requirements and behavioral patterns relate directly to the potential for the Installation's continued support of the species. Where suitable, maintaining the closed-canopy structure of the forested areas on LEAD is important for maintaining the suitability of available habitat (see objective 4 in section 3, Conservation Actions).

In Pennsylvania, the primary habitat for the NLEB is central oak-pine forest and secondarily northern hardwood and conifer forest (PGC 2015). More specific habitat associations include northeastern interior dry-mesic oak forest and Appalachian (hemlock)-northern hardwood forest (PGC 2015).

Summer roosts provide the NLEB with a thermally stable environment as well as protection from the elements and predators (Owen et al. 2002). Day roost selection by NLEBs depends upon the presence of suitable live or dead (snag) trees having cavities, crevices, or exfoliating bark for roosting, although they also might use human-made structures and caves for roosting. Throughout their range, NLEBs roost in a variety of tree species selected based on their suitability to retain bark or provide cavities or crevices (USFWS 2015). They also might use an isolated tree as a roost, provided it is



LEGEND

LEAD Boundary	2015 Survey Sites
Road	2015 Bat Bunkers
Building	2000 Survey Sites
Stream	* NLEB Capture Site

Northern Long-eared Bat Positive Detections on Letterkenny Army Depot

Figure 4

Source: Tetra Tech 2000, LEAD GIS 2013, PNHP and WPC 2015.

within 1,000 feet of another suitable roost tree or forested area (USFWS 2014). The NLEB roosts alone or in small maternity colonies and switches roosts often; on average, lactating females switch roosts every 2 to 5 days (Menzel et al. 2002, Sasse and Perkins 1996). It is likely the species exhibits a strong preference for selection of roosts within older forest stands that contain many large trees and snags with exfoliating or plate-like bark and/or cavities (Ford et al. 2006).

2.4 LIFE HISTORY/ECOLOGY

Unlike the true long-distance migratory bats, NLEBs do not migrate long distances between summer and winter ranges. They do, however, go shorter distances between summer roosts and winter hibernacula. They arrive at hibernacula in August or September and often swarm for mating at the entrance (USFWS 2015). They begin hibernation in caves, mines, and human-made structures in October and November (USFWS 2014). NLEBs leave for summer habitats in March or April (USFWS 2015).

The species prefers large hibernacula with large entrances, and although NLEBs are often found with other *Myotis* species, they prefer cooler temperatures and higher humidity than others (Harvey et al. 2011). Individuals might hibernate in cracks and crevices in hibernacula walls and as a result might be overlooked by field personnel during winter surveys. The species also has been found in less traditional hibernacula, including dams, dry wells, culverts, bunkers, forts, tunnels, excavations, quarries, and houses (USFWS 2015). The NLEB might use human-made structures more frequently than previously thought, especially in the northeast. For example, NLEBs were discovered hibernating in World War II bunkers in New Hampshire (McCormack 2010).

During the summer, NLEBs roost singly or in colonies underneath bark in cavities or crevices of live and dead trees. In June and July, females form maternity colonies generally consisting of 30 to 60 females and young located within cavities or loose bark of trees or snags (USFWS 2019a). They give birth to a single pup in early summer, and the young can fly within 3 weeks (USFWS 2014). They feed their young through lactation during the day and between bouts of foraging. The young become volant in late July and August and can have a lifespan of more than 18 years (Harvey et al. 2011). Males and nonreproductive females might roost and forage within areas adjacent to maternity colonies, but also might be solitary. The NLEB also will use human-made structures such as barns and sheds as daytime roosts (USFWS 2015).

2.5 REASON FOR LISTING

The U.S. Fish and Wildlife Service's (USFWS's) listing of the NLEB in 2015 was a response to the impact of WNS (USFWS 2015). Dramatic decreases in populations of NLEB have occurred since 2006 years primarily because of WNS. WNS is a disease that affects hibernating bats and is caused by the fungus *Pd* (WNSRT 2019). Sometimes *Pd* looks like a white fuzz on bats' faces, which is how the disease got its name. *Pd* grows in cold, dark, and damp places. It attacks the bare skin of bats while they are hibernating in a relatively inactive state. As it grows, *Pd* causes changes in bats that make them become active more than usual and burn up fat they need to

survive the winter (WNSRT 2019). Bats with WNS can exhibit untypical behavior like flying outside on winter days.

