REVISED DRAFT
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE

NEW YORK ARMY NATIONAL GUARD
CAMP SMITH TRAINING SITE

OCTOBER 2012

NEW YORK ARMY NATIONAL GUARD
NEW YORK STATE DIVISION OF MILITARY AND NAVAL AFFAIRS
ENVIRONMENTAL COMPILANCE BRANCH
LATHAM, NEW YORK

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE NEW YORK ARMY NATIONAL GUARD CAMP SMITH REVISED DRAFT OCTOBER 2012

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE NEW YORK ARMY NATIONAL GUARD CAMP SMITH REVISED DRAFT OCTOBER 2012

The U.S. Fish and Wildlife Service and New York Army National Guard are in mutual agreement with regard to the contents of this Integrated Natural Resources Management Plan Update:

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The New York State Department of Environmental Conservation and New York Army National Guard are in mutual agreement with regard to the contents of this Integrated Natural Resources Management Plan Update:

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LIST OF ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
ARNG	Army National Guard
AT	annual training
BASH	bird-aircraft strike hazard
BMP	best management practice
COE	Corps of Engineers
CWA	Clean Water Act
DA	Department of the Army
DoD	Department of Defense
DMNA	New York State Division of Military and Naval Affairs
E	endangered
EA	Environmental Assessment
EC	Environmental Compliance Branch
EIS	Environmental Impact Statement
EO	Executive Order
^{o}F	degrees Fahrenheit
FNSI	Finding of No Significant Impact
FMO	Facilities Management Office
ft	feet
GIS	geographic information system
GPS	global positioning system
HQDA	Headquarters, Department of the Army
ICRMP	Integrated Cultural Resources Management Plan
IDT	inactive duty training
INRMP	Integrated Natural Resources Management Plan
IPC	Invasive Plant Council
ITAM	Integrated Training Area Management Program
LCTA	Land Condition Trend Analysis
LRAM	Land Rehabilitation and Maintenance
m	meter
MNAG	Office of the Adjutant General
MNAR	Headquarters New York Army National Guard
MNFE	Facilities Management and Engineering
MNFE-EC	Facilities Management and Engineering, Environmental Compliance Branch
MNFE-FO	Nonmilitary Use Program Branch
MNL	Army Logistics and Maintenance
MNMS	Military Support
MNNOT	Army Training and Readiness Directorate
MNPA	Public Affairs Office
MOUT	Military Operations on Urban Terrain
MSL	mean sea level
NEPA	National Environmental Policy Act

NGB	Army National Guard Bureau
NGB-ARE	Army National Guard Bureau Environmental Programs Division
NYSDEC	New York State Department of Environmental Conservation
NYARNG	New York Army National Guard
OPRHP	New York State Office of Parks, Recreation, and Historic Preservation
PLS	planning level survey
POTO	Plans, Operations, and Training Officer
RDP	Range Development Plan
REC	Record of Environmental Consideration
RFMSS	Range Facility Management Support System
RPOM	Real Property Operations and Maintenance
RTLP	Range and Training Land Program
SC	species of special concern
SEQR	State Environmental Quality Review Act
SHPO	State Historic Preservation Office
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
TAG	The Adjutant General
TRI	Training Requirements Integration
U	unprotected
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
V	exploitably vulnerable
WES	Waterways Experiment Station
WL	watch list
WMU	wildlife management unit

SECTION 1

INTRODUCTION

1.1 AUTHORITY

This Integrated Natural Resources Management Plan (INRMP) Update for Camp Smith Training Site was prepared by the New York Army National Guard (NYARNG) in accordance with requirements specified by the following: the Sikes Act Amendment Act of 2011 (Sikes Act, 16 U.S.C. 670a et. seq.), Department of the Army (DA) policy set forth in the 25 May 2006 memorandum entitled *Guidance for Implementation of the Sikes Act Improvement Act*; Army National Guard Bureau (NGB) policy; Department of Defense (DoD) Directive 4700.4, *Natural Resources Management Program*; and Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*. The National Defense Authorization Act for Fiscal Year 2012 implemented the Sikes Act Amendment Act of 2011, which includes improved Sikes Act coverage of State-owned facilities used for the national defense:

The Secretary of a military department may, subject to the availability of appropriations, develop and implement an integrated natural resources management plan for a State-owned National Guard installation. Such a plan shall be developed and implemented in coordination with the chief executive officer of the State in which the State-owned National Guard installation is located. Such a plan is deemed, for purposes of any other provision of law, to be for lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use.

The term "State-owned National Guard installation" means land owned and operated by a State when such land is used for training the National Guard pursuant to chapter 5 of title 32, United States Code, with funds provided by the Secretary of Defense or the Secretary of a military department, even though such land is not under the jurisdiction of the Department of Defense. The Camp Smith property is owned New York State Division of Military and Naval Affairs (DMNA) and is considered a State-owned National Guard installation pursuant to the Sikes Act Amendment Act of 2011.

1.2 SUMMARY OF INRMP REVIEW AND UPDATE

The Sikes Act specifically directs that INRMPs be reviewed "as to operation and effect," emphasizing that the review is intended to determine whether existing INRMPs are being implemented to meet requirements of the Sikes Act and contribute to conservation and rehabilitation of natural resources on military installations. Based on the current review of the Camp Smith INRMP, the NYARNG identified the need to update portions of the plan to reflect changes in existing conditions, status of some rare species, staffing, and program priorities or direction.

The review indicated that the INRMP is being implemented as an effective tool for conservation of natural resources at Camp Smith. While some of the project-specific goals established in the previous INRMP have not been fully completed because of various constraints or changes in program priorities, the review indicates that the overall program goals are being met. The following examples of accomplishments made under the previous INRMP demonstrate the effectiveness of the overall program:

- Land Rehabilitation and Maintenance (LRAM) projects were completed under the Integrated Training Area Management (ITAM) Program, primarily on maneuver trails to sustain training and reduce soil erosion.
- Management practices, including non-lethal deterrents and controlled hunting in accordance with state regulations, were implemented to manage the resident Canada goose population and reduce safety risks and nuisances caused by these birds.
- A recreational hunting program for white-tailed deer, resident Canada geese, and wild turkey was implemented in 2008.
- Natural resources planning level surveys were completed at the installation (avian, bat, vegetation, and invasive plant surveys). These surveys contributed to the overall understanding of the natural resources at the installation and will support future management efforts. Three state species of special concern were identified during these surveys (Cooper's hawk, sharp-shinned hawk, and small-footed bat). In addition, the bat surveys indicated the probable absence of Indiana bat (federally listed as endangered) maternity roosts at the installation, providing important information for future management and contributing to the overall understanding of Indiana bat distribution in the state.

- A successful bald eagle nest was identified immediately adjacent to the installation by Camp Smith personnel for the first time in 2008. While the bald eagle was removed from the federal list of endangered and threatened species in 2007, it remains federally protected under the Bald and Golden Eagle Protection Act and is state listed as a threatened species. Camp Smith personnel immediately notified the New York State Department of Environmental Conservation (NYSDEC) of the nest and implemented protection measures around the nest. NYSDEC banded the young eagle to support ongoing research and management of this species in New York State.
- Information contained in the INRMP was used to support the National Environmental Policy Act process and informal consultation with the U.S. Fish and Wildlife Service for construction and demolition projects at Camp Smith.
- DMNA filled two key positions that provide support to natural resources management programs at Camp Smith; a Geographic Information Systems (GIS) Analyst in Latham and an Environmental Protection Specialist at Camp Smith.

1.3 MANAGEMENT PHILOSOPHY

This INRMP was developed under the following five concepts:

- No net loss to training capacity;
- Sustained use of lands for military training;
- Natural resources stewardship;
- Biodiversity protection; and
- Ecosystem management.

To fully support and sustain its military mission at Camp Smith, the NYARNG must manage, protect, and enhance the biological integrity of its lands. The NYARNG mission includes both federal and state components. The primary federal mission of the NYARNG is to train and equip units capable of immediate expansion to war strength. These units must be available for service in time of war or national emergency, or when appropriated to augment the active Army. The primary state mission is to support and train civil authorities in the protection of life and property. In order to accomplish these missions, the NYARNG requires

sufficient training lands. Therefore, the training lands at Camp Smith are some of the most valuable assets of the NYARNG. Sustainable use of these lands can be achieved by integrating sound natural resources management programs with installation mission activities.

Natural resources stewardship is the management of natural resources with the goal of maintaining or increasing the resource's value indefinitely into the future. The stewardship goal of the NYARNG is to sustain multiple uses of natural resources over the long-term, while promoting the health of the ecosystems in which these activities occur. While NYARNG training lands are primarily used for mission activities, other uses include outdoor recreation, aesthetics, and conservation.

Biodiversity is defined as the variety of life and its processes, including living organisms, the differences among them, and the communities and ecosystems in which they occur. Protecting and enhancing biodiversity is an overall goal of the NYARNG. Biodiversity consists of many elements of the natural environment including indigenous ecological communities, native species, and their associations, as well as ecosystem functions such as predation, grazing, nutrient cycling, and fire. Biodiversity is best measured or defined in terms of the variety of natural communities or ecosystems and the various natural functions that occur within and among these communities or ecosystems, rather than simply by the numbers of species present. Management for maximum biodiversity helps to ensure ecosystem health, which in turn ensures sustainable use of lands to accomplish military missions.

Ecosystem management is a process for the NYARNG to use not only in its efforts to protect and enhance biodiversity, but also to sustain the use of its military lands. This process encourages management decisions to focus on natural resources at a community or ecosystem level rather than at a single species level. By maintaining or improving the quality, integrity, and connectivity of the ecosystem, individual species should prosper. However, individual rare species are not neglected by this management approach. Consideration must be given to rare species during project planning because these species contribute to ecosystem health and to biodiversity, and, in many instances, are provided legal protection.

In accordance with the DA and NGB policy, the major components of the INRMP include managing natural resources to support the military mission and to provide for sustainable use of training lands; identifying natural resources inventory and monitoring needs;

protecting, enhancing, and restoring fish and wildlife habitat, including wetlands; and enforcing natural resources laws and regulations. Each of these components is essential to the success of an ecosystem management plan that aims to achieve sustainable military use and promote biodiversity.

1.4 PURPOSE OF PLAN

The purpose of this INRMP is to document the policies and desired future direction of NYARNG's natural resource programs that are consistent with military training and use at Camp Smith. Specific expectations of the plan include the following:

- To provide a comprehensive planning document that allows the NYARNG to carry out its mission, promote ecosystem health, and maximize biodiversity at its installations and in the surrounding region;
- To ensure no net loss of training capacity;
- To document specific natural resources management goals, objectives, policies and the desired future direction of natural resources programs;
- To establish the framework for the implementation of natural resources programs and ecosystem management;
- To provide a centralized source of information on the status of natural resources programs;
- To identify mission-related impacts and options for conflict resolution;
- To serve as a baseline for defensible Environmental Assessments (EAs) and Environmental Impact Statements (EISs), when necessary;
- To ensure that installations comply with environmental regulations; and
- To identify, prioritize, and schedule long-term budget requirements.

1.5 ORGANIZATION OF PLAN

This plan is divided into 12 sections. Sections 1 through 3 provide introductory information, a description of the military mission and environmental setting, and an explanation of the natural resources planning structure. Sections 4 through 10 describe resource-specific

management programs at the installation, including management issues and goals. Section 11 includes an implementation plan for each program and Section 12 contains references.

SECTION 2

INSTALLATION MISSION AND ENVIRONMENTAL SETTING

2.1 MILITARY MISSION

Camp Smith, which is located in Westchester County, New York (Figure 2-1), has continuously served as a training facility for active and reserve components of the Armed Forces since 1883. Presently, the 1,613-acre installation is a primary location for annual training and inactive duty training for NYARNG and other reserve component units. It has the additional mission of providing logistical support, mobilization training of military forces during partial or total mobilization, and a mobilization/demobilization station. Camp Smith also serves as a training facility for federal, state, and local law enforcement agencies.

2.2 MILITARY LAND USE

This section briefly summarizes military land use at Camp Smith relevant to natural resources management. The major concentration of land use at Camp Smith occurs along the southeastern portion of the installation (Figure 2-2) in the cantonment area. These uses comprise housing facilities (i.e., barracks, latrines, bachelor officer quarters, and general officer quarters), dining facilities, classrooms, administration buildings, warehouses, combined support maintenance shop, troop service buildings, chapel, dispensary, water and wastewater treatment facilities, helicopter landing pad, Military Operations on Urban Terrain (MOUT) site, and supporting facilities. These facilities comprise approximately 350 acres of Camp Smith. The remaining portions of Camp Smith, approximately 1,263 acres, contain field training sites, an additional MOUT site in Training Area 3, and undeveloped wooded areas. Training area boundaries are shown in Figure 2-2. Year-round training conducted at Camp Smith includes range firing; specialized equipment training; bivouac and maneuver training; Regional Training

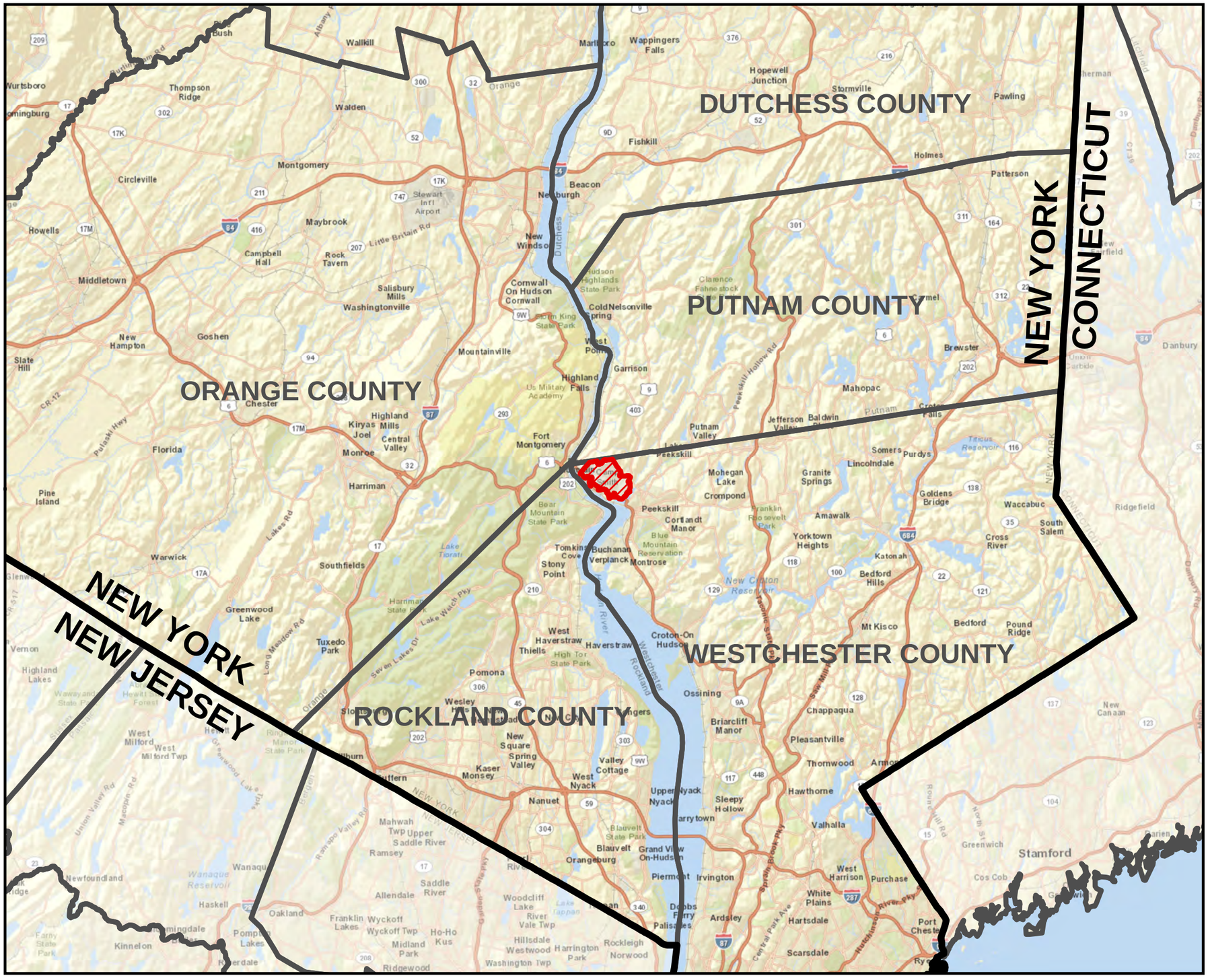

Figure 2-1

Camp Smith Training Site Location Map

New York Army National Guard

Legend

- Camp Smith Training Site
- County Boundaries
- State Boundaries

0 2.5 5 10 Miles

Background source: ESRI

Scale:	1:300,000
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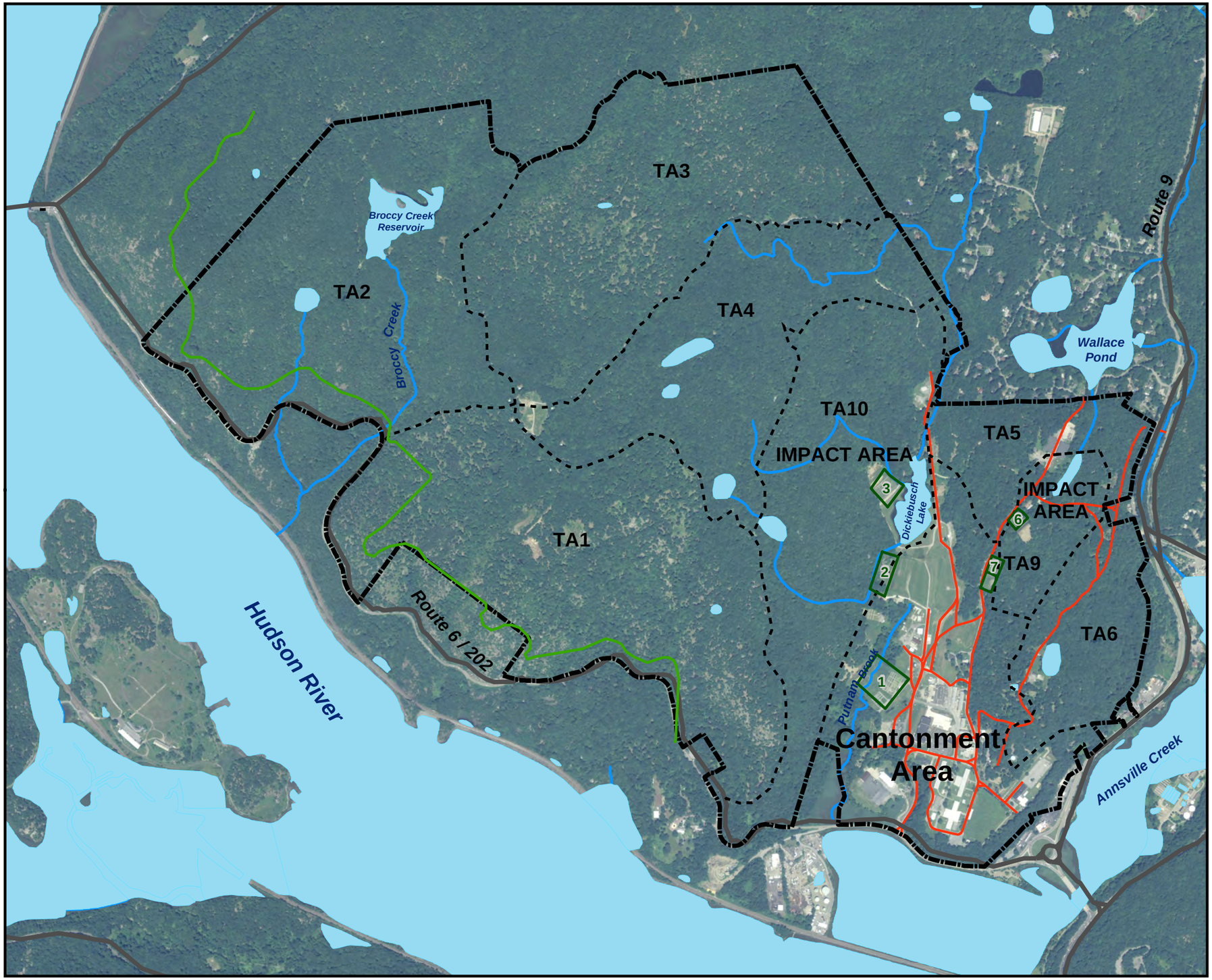
Figure 2-2
Camp Smith Training Site Installation Map

New York Army National Guard



Legend

- Camp Smith Boundary
- Training Area Boundaries
- Range Boundaries
- State Roads
- Camp Smith Roads
- Greenway Trail
- Water Bodies
- Streams / Rivers

0 500 1,000 2,000 Feet

Sources: Image- NAIP, 2011. Data- ESRI & New York Division of Military and Naval Affairs

Scale:	1:15,000
Created By:	Parsons
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Institute training (proponent of the officer candidate and non-commissioned officer programs); specialized training; and combined support maintenance and organizational maintenance training. Training conducted in the undeveloped, wooded training areas primarily includes land navigation, dismounted maneuvers, and collective training. Developed field training facilities at Camp Smith include small arms ranges, various training courses, Engagement Skill Trainer 2000, and Virtual Convoy Operations Trainer. The ranges at Camp Smith are designed to accommodate small caliber weapons and sub-caliber devices. Small weapons proficiency and qualification can be gained at these sites. Ranges also provide sufficient room for battalion-size firing (approximately 600 soldiers). Training courses, which have been established throughout the post, are used for specific exercises and/or with specialized equipment such as engagement skills trainer, leader's reaction, and land navigation. Other training areas and facilities have been established throughout the post for specialized training such as bivouac and maneuver; command post exercises; field training exercises; nuclear, biological, and chemical training; and communications training. Areas for specialized schooling and training for food services, logistics, maintenance and property accountability, and computer operations are also available at Camp Smith. These training facilities are used in accordance with specific programs of instruction.

2.3 NON-MILITARY USE

Several federal, state, and local non-military agencies use Camp Smith. Federal law enforcement agencies that use Camp Smith include the Federal Bureau of Investigation, U.S. Secret Service, U.S. Immigration Customs Enforcement, Drug Enforcement Administration, U.S. Postal Inspection Service, U.S. Marshal Service, and the U.S. Department of State, Security. State and local law enforcement agencies include the New York State Police, New York City Fire Marshals, New York City Police Department Special Operations Unit, Westchester County Police, and local police departments in the area.

Over 75 percent of land use at Camp Smith is conducted by non-military agencies. Of this non-military land use, a large percent takes place at the installation's small arms ranges. All non-military users have use agreements or leases with Camp Smith and some agencies, such as the Drug Enforcement Administration, have a full-time presence at Camp Smith.

2.4 INSTALLATION HISTORY

Camp Smith, originally called the State Camp of Instruction at Peekskill, was officially opened on July 1, 1882. The camp, which originally consisted of 97 acres, was leased from the McCoy estate for a period of one year, with a two-year lease option. Additionally, the state had the option to purchase the 97 acres for $13,000. Before the ground could be adapted for military use, large stone walls and trees had to be removed, and the site in general had to be leveled and graded. Additionally, roads had to be built and water and sewer systems had to be installed. In 1885, the New York State Legislature appropriated $30,000 for the purchase of the McCoy farm and some small adjacent holdings. Between 1913 and 1914, the remaining 187 acres of the McCoy farm were purchased as well as an additional 65 acres, which were purchased from the adjoining Wendover and Couch properties. In 1923, the State Camp purchased nearly 1,500 acres of land from the Van Cortlandt Estate. The name of the installation was changed to Camp Smith in 1926, in honor of the four-term Governor of New York State, Alfred E. Smith. Approximately 300 acres of land in the northwestern corner of the installation were transferred to the New York State Department of Environmental Conservation (NYSDEC), Office of Parks, Recreation, and Historic Preservation (OPRHP) in 1999. This parcel of land is now part of the Hudson Highlands State Park. The parcel of land containing the Bear Mountain Bridge Toll House on Route 6/202 was also transferred to OPRHP.

2.5 GEOGRAPHIC LOCATION AND SIZE

Camp Smith consists of approximately 1,613 acres and is located in the Hudson Highlands area along the east bank of the Hudson River in New York State (Figure 2-1). It lies entirely within northern Westchester County and is bordered to the west by the Hudson River, to the north by Putnam County, to the south by Annsville Creek, and to the east by the Town of Cortlandt. The installation is approximately 50 miles north of New York City and represents one of the few relatively undeveloped areas in the vicinity of New York City.

2.6 CLIMATE

The climate at Camp Smith is heavily influenced by winds moving up the Hudson River Valley and is characterized by short, moderately cold winters and warm summers. Climatic data from the National Oceanic and Atmospheric Administration, National Climatic Center

show a 30-year mean annual temperature of 53.0 degrees Fahrenheit (°F) for the Dobbs Ferry, New York area. The 30-year mean annual daily maximum is 61.6°F and the 30-year mean daily minimum is 44.3°F. Precipitation patterns at Camp Smith tend to be distributed relatively evenly with the highest rains falling from April to September. Precipitation data from NCC indicate that the 30-year mean annual rainfall is 50.3 inches and the 30-year mean annual snowfall is 38.9 inches. Prevailing winds at Camp Smith are typically from the southwest with the highest mean wind speed in April. Additional 30-year mean climatic data for Dobbs Ferry are presented in Table 2.1.

2.7 TOPOGRAPHY

The terrain at Camp Smith is gently to steeply hilly. Slopes range from approximately 5 percent to 60 percent, and are steeper on ridge slopes facing the Hudson River. Elevations range from sea level along the Hudson River to approximately 867 feet above mean sea level (MSL) at the top of Mountain 867. The main cantonment is approximately 100 feet above MSL.

Four major topographic peaks exist at Camp Smith. Manitou Mountain is located in the west-central portion of the installation and is approximately 800 feet above MSL. Mine Mountain and Mountain 867 are located along the northern boundary of the installation. Mountain 867, located west of Mine Mountain, is approximately 867 feet above MSL and Mine Mountain is approximately 860 feet above MSL. An unnamed major peak, referred to as Unknown Mountain in this plan, is located south of Mountain 867 and is approximately 840 feet above MSL. Several other minor topographic peaks exist throughout the installation.

2.8 GEOLOGY

Westchester County lies in the southeast corner of New York State, within the New England uplands physiographic province. The New England uplands area is geologically

TABLE 2.1

30-YEAR CLIMATOLOGICAL SUMMARY FOR DOBBS FERRY, NEW YORK AND VICINITY

Climatic Parameter[(1)]	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Temperature (°F)													
Monthly mean	29.9	31.7	40.0	51.6	61.4	70.2	75.2	73.7	66.4	55.8	45.5	34.2	53.0
Daily maximum	36.7	39.3	48.4	61.9	71.9	80.1	85.0	83.0	75.2	64.3	52.6	40.7	61.6
Daily minimum	23.1	24.1	31.6	41.2	50.9	60.1	65.5	64.4	57.6	47.4	38.3	27.7	44.3
Rainfall (inches)													
Monthly mean	3.8	3.6	4.9	4.4	3.9	3.8	4.0	4.5	4.2	4.0	4.7	4.5	50.4
Greatest monthly	12.3	6.1	10.2	8.6	8.6	15.5	7.3	12.5	12.6	14.2	9.9	10.8	15.5
Greatest daily	3.8	3.2	3.3	3.1	5.4	5.7	3.2	4.8	4.8	4.3	5.3	3.2	5.7
Snowfall (inches)													
Monthly mean	9.4	10.8	9.3	0.8	0.0	0.0	0.0	0.0	0.0	0.1	1.1	7.4	38.9
Maximum monthly	32.7	28.1	32.4	6.8	0.0	0.0	0.0	0.0	0.0	2.1	7.5	24.4	32.7

[(1)]Based on 30-year normal mean.

Source: National Oceanic and Atmospheric Administration, National Climatic Center

1951 to 1980 climatological data for Dobbs Ferry, New York (elevation 240 feet).

complex and exhibits moderate relief. The bedrock geology at Camp Smith includes a variety of rocks and formations ranging from the middle Proterozoic to the Upper Triassic. The installation is comprised of bedrock and till over bedrock. The bedrock area, which dominates the western third of the installation above the Hudson River, consists of exposed bedrock or bedrock within 1 meter of the surface. The remainder of the installation consists of glacial till over bedrock, where bedrock lies within 1 to 3 meters of the surface and bedrock exposures are common on ridge tops and knolls. The metamorphic rocks within Camp Smith consist of two principal rock units. One rock unit, which forms approximately two-thirds of the camp area, consists of amphibolite, pyroxenic amphibolite, and hornblende gneiss. The other principal rock unit is composed of garnet bearing gneiss with interbedded veins of quartzite, which contain varying amounts of biotite, garnet, sillimanite, paragneiss and rusty paragneiss, and amphibolite. Hornblende granite and granitic gneiss also occur with some frequency within Camp Smith.

2.9 SOILS

Table 2.2 and Figure 2-3 present the soil types at Camp Smith. Detailed descriptions of each soil type as taken from the county soil survey (U.S. Soil Conservation Service 1994) are presented in Appendix A. Soils on the installation are formed in glacial till. The till deposits consist of poorly sorted clays, silts, and sands intermixed with boulders and cobbles. The soils are nearly all moderately well drained to excessively well drained loams and sandy loams. Bedrock is near the surface throughout the area, with bedrock exposures on most ridges, knolls, ridge side slopes, and cliffs. Poorly drained soils occur as small inclusions throughout the uplands, supporting numerous vernal pools and swamps. Moderately well drained soils predominate in areas adjacent to stream bottoms and in lower elevations (U.S. Soil Conservation Service 1994).

Upland soils in the Camp Smith area are minimally to moderately weathered. The primary factor distinguishing between the different soil series mapped within the study area is the depth to bedrock. On gently to moderately sloping hills, bedrock is typically 24 to 60 inches below the surface (Charlton loam and sandy loam). These soils commonly occur in association with Chatfield soils, which are slightly more fine-grained (loam and silt loam) and

TABLE 2.2

SOIL TYPES AT CAMP SMITH

Soil Key	Soil Name
Ce	Carlisle muck
CIC	Charlton loam, 8 to 15 percent slopes, very stony
CID	Charlton loam, 15 to 25 percent slopes, very stony
CIE	Charlton loam, 25 to 35 percent slopes, very stony
CrC	Charlton-Chatfield complex, rolling, very rocky
CsD	Chatfield-Charlton complex, hilly, very rocky
CtC	Chatfield-Hollis-Rock outcrop complex, rolling
CuD	Chatfield-Hollis-Rock outcrop complex, hilly
Hrf	Hollis-Rock outcrop complex, very steep
Ip	Ipswich mucky peat
LeB	Leicester loam, 2 to 8 percent slopes, very stony
Pa	Palms muck
Pc	Palms and Carlisle soils, ponded
Pv	Pits, quarry
RhD	Riverhead loam, 15 to 25 percent slopes
RhE	Riverhead loam, 25 to 50 percent slopes
Sh	Sun loam
Sm	Sun loam, extremely stony
Ub	Udorthents, smoothed
Uc	Udorthents, wet substratum
Uf	Urban land
UvB	Urban land-Riverhead complex, 2 to 8 percent slopes

Source: Soil Survey of Putnam and Westchester Counties, New York. Issued September 1994 by U.S. Department of Agriculture Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station.

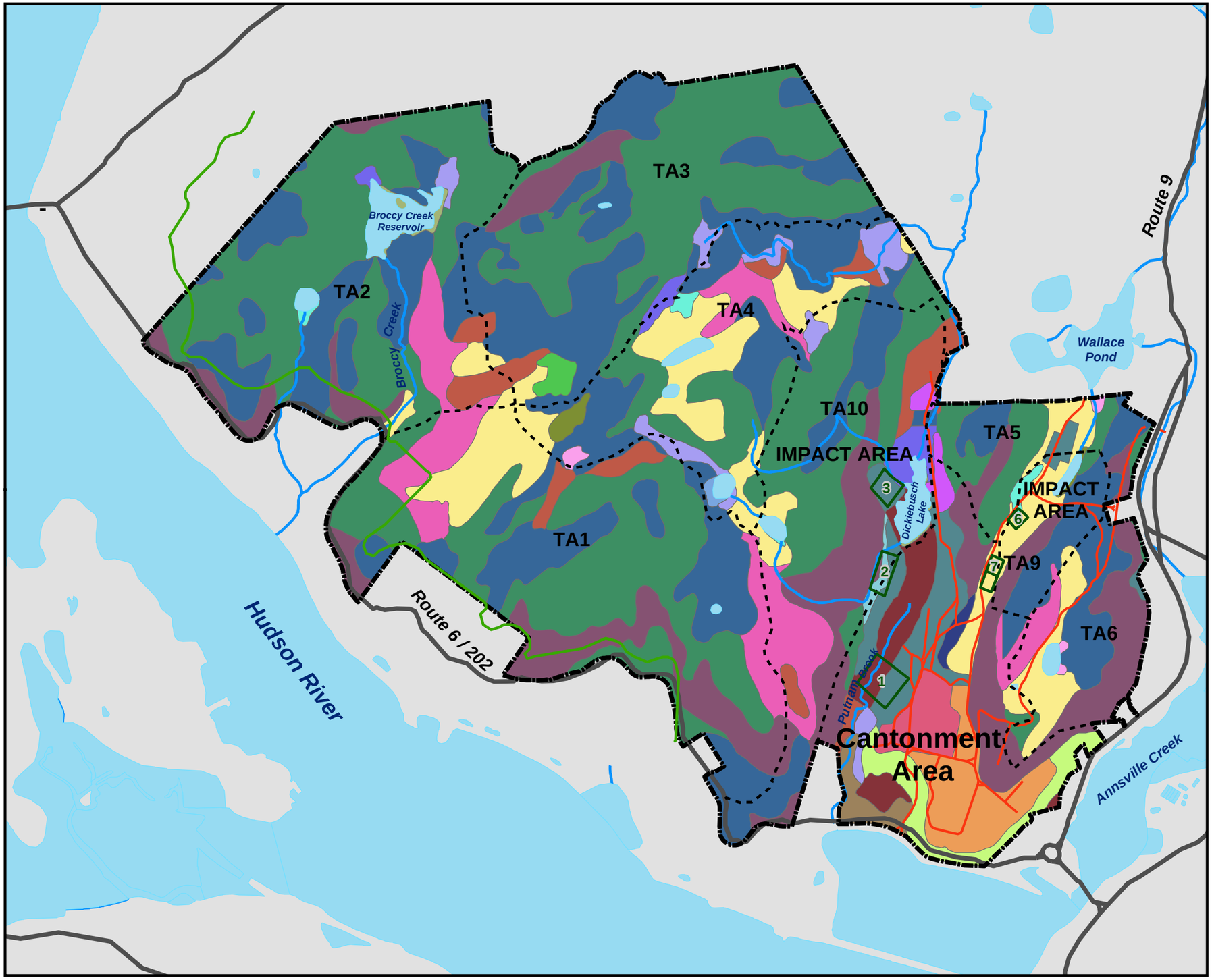

Figure 2-3

Camp Smith Training Site Soils Map

New York Army National Guard

Legend

- Range Boundaries
- Greenway Trail
- Camp Smith Boundary
- Training Area Boundaries
- State Roads
- Camp Smith Roads
- Water Bodies
- Streams / Rivers

Soils

Ce	HrF	Sh
ClC	Ip	Sm
ClD	LeB	Ub
ClE	Pa	Uc
CrC	Pt	Uf
CsD	Pv	UvB
CtC	RhD	W
CuD	RhE	Z

Refer to Table 2.2 for key to soil name

0 500 1,000 2,000 Feet

Sources: ESRI, SSURGO &
New York Division of Military and Naval Affairs

Scale:	1:15,000
Created By:	Parsons
Date:	10/11/2012
Figure Number:	2-3

N

shallower (bedrock at approximately 24 inches). Steeper slopes (up to 60 percent) support associations of Chatfield and Hollis soils, which are shallow (16 inches) sandy loams. Locations where soils are absent or very thin are Rock Outcrop (U.S. Soil Conservation Service 1994).

2.10 FLOODPLAINS

A small area in the southern portion of Camp Smith, just northwest of the main entrance, is located within the 100-year floodplain delineated by the Federal Emergency Management Agency (Figure 2-4). Portions of the parking lot located in this area are in the floodplain. Buildings previously located in the floodplain have been demolished.