As of May 2016, WNS was estimated to have killed more than 6 million bats in the northeast United States and Canada, with some bat hibernacula sites having mortality rates of 90–100 percent (USFWS 2016a). WNS was first discovered in eastern New York in February 2006 and has been confirmed in at least 33 states and five Canadian provinces (WNSRT 2019). While there is no cure for WNS as of summer 2019, scientists from all over the world are working together to study the disease, how it spreads and infects bats, and how to control it. Several experimental treatments, including a vaccine and making changes to bat habitats, are being tested and will hopefully lead to increased NLEB survival rates.

The NLEB is one of the species hardest hit by this disease because of its preference for hibernating in colder and more humid sections of caves that help cultivate the fungus (Harvey et al. 2011, Hayman et al. 2016). Short-term population trends show a decline of more than 90 percent in Pennsylvania (PGC 2015). Winter survey numbers show a 99 percent decline in comparison to pre-WNS numbers (PCG 2014). Hibernation is an extremely vulnerable time during the NLEB’s life history, thus recreational and commercial caving causing disturbances can lead to direct mortality and low fecundity of adult females, and exacerbate problems caused by WNS (PGC 2015). Flooding can even drown and kill hibernating bats in subterranean environments (PGC 2015).

Other threats leading to NLEB listing include loss and fragmentation of forested habitat, alteration to traditional hibernacula, and anthropogenic sources of mortality that include wind energy facilities (USFWS 2014). Removal of mature trees in Pennsylvania to maintain younger forests limits potential roosting sites (PGC 2015). Wind energy facilities have documented NLEB fatalities; however, they are rare with only six recorded in the American Wind Wildlife Institute (AWWI) database (AWWI 2018).

2.6 CONSERVATION MEASURES

2.6.1 Federal Listing of the Northern Long-Eared Bat

On April 2, 2015, the USFWS announced that the NLEB was being listed as threatened under an interim ESA section 4(d) rule. The intent of a 4(d) rule is to provide the USFWS with flexibility in implementing the ESA by modifying regulations necessary to provide for the conservation of a threatened species while not overburdening private landowners, state agencies, and others with blanket regulations that do not further conservation of the species. A final 4(d) rule for the NLEB was released on January 14, 2016 (USFWS 2016a) and became effective February 16, 2016. The USFWS determined that WNS is the primary threat to the NLEB and that regulating other sources of mortality or harm will not effectively conserve the species. Therefore, the USFWS has not published a recovery plan or designated critical habitat for the NLEB.

The final 4(d) rule prohibits all “purposeful take” within the range of the NLEB except removal of NLEBs from human structures, defense of human health (disease

monitoring), or removal of hazardous trees for the protection of human life and property.¹ All take incidental to otherwise lawful activities is allowed outside of the WNS zone. The WNS zone comprises all counties affected by WNS and an additional 150-mile buffer around those counties (USFWS 2019b), including LEAD. For areas within the WNS zone, “incidental take”² is prohibited only if it occurs within a hibernaculum or if tree removal activities occur within one-quarter mile of a hibernaculum³ at any time of year or within 150 feet of a known, occupied maternity roost tree from June 1 through July 31 (USFWS 2016a).

The rule does not remove or alter in any way the consultation requirements under Section 7 of the ESA. If, however, a federal project might result in prohibited take as described above (or if a project is authorized, funded, or permitted by a federal agency) (USFWS 2016a), the final 4(d) rule provides a programmatic biological opinion and optional framework for streamlining Section 7 consultations.⁴ The USFWS might advise federal agencies, however, when project-level consultation for the NLEB is required (USFWS 2016a). Any actions taken by an agency that are exempted in the 4(d) rule will not require an incidental take statement.

2.6.2 Nonregulatory State Protection

The 2015 Pennsylvania Wildlife Action Plan (PWAP) is a nonregulatory, proactive conservation blueprint to prevent Species of Greatest Conservation Need (SGCN) from requiring federal protection under the ESA. The NLEB is listed as a SGCN in the state of Pennsylvania (PGC 2015). The overarching goal of the PWAP is to move toward proactive management of the species and habitats for which Pennsylvania has some regional, national, or global responsibility. That approach helps reduce the cost of fish and wildlife management by decreasing the need for expensive recovery efforts for species in need of critical care. The PWAP provides the framework to secure those resources for future generations.

¹ “Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take. Intentionally killing or harming bats is also purposeful take and is prohibited” (USFWS 2016a).

² “Incidental take is defined by the Endangered Species Act as take that is incidental to, and not the purpose of the carrying out of an otherwise lawful activity. For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats” (USFWS 2016a).

³ NLEB hibernaculum include caves and abandoned mines with constant, cooler temperatures and high humidity in which they spend the winter in a state of metabolic depression (USFWS 2016a).

⁴ Section 7 NLEB consultation information with an online Determination Key is available at <https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html>.

2.6.3 Balance of Army Mission and Conservation

Army policy on listed species is guided by AR 200-1 and includes the following elements: (1) balancing mission requirements with endangered species protection, (2) cooperating with regulatory agencies, and (3) conserving biological diversity within the context of the military mission (HQDA 2007). As required by AR 200-1, the Army must ensure that it carries out mission requirements in harmony with requirements of the ESA. All Army land uses—including military training and testing, timber harvesting, recreation, and grazing—are subject to ESA requirements in protecting listed species and critical habitat. In fulfilling its conservation responsibilities, the Army is required to work closely and cooperatively with the USFWS and National Marine Fisheries Service (NMFS), the two federal agencies responsible for enforcing the act. Installations are encouraged to engage in informal consultation with USFWS and NMFS during the planning of projects or activities to ensure ESA compliance. In conserving biological diversity, installation commanders and Army natural resource managers are required to develop and implement policies and strategies to maintain viable populations of native plants and animals, maintain natural genetic variability within and among populations, maintain functioning representations of the full spectrum of ecosystems and biological communities, and integrate human activities with the conservation of biological diversity (HQDA 2007).

AR 200-1 requires every installation to prepare an ESMP for each listed and proposed species and critical habitat present on the installation, including areas used by tenant organizations. Installation ESMPs must prescribe area-specific measures necessary to meet the installation's conservation goals for the subject species and critical habitats (HQDA 2007). This ESMP is based on the U.S. Army Environmental Center-published *Manual for the Preparation of Installation Endangered Species Management Plans* to provide a standard and comprehensive document (SAIC 1995).

AR 200-1 states that installation INRMPs are to include components to address endangered species and that each Army installation's integrated natural resources management effort should include the following:

- Preparing and implementing an Endangered Species Management Component as part of the INRMP consistent with current policy and guidance.
- Carrying out mission requirements in compliance with ESA.
- Integrating endangered species management and installation planning functions to ensure compliance with ESA.

3.0 CONSERVATION ACTIONS

3.1 OBJECTIVE 1

The Army will comply with all applicable sections of the ESA for all training, operations, maintenance, and construction activities conducted on LEAD.

3.1.1 Objective 1 Justification

This ESMP does not supersede the legal obligations of the Army or LEAD to comply with federal law as set forth in the ESA.

3.1.2 Objective 1 Conservation Action

As required by section 7 of the ESA, the Army and LEAD will assess the effect of any proposed activity on any listed species or its habitat occurring in the project area. Surveys to determine the presence of federally listed bat species have documented the presence of the NLEB on the Installation and all mission activities will comply with the 4(d) rule for that species.

3.2 OBJECTIVE 2

LEAD will preserve all trees within 150 feet of known, occupied NLEB maternity roost trees during the pupping season (June 1–July 30).

3.2.1 Objective 2 Justification

Incidental take of any NLEBs resulting from removal of trees within 150 feet of known, occupied NLEB maternity roost trees during the pupping season is prohibited under the 4(d) rule (USFWS 2016a).

3.2.2 Objective 2 Conservation Action

LEAD will avoid tree removal activities during the NLEB pupping season (June 1– July 30). If personnel, equipment, and funding is available, surveys of individual trees or within a forest stand may be conducted to eliminate the potential for incidental take before tree removal during the active season (April 1–October 31), although surveys to determine presence of the NLEB are not required under the 4(d) rule. Trees that pose a threat to human life or property can be removed without contacting the USFWS; however, for other tree removal activities within 150 feet of a known, occupied maternity roost during the pupping season, LEAD must contact the USFWS prior to the activity.

3.3 OBJECTIVE 3

LEAD will conduct no activities within one-quarter of a mile of an NLEB hibernaculum.