2.11 SURFACE WATER

Surface waters at or in the vicinity of Camp Smith include riverine, lacustrine, palustrine, and estuarine systems (Figure 2-2). These surface water systems support important ecological functions, provide a unique setting for military training, and offer potential recreational resources.

2.11.1 Tidal Rivers and Creeks

Camp Smith is located in the 13,400 square mile Hudson River basin. The Hudson River is located along the western boundary of the installation and forms a deep and scenic gorge through the Hudson Highlands in this area. The river is tidal from New York City to Troy (150 miles). This estuary is one of New York's outstanding natural resources and is vital for its ecological role locally and along the Atlantic coastline. The estuary provides important habitat for fish, shellfish, birds, and wildlife. Its extensive marshes and mudflats contribute nutrients and energy to the local and regional food web. The Hudson River is also recognized nationally and internationally for its scenic and cultural resources. This diverse combination of ecological, scenic, and cultural resources makes the river a major recreational and economic resource for the region.

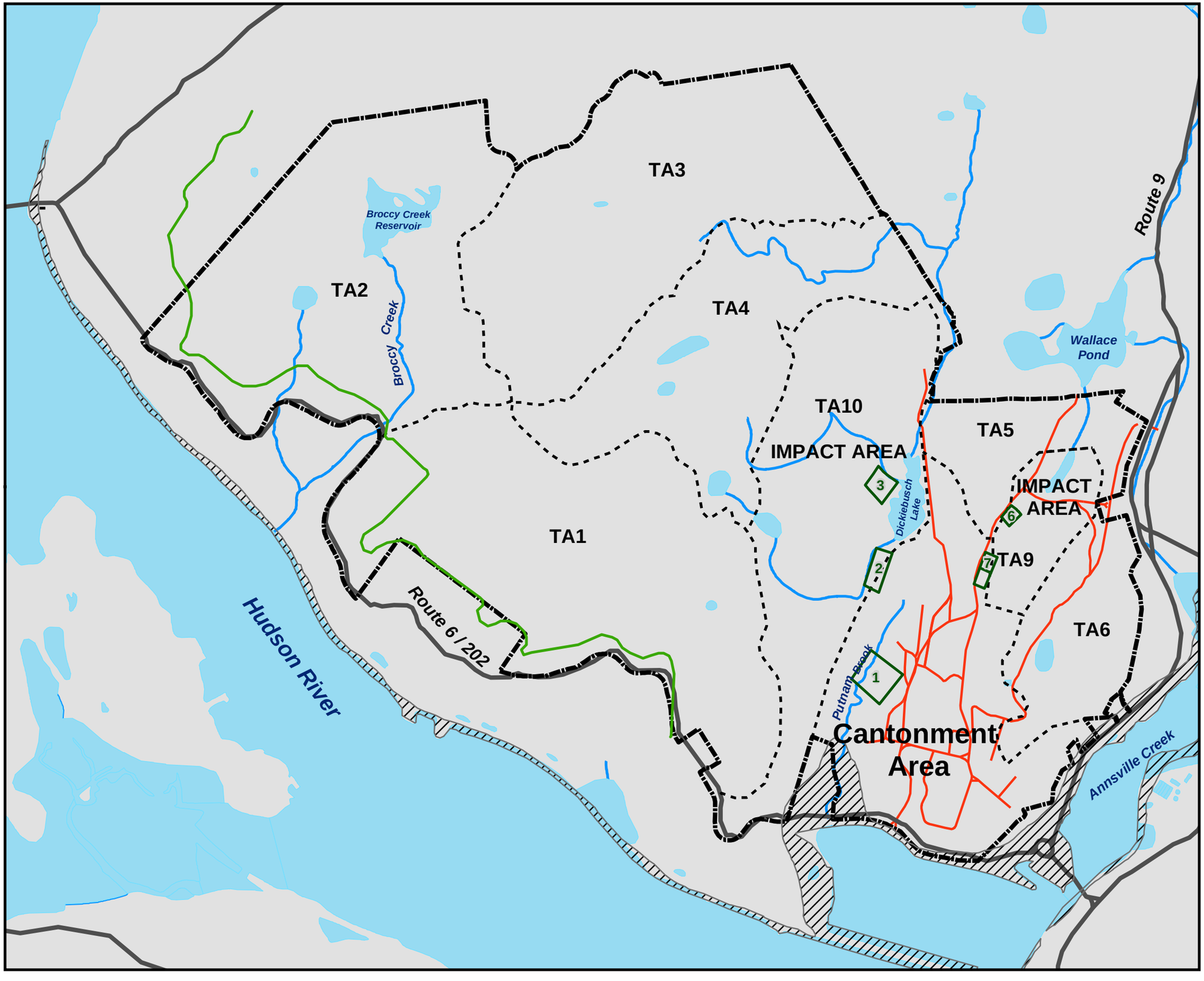

Figure 2-4

Camp Smith Training Site Floodplain Map

New York Army National Guard

Legend

- Camp Smith Boundary
- Training Area Boundaries
- Range Boundaries
- 100 Year Floodplain
- State Roads
- Camp Smith Roads
- Greenway Trail
- Water Bodies
- Streams / Rivers

0 500 1,000 2,000 Feet

Sources: ESRI, New York Division of Military and Naval Affairs

Scale:	1:15,000
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Date:	10/11/2012
Figure Number:	2-4

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Annsville Creek, which is located east of the installation, is a major tidal tributary of the Hudson River. A variable channel width and extensive marshes and mudflats characterize the creek.

2.11.2 Streams

The two major streams within the installation boundaries are Broccy Creek and Putnam Brook. Both streams drain the western two-thirds of Camp Smith and while these streams have a moderate discharge volume during the wet months, they are considered intermittent stream communities and maintain perennial flow only in excessively wet years. Broccy Creek and Putnam Brook are confined to narrow, structurally controlled stream channels that follow relatively steep gradients to their confluence with the Hudson River and Annsville Creek, respectively. Consequently, these streams exhibit poorly developed stream terraces (small to non-existent) and for the most part are confined to active floodplains. Putnam Brook is a tidal creek in its lower reaches. Several other smaller intermittent streams are located throughout the installation.

2.11.3 Impoundments and Wetlands

The two major surface water impoundments at Camp Smith are Broccy Creek Reservoir and Dickiebusch Lake. Broccy Creek Reservoir is located in the northwestern portion of the installation in a topographic depression between Anthony's Nose, Mountain 867, and Unknown Mountain at an elevation of 520 feet (Figure 2-2). The surface area of Broccy Creek Reservoir is approximately 11 acres and the maximum depth 4 feet. Damming the headwaters of Broccy Creek formed the reservoir. The watershed area of the reservoir is 181 acres and the flushing rate is 10.2 times per year (Adirondack Lakes Survey Corporation 1987). The watershed is relatively undisturbed and the primary terrestrial community types in the watershed include mixed hardwood forest and chestnut oak (*Quercus prinus*) forest (Parsons ES 1996a). Portions of the shoreline consist of exposed bedrock and boulders. A transition from open water to red maple-hardwood swamp occurs in the northeastern corner of the reservoir. Some of the area that the reservoir now covers was probably once a red maple-hardwood swamp. The shallow mucky bottom supports an abundance of submerged and floating-leaved aquatic vegetation throughout Broccy Creek Reservoir. Broccy Creek Reservoir is considered eutrophic because of its relatively low flushing rate, abundant aquatic vegetation, shallow depth, and high

allochthonous inputs of organic matter. It is likely that the reservoir is monomictic, being stratified in winter and unstratified in the summer.

Dickiebusch Lake is located in the cantonment area of the installation at an elevation of 100 feet and has a surface area of approximately 7 acres (Figure 2-2). The lake was formed by the damming of Putnam Brook and the maximum depth is 10 feet. Water discharges from the lake via a concrete spillway, which flows into an underground culvert. The outlet flows through the underground culvert for approximately 656 feet before discharging to reform Putnam Brook.

The watershed area of Dickiebusch Lake is 710 acres and the flushing rate is 47.7 times per year (Adirondack Lakes Survey Corporation 1987). The majority of the watershed is relatively undisturbed and the primary terrestrial community type in the watershed is mixed hardwood forest. The terrestrial community type in the vicinity of the lake is mowed lawn (Parsons ES 1996a). The northern third of the lake shoreline is forested with species such as American hornbeam (*Carpinus caroliniana*), red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), witch hazel (*Hamamelis virginiana*), and red oak (*Quercus rubra*). The lake bottom consists of mud and muck towards the middle, with an increase in gravel and sand around the shoreline. The northern portion of the lake has a thick (10 inches) leaf litter layer on the muddy bottom. A firing range is located west of the lake and the helicopter landing pad is located to the east. Due to its relatively high flushing rate and lack of aquatic vegetation, Dickiebusch Lake is considered mesotrophic. Significant thermal stratification probably only occurs in winter during periods of ice cover. It is likely that the reservoir is monomictic, turning over once in the spring after ice out.

Other significant surface waters at Camp Smith include vernal pools and red maple-hardwood swamps, which are described in more detail in Section 2.14. These wetlands are scattered throughout the installation and provide freshwater habitat on a seasonal basis. Various species of frogs, toads, salamanders, and newts frequent these communities during the spring and fall.

2.12 GROUNDWATER

The Sprout Brook Watershed, which is one watershed within the Northern Westchester Planning Area, is the closest to Camp Smith. The average depth of groundwater ranges from 30 feet to 60 feet with an average flow of 5 to 10 gallons per minute, which is barely enough for residential use. As such, the two wells that furnish water to Camp Smith tap another aquifer at the foot of the Sprout Brook Watershed at a rate of 200 gallons per minute each. The water quality is considered good, but somewhat hard (NYARNG 1987).

2.13 HISTORIC VEGETATION

Prior to settlement and development at Camp Smith and surrounding areas of Westchester and Putnam Counties, dense oak and northern hardwood forests dominated the land. Characteristic vegetation included white oak (*Quercus alba*), scarlet oak (*Quercus coccinea*), chestnut oak, black oak (*Quercus velutina*), American chestnut (*Castanea dentata*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), American basswood (*Tilia americana*), black cherry (*Prunus serotina*), and striped maple (*Acer pensylvanicum*) (Harker et. al. 1993). During development of southern Putnam and northern Westchester Counties, the proportion of densely forested areas decreased rapidly. Camp Smith and surrounding areas in particular were a source of high-grade iron ore and wood for the charcoal used in iron production. As a result, most historic woodlands were harvested to produce iron. As such, today's forested areas at Camp Smith are second- or third-growth timber.

2.14 EXISTING VEGETATION AND ECOLOGICAL COMMUNITIES

The existing ecological communities at Camp Smith were originally mapped and classified by the NYARNG Natural Resources Manager in 1995 and 1996 (Parsons ES 1996b) using the NYSDEC Natural Heritage Program community classification (Reschke 1990). Subsequently, in 1998, the U.S. Army Corps of Engineers Waterways Experiment Station prepared a wetland delineation for the property. This wetland delineation identified aquatic resources on the site, and classified those resources in accordance with Cowardin et al. (1979). A project completed in 2010 updated the vegetation/ecological community mapping for Camp Smith and incorporated the U.S. Army Corps of Engineers Waterways Experiment Station wetland delineation data into the overall vegetation/ecological community map and GIS data

for the installation (The Chazen Companies 2010). The 2010 survey also made changes to the Camp Smith property boundary to reflect land acquisitions by others. Adjustments to the boundaries of both terrestrial and aquatic communities that were necessary for consistency with observed field conditions were also made. Results of the 2010 survey are presented in Table 2.3 and Figure 2-5.

Camp Smith is mostly forested, with scattered wetlands, woodland pools, streams, and two lakes. Heavy deer browse is apparent, as the forest understory is thin and not readily apparent. The east-central portion of the site is developed with buildings, parking, maintained lawn, and ranges. Four-wheel-drive roads and trails allow access to most of the site. The following descriptions are taken from the 2010 survey report (The Chazen Companies 2010) and are grouped into three categories; manmade unvegetated areas, terrestrial communities, and aquatic communities.

2.14.1 Manmade Unvegetated Areas

Manmade unvegetated areas, which include buildings, parking areas, driveways, construction areas, and road maintenance areas compose approximately 4.1 percent of the site.

2.14.2 Terrestrial Communities

Mixed Hardwood Forest: This is the dominant community covering the majority of the site (approximately 64%). The community is actually a mosaic of the Appalachian oak-hickory forest and beech-maple mesic forest communities described in *Ecological Communities of New York State*. While none of the communities have well defined boundaries, the boundaries of these two communities are especially ill-defined and often overlap.

The 1996 survey included a third community, the hemlock-northern hardwood forest, within the mixed hardwood forest; however, most of the eastern hemlocks (*Tsuga canadensis*) have now been eliminated from the site as a result of apparent woolly adelgid (*Adelges tsugae*) infestation. The 1996 survey report appears to have correctly predicted that the woolly adelgid would eliminate hemlocks from the site within the next decade (1996-2006). This community no longer exists onsite.

TABLE 2.3
VEGETATIVE COMMUNITY COVER AT CAMP SMITH

Cover Type	Acres	Percent of Installation
Manmade/Cultural	**65.8**	**4.2%**
Construction/road maintenance spoils	0.8	0.1%
Buildings	10.2	0.7%
Roads/parking lots	54.8	3.5%
Terrestrial	**1,457.1**	**91.9%**
Cliff community	2.0	0.1%
Rocky summit grassland	8.0	0.5%
Pitch pine-oak-heath rocky summit	8.3	0.5%
Successional northern hardwoods	10.4	0.7%
Brushy cleared land	13.3	0.8%
Successional southern hardwoods	15.6	1.0%
Beech-maple mesic forest	18.1	1.1%
Mowed lawn	67.0	4.2%
Acidic talus slope woodland	79.1	5.0%
Chestnut oak forest	226.8	14.3%
Mixed hardwood forest	1,008.5	63.6%
Aquatic/Wetlands	**62.7**	**4.0%**
Palustrine forested	0.9	0.1%
Palustrine emergent/scrub-shrub or palustrine scrub-shrub/emergent	1.2	0.1%
Palustrine forested broad-leaved deciduous/emergent	1.9	0.1%
Palustrine forested broad-leaved deciduous/scrub-shrub	3.3	0.2%
Estuarine emergent	6.7	0.4%
Palustrine emergent	7.9	0.5%
Palustrine scrub-shrub	8.2	0.5%
Palustrine forested broad-leaved deciduous	13.5	0.9%
Lacustrine open water	19.2	1.2%

Source: The Chazen Companies 2010.

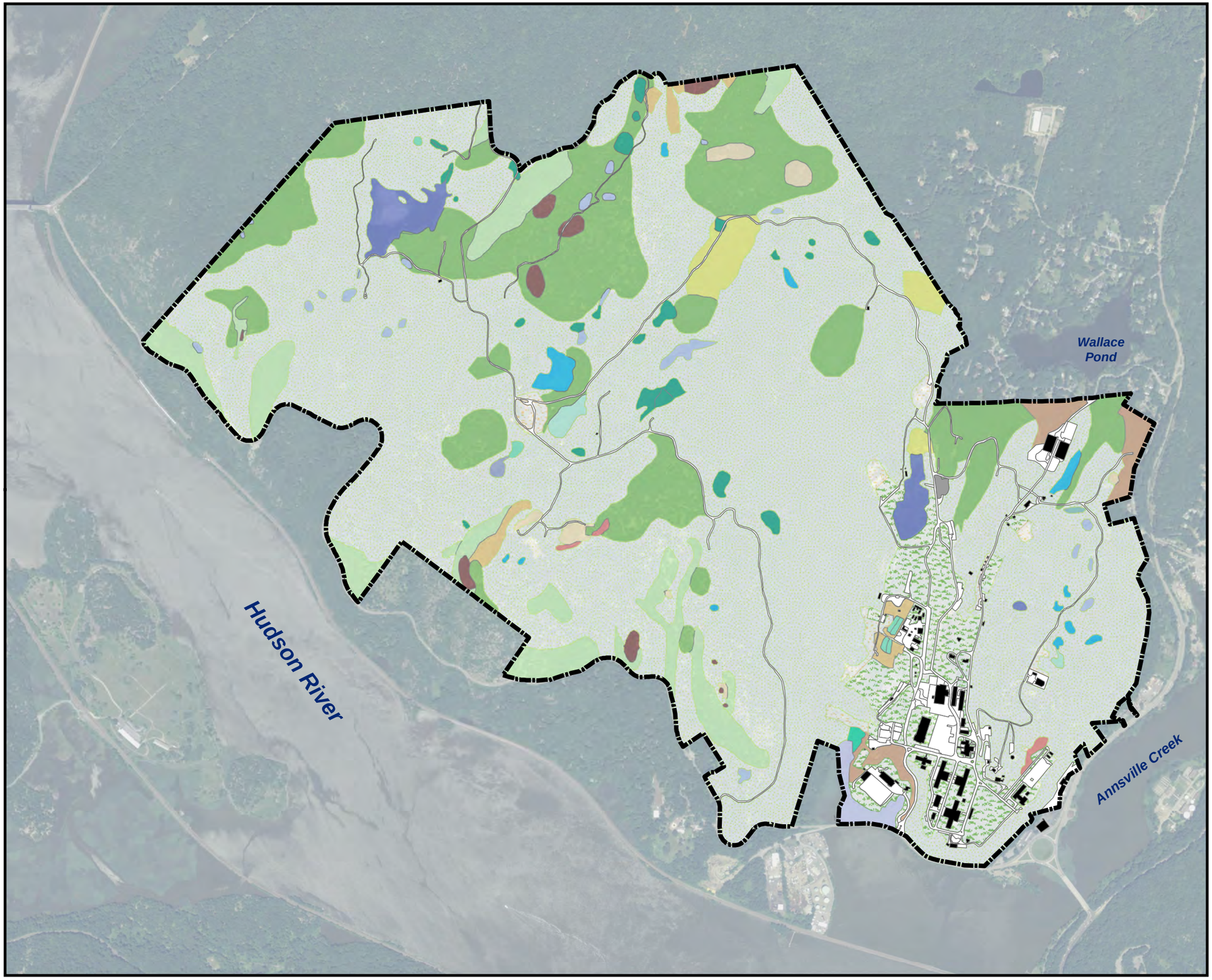

Figure 2-5

Camp Smith Training Site Ecological Community Map

New York Army National Guard

Legend

Camp Smith Boundary

Manmade/Cultural

- Buildings
- Construction/Road Maintenance Spoils
- Roads / Parking Lots

Terrestrial Resources

- Acidic Talus Slope Woodland
- Beech Maple Mesic Forest
- Brushy Cleared Land
- Chestnut Oak Forest
- Cliff Community
- Mixed Hardwood
- Mowed Lawn
- Pitch Pine Oak Heath Rocky Summit
- Rocky Summit Grassland
- Successional Northern Hardwoods
- Successional Southern Hardwoods

Aquatic Resources

- Estuarine Emergent
- Lacustrine Open Water
- Palustrine Emergent
- Palustrine Emergent/Scrub-Shrub
- Palustrine Forested
- Palustrine Forested Broad-Leaved Decid.
- Palustrine For. Broad-Leaved Decid./Em.
- Palustrine For. Broad-Leaved D./Scr.-Shr.
- Palustrine Scrub-Shrub
- Palustrine Scrub-Shrub/Emergent

0 500 1,000 2,000 Feet

Sources: ESRI, Chazen Engineering, Land Surveying & Landscape Architects Co., New York Division of Military and Naval Affairs

Scale:	1:15,000
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Figure Number:	2-5

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The mixed hardwood forest at Camp Smith is dominated by red, white, and black oak; shagbark hickory (*Carya ovata*); and sugar maple. Associate species in this community include white ash (*Fraxinus americana*), red maple, and eastern hop hornbeam (*Ostrya virginiana*).

Although the understory is generally lacking or thin in places, witch hazel, striped maple, black cherry, lowbush blueberry (*Vaccinium angustifolium*), Virginia creeper (*Parthenocissus quinquefolia*), fox grape (*Vitis labrusca*), and poison ivy (*Toxicodendron radicans*) can be found growing throughout this community.

Chestnut Oak Forest: While chestnut oak dominates, red maple and American elm (*Ulmus americana*) can be found scattered throughout this community at Camp Smith. Sassafrass (*Sassafras albidum*) grows throughout the understory, while witch hazel, lowbush blueberry, and poison ivy occur in scattered patches. Chestnut oak forest covers roughly 14 percent of the installation.

Acidic Talus Slope Woodland: The canopy of this community, which occurs on the installation's rocky slopes, ranges from open to closed. At Camp Smith, this community is dominated by chestnut, red and white oak; sugar maple, striped maple, and mountain laurel (*Kalmia latifolia*). Acidic talus slope woodlands cover approximately 5 percent of the property.

Mowed Lawn: This area includes all maintained/mowed grassy areas at the installation, some of which contain scattered trees or shrubs. Most of the mowed lawn occurs around buildings and parking lots, or within the ranges. Mowed lawn covers approximately 4 percent of the property.

Beech-Maple Mesic Forest: Although this community is included within the mosaic of mixed hardwood forest described above, three areas in the north-central portion of the installation can be described as purely beech-maple mesic forest. These areas are dominated by sugar maple and American beech, and cover approximately 1 percent of the property.

Successional Northern and Southern Hardwoods: Patches of successional forest occur throughout the central portion of the installation. These forests develop areas that have

been disturbed in the past, either by human activities or natural causes such as fires. These communities are dominated sun-loving vegetation adapted to relatively recently cleared areas. Dominant species in the northern and southern hardwood communities at Camp Smith include gray birch (*Betula populifolia*), quaking aspen (*Populus tremuloides*), red maple, American elm, and white pine (*Pinus strobus*), with black cherry, black locust (*Robinia pseudoacacia*), sassafrass, and fox grape in the understory.

Brushy Cleared Land: This community occurs around the developed portion of the property, as well as on a constructed village training area in the east-central portion of the installation. Dominant plant species include various grasses including Kentucky bluegrass (*Poa pratensis*), sedges and rushes such as Baltic rush (*Juncus balticus*), and other forbs such as birdsfoot (*Lotus corniculatus*), dogbane (*Apocynum cannabinum*), ragweed (*Ambrosia artemisiifolia*), and plantain (*Plantago lanceolata*). Shrub species include black raspberry (*Rubus occidentalis*) and barberry (*Berberis thunbergii*).

Pitch Pine-Oak-Heath Rocky Summit: This community occurs on many of the dry, rocky ridgetops throughout the installation. Vegetation is sparse in these areas, but includes pitch pine (*Pinus rigida*), black oak, scarlet oak, eastern hop hornbeam, blueberry, and mountain laurel. More areas were defined as pitch pine-oak-heath rocky summit than in the 1996 survey. This is because the more current *Ecological Communities of New York State* indicates that this community does not necessarily have to include pitch pine. Several ridgetops at Camp Smith exhibit the characteristics of this community, but only a few contain pitch pine.

Rocky Summit Grassland: This community occurs on many of the exposed ridgetops at the installation. Vegetation coverage is thin, but includes waivy hairgrass (*Deschampsia flexuosa*) and little bluestem (*Schizachyrium scoparium*), as well as scattered lowbush blueberry shrubs. Various lichens and mosses cover the exposed rocks in this community at Camp Smith.

Cliff Community: This community occurs on several steep slopes at the installation, and is very similar to the acidic talus slope woodland. Cliff communities at Camp Smith are differentiated from acidic talus slope woodlands by the dense coverage of mountain laurel, and

the lack of tree coverage. Although some scattered hardwoods are present, they are much less dense than in the talus slope community. Common herbaceous plants on these cliffs include rock polypody (*Polypodium virginianum*), wood fern (*Dryopteris marginalis*), and hairgrass.

2.14.3 Aquatic Communities

Aquatic communities were identified using the Cowardin System (Coward et al. 1979) and are shown in Figure 2-5. Under this system, wetlands are of two basic types: coastal (also known as tidal or estuarine wetlands) and inland (also known as non-tidal, freshwater, or palustrine wetlands). Both coastal and inland communities exist at Camp Smith. Aquatic communities make up approximately 62.73 acres or 4 percent of the cover at Camp Smith.

Estuarine Communities: The estuarine or coastal community at Camp Smith is a tidal marsh abutting the Hudson River Estuary west of the installation's southern entrance. The tidal marsh is dominated by common reed (*Phragmites australis*), narrowleaf cattail (*Typha angustifolia*), and arrow-arum (*Peltandra virginica*), and includes an intertidal mudflat. This community is approximately 0.4 percent of the cover at Camp Smith.

Lacustrine Communities: The installation includes two lakes, Broccy Creek Reservoir in the northwestern portion of the property, and Dickiebusch Lake in the cantonment area. Both lakes are manmade impoundments and are listed as lacustrine open water on the survey map. This community makes up approximately 1.21 percent of the cover at Camp Smith.

Palustrine Communities: Palustrine communities at Camp Smith were classified as emergent marsh, scrub-shrub, forested, or a combination thereof. These palustrine communities, combined, make up approximately 2.34 percent of the cover at Camp Smith.

Emergent marshes occur on mineral soils and are scattered throughout the property. They are typically permanently saturated and seasonally flooded with water depths ranging from approximately 6 to 36 inches depending on season and rainfall/snowfall. Water levels typically drop by mid to late summer and the substrate is exposed. Many of the intermittent woodland pools at Camp Smith are emergent marshes. Plants found in the installation's

emergent marshes include skunk cabbage (*Symplocarpus foetidus*), Baltic rush, manna grass (*Glyceria borealis*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), bulrush (*Scirpus atrovirens*), and a variety of sedges (*Carex* spp.).

Scrub-shrub wetlands are found throughout the site and include some of the intermittent woodland pools. The two largest scrub-shrub wetlands cover approximately 6.6 acres east of the "bald spot," near the training village. The scrub-shrub wetlands are dominated by speckled alder (*Alnus incana* ssp. Rugosa), silky dogwood (*Cornus amomum*), highbush blueberry (*Vaccinium corymbosum*), and buttonbush (*Cephalanthus occidentalis*), as well as skunk cabbage, Baltic rush, manna grass, and various ferns.

Many forested wetlands are scattered throughout the site. These wetlands range from small intermittent woodland pools to large swamps. The wetlands contain many of the plants listed above, as well as red maple, gray birch (*Betula populifolia*), basswood (*Tilia americana*), black ash (*Fraxinus nigra*), and silver maple (*Acer saccharinum*) trees.

2.15 WILDLIFE

A variety of game and non-game wildlife species inhabit Camp Smith including white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), wild turkey (*Meleagris gallopavo silvestris*), rabbit (*Sylvilagus floridanus*), squirrel (*Sciurus caroliniensis*), opossum (*Didelphis virginiana*), porcupine (*Erethizon dorsatum*), muskrat (*Ondatra zibethicus*), hawks (*Buteo* spp), resident Canada geese (*Branta canadensis*), mute swan (*Cygnus olor*), and various songbirds. A variety of amphibians and reptiles occupy upland and wetland areas including frogs, toads, lizards, skinks, salamanders, turtles, and snakes. A list of common wildlife at Camp Smith is presented in Appendix B and additional information is provided in the *Camp Smith Training Site Ecological Communities and Rare Species Survey Report* (Parsons ES 1996b). In addition, avian surveys were conducted in 2003 and 2005 (Parsons 2003, 2005) and bat surveys were conducted in 2007 (Woodlot Alternatives, Inc. 2007).

Camp Smith is a potential stopover point for many neotropical birds and migratory waterfowl because of its proximity to the Hudson River. The Hudson River is a part of the Atlantic Flyway, which is one of the four major pathways for birds leading from the Arctic and the Northern Plains to wintering grounds in the southern United States, Caribbean, and Central and South America.

2.16 AQUATIC LIFE

The surface water systems at and in the vicinity of Camp Smith provide habitat for diverse communities. Brief descriptions of the aquatic life in these aquatic systems are provided below. Detailed descriptions of fish and macroinvertebrates at Camp Smith are provided in the *Camp Smith Training Site Aquatic Resources Survey Report* (Parsons ES 1996a).

2.16.1 Hudson River and Annsville Creek Aquatic Life

The Hudson River supports a variety of fish species of ecological, recreational, and commercial importance. The Hudson River fish fauna list includes a total of 206 species that have been identified to date in the Hudson River drainage. These include anadromous species such as striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*), as well as the catadromous (lives in freshwater and spawns in saltwater) American eel (*Anguilla rostrata*). The striped bass stock has increased in recent years; however, the American shad stock appears to be in decline (NYSDEC 1996). Two species of sturgeon inhabit the river. The shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrhynchus*) are federal endangered species. Since its listing as endangered in 1967, the shortnose sturgeon has increased in abundance. The New York Bight distinct population segment of the Atlantic sturgeon was listed in February 2012. Oyster beds occur in the Hudson as far north as Croton Point, approximately 8 miles to the south of Camp Smith. Blue crabs (*Callinectes sapidus*) are found throughout the tidal portion of the river. Several health advisories have been issued by the New York State Department of Health Advisory for consumption of aquatic life from the Hudson River due to PCB and cadmium contamination.

Annsville Creek near its confluence with the Hudson River contains many of the same species as the Hudson River. Common fish in this area include striped killifish (*Fundulus diaphanous*) and yellow perch (*Perca flavescens*).

2.16.2 Broccy Creek and Putnam Brook Aquatic Life

The streams at Camp Smith support a variety of freshwater aquatic life. Despite their intermittent flows, Broccy Creek and Putnam Brook contain diverse benthic macroinvertebrate communities including many pollution intolerant species such as mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera).

Eleven fish species were collected from Putnam Brook during May 1996, including creek chub (*Semotilus atromaculatus*), blacknose dace (*Rhinichthys atratulus*), American eel, eastern brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), white sucker (*Catostomus commersonii*), striped killifish, and yellow perch (Parsons ES 1996a). Trout were stocked in Dickiebusch Lake annually by the NYSDEC and some of the stocked fish moved from the lake into Putnam Brook. Trout are no longer stocked and do not occur in Putnam Brook. Creek chub and blacknose dace are native species that are commonly found in rocky headwater streams in New York. The presence of these species in Putnam Brook above Dickiebusch Lake suggests that this section of the stream contains water year-round, or that these species move to Dickiebusch Lake for short periods when the stream is not flowing. The American eel was collected throughout Putnam Brook and Dickiebusch Lake. Pumpkinseed, bluegill, and largemouth bass were collected downstream of Dickiebusch Lake and apparently move into Putnam Brook from the lake and/or Annsville Creek during periods of high flow. White suckers, which were collected below the lake, are common in freshwater streams throughout New York. The striped killifish is a brackish marsh species and an important prey item for many commercially valuable species of fish and wading birds. This species was collected during low tide at the fall line. The yellow perch is a widely-distributed anadromous species that also is commonly stocked in freshwater impoundments. This species was collected during low tide near the fall line. No fish were collected from Broccy Creek; however, this stream may contain a few fish from Broccy Creek Reservoir during high flows.

2.16.3 Broccy Creek Reservoir and Dickiebusch Lake Aquatic Life

Both Broccy Creek Reservoir and Dickiebusch Lake contain diverse macroinvertebrate, fish, and aquatic communities. Macroinvertebrates found in these impoundments include mayflies, caddisflies, dragonflies and damselflies (Odonata), beetles (Coleoptera), isopods/sowbugs (Isopoda), amphipods (Amphipoda), leaches (Hirudinea), snails (Lymnaeidae and Planorbidae), and a variety of true flies (Diptera).

The shallow mucky bottom of Broccy Creek Reservoir supports an abundance of submerged and floating-leaved aquatic vegetation. Dominant species include Eurasian watermilfoil (*Myriophyllum spicatum*) and waterlilies (*Nymphaea* sp.). Filamentous green algae are also abundant, especially in shallow northeastern portion of the reservoir. Submerged aquatic vegetation in Dickiebusch Lake is not as abundant and includes Eurasian watermilfoil and American eel-grass (*Vallisneria americana*).

Fish species found in Broccy Creek Reservoir include pumpkinseed, bluegill, largemouth bass, golden shiner (*Notemigonus crysoleucas*), brown bullhead (*Ameiurus nebulosus*), and yellow perch. Fish species found in Dickiebusch Lake include pumpkinseed, bluegill, largemouth bass, American eel, golden shiner, yellow perch, black crappie (*Pomoxis nigromaculatus*), and chain pickerel (*Esox niger*).

2.17 BIODIVERSITY

As mentioned in Section 1, protection and enhancement of biodiversity through ecosystem management is an overall goal of the NYARNG. Biodiversity consists of many elements of the natural environment including indigenous ecological communities, native species, and their associations, as well as ecosystem functions such as predation, grazing, nutrient cycles, and fire. Biodiversity is best measured or defined in terms of the variety of natural ecosystems and the variety of natural functions that occur within and among these ecosystems, rather than simply by the numbers of species present. Management for maximum biodiversity helps to ensure ecosystem health, which in turn ensures sustainable use of training lands to accomplish the military mission.

Camp Smith has a rather unique setting in the Hudson Highlands of Westchester County. Topography and forest cover is mountainous in nature while the Hudson River Estuary provides a more coastal character. A wide variety of ecological communities exist in this unique environment. As presented above in Section 2.14, at least 20 ecological communities occur at, or in the vicinity of, Camp Smith. Communities range from estuarine tidal rivers to acidic talus slopes. Some communities are highly influenced by years of human occupation (e.g., manmade/cultural communities in the cantonment area). However, approximately 70 percent of the installation is relatively undisturbed and consists of indigenous ecological communities with healthy structures and functions. Several unique communities also exist at Camp Smith, including the Hudson River Critical Environmental Area to the west of Bear Mountain Bridge Road (Route 6/202) to the Hudson River, and significant coastal fish and wildlife habitat in the tidal marsh. These unique communities and others are discussed in Section 2.20. In addition to ecological communities, Camp Smith and vicinity provide habitat for several rare plant and wildlife species, which are discussed in Section 2.18.

2.18 RARE SPECIES

For the purposes of this INRMP, the term "rare species" is used to refer to various plants and animals that are protected by law or warrant special management consideration. Rare species include the following:

- Species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act, and species proposed for such listing;
- Plant species listed as protected native plants (endangered, threatened, rare, and exploitably vulnerable) by NYSDEC;
- Fish and wildlife species listed as endangered, threatened, and special concern by NYSDEC; and
- Species that are actively inventoried by NYSDEC or are on the NYSDEC watch list.

A rare species evaluation and survey was conducted at Camp Smith in 1996 and the findings are presented in the *Camp Smith Training Site Ecological Community and Rare Species Survey Report* (Parsons ES 1996a). In addition, avian surveys were conducted in 2003

and 2005 (Parsons 2003, 2005) and bat surveys were conducted in 2007 (Woodlot Alternatives, Inc. 2007). Incidental observations of rare species have also been recorded at Camp Smith.

A total of 14 species that are currently considered rare have been documented at the installation and five additional rare species potentially occur in the area (Table 2.4). No federally listed species have been documented on Camp Smith, but the shortnose sturgeon and Atlantic sturgeon (federally listed as endangered) occur near the installation in the Hudson River. Species found at Camp Smith that were once considered state rare species, but are no longer considered rare include: hirsute sedge (*Carex complanata*, former status of rare), sedge (*Carex argyrantha*, former watch list species), dittany (*Cunila origanoides*, former watch list species), and five-lined skink (*Eumeces fasciatus*, former watch list species). Additional information about rare species is presented in Section 6.

2.19 UNIQUE ENVIRONMENTAL AREAS

Camp Smith's location in the Hudson River drainage basin and the Hudson River Estuary make it part of a very large unique environmental area. All of Westchester County is located within the Hudson River Valley National Heritage Area, which has been designed by Congress to recognize the importance of the history and the resources of the Hudson River Valley to the nation. Several specific areas on or near the installation have been officially designated by NYSDEC as part of the Hudson River Estuary Management Program. The Estuary Program was established in 1987, in response to passage of the Hudson River Estuary Management Act, Section 11-0306 of the Environmental Conservation Law. The law directs NYSDEC to develop a management program for the Hudson River Estuarine District and its associated shorelands (the estuary from Troy dam south to the Verrazano Narrows, including tidal portions of tributaries). The purpose of the Estuary Program is to provide a holistic approach to management of the ecosystem and to better coordinate management activities within NYSDEC and with other government agencies. A summary of designated unique environmental areas at or in the vicinity of Camp Smith are provided below:

- Hudson River Estuarine District - Portions of Camp Smith adjoining the Hudson River and tidal portions of Putnam Brook;

TABLE 2.4

RARE SPECIES POTENTIALLY OCCURRING AT OR NEAR CAMP SMITH

Common Name	Scientific Name	Federal Status	State Status	Documented at Camp Smith
Birds				
Bald eagle	*Haliaeetus leucocephalus*	None[(1)]	T	Yes
Cooper's hawk	*Accipter cooperii*	None	SC	Yes
Peregrine falcon	*Falco peregrinus*	None[(2)]	E	No[(3)]
Sharp-shinned hawk	*Accipter striatus*	None	SC	Yes
Fish				
Atlantic sturgeon	*Acipenser oxyrinchus*	E	None	No[(4)]
Shortnose sturgeon	*Acipenser brevirostrum*	E	E	No[(4)]
Mammals				
Indiana bat	*Myotis sodalis*	E	E	No[(5)]
Small-footed bat	*Myotis leibii*	None	SC	Yes
Plants				
Flowering dogwood	*Cornus florida*	None	V	Yes
Mountain laurel	*Kalmia latifolia*	None	V	Yes
Spongy arrowhead	*Sagittaria calycina* var *spongiosa*	None	T	Yes
Weak stellate sedge	*Carex seorsa*	None	T	Yes
Yellow harlequin	*Corydalis flavula*	None	WL, U	Yes
Reptiles				
Bog turtle	*Clemmys muhlenbergii*	T	E	No[(6)]
Eastern box turtle	*Terrapene c. carolina*	None	SC	Yes
Fence lizard	*Sceloporus undulatus*	None	T	Yes
Spotted turtle	*Clemmys guttata*	None	SC	Yes
Timber rattlesnake	*Crotalus horridus*	None	T	Yes
Wood turtle	*Clemmys insculpta*	None	SC	Yes

Status Codes: E = endangered, T = threatened, SC = species of special concern, WL = watch list, U = unprotected, V = exploitably vulnerable.

[(1)]Delisted by USFWS in 2007.

[(1)]Delisted by USFWS in 1999.

[(3)]Peregrine falcons have been documented nesting northwest of Camp Smith along the Hudson River.

[(4)]Atlantic and shortnose sturgeon inhabit the Hudson River near Camp Smith.

[(5)]An Indiana bat roost site has been documented within 16 miles of Camp Smith (Robyn Niver, USFWS, personal communication, July 20, 2006).

[(6)]A historic bog turtle site has been documented within four miles of Camp Smith (Robyn Niver, USFWS, personal communication, July 20, 2006).

- Hudson River Critical Environmental Area - Areas west of Bear Mountain Bridge Road (Route 6/202) to the Hudson River;
- Hudson River Greenway - All of Camp Smith;
- Significant Coastal Fish and Wildlife Habitat - Camp Smith Marsh/Annsville Creek and Iona Island Marsh located directly across the river from Anthony's Nose;
- Iona Island/Doodletown Bird Conservation Area – Directly across the river from Anthony's Nose;
- Scenic Area of Statewide Significance - All of Camp Smith and the Hudson Highlands;
- Scenic Road - Bear Mountain Bridge Road from Bear Mountain Bridge south for 2.9 miles.

Other unique environmental areas in the vicinity include Bear Mountain State Park and Harriman State Park located directly across the Hudson River from Camp Smith. In addition, approximately 300 acres in the northwestern corner of the installation were transferred to the NYSDEC OPRHP in 1999 to become part of Hudson Highlands State Park.

The NYSDEC Natural Heritage Program maintains records of ecological communities of concern. Unique communities at Camp Smith include brackish intertidal mudflats and tidal marsh, and chestnut oak forests. In addition, an anadromous fish concentration area is located in the Hudson River along the northwestern boundary of Camp Smith (Ricci 1995). Although these ecological communities are not given federal or state status by the Natural Heritage Program, they are given global and state heritage ranks since they are considered unique and worthy of special management considerations. Global and state ranks carry no legal weight; however, they do reflect the rarity of the community throughout the world and within New York. Each unique ecological community at Camp Smith and its associated heritage rank are presented in Table 2.5.

TABLE 2.5

UNIQUE ECOLOGICAL COMMUNITIES AND HERITAGE RANKS

Community Type	Global Rank	State Rank
Brackish intertidal mudflats	G3G4	S1S2
Brackish tidal marsh	G4	S2S3
Chestnut oak forest	G3G4	S4
Anadromous fish concentration	None	S?

GLOBAL RANK:

G3 = Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g., a physiographic region), or vulnerable to extinction throughout its range because of other factors.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

STATE RANK:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.

S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4 = Apparently secure in New York State.

? = Indicates a question exists about the rank.

2.20 OUTDOOR RECREATION AREAS

Camp Smith and the surrounding region provide many opportunities for natural resources-based outdoor recreation. With the exception of impact areas, the majority of the installation is suitable for a variety of natural resources-based outdoor recreation activities. Natural resources-based outdoor recreation areas at Camp Smith include the Greenway Trail, Dickiebusch Lake, and Broccy Creek Reservoir. Recreational activities available at the installation include:

- Fishing in Dickiebusch Lake and Broccy Creek Reservoir in accordance with NYSDEC regulations;
- Hiking on the Greenway Trail which runs through the northwestern boundary of the installation in the vicinity of Anthony's Nose; and
- Birding, wildlife viewing, and other non-consumptive activities.

In general, the installation is open to military personnel and Camp Smith users for recreation. Outdoor recreation is encouraged as long as it does not interfere with the military mission. Access must be coordinated through the Range Officer and is limited based on training and range schedules. Access is not granted to the general public due to safety considerations; however, use of the Greenway Trail is not restricted. In addition, Camp Smith has a controlled recreational hunting program for white-tailed deer, wild turkey, and resident Canada geese. Details of the hunting program are provided under the Fish and Wildlife Management Program (Section 5).

2.21 SURROUNDING LAND USE AND ENCROACHMENT

Camp Smith is located in the northwestern sector of Westchester County, within the Town of Cortlandt. The installation is bordered on the west by the Hudson River, the north by Putnam County, the south by Annsville Creek, and the east by the Town of Cortlandt. The installation is approximately 2 miles northwest of the City of Peekskill and is approximately 17 miles south of the City of Beacon. Bear Mountain Bridge Road (Route 6/202) runs through the western part of the installation. This route is a two-lane NYSDEC Designated Scenic Road and has moderate to heavy traffic. A railroad runs along the Hudson River west of the installation

and crosses the mouth of Annsville Creek. The area between the western boundary and the Hudson River is railroad right-of-way. A small private inholding, 14 acres, also is located in the western portion of the installation (Figure 2-2). Bear Mountain State Park and Harriman State Park are located directly across the river from the installation. Route 9 parallels the eastern boundary of Camp Smith. Areas to the south and southeast of the installation are zoned industrial, business, office, and commercial. Major features to the south include a tank farm and the nuclear-powered Indian Point Power Plant. The surrounding area north in Putnam County is predominantly rural residential.

Encroachment refers to the urban or suburban development of areas surrounding military installations. Many posts were established decades ago in rural areas. As development increases in the vicinity of an installation, the potential for civilian complaints and conflicts also increases. At some installations encroachment is impacting the Army's use of its training areas and consequently affecting military readiness. Future development along the western and northern boundaries of Camp Smith is not likely due to the presence of the Hudson River and public parkland. However, increased recreational use of these areas and the Greenway Trail, which cuts through the western portion of the installation (Figure 2-2), could result in future encroachment issues. Land to the south and east along Route 9 is privately owned. Future development in this area is somewhat limited by existing industrial/commercial development and the presence of Annsville Creek. There is potential for future residential development on private lands east of the installation. Westchester County experienced a 2.8 percent increase in population from 2000 to 2010, compared to 2.1 percent for New York State and 9.7 percent for the United States.

2.22 CULTURAL RESOURCES

2.22.1 General

The NYARNG prepared an Integrated Cultural Resources Management Plan (ICRMP), which includes Camp Smith. The ICRMP serves as NYARNG's comprehensive plan for managing cultural resources. It includes detailed information regarding applicable cultural resources management laws, regulations, and NYARNG management procedures, as well as descriptions of known and potential resources present. The ICRMP was developed in consultation with the State Historic Preservation Office (SHPO) and Native American groups.

The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, treaties, statues, executive orders, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependant nations under its protection. Executive Order (EO) 13175 *Consultation and Coordination with Indian Tribal Governments* (January 5, 2001) and the October 27, 1999 *Annotated Policy Document for the DoD American Indian and Alaska Native Policy* establish regular and meaningful consultation and coordination with federally recognized Indian tribal governments. The NYARNG ICRMP provides procedures that permit elected officials and other representatives of Indian tribal governments to provide meaningful and timely input on actions or policies that might be of tribal interest, such as those that affect sacred or Indian cultural sites. In accordance with EO 13175 and DoD policy, the NYARNG initiated consultation with federally recognized Indian Tribes during preparation of the ICRMP. In New York, there are seven federally recognized Indian tribes including the following:

- Cayuga Nation of New York;
- Oneida Nation of New York;
- Onondaga Nation of New York;
- Seneca Nation of New York;
- St. Regis Band of Mohawk Indians of New York;
- Tonawanda Band of Seneca Indians of New York; and
- Tuscarora Nation of New York.

Cultural resources could present constraints to various natural resources management activities at Camp Smith. Ground disturbing activities associated with the INRMP could require National Historic Preservation Act Section 106 consultation. When necessary, the NYARNG would initiate the Section 106 process with the SHPO to ensure that impacts to cultural resources are avoided. In addition, the previous Draft INRMP and Draft EA for the INRMP were submitted to the SHPO for review. Specific procedures for Section 106 consultation and procedures for inadvertent discovery are specified in the ICRMP and these procedures are incorporated into this INRMP by reference. In addition, the NYARNG would consult with appropriate Indian tribal governments for any INRMP activities that may have a potential to significantly affect protected tribal resources, tribal rights, or Indian land. The

ICRMP includes contact information for the tribes and consultation procedures, which are incorporated into this INRMP by reference.

2.22.2 Existing Resources

Overview

Camp Smith and the surrounding regions contain a wide variety of cultural resources. Of particular note is the Revolutionary War history associated with the region. A cultural resources assessment and reconnaissance was conducted for Camp Smith during 1996. Although the assessment and reconnaissance were not intended as a comprehensive cultural resources survey, several known or predicted cultural resources were identified at the installation. The findings of this study are presented in the *Camp Smith Training Site Cultural Resources Assessment and Reconnaissance Report* (Parsons ES 1996c). This report provides preliminary prehistoric and historic contexts, a predictive model for potential cultural resources, and information on known and predicted cultural resources at the installation based on background research and a two-day walkover survey. Identified cultural resources sites at Camp Smith are have been mapped in the NYARNG Geographic Information System (GIS). However, mapping is not provided in this document due to the sensitive nature of the data.

Archaeological Sites

Nine potential archaeological sites have been identified at Camp Smith. These include two potential prehistoric sites and seven historic sites. Camp Smith also contains three previously recorded archaeological sites (two rockshelters and one historic artifact scatter). Additional potential sites were also identified during the 1996 survey, but some potential sites were located on land transfer to NYSDEC OPRHP. Possible prehistoric sites include a large rockshelter below South Hill that overlooks an unnamed intermittent drainage (CS-4), and two medium-sized rockshelters above the headwaters of Broccy Creek (CS-15). A more systematic survey of the installation, including shovel testing of rockshelters and ground surfaces with minimal exposure, may produce a greater number of prehistoric sites. Prehistoric archaeological sites are most likely to occur on ridgetops, saddles, and knolls overlooking major streams or the Hudson River, above the confluence of two or more streams, or in proximity to springheads. Prehistoric sites are likely to occur in overhangs and rockshelters.

The bluffs overlooking the confluence of Annsville Creek and the Hudson River (i.e., the original McCoy property) would have been considered a high probability area, but construction activities and land disturbance have probably combined to destroy any evidence of prehistoric occupations.

Five of the potential historic archaeological sites identified in the area (CS-1, CS-2, CS-3, CS-9, and CS-12) may be related to former mining activities; three sites (CS-10, CS-13, and CS-16) consist of historic roadbeds and/or stone walls; two sites (CS-5 and CS-6) are historic dams; one site (CS-7) includes three separate stone foundations associated with Anthony's Hospital; one site is a twentieth century target range (CS-8); one site (CS-11) consists of the artifact scatter associated with the 1924 toll house; one twentieth century site (CS-14) consists of concrete piers for a building of unknown function; and one site (CS-17) consists of three uncut stone foundations that probably represent Revolutionary War redoubts associated with the boom chain across the Hudson River at Anthony's Nose. Given the more recent and intensive historic occupation of this area, historic artifact scatters, features, or midden deposits, associated with a variety of activities (e.g., mining, Revolutionary War, farmsteads, military, etc.), may be buried beneath lawn surfaces or layers of fill at the east and west portions of the installation, and the parade grounds.

Historic Architectural Sites

At least 52 buildings at Camp Smith presently meet the National Register 50-year age consideration. These include 2 buildings from 1918, 21 buildings from the 1920s, 14 buildings from the 1930s, and 15 buildings from the 1940s. The Bear Mountain Bridge Toll House, built in the early 1920s, is listed in the National Register of Historic Places and has been transferred to NYSDEC OPRHP. None of the buildings at Camp Smith are considered eligible for the National Register according to the SHPO. Construction methods for buildings that meet the 50-year age consideration include wooden frame structures, poured concrete buildings, and concrete block buildings. Building types that meet the 50-year age consideration include administrative buildings, troop service buildings and quarters, warehouses and maintenance shops, chapel, water treatment facility, sewage disposal plant, pump house, incinerator, and training facilities.

SECTION 3

NATURAL RESOURCES PLANNING STRUCTURE

3.1 INTRODUCTION

The purpose of this section is to present the framework for natural resources planning and INRMP development and implementation at Camp Smith. The key steps to developing an effective INRMP include:

- Forming a planning team and identifying stakeholders;
- Assessing current natural resources programs;
- Identifying management issues and concerns; and
- Developing general and specific natural resources goals and objectives.

3.2 RESPONSIBILITIES AND REQUIREMENTS

This INRMP has been prepared in accordance with requirements specified by the Sikes Act, DA policy, NGB policy, DoD Directive 4700.4, *Natural Resources Management Program*, and AR 200-1. As discussed in Section 1, the Sikes Act requires INRMPs for military installations, unless the lack of significant resources makes preparation of a plan inappropriate. The Secretary of a military department may develop and implement an INRMP for a State-owned National Guard installation. Camp Smith is owned the New York State Division of Military and Naval Affairs (DMNA) and is considered a State-owned National Guard installation pursuant to the Sikes Act Amendment Act of 2011.

The Adjutant General (TAG) of the NYARNG has overall responsibility for the preparation and implementation of an INRMP that fulfills both stewardship and legal requirements. The Environmental Compliance Branch (Environmental Office), within Facilities Management and Engineering of DMNA, is assigned day to day responsibility for

development and implementation of the INRMP. The Camp Smith Post Director is responsible for providing input to the plan and implementing specific elements of the plan.

3.3 NATURAL RESOURCES PLANNING COMMITTEE

The Camp Smith Natural Resources Planning Committee was established in October 1995, to ensure that use of natural resources at Camp Smith is consistent with the military mission and sound conservation and environmental concerns. Specific responsibilities of the Camp Smith planning committee include the following:

- Identifying military training and land use needs;
- Identifying and evaluating management issues and concerns;
- Providing policy, guidance, and oversight for development of goals and objectives;
- Identifying staffing and funding resources for implementing the INRMP;
- Overseeing development, implementation, and revision of the INRMP; and
- Fostering environmental awareness and good stewardship at Camp Smith.

The Committee is a multidisciplinary group that represents military land use needs and provides natural resources subject matter expertise. The Natural Resources Manager within the Environmental Office serves as the committee chair. The Committee meets quarterly, or as scheduled by the committee chair, at Camp Smith to discuss management issues and concerns. Meeting minutes are distributed to all members to keep them informed of the latest changes and current issues. The Committee membership is composed of the following positions:

- NYARNG Environmental Office, Natural Resources Manager, Latham;
- NYARNG Environmental Office, Branch Chief, Latham;
- Army Training and Readiness Directorate, Director, Latham;
- Post Director, Camp Smith Training Site;
- Training Site Commander, Camp Smith Training Site;
- Deputy Director, Camp Smith Training Site;

- Range Operations Officer/Non-commissioned Officer in Charge, Camp Smith Training Site; and
- Training Representative, Camp Smith Training Site.

3.4 STAKEHOLDERS

In addition to the Natural Resources Planning Committee, internal and external stakeholders are involved in the natural resources planning process. Internal stakeholders include all Camp Smith users and managers. External stakeholders include various government agencies and non-governmental organizations. These stakeholders have a vested interest in how the natural resources at Camp Smith are managed. As such, stakeholders are included in the natural resources planning process and have the opportunity to provide technical or/and regulatory input. All requests for external stakeholder involvement must be coordinated through the NYARNG Public Affairs Office. Internal and external stakeholders include the following:

Internal Stakeholders

- Office of the Adjutant General (MNAG), Latham;
- Facilities Management and Engineering (MNFE), Latham;
- Facilities Management and Engineering, Environmental Compliance Branch (MNFE-EC), Latham;
- Military Support (MNMS), Latham;
- Public Affairs Office (MNPA), Latham;
- Headquarters NYARNG (MNAR), Latham;
- Nonmilitary Use Program Branch (MNFE-FO), Latham;
- Army Logistics and Maintenance (MNL), Latham;
- Army Training and Readiness (MNOT), Latham;
- Headquarters, Camp Smith Training Site;
- National Guard Bureau (NGB); and
- Department of the Army (DA).

External Stakeholders

- New York State Department of Environmental Conservation (NYSDEC);
- New York State Office of Parks, Recreation, and Historic Preservation (OPRHP);
- New York State Department of State;
- The Hudson River Estuary Management Advisory Committee;
- Westchester County Planning Commission;
- United States Fish and Wildlife Service (USFWS); and
- United States Department of Agriculture, Animal Damage Control.

3.5 AGENCY COORDINATION

In accordance with the Sikes Act and DA and NGB policy, this INRMP has been submitted to the USFWS and NYSDEC for review and input. Input from both of these agencies has been incorporated into the INRMP. Copies of correspondence with these agencies are provided in Appendix C.

3.6 MANAGEMENT PROGRAM OVERVIEW

Seven resource-specific natural resources management programs have been developed to address relevant issues at Camp Smith. The program structure has been developed based on the installation-specific management situation and is designed to facilitate issue identification and prioritization, as well as project funding, implementation, and tracking. Due to the inherent interaction of natural resources, significant overlap exists among programs. Therefore, all programs are integrated with each other, as well as the overall land use and mission planning processes at the NYARNG. Management programs are covered separately in Sections 4 through 10 and include the following:

- Integrated Training Area Management (ITAM) Program, which includes the following:
  - Range and Training Land Assessment (RTLA);
  - Land Rehabilitation and Maintenance (LRAM);
  - Training Requirements Integration (TRI); and
  - Sustainable Range Awareness (SRA);

- Fish and Wildlife Management Program;
- Rare Species Management Program;
- Outdoor Recreation Program;
- Wetlands Management Program;
- Forest Management Program; and
- Invasive Species Management Program.

3.7 NATURAL RESOURCES PLANNING PROCESS

3.7.1 Assessing Natural Resources Programs

Periodic assessment is a necessary part of the natural resources planning process that evaluates program status, measures progress, and identifies new management issues, concerns, goals, and objectives. The natural resources planning framework, programs, issues, concerns, goals, and objectives presented in this INRMP are based on an assessment of existing information on the military mission, current programs, and natural resources. The current status of programs or management activities that have been previously established at the Camp Smith is provided in Sections 4 through 11, along with recently identified natural resources issues and program development needs. The INRMP review and revision process is described in Section 3.11.

3.7.2 Identifying Natural Resources Issues and Concerns

Natural resources issues and concerns, which are discussed in detail for each management program in Sections 4 through 11, are defined as any action, process, activity, program, etc. that might present constraints to operations and mission activities, readiness, and future planning at Camp Smith. The Environmental Office and Natural Resources Planning Committee are responsible for identifying issues and concerns by assessing current programs and evaluating the status and trends of natural resources.

3.7.3 Developing Natural Resources Goals and Objectives

Goals, objectives, and projects are established for each management issue and concern to provide a clear direction and concrete approach to natural resources planning. As with the

management issues and concerns, the Environmental Office and Natural Resources Planning Committee are responsible for developing management goals and objectives. Measurable goals have been developed where appropriate for each management program. Objectives and specific projects under each goal represent activities that the NYARNG intends to implement, if funding is available, in an effort to fulfill the goals. Specific goals are prioritized for implementation using the following criteria:

- High Priority - Issues required to sustain or improve training and readiness or issues driven by legislation that must be addressed to ensure compliance or to prevent potential situations involving compliance;
- Medium Priority - Issues that are not compliance driven and will not impede the military mission of Camp Smith, but will significantly enhance ecosystem health and environmental awareness; and
- Low Priority - Issues that are not compliance driven and will not impede the military mission of Camp Smith, but will enhance ecosystem health and environmental awareness but to a lesser extent compared to high and medium priority goals.

3.8 STAFFING

Primary staffing for developing and implementing the INRMP comes from the Environmental Office and the Camp Smith Environmental Analyst. The Natural Resources Manager at NGB-ARE provides technical guidance and support to implement various aspects of the INRMP. In light of the goals stated in the INRMP, additional staffing will be used for implementation. Estimated staffing requirements for implementing specific INRMP goals and programs are presented in Section 11. Possible staffing sources for natural resources programs at Camp Smith include:

- Permanent DMNA staff:
  - NYARNG Environmental Office (full-time staff and part-time Table of Distribution Allowances);
  - Camp Smith Facility Engineering Office;
  - Camp Smith Operations Office; and
  - Various NYARNG Units.
- Temporary DMNA staff:

  - Military Mandays; and
  - Students/Interns.
- NYSDEC representatives in cooperation with DMNA; and
- Contractors and consultants.

3.9 FUNDING

Funding for the Environmental Office staff and standard supplies comes from direct funding sources. A variety of funding sources, including the following may be utilized to implement specific projects:

- Army Conservation Program;
- ITAM Program;
- Real Property Operations and Maintenance (RPOM);
- Range and Training Land Program (RTLP);
- DoD Legacy Program; and
- New York State legislature and other state funds.

Estimated funding requirements for implementing specific INRMP goals and programs are presented in Section 11.

3.10 PUBLIC REVIEW AND NATIONAL ENVIRONMENTAL POLICY ACT PROCESS

The National Guard Bureau Office of General Counsel has determined that AR200-1 requirements for INRMP implementation necessitate the preparation of National Environmental Policy Act documentation prior to plan approval. In addition, AR200-1 requires that INRMPs be made available to the public for review.

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to consider the potential environmental consequences in the decision making process. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal

decisions. The NEPA process involves one of three levels of analysis, as well as accompanying documentation:

- A Record of Environmental Consideration (REC) is not a NEPA document but an official "decision document" in the Army National Guard' NEPA process. A REC is a written record that an action has been evaluated and either (a) falls under the Categorical Exclusion requirements specified in 32 CFR Part 651 or (b) has been appropriately analyzed in another NEPA document.
- An Environmental Assessment (EA) is prepared to determine the magnitude of the impacts, both individually and cumulatively, of a proposed project's implementation. An EA is required when the conditions for a Categorical Exclusion are not met. If the analysis in the EA indicates there is no significant impact to the quality of the environment, a Finding of No Significant Impact (FNSI) is issued and then the proposed action may proceed as planned. A public comment period is provided after the EA is developed. After the comment period concludes, and if a FNSI is proposed and issued, another comment period is held before initiating the action.
- An Environmental Impact statement (EIS) is necessary when any federal agency or department proposes a "major action significantly affecting the quality of the human environment" (NEPA, Section 102(a)). An EIS is the typical course of action when an EA does not result in a FNSI.

In accordance with 32 CFR Part 651 and NEPA, an EA was prepared to evaluate the potential environmental consequences of implementing the Camp Smith INRMP that was finalized in October 2001 and a Finding of No Significant Impact was issued. The NYARNG has reviewed the actions proposed under this INRMP Update and has determined that the biophysical consequences of implementing this INRMP Update are not materially different than those that were analyzed for the 2001 INRMP. Therefore, preparation of an EA is not required for this INRMP Update. Accordingly, the NYARNG will prepare a REC for this INRMP Update.

3.11 INRMP EVALUATION AND REVISION

This INRMP covers a five-year planning period from the date of approval. Army and NGB policy requires that INRMPs be reviewed as to operation and effect by the parties thereto

on a regular basis, but not less often than every five years. The Environmental Office will review the plan annually (at a minimum) in consultation with the Natural Resources Planning Committee, USFWS, and NYSDEC. The need for revisions or updates to the INRMP will be determined during these annual reviews. In addition, the Environmental Office will formally request a comprehensive review of the plan by USFWS and NYSDEC not less often than every five years. The Environmental Office will document all INRMP reviews in a Memorandum for the Record.

The INRMP will be revised, as needed, based on various factors such as changes in conditions and the effectiveness of ongoing management practices. Revisions will be submitted to the USFWS and NYSDEC for review and concurrence. The Environmental Office will evaluate all proposed INRMP revisions to determine if public review and NEPA documentation are appropriate and necessary. Generally, any INRMP revisions that would result in materially different biophysical consequences than previously considered would be subject to public review and the NEPA process.

SECTION 4

INTEGRATED TRAINING AREA MANAGEMENT PROGRAM

4.1 INTRODUCTION AND PROGRAM OVERVIEW

4.1.1 Administrative Responsibilities and Requirements

The Integrated Training Area Management (ITAM) Program at Camp Smith was initiated in 1996. Based on the size and uses of NYARNG training sites a full-time ITAM Coordinator has not been allocated to the NYARNG. The Environmental Analyst at Camp Smith has been assigned the additional duty of ITAM Coordinator for program activities at the installation, with support provided by the Environmental Office. Overall program responsibilities are coordinated among the Plans, Operations, and Training Officer (POTO), Facilities Management Office (FMO), Environmental Office staff, and the Camp Smith Post Commander, Facilities Engineer, and Facilities Manager.

Along with the Range and Training Land Program (RTLP), ITAM is a core program for the U.S. Army Sustainable Range Program (SRP). ITAM Program requirements are specified in Army Regulation 350-19 - *The Army Sustainable Range Program*.

4.1.2 Program Description

4.1.2.1 Integrated Training Area Management Program Description

As the Department of Defense's premier land force, the Army relies on land to achieve its training objectives and maintain readiness standards. Consequently, training lands are one of the Army's most valuable assets. In order to achieve its missions, the Army must have lands that are capable of supporting training and other functions indefinitely into the future. The ITAM Program was developed by the DA to integrate training and other mission requirements for land use with sound natural resources management of the land. Components of ITAM can be thought of as preventive maintenance of training land. Just as the Army conducts preventive

maintenance programs to protect its substantial investment in tactical equipment, it also must invest in preventive maintenance of its training lands.

The ITAM Program provides Army range officers with the capabilities to manage and maintain training lands and support mission readiness and the Mission Essential Task List. ITAM integrates the mission requirements derived from RTLP, with environmental requirements and environmental management practices, and establishes the policies and procedures to achieve optimum, sustainable use of training and testing lands by implementing a uniform land management program that includes the following (DA 2005):

- Assessing land quality, monitoring land conditions, and recommending land rehabilitation options;
- Integrating training and testing requirements with training land carrying capacity;
- Educating land users to minimize adverse impacts; and
- Rehabilitating and maintaining training land.

The ITAM Program is based on user requirements derived from continuous interaction throughout command levels. The program is applicable to Active Army, Army Reserve, and Army National Guard (ARNG) installations that have a major training or testing mission, including those managed by NGB. The ITAM Program is comprised of the following four components:

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

4.1.2.2 Range and Training Land Assessment Description

The RTLA component acquires data and assesses information to maximize the capability and sustainability of the land to support live training and testing activities. Installations use RTLA data to: (1) identify LRAM projects; (2) ensure that biological

considerations are part of the LRAM project prioritization process; (3) create maps depicting the availability, suitability, accessibility, and capacity of training lands; and (4) conduct internal encroachment assessments by routinely reviewing plans, such as the INRMP and ICRMP.

4.1.2.3 Training Requirements Integration Description

The TRI component provides a decision support capability based on the integration of training requirements, land conditions, range facilities, and environmental management requirements. The ITAM Coordinator consults with the range officer, other range organization personnel, trainers, environmental technical staff, natural and cultural resources managers, and other environmental staff members to integrate training requirements; land management, training management; and natural and cultural resources management data; and data received from RTLA and Army conservation program components.

4.1.2.4 Land Rehabilitation and Maintenance Description

LRAM is a preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements.

4.1.2.5 Sustainable Range Awareness Description

The SRA component of the ITAM Program provides a proactive means to: (1) develop and distribute educational materials to users of range and training land assets and (2) integrate SRA into existing command and/or installation operational awareness activities and events, and initiate new events that maximize outreach for the command. Materials relate procedures that reduce the potential for inflicting avoidable impacts on range and training land assets, including the local natural and cultural resources.

4.1.3 Program Status and Issues

4.1.3.1 General Integrated Training Area Management Program Status and Issues

The NYARNG ITAM Program was formally initiated in 1996. The applicability of the ITAM Program to individual installations is first determined by identifying installations having a significant training land use. As described in Section 2, Camp Smith is the NYARNG's largest (approximately 1,613 acres) and most intensely used training site. The installation supports a variety of fielding training missions during both annual training and in-active duty training, which cannot be accomplished at other NYARNG training sites. Therefore, Camp Smith is considered to have a "significant training land use" that must be sustained to meet mission objectives. Other NYARNG training sites are smaller and support limited fielding training activities compared to Camp Smith. Accordingly, Camp Smith is the primary focus of the NYARNG ITAM Program and the remaining installations are considered sub-installations from an ITAM Program implementation perspective. This approach recognizes that ITAM issues might arise at the sub-installations, but maintains the priority at Camp Smith.

HQDA categorizes ITAM installations according to the relative importance of their land management requirements. NGB provides information on ARNG installations to HQDA. Based on factors such as the mission, training load and training intensity, installation size, and environmental sensitivity to mission activity, HQDA assigns categories to the installations. Category I (CAT I) installations have the highest priority and therefore receive the highest level of ITAM funding, followed by CAT II–IV, respectively. Assignment of installations to categories is reviewed annually and revised to reflect changed conditions, if appropriate. As of 2008, Camp Smith was considered a CAT IV installation and has not been allocated a full-time ITAM Coordinator. Consequently, the installation is currently considered to have a relatively low priority for ITAM funding, which could affect NYARNG's ability to address identified issues and needs. The NYARNG and NGB will continue to evaluate the status of Camp Smith's ITAM categorization annually.

4.1.3.2 Range and Training Land Assessment Status and Issues

Effective management of NYARNG lands requires information regarding initial resource conditions and knowledge of impacts from various types of military training. As discussed in Section 2, the NYARNG conducted various natural resources Planning Level

Surveys (PLSs) at Camp Smith in 1995, 1996, 2003, 2005, and 2007, and has incorporated these data into the NYARNG Geographic Information System (GIS). The GIS is a computer system that is used to manage spatially referenced data acquired about the installation's environment and resources. The PLS data help to define baseline conditions and identify environmentally sensitive areas.

In 1997, the NYARNG initiated a long-term RTLA (formerly Land Condition Trend Analysis [LCTA]) plot inventory and monitoring program at Camp Smith. Fourteen permanent RTLA plots were established at Camp Smith in 1997, including four core plots and 10 special use plots. Detailed information on the objectives, plot locations, standard operating procedures, and inventory data are contained in the Camp Smith LCTA Notebook (Parsons ES 1997). Each of the RTLA plots was also monitored in 1998 and 1999. The RTLA plot monitoring conducted to date has not indicated adverse training-related impacts at the installation. The existing RTLA core plots are located in areas where low impact training occurs and the NYARNG has determined that continued monitoring of the existing plots is not likely to provide useful information to support decision making. Therefore, NYARNG does not intend to continue monitoring or maintaining the existing plots.

Refinements to the RTLA monitoring protocols will be implemented over the next few years based on the types of training that occurs at the installation. As described in Section 2, a variety of field training activities are conducted at Camp Smith. Potential training-related impacts vary substantially based on the type of training. For example, dismounted maneuver and land navigation exercises have a relatively low potential for impact, while heavy equipment training and vehicle maneuvers have a relatively high potential for impact. Activities that involve concentrated and repeated use of an area (e.g., bivouac and command post sites) also have a relatively high potential for impact. At Camp Smith, heavy equipment and vehicle maneuver training are limited to existing unpaved roads and maneuver trails. No tracked vehicle training is conducted at the installation.

Future RTLA efforts at Camp Smith will also focus on monitoring the most intensely used training areas including maneuver trails, open areas, and bivouac sites. This approach will identify potential impacts, such as maneuver trail erosion, before they adversely affect training or the environment. This approach also helps to minimize land rehabilitation costs.

The first steps in implementing the refined RTLA approach will involve conducting an initial inventory of intensely used training areas, establishing the long-term monitoring points, and establishing monitoring protocols. The initial inventory is included as ITAM Objective #1 in this INRMP and will include:

- Accurately mapping each area in the NYARNG GIS using a global positioning system (GPS) and digital aerial photography;
- Defining training area uses, frequency of use, and intensity of use; and
- Documenting existing natural resources and existing impacts.

Long-term monitoring points will be established during the initial inventory and monitored on a routine basis (e.g., annually, following major training events, etc.) under ITAM Objective #2. The site-specific protocols will provide a systematic approach for collecting qualitative land condition data. They will be designed to identify changes in land condition overtime, identify specific areas that require rehabilitation, and provide information that can be easily used to make informed training area management decisions. As such, the parameters monitored will include general site characteristics such as the relative percentage of vegetative cover and bare ground, presence and severity of soil erosion, potential for soil erosion to impact nearby water resources, and specific evidence of training-related impacts. In general, the protocols will be qualitative rather than quantitative for ease of implementation. However, the approach will be standardized and systematic to allow detection of change from year to year.

Another RTLA issue identified for Camp Smith is the need for an updated, accurate inventory of maneuver trails and training area roads. Many of the potential training-related impacts at the installation have been associated with maneuver trails and roads, and various maintenance projects have been implemented over the years. Maneuver trail and road layers in the NYARNG GIS are not current and attribute data regarding the classification and status of each trail/road are not available. Without such information it is difficult to accurately identify and monitor the location of training-related impacts and LRAM priorities. Accurate information on classification of trails and roads is also required to determine appropriate funding mechanisms for land rehabilitation and maintenance projects. For example, restoration of maneuver trails falls under the ITAM Program, while maintenance of roads does not.

ITAM Objective #1 includes mapping all existing maneuver trails and roads at Camp Smith in the NYARNG GIS using GPS and digital aerial photography. Attribute data will also be collected for specific trail/road segments. The attribute database will include detailed information on trail/road classifications, physical descriptions, uses, and condition, as well as information on rehabilitation and maintenance activities that have taken place or are planned.

4.1.3.3 Training Requirements Integration Status and Issues

TRI provides a decision support procedure that integrates training requirements with management processes for land, training, and natural and cultural resources. TRI uses data derived from RTLA and Army Conservation Program components. TRI is intended to achieve the "training-environmental" balance and interface that is central to the ITAM Program.

The NYARNG POTO, FMO, Environmental Office, and training site representatives have traditionally worked together over the years to address all environmental issues at Camp Smith. As discussed in Section 3.3, the Natural Resources Planning Committee provides a forum for addressing such issues. This process will continue. The general TRI objectives for the NYARNG include the following:

- Integrate training requirements with training land management into a prioritized work plan, and execute requirements subject to availability of resources;
- Optimize training land management decisions by coordinating mission requirements and land maintenance activities with training land carrying capacity;
- Identify existing and projected training land resources and prioritized land use requirements; and
- Generate prioritized requirements for land rehabilitation, repair, and/or reconfiguration.

An important aspect of TRI is understanding specific requirements for training lands and facilities. Standard Army procedures for defining such requirements include the Range Facility Management Support System (RFMSS) and the RTLP Development Plan (RDP). RFMSS is a multi-user, PC-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. RFMSS was developed to optimize the scheduling, use, and operations and

maintenance functions for an installation's live-fire ranges, maneuver training areas, and other related training facilities and assets under AR 210-21. The RFMSS software is currently used at Camp Smith.

A RDP was be prepared for the NYARNG training sites in 2001, in accordance with Army Regulation 210-21. The RDP provides a view of the available training assets at Camp Smith, identify users, and establish the training requirements based on Army training doctrine and resource guidance. It establishes current requirements and utilization levels for available training assets, providing a near- and long-term project plan for training, public works, and environmental planners. The RDP identifies potential range and training facility shortfalls for the NYARNG and evaluate alternatives and priorities for addressing the shortfalls.

4.1.3.4 Land Rehabilitation and Maintenance Status and Issues

LRAM is any preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. LRAM procedures, such as redesigning and/or reconfiguring a training area to meet training requirements, mitigate the environmental effects of training and testing. Overall goals of the NYARNG LRAM Program include:

- Sustain long-term training on lands held under the stewardship of the NYARNG;
- Sustain the overall condition of installation lands to ensure long-term military viability of its installations;
- Apply best management practices (BMPs) for design and execution of LRAM to ensure that the rehabilitation, repair and maintenance results are commensurate with the applied resources; and
- Coordinate long-term land maintenance plans with other real property management programs on an installation.

Specific LRAM projects that are programmed for the next five years are specified in the NYARNG ITAM Work Plan, which is maintained in the Environmental Office and updated at least once per year.

It is anticipated that the LRAM projects will be designed and implemented by NYARNG Engineer Units during annual training (AT) or inactive duty training (IDT). However, there may be an instance where this is not feasible (e.g., overseas deployment of units) and the work must be contracted out. The Environmental Office will provide oversight in coordination with the FMO, POTO, Training Site Manager, unit commanders, and contractors. The FMO will provide design support and the Environmental Office will provide regulatory permitting support, if necessary.

4.1.4.5 Sustainable Range Awareness Status and Issues

SRA activities at Camp Smith were formally initiated in 1996 during preparation of the original INRMP. SRA information is conveyed to all Camp Smith users as part of briefings given at pre-camp conferences or other occasions. SRA briefings will continue to be given to military and non-military personnel training at the installation.

4.2 MANAGEMENT GOALS AND OBJECTIVES

Management goals, objectives, and projects for the NYARNG ITAM Program are outlined in this section. Implementation information is provided in Section 11.

ITAM Goal #1 – Achieve optimal sustained use of lands for the execution of realistic training, by providing a sustainable core capability, which balances usage, condition, and level of maintenance.

Objective #1 – Conduct RTLA inventory of heavily used training areas at Camp Smith to identify existing training related impacts and establish a long-term monitoring program.

1. Identify and map heavily used training areas (e.g., maneuver trails, roads, open areas, bivouac sites, command post sites) in the NYARNG GIS using GPS and digital aerial photography.
2. Collect detailed attribute data for trail/road segments including: classification, physical description, uses, and condition, as well as information on rehabilitation and maintenance activities that have taken place or are planned.

3. Define training area uses, as well as frequency and intensity of use, and incorporate information into a GIS attribute database.
4. Document existing natural resources and existing impacts.
5. Incorporate data into the NYARNG GIS and analyze data.
6. Prepare initial RTLA inventory report, including potential LRAM project sites, refined RTLA objectives, and long-term monitoring protocols.

Objective #2 – Implement routine, long-term RTLA monitoring program to identify land condition trends at Camp Smith.

1. Conduct routine RTLA monitoring annually.
2. Incorporate data into the NYARNG GIS and analyze data.
3. Prepare annual RTLA report, including potential LRAM project sites.

Objective #3 – Implement LRAM projects in accordance with ITAM Work Plan.

1. Prepare project-specific designs.
2. Coordinate and schedule project implementation.
3. Implement project.

SECTION 5

FISH AND WILDLIFE MANAGEMENT PROGRAM

5.1 INTRODUCTION AND PROGRAM OVERVIEW

5.1.1 Administrative Responsibilities and Requirements

The Environmental Office is primarily responsible for the Fish and Wildlife Management Program. The Natural Resources Manager coordinates planning and general administrative functions of the program with other NYARNG staff and the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC), as necessary. The Camp Smith Range Control Officer is responsible for specific elements of the program and NYSDEC provides natural resources law enforcement support. Management of fish and wildlife resources is directed by Army and NGB Policy, DoD Directive 4700.4, AR 200-3, and New York State Environmental Conservation Law.

5.1.2 Program Description

The Fish and Wildlife Management Program addresses game management, non-game management, nuisance wildlife management, habitat management, and fisheries management issues at Camp Smith. In accordance with the overall natural resources management approach of the NYARNG, fish and wildlife management focuses on protecting and enhancing biodiversity through ecosystem management. Biodiversity consists of all elements of the natural environment and ecosystem management is a process that encourages management decisions to focus on natural resources at a community or ecosystem level rather than at a single species level. By maintaining or improving the quality, integrity, and connectivity of the ecosystem, individual species should prosper. While species-specific management actions are implemented under the Fish and Wildlife Management Program, they are done so within the broader context of ecosystem management. It should be recognized that virtually every management program contributes to the management of fish and wildlife at the installation and that there is significant overlap with other programs. For example, rare species are a component of non-game management, but they are also addressed separately under the Rare

Species Management Program (Section 6). Therefore, this section includes several cross-references to other sections of the INRMP.

5.1.3 Program Status and Issues

5.1.3.1 Planning Level Surveys

The results of Planning Level Surveys conducted at Camp Smith provide important information to support development and implementation of the Fish and Wildlife Management Program. Surveys completed at the installation include ecological community surveys, terrestrial flora and fauna inventories, macroinvertebrate and fish surveys, wetland surveys, and rare species surveys. Information obtained during the surveys has been incorporated into the NYARNG GIS. In addition, surface water and soils data have been mapped in the NYARNG GIS. Specific descriptions of resources covered by these surveys are provided in Section 2 and the *Camp Smith Training Site Ecological Communities and Rare Species Survey Report* (Parsons ES 1996b), *Camp Smith Training Site Aquatic Resources Survey Report* (Parsons ES 1996a), *Avian Surveys at New York Army National Guard Installations* (Parsons 2003, 2005), *Camp Smith Training Site and Guilderland Local Training Area 2007 Indiana Bat Survey Report* (Woodlot Alternatives, Inc. 2007), and *Vegetation Communities Survey Camp Smith Training Site* (The Chazen Companies 2010).

5.1.3.2 White-tailed Deer Management

White-tailed deer are very common throughout New York and at Camp Smith. They are very adaptable and thrive in a variety of habitats, including those with high levels of human activity. Over the past 30 years, white-tailed deer populations have increased to unprecedented levels in many parts of their range. They have a high reproductive capacity that likely evolved to offset losses to predators such as wolves, cougars, and humans. When predation and other losses are low and food is plentiful, deer populations can double every two or three years. High deer populations cause concerns about impacts to native plant communities, wildlife habitat, deer-human interactions, and deer herd health. These concerns have been well studied and documented, and the need to manage them is well recognized (Wildlife Management Institute 1984).

Deer population numbers at Camp Smith are high due to availability of suitable habitat and the lack of predators and limited hunting (no hunting for any species had occurred at Camp Smith until 2008). Monthly deer surveys are conducted by the Natural Resources Manager using standard protocols to determine a relative population index for bucks (mature males), does (mature females), and antlerless deer (immatures). Current data indicates an increasing population. The most obvious evidence that the herd size has increased to a level that is causing undesirable effects is the presence of a clearly identifiable browse line in forested areas throughout the installation. The term browse line refers to an area where all suitable forage within the reach of deer has been eaten.

If the deer herd at Camp Smith is left unmanaged, these undesirable effects could escalate into long-term impacts to natural plant communities and possibly rare plant populations. Likewise, the availability of food and cover for other wildlife species would be affected. The physical condition of the deer would also decline as the population grows and food resources are depleted. This results in higher winter malnutrition losses and poorer fawn survival. Additional impacts that are associated with increasing white-tailed deer populations include increased deer/vehicle collisions and an increase in the incidence of Lyme disease. Estimates for the cost of deer-related vehicle accidents in New York State are $50 to $70 million per year (NYSDEC, unpublished report). Westchester County has one of the highest incidences of Lyme disease in the nation. Consequently, it is necessary for the NYARNG to implement deer management activities to attain and maintain an appropriate population level.

A variety of deer management options have been evaluated in New York and other states with increasing deer populations. DEC has evaluated the pros and cons of a variety of non-lethal (e.g., capture and relocation, habitat alteration, and fertility control) and lethal (e.g., predator introduction, shooting over bait, capture and kill, and traditional hunting) deer management options. They recommend controlled recreational hunting as the most suitable option for most management situations (NYSDEC 1999a). The NYARNG has also evaluated the full range of deer management options for Camp Smith and has selected controlled recreational hunting as the preferred option. Other options are not currently proposed because they were determined to be less effective and more costly than controlled recreational hunting. Furthermore, these alternatives do not provide the recreational benefits associated with hunting. A deer hunting program can provide multiple benefits. The value of the potential recreational hunting resource at Camp Smith is high because public hunting lands in Westchester County

are a very limited resource. As managers of public lands, it is NYARNG's responsibility to manage for multiple uses that do not interfere with the military mission.

Accordingly, controlled recreational hunting for white-tailed deer at Camp Smith was initiated during the 2008 hunting season. Long-term white-tailed deer management goals for Camp Smith include the following:

- Ensure the present and future well-being of white-tailed deer and their habitat;
- Maintain deer populations at levels necessary to ensure compatibility with mission land uses and natural ecological communities; and
- Provide high quality recreational activities that do not interfere with the military mission.

Specific management goals for the desired population size and harvest targets will be established for Camp Smith, in consultation with NYSDEC, based on relative population data collected through surveys and hunter harvest data. Relative population data will be collected by three methods: (1) ongoing monthly surveys using standard drive protocols, (2) hunter surveys, and (3) hunter harvest data. A copy of the hunter survey form is provided in Appendix D. Hunters are required to bring all harvested game to Range Control and to turn in a completed hunter survey prior to leaving Camp Smith. Currently, there are no plans for establishing an official game checking station at the installation due to limited staffing resources. Therefore, biological data collected from harvested deer will be limited to sex and number of antler points for bucks, as reported by the hunter on the survey form. Hunters are required to check harvested deer at a state game checking station in accordance with New York State law.

Survey data will be used to identify whether the deer population at Camp Smith is increasing, decreasing, or has stabilized. This information can then be used to establish harvest targets in consultation with NYSDEC. Coordination with NYSDEC will ensure that management activities at the installation are consistent with NYSDEC's Wildlife Management Unit (WMU) 3S, which is comprised entirely of Westchester County. NYSDEC's current objective for WMU 3S is to reduce the herd size based on the current liberal bag limits established. Currently, hunters can harvest multiple deer in WMU 3S through NYSDEC's Deer

Management Permit and Bonus Permit programs. Deer hunting in WMU 3S is limited to an archery-only season (October 1 through December 31 for the 2012 season) due to the high human population density throughout most of the county.

Installation-specific harvest targets will be reflected in the Camp Smith Hunting Rules (Appendix D), which will be updated annually. The long-term goal is to establish a Quality Deer Management program. Initially, management will focus on reducing the herd size by encouraging the harvest of does or antlerless deer. The first deer harvested by each hunter must be antlerless and only one mature buck (at least four points on one side) can be harvested per hunter. Hunting permits issued by the Environmental Office will specify the sex of deer that may be harvested.

Access to Camp Smith for hunting will be limited based on safety and military mission constraints. Individuals eligible to hunt include active or retired New York Army National Guard and New York Division of Military and Naval Affairs personnel and their immediate family members (spouse, parents, and children/grandchildren). Minors (less than 18 years old) must be accompanied by an adult at all times. Deer hunting is allowed in training areas 1 through 4.

The Natural Resources Manager within the Environmental Office has overall responsibility for administrative aspects of the controlled recreational hunting program at Camp Smith. All activities are coordinated with the Post Director and Range Control Officer. The Range Control Officer is responsible for day to day implementation of program activities at the installation and is responsible for ensuring that hunting activities do not conflict with military training. NYSDEC will provide natural resources law enforcement support. Specific information on program administration is provided in the Camp Smith Hunting Rules (Appendix D).

5.1.3.3 Wild Turkey Management

Wild turkeys are abundant at Camp Smith. Monthly turkey surveys are conducted by the Natural Resources Manager using standard protocols to determine a relative population index for gobblers (mature males), hens (mature females), and jakes (immature males). Current data indicates a stable or increasing population that can support controlled recreational hunting.

Westchester County currently has fall and spring turkey seasons, which allow the use of shotguns. Current Camp Smith Hunting Rules (Appendix D) establish a spring shotgun season for wild turkey. A fall shotgun season is not currently proposed for Camp Smith because it could conflict with the fall archery only deer season. However, archery hunters may take turkeys during the fall season in accordance with NYSDEC Hunting Regulations and Camp Smith Hunting Regulations.

5.1.3.4 Resident Canada Goose Management

Resident Canada geese (*Branta canadensis*) are currently the only wildlife species that is considered a nuisance at Camp Smith. Resident Canada goose populations have increased significantly over the last 30 years throughout the eastern United States and New York. Resident geese, as their name implies, spend most of their lives in one area, although some travel hundreds of miles to wintering areas. As shown by banding studies, resident geese are distinct from migratory populations that breed in northern Canada. Most resident geese in New York State are likely descendants of captive birds released by private individuals or game farm geese that were released by the State Conservation Department on wildlife management areas in upstate New York during the 1950s and 1960s. Local flocks quickly became established because released birds lacked the natural migratory imprint of wild migratory geese. Resident birds are long-lived and have a relatively high reproductive capacity, especially in suburban settings, allowing flocks to grow rapidly and spread to other areas. In suburban areas throughout New York State, abundant suitable habitat, lack of natural predators, limited hunting, and supplemental feeding have created an explosion in resident goose numbers. By the mid 1990s resident goose nesting was documented throughout New York State and the estimated number of breeding geese doubled between 1989 and 1998 (NYSDEC and USDA 1999).

While Canada geese are a valuable natural resource enjoyed by many, the recent population increases of resident birds have caused significant problems. General problems have been well documented by various federal and state natural resources management agencies and include: over-grazing of lawns and natural vegetation, accumulations of droppings and feathers in public areas (a goose produces a pound of droppings per day), nutrient loading to ponds, public health concerns, aggressive behavior by nesting birds, and safety hazards near roads and airports (NYSDEC and USDA 1999).

Prior to implementation of the hunting program and other management practices at Camp Smith, large numbers of geese congregated in and around the cantonment area, especially in the immediate vicinity of Dickiebusch Lake and the helicopter landing pad. The Environmental Office has conducted goose monitoring at the installation since 1994. Historically, the goose population at Camp Smith ranged from 165 to 240 individuals during peak months (summer/fall) and from 40 to 50 individuals during off-peak months. As many as 301 birds have been documented at the installation during a single count. Resident Canada geese are considered a nuisance at the installation and warrant active management based on the following reasons:

- Resident Canada geese negatively impact mission activities and create a significant bird-aircraft strike hazard (BASH) by congregating in the immediate vicinity of the helicopter landing pad. This increases the potential for loss of life and property. Fortunately, no bird-aircraft strikes have occurred at Camp Smith and no near misses have been reported to date. However, it is NYARNG's policy to minimize all aviation risks.
- Geese congregate on and around the small arms ranges at the installation and create a potential distraction and safety hazard for personnel training on the ranges.
- The majority of the maintained open areas at the installation are littered with goose fecal matter (approximately 590 acres), which can degrade water quality and increase the potential for transmission of human and avian diseases.

In 2008, resident Canada goose management at Camp Smith was expanded to include recreational hunting in accordance with NYSDEC regulations. Hunting has helped to reduce the population and has conditioned the geese to be less tolerant of human presence and weapons firing noise on the small arms ranges. Geese are now more responsive to harassment efforts and when geese near an active range hear firing they fly away. Establishment of an acceptable population level for resident Canada geese at Camp Smith is primarily based on BASH concerns. Currently, the long-term goal is to reduce the population to no more than 25 birds observed during monthly counts. This number will continue to be evaluated based on monitoring and consultation with NYARNG aviation safety personnel. Resident Canada goose management actions at Camp Smith will continue to include the following options:

- Frightening/harassment – The primary means include the use of a laser device specifically designed for frightening geese and distress calls. The laser technique is most effective at night or in low-light conditions. Alternative techniques such as use of vehicles (all terrain vehicles) and firing blank ammunition will be used as necessary to supplement the laser devices and distress calls.

- Egg addling – This measure involves treating eggs to prevent hatching by shaking or puncturing and will be used to as a means of reducing recruitment. Required permits will be obtained from NYSDEC.

- Recreational hunting – Controlled recreational hunting will be used as a management measure during the New York State Canada goose seasons established for WMU 3S, which allows hunters to harvest five to eight birds per day during the 2012-2013 seasons. Hunting would be in accordance with the Camp Smith Hunting Rules and NYSDEC regulations. Most geese congregate in the cantonment area and near the small arms ranges, which presents unique safety and mission concerns. In addition to the standard Camp Smith Hunting Rules (Appendix D), the following special restrictions apply to ensure that the controlled hunting is conducted safely and does not interfere with the mission: (1) hunting is limited to selected Camp Smith employees as determined by Post Director; (2) hunting is limited to the Range 2 and 3 footprints, firing only within the approved safety fans; (3) no more than two hunters at a time are allowed on the ranges.

Monthly goose monitoring will continue to be conducted to measure the goose population and track the effectiveness of management practices. Nesting surveys will also be conducted during the nesting season (typically March through June). An adaptive resident Canada goose management approach will be used based on the effectiveness of ongoing management practices. If the measures outlined above are not effective, alternative actions will be considered including live capture and humane euthanasia.

Live capture and humane euthanasia is an effective management practice to reduce populations of resident Canada geese when non-lethal methods or hunting are not effective. This method is controversial and can draw media and public interest. General procedures for this management practice include the following:

- Adult geese are captured during their annual feather molt, when they are flightless (typically late June and early July) using "drive-trapping" techniques.
- Trapping should only be conducted on overcast days and/or in the early mornings to keep geese from becoming overly stressed due to warm temperatures.
- Once live-captured, resident geese are placed in properly ventilated transport crates and transported to a certified processor.
- The processor will euthanize the geese in accordance with American Veterinary Medical Association methods and any applicable federal or state policies.
- Meat is processed by a state or USDA licensed meat processor that has agreed in advance to process the birds according to specific guidelines.
- The processed meat is donated to a charitable organization for use as food.

5.1.3.5 Non-Game and Habitat Management

Management of non-game species, or non-harvested wildlife, at Camp Smith is integrated with the overall ecosystem management approach contained in this INRMP. The focus is on resource monitoring, resource protection, biodiversity, habitat management, and overall ecosystem health, rather than management for a particular species or group of animals. The majority of management practices implemented under the INRMP will directly or indirectly benefit non-game species.

Wildlife habitat management activities at Camp Smith focus on protecting and enhancing a diversity of natural ecological communities. Specific wildlife habitat management and protection measures are addressed in various resource management programs, particularly ITAM (Section 4), Wetlands Management (Section 8), Forest Management (Section 9), and Invasive Species (Section 10). To the extent possible, the NYARNG protects wildlife habitat through the following management practices:

- Avoid impacts to rare species and their habitats;
- Ensure no net loss of wetlands and minimize training impacts in wetland areas;
- Implement sediment and erosion practices and Best Management Practices (BMPs);

- Implement forest management practices that enhance wildlife habitat;
- Protect riparian forest buffers;
- Control the spread of invasive plants; and
- Implementation of stream bank, shoreline, and upland erosion control measures, when necessary.

5.1.3.6 Fisheries Management

Recreational fisheries resources at Camp Smith include Broccy Creek Reservoir and Dickiebusch Lake. Fishing is authorized on these impoundments in accordance with the Camp Smith Fishing Rules (Appendix E) and NYSDEC regulations.

The impoundments have been stocked in the past with species such as largemouth bass, bluegill, and golden shiner. Most recently, Broccy Creek Reservoir was stocked with bass and golden shiners in 1987, after completion of the new dam. Dickiebusch Lake also contains chain pickerel. Fish surveys were conducted at Camp Smith in 1987 and 1996 (Parsons ES 1996a). Both impoundments contain healthy and relatively balanced populations of bass and sunfish that are capable of providing fair to good angling. Fishing pressure is light on both impoundments. Use of Broccy Creek Reservoir is limited by its remote location and use of Dickiebusch Lake is limited by training and range schedules.

NYSDEC seasons and creel limits apply to all waters at Camp Smith. Currently, the only planned fisheries management activities include implementation of the Camp Smith Fishing Rules (see Appendix E).

5.2 MANAGEMENT GOALS AND OBJECTIVES

Management goals, objectives, and projects for the NYARNG Fish and Wildlife Program are outlined in this section. Implementation information is provided in Section 11.

Fish and Wildlife Goal #1 – Maintain deer population at levels necessary to ensure compatibility with mission land uses and natural ecological communities.

Objective #1 – Collect deer population data and establish harvest targets.

1. Conduct monthly white-tailed deer surveys to develop a relative population index.
2. Collect hunter survey and harvest data.
3. Compile and analyzed data, prepare annual summary report, and update Camp Smith Hunting Rules annually.
4. Share data and consult with NYSDEC regarding management issues, as necessary, to establish harvest targets.

Objective #2 – Implement hunting program to manage deer population and achieve harvest targets.

1. Review and update Camp Smith Hunting Rules annually and submit for approval by 1 March.
2. Announce and advertise approved Camp Smith Hunting Rules by 1 April annually.
3. Announce and advertise dates, times, and locations of Camp Smith Hunting briefings by 1 August and 1 April annually.
4. Conduct Camp Smith Hunting briefings annually.
5. Process and issue Camp Smith Hunting Permits.

Fish and Wildlife Goal #2 – Maintain resident Canada goose population below 25 birds observed during monthly counts to ensure aviation safety.

Objective #1 – Collect resident Canada goose population data and establish harvest targets.

1. Conduct monthly Canada goose surveys to determine specific population numbers.
2. Conduct weekly Canada goose nesting surveys from March through June, annually.
3. Collect hunter survey and harvest data.

4. Compile and analyzed data, and prepare annual summary report.

Objective #2 – Implement management activities for resident Canada geese.

1. Use frightening/harassment techniques or other acceptable methods to deter resident Canada geese from using Camp Smith.
2. Conduct egg addling during the nesting season and in accordance with applicable regulations/permits.
3. Implement controlled, recreational hunting program for resident Canada geese.
4. Prepare annual resident Canada goose management status report, evaluate success of management activities, and consider alternative management actions, as necessary.

SECTION 6

RARE SPECIES MANAGEMENT PROGRAM

6.1 INTRODUCTION AND PROGRAM OVERVIEW

6.1.1 Administrative Responsibilities and Requirements

The Rare Species Management Program is primarily the responsibility of the Environmental Office, which conducts and oversees species surveys, monitoring, and GIS mapping. This program is integrated with the ITAM, real property master planning, and Range and Training Land Program processes through continuous coordination with the Facilities Management and Engineering Office, POTO, and Camp Smith Training Site staff. When necessary, the Environmental Office coordinates rare species management activities with federal and state agencies such as the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC).

The program ensures compliance with the Endangered Species Act of 1973 (Public Law 93-205) and the New York State Environmental Conservation Law. The Endangered Species Act applies to federal endangered and federal threatened species. Consultation with the USFWS is required for any action that may affect federally listed species.

Part 193.3 of the New York State Environmental Conservation Law establishes lists of protected native plants, which are designated as endangered, threatened, rare, and exploitably vulnerable. In addition, all native clubmosses, all native orchids, and most native ferns are protected native plants under Part 193.3. It is illegal to pick, pluck, sever, remove, damage by the application of herbicides or defoliants, or carry away, without the consent of the owner, any protected plant. The New York Natural Heritage Program also maintains the New York Rare Plant Status List, which includes all plants that the Heritage Program actively inventories. A "watch list" is also maintained for taxa that are considered rare, uncommon, or declining in numbers. Additional information or monitoring is required for watch list species to decide if they should be actively inventoried or listed.

Part 182 of the Environmental Conservation Law establishes lists of endangered and threatened species of fish and wildlife, as well as species of special concern. It is illegal to take, import, transport, possess, or sell any endangered or threatened species. Species of special concern warrant attention and consideration but current information does not justify listing these species as either endangered or threatened. Special concern species are not afforded the legal protection provided to endangered and threatened species. The New York State Environmental Quality Review (SEQR) Act requires consideration of impacts to protected native plants and endangered and threatened fish and wildlife for actions on state owned land.

6.1.2 Program Description

For the purposes of this INRMP, the term "rare species" is used to refer to various plants and animals that are protected by law or warrant special management consideration. Rare species include the following:

- Species listed as endangered or threatened by the USFWS under the Endangered Species Act, and species proposed for such listing;
- Plant species listed as protected native plants (endangered, threatened, rare, and exploitably vulnerable) by NYSDEC;
- Fish and wildlife species listed as endangered, threatened, and special concern by NYSDEC; and
- Species that are actively inventoried by NYSDEC or are on the NYSDEC watch list.

The focus of the Rare Species Management Program at Camp Smith is to maintain updated information about the presence of rare species at the installation and to avoid potential impacts to rare species through appropriate planning. The program is applicable to the entire installation and interacts with all of the other natural resources management programs. Information on the location of rare species and their habitat has been incorporated into the NYARNG GIS and is used to help define areas of high protection priority. This information allows Camp Smith to integrate rare species management into its ITAM, real property master planning, Range and Training Land Program, and Range Development Plan processes.

6.1.3 Program Status and Issues

6.1.3.1 Overview

A rare species evaluation and survey was conducted at Camp Smith in 1996 and the findings are presented in the *Camp Smith Training Site Ecological Community and Rare Species Survey Report* (Parsons ES 1996a). In addition, avian surveys were conducted in 2003 and 2005 (Parsons 2003, 2005) and bat surveys were conducted in 2007 (Woodlot Alternatives, Inc. 2007). Incidental observations of rare species have also been recorded at Camp Smith.

A total of 14 species that are currently considered rare have been documented at the installation and five additional rare species potentially occur in the area (Table 6.1). No federally listed species have been documented on Camp Smith, but the shortnose sturgeon and Atlantic sturgeon (federally listed as endangered) occur near the installation in the Hudson River. Species found at Camp Smith that were once considered state rare species, but are no longer considered rare include: hirsute sedge (*Carex complanata*, former status of rare), sedge (*Carex argyrantha*, former watch list species), dittany (*Cunila origanoides*, former watch list species), and five-lined skink (*Eumeces fasciatus*, former watch list species).

As discussed in Section 2, the primary concentration of rare species is in the western third of the installation. However, many of the rare wildlife species have potential to occur throughout the installation. Consequently, impacts to rare species are evaluated early in the planning process for all new actions. Currently, most training in the western third of the installation is limited to infrequent dismounted maneuvers, which have a relatively low potential for impact. The Greenway trail, which is open to the public, is also located in the western portion of the installation. Therefore, the Rare Species Management Program also addresses issues related to public use. The New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) has a 100-foot wide right-of-way easement for the trail and is responsible for trail management. As discussed below, rare species management activities are coordinated with OPRHP, as necessary. Species-specific management issues are discussed in the following subsections.

TABLE 6.1

RARE SPECIES POTENTIALLY OCCURING AT OR NEAR CAMP SMITH

Common Name	Scientific Name	Federal Status	State Status	Documented at Camp Smith
Birds				
Bald eagle	*Haliaeetus leucocephalus*	None[(1)]	T	Yes
Cooper's hawk	*Accipter cooperii*	None	SC	Yes
Peregrine falcon	*Falco peregrinus*	None[(2)]	E	No[(3)]
Sharp-shinned hawk	*Accipter striatus*	None	SC	Yes
Fish				
Atlantic sturgeon	*Acipenser oxyrinchus*	E	None	No[(4)]
Shortnose sturgeon	*Acipenser brevirostrum*	E	E	No[(4)]
Mammals				
Indiana bat	*Myotis sodalis*	E	E	No[(5)]
Small-footed bat	*Myotis leibii*	None	SC	Yes
Plants				
Flowering dogwood	*Cornus florida*	None	V	Yes
Mountain laurel	*Kalmia latifolia*	None	V	Yes
Spongy arrowhead	*Sagittaria calycina* var *spongiosa*	None	T	Yes
Weak stellate sedge	*Carex seorsa*	None	T	Yes
Yellow harlequin	*Corydalis flavula*	None	WL, U	Yes
Reptiles				
Bog turtle	*Clemmys muhlenbergii*	T	E	No[(6)]
Eastern box turtle	*Terrapene c. carolina*	None	SC	Yes
Fence lizard	*Sceloporus undulatus*	None	T	Yes
Spotted turtle	*Clemmys guttata*	None	SC	Yes
Timber rattlesnake	*Crotalus horridus*	None	T	Yes
Wood turtle	*Clemmys insculpta*	None	SC	Yes

Status Codes: E = endangered, T = threatened, SC = species of special concern, WL = watch list, U = unprotected, V = exploitably vulnerable.

[(1)]Delisted by USFWS in 2007.

[(1)]Delisted by USFWS in 1999.

[(3)]Peregrine falcons have been documented nesting northwest of Camp Smith along the Hudson River.

[(4)]Atlantic and shortnose sturgeon inhabit the Hudson River near Camp Smith.

[(5)]An Indiana bat roost site has been documented within 16 miles of Camp Smith (Robyn Niver, USFWS, personal communication, July 20, 2006).

[(6)]A historic bog turtle site has been documented within four miles of Camp Smith (Robyn Niver, USFWS, personal communication, July 20, 2006).

6.1.3.2 Rare Plant Management

Of the five rare plants found at the installation, two species, spongy arrowhead and weak stellate sedge are listed as state threatened, which indicates that they are likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges in the state. A healthy population of spongy arrowhead occurs in the Camp Smith tidal marsh near the confluence of Dickiebush Creek and Annsville Creek. Approximately 50 to 100 plants were observed during surveys conducted in 1996 and the documented habitat for this species has been mapped in the NYARNG GIS. No training occurs in or near the plant's habitat and the marsh has been identified as an area with a high protection priority. Annual monitoring is conducted during the flowering season to determine the relative number of plants and any changes to the habitat. Portions of the marsh are dominated by the common reed (*Phragmites australis*), a native plant that can be invasive. Further expansion of *Phragmites* within the marsh could potentially effect the spongy arrowhead population. Potential effects of *Phragmites* on the spongy arrowhead population will continue to be monitored annually. Currently, no *Phragmites* controls are proposed primarily due to potential negative impacts that might be associated with such controls.

The weak stellate sedge was identified at Camp Smith during surveys conducted in 1996. At that time, this species was not listed as state threatened; therefore, locations of its occurrence were not mapped and populations were not estimated. The survey report indicates that this species is associated with freshwater wetland (palustrine) communities (Parsons ES 1996a). Wetlands at Camp Smith have been mapped and have a high protection priority. Therefore, current and future activities are not likely to affect this species.

The flowering dogwood and mountain laurel are listed as exploitably vulnerable plants in New York. Such listing indicates that these species are in danger of exploitation, but are not necessarily uncommon. Both flowering dogwood and mountain laurel are common in forested portions of the installation, and no specific management actions are necessary for these species at this time. However, potential effects to these species will be evaluated for future actions.

Yellow harlequin is on the Heritage Program's watch list, but are not currently listed as protected native plants under the Environmental Conservation Law. Yellow harlequin was documented in 1996 on a western facing mid-slope at Anthony's Nose. Approximately 100+ individual plants were observed and the population appeared stable. Documented and potential

habitat for this species has been mapped in the NYARNG GIS. This species has been observed in proximity to the Greenway trail.

The status of three plants that occur at Camp Smith changed after they were first documented at Camp Smith. Hirsute sedge (*Carex complanata*) was previously listed as rare and *Carex argyrantha* (no common name) and dittany (*Cunila origanoides*) were previously on the watch list. These species are no longer tracked by the Natural Heritage Program and no longer considered rare species. Consequently, they will no longer be managed as rare species at Camp Smith.

6.1.3.3 Rare Animal Management

Bald Eagle

Of the nine rare animal species documented at the installation, three species, the bald eagle, fence lizard, and timber rattlesnake are listed as state threatened. Formerly listed under the Endangered Species Act, the bald eagle was delisted in 2007, but remains federally protected under the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act. Both laws prohibit killing, selling or otherwise harming eagles, their nests, or eggs. Specifically, the Eagle Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act defines "take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Numerous bald eagles winter along the Hudson River in the general vicinity of Camp Smith. Iona Island, which is directly across the Hudson River from the installation, is recognized as an important wintering site. In addition, bald eagles have successfully nested along various parts of the Hudson River since 1997 (Nye 2007). The number of successful

nesting pairs along the Hudson River increased from 1 in 1997 to 30 in 2006. In 2007, 19 successful nests were documented (Nye 2007).

Since about 2005, bald eagles have occasionally been observed flying over the installation or perching in a trees north of Building 508 during daylight hours. However, no nesting activity had been observed at or adjacent to the installation until Camp Smith personnel identified an active bald eagle nest adjacent to the installation in 2008. Camp Smith personnel contacted NYSDEC to report the nest and implemented management actions to ensure the nest was not disturbed. The nesting pair successfully fledged one young, a female, which was banded by NYSDEC personnel. Once a pair selects a nesting territory, they use it the rest of their lives. Therefore, bald eagles are expected to nest near and possibly on Camp Smith in the future.

The nest is located on a relatively steep, forested slope above Route 9 and Annsville Creek near the eastern boundary of Camp Smith. The portion of the installation adjacent to the nest site is undeveloped and is not normally used for training or other activities, and no roads or trails are located in the immediate vicinity of the nest. A trail that is suitable for four-wheel drive vehicle use is located about 450 feet east of the nest, but it is seldom used. The nest is not visible from developed portions of the installation, but is within about 300 to 400 feet of Route 9 and associated development along the road. Based on the nest location and existing and anticipated installation land uses, conflicts between bald eagle nesting and installation activities are not anticipated. In addition, it appears that the nesting birds may be tolerant of any human disturbance associated with traffic or other activities along Route 9 based on the nesting success observed in 2008.

The following bald eagle protection measures, which are based on the National Bald Eagle Management Guidelines (USFWS 2007), will be implemented to avoid human disturbance at the nesting site and to help ensure compliance with the Eagle Act and MBTA:

- A 330-foot protective buffer will be established around the nest during the breeding season (December through August). Human entry in this buffer is not authorized during the breeding season unless it is required for emergency response.
- Helicopters will not be operated within 1,000 feet of the nest unless it is required for emergency response.

- Vegetation will not be cut or cleared within 330 feet of the nest at any time.
- The effects of any future changes in land use at Camp Smith on the nesting site will be evaluated in accordance with the Army National Guard National Environmental Policy Act process.

The NYARNG will continue to monitor the installation for bald eagle nesting activity. Any observed nesting activity will be immediately reported to NYSDEC and NYARNG will continue to provide access to the installation for NYSDEC management efforts such as nest monitoring and banding. It is likely that the pair will return to the same nest site in future years. They could also establish alternative nest sites in the same general area. As the resident bald eagle population along the Lower Hudson River continues to expand, it is possible that additional pairs could establish nesting territories on Camp Smith. Any new nesting sites would be protected in accordance with the National Bald Eagle Management Guidelines (USFWS 2007).

Fence Lizard

Fence lizards have been sighted in various locations at Camp Smith including near the peak of Anthony's Nose, near Dickiebush Lake, and in the main cantonment area. The NYSDEC Endangered Species Unit has indicated that Camp Smith might provide some of the best fence lizard habitat in the state (Parsons ES 1996a). This species utilizes a variety of habitats including most ecological communities found at the installation. Therefore, this species is likely to be found throughout the installation. Cliff, rocky summit grassland, acidic talus slope, and pitch pine-oak-heath rocky summit communities along Anthony's Nose and Manitou Mountain are likely the best habitat for the fence lizard. Very limited dismounted maneuver training occurs in these areas and the steep terrain limits potential future development. Therefore, the potential for impacts is minimal. Due to the widespread distribution of