3.3.1 Objective 3 Justification

NLEB incidental take is prohibited only if it occurs within a hibernaculum or if tree removal activities occur within one-quarter of a mile of a hibernaculum at any time of year under the 4(d) rule (USFWS 2016a).

3.3.2 Objective 3 Conservation Action

LEAD will comply with this requirement if hibernacula are discovered on the Installation during recommended surveys or during daily operations. NLEBs have been observed hibernating in concrete bunkers at other military installations and it is possible that they

are hibernating in the ammunition bunkers on LEAD. Although bats might be removed from those spaces because of health and human safety, it is most prudent to eliminate access to them in the fall by placing screens over vents and adding rubber flanges to doors. If NLEBs are found and allowed to finish hibernation, one-way valve entrances can be installed at access points to deter re-entry.

3.4 OBJECTIVE 4

LEAD will maintain and promote summer roosting and foraging habitat for the NLEB on the Installation where feasible.

3.4.1 Objective 4 Justification

The NLEB requires closed-canopy forests for suitable roosting and foraging habitat. The species is highly maneuverable and can fly within the forest under the canopy for protection from predators. They use trees for roosting and are flexible in their choice of roost trees, using both live and dead trees and roosting under bark, in crevices, or in hollows. NLEBs exhibit site fidelity by returning to summer roosting habitat year after year. Their home ranges are also relatively small compared with other tree-roosting species, with males at 3.5 acres and females at 21.3 acres, meaning that some individuals' home ranges could be entirely within the Installation (Broders et al. 2006).

3.4.2 Objective 4 Conservation Actions

The 2012 FMP recommended that five management stands in Zone 2 undergo timber harvest or a timber improvement cut between fall/winter 2019 and 2022 (USACE 2012a). Improvements include removing dead hemlock to reduce fuel load, removing dead black birch, and timber harvest. Those activities are scheduled for fall/winter to avoid NLEB restrictions. However, if removing roost snags with suitable roosting habitat such as sheets of peeling bark or hollows is necessary, LEAD personnel will consider adding groups of 5–7 rocket boxes (artificial roosts) to replace lost roosting habitat for maternity colonies. The state of West Virginia has had high rates of success using the artificial roosts: 40 percent of the boxes installed were found to be occupied by NLEB in the first 2 years, including seven maternity colonies (AllStar Ecology 2018). LEAD will leave snags during tree removal or, if the area is lacking snags, girdle trees to create snags where feasible. Snags can create roosting opportunities like peeling bark and cavities for the NLEB and other species.

A large, contiguous forest at the western end of the Installation and extending toward Broad Mountain and State Game Lands represents high-quality bat and NLEB habitat. Maintaining connectivity between the forested areas on base and the western contiguous forest might help support populations of NLEB, both on and adjacent to the Installation. Minimizing canopy-level forest alterations will help maintain contiguous forest and closed-canopy flyways. Maintaining a buffer and forest connectivity around open water sources is important to maintain NLEB flyways between roosting and drinking habitat. Bats, particularly reproductive females, spend the day in roosts with high temperatures, causing them to lose water during the hot summer months (Johnson

and Gates 2008). Often, they visit a drinking water source to replenish evaporated water before they start evening foraging. Therefore, a water source might be used by multiple species in addition to providing good foraging habitat due to higher concentrations of insect prey (Hill and Smith 1984; Schmidly 2004).

Maintaining multiple habitats for bat use on the Installation is important. Because NLEBs can feed over open water, it is vital for LEAD to protect its wetlands, surrounding forests, and corridors that connect with other forest patches. The species prefers to forage along forest edges where insects tend to congregate and that increase in density in wetter areas. Forested corridors that connect the forest patches or run along streams provide a sheltered environment the bats can use to move around the landscape.

Although LEAD has no specific requirements in place to guide fish and wildlife habitat improvement on the Installation, federal and Army regulations require that fish and wildlife populations and habitat be managed and sustained on all installations (HQDA 2007). Annual programs designed to improve fish and wildlife habitat on LEAD include planting and maintaining food plots, harvesting timber, planting trees, removing nonnative invasive plants, creating browse, planting and promoting warm season grasses (e.g., switchgrass and big bluestem), daylighting water sources, and fertilizing fruit and nut-bearing trees (Tetra Tech 2013). Most of those projects are completed by volunteers through conservation work project hours required for hunting and fishing privileges.

3.5 OBJECTIVE 5

Minimize adverse effects on NLEB while implementing Installation fire management and protection policies.

3.5.1 Objective 5 Justification

The primary goal of the fire management program at LEAD as stated in the Integrated Wildland Fire Management Plan is to prevent fire to the maximum extent possible and, if a fire occurs, to protect human health and safety and to prevent unacceptable damage to natural resources (USACE 2012b). Because of LEAD's material storage mission, fire management consists of preventing uncontrolled wild fires. Efforts include regular mowing, some by lessees in the agricultural lease program as well as around igloos and along roads. Any fire at the Installation could pose a serious risk to both LEAD personnel and the public in the surrounding area.

LEAD has had an active prescribed fire program since 2017 and is drafting a new burn plan to include the entire Installation.

3.5.2 Objective 5 Conservation Actions

Brush clearing and allowing forests that shade out dense understory to reach maturity can maintain uncluttered under-canopy flyways during a fire suppression regime. Fire

suppression (stopping wildfires from burning) without supplemental forest stand management can lead to a dense forest that precludes NLEB flight.

Prescribed fires will improve habitat for NLEB on the installation. LEAD in coordination with the PGC will perform woodland prescribed fire operations in a manner that supports NLEB. Prescribed fire may increase the number of snags and, therefore, roost trees. Fire also increases canopy gaps and, as a result, solar radiation reaching roosts, which can increase maximum roosting temperatures and benefit maternity colonies (Johnson et al. 2009). Increased roosting temperatures are associated with rapid development of young (Boyles and Aubrey 2006). Maintaining a primarily closed-canopy forest would be of most benefit to the NLEB. LEAD will minimize and if possible exclude fire operations during the pupping season (June 1–July 30).

3.6 OBJECTIVE 6

LEAD will reduce the potential for other causes of direct mortality such as bridge maintenance and repair.

3.6.1 Objective 6 Justification

Other potential causes of direct mortality should also be considered on the Installation. Because the NLEB has been known to roost under bridges, bridge maintenance or removal activities conducted during the active season could disturb, displace, or otherwise lead to mortality of the species (Civjan et al. 2017).

3.6.2 Objective 6 Conservation Actions

All bridges should be checked for NLEB occupancy and signs of occupancy (guano and staining) before alteration, repair, or demolition activities are conducted. Bridge repair, retrofit, maintenance, and/or rehabilitation work should occur outside the NLEB active season.

3.7 OBJECTIVE 7

LEAD personnel will minimize adverse effects on the NLEB while implementing the Installation's IPMP.

3.7.1 Objective 7 Justification

The goal of the Installation's pest management program is to protect human health and suppress or prevent damage to real estate and natural resources caused by pests (LEAD 2018). Use of integrated pest management techniques to eliminate, suppress, and control pests, with the judicious use of both chemical (when necessary) and nonchemical control techniques, is encouraged in the IPMP. NLEBs are insectivorous, meaning their diet depends solely on insects. They forage for a variety of night-flying insects, including moths, beetles, and flies. Large-scale nontargeted chemical pest control could have an adverse effect on the NLEB food source.

3.7.2 Objective 7 Conservation Actions

Pesticides kill living organisms, whether they are plants or animals. At one time, pesticides were considered the most effective control available, but pest resistance rendered many pesticides ineffective. In recent years, the trend has been to use pesticides that have limited residual action. While this method has reduced human exposure and lessened environmental impact, the cost of pesticide use has risen because more frequent application is required. Because personal protection and special handling and storage are required with the use of pesticides, the overall cost of using them as a sole means of control can be quite high when compared with other control methods.

Gypsy moth infestations have occurred periodically in the mixed hardwood forestlands in the western portion of LEAD's buffer zone (LEAD 2018). That area contains valuable stands of timber that provide good-to-excellent wildlife habitat. Occasionally, gypsy moth populations reach levels that could threaten ecosystem integrity, result in economic loss, and warrant chemical control measures (Tetra Tech 2018). The U.S. Forest Service (USFS) conducts annual surveys on LEAD for defoliation (June) and gypsy moth egg masses (October) throughout this area. The USFS prepares an annual report that summarizes the survey results, treatment alternatives, and management recommendations. If chemical control is warranted, aerial pesticide application would be planned, reviewed, coordinated, and conducted in accordance with the requirements of AR 200-1; and all pesticides must be used according to all instructions on the label. Chemical options such as GYPCHEK, which specifically target gypsy moth, should be used. The alternative is the principal insecticide used by the Pennsylvania Bureau of Forestry for gypsy moths that contains the bacteria *Bacillus thuringiensis var. kurstaki* that could adversely affect other moth species that are a food source for the NLEB (Tetra Tech 2018). If possible, spot treatment is preferred over aerial application.

Hemlock woolly adelgid (*Adelges tsugae*), emerald ash borer (*Agrilus planipennis*), and spotted lanternfly (*Lycorma delicatula*) are insect pest species present on LEAD for which the IPMP contains chemical control options. Targeted chemical management or alternatives to chemical methods are recommended.

Ornamental pests are less of a concern because controlling them using chemical options is rarely required, and infestations are typically avoided by mechanical controls such as sanitation pruning. Ornamental pests include pests of ornamental shrubs and tree scale insects, elm leaf beetles, leaf roller, bag worms, tent caterpillars, fungi, and diseases. Very rarely do insect populations or disease threaten the life of a shrub or tree in the cantonment area to the point where chemical control is warranted (LEAD 2018).

3.8 OBJECTIVE 8

LEAD will minimize light pollution.

3.8.1 Objective 8 Justification

Lights can make bats more visible to predators such as owls and may be disorienting to the NLEB.

3.8.2 Objective 8 Conservation Actions

If possible, LEAD personnel will conduct mission support activities during daytime hours to limit impacts on the NLEB related to increased light levels. Personnel will evaluate the use of outdoor lighting during the species' active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.

4.0 MONITORING PLAN

Surveys will help LEAD natural resources personnel meet their responsibilities under Section 7(a)(1) of the ESA. The USFWS and partners will use the survey data to better understand habitat use and distribution of the NLEB, track the status of the species, evaluate threats and impacts to it, and develop effective conservation and recovery actions to benefit it. Active participation of federal agencies in survey efforts will lead to a more effective NLEB conservation strategy. If the USFWS reclassifies the NLEB as endangered in the future, having conducted baseline bat surveys and documented bat use and/or potential habitat within LEAD's boundaries could give it greater flexibility under ESA Section 7(a)(2). The survey data will be reviewed and used for revisions to the INRMP.

Research is critical to monitoring NLEB populations and activity levels. Repeating surveys on a predictable 5-year interval, if funding and time allows, will allow for comparison between years and might indicate declining or increasing activity levels or loss of species.

The following monitoring activities are recommended to better understand the NLEB's use of LEAD if funding and time allows:

1. Survey ammunition bunkers for bat occupancy during summer roosting and winter hibernation.
2. Monitor the three bat bunkers erected in 2015 for NLEB occupancy.
3. Conduct a mist-netting survey with radio tracking for both day roosts and foraging areas.
4. Conduct a home range (95 percent adaptive kernel method) or core utilization study, which requires 30–50 location points, to determine bats' true use of the Installation.
5. Conduct an acoustic monitoring survey during an entire year to determine when bats arrive on and leave the Installation. That survey will pertain both to bats

migrating from distant areas and to individuals arriving from local hibernacula. Swarms detected in late fall could indicate a hibernaculum is nearby.

5.0 TIME, COSTS, AND PERSONNEL

[To be provided by LEAD after USFWS review and agreement.]

6.0 VOLUNTARY MONITORING ACTIVITY AND SURVEY CHECKLIST

Schedule ^a	Activity ^b	Implemented	
		Date	Signature
Winter 2020	Survey ammunition bunkers for bat occupancy.		
April 2020	Conduct an acoustic monitoring survey during an entire year to determine when bats are arriving on and leaving the Installation. That survey will pertain both to bats migrating from distant areas and to individuals arriving from local hibernacula. Swarms detected in late fall could indicate a hibernaculum is nearby.		
June 2020	Monitor the three bat bunkers erected in 2015 for NLEB occupancy.		
Summer 2020	Conduct a mist-netting survey with radio tracking for both day roosts and foraging areas.		
Summer 2020	Conduct a home range (95 percent adaptive kernel method) or core utilization study, which requires 30–50 location points, to determine bats’ true use of the Installation.		

Note:

^a Each monitoring activity may be repeated every 5 years after survey date.

^b These monitoring activities are not mandatory requirements. Monitoring may be performed if adequate personnel, time, and funding allow.

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Notes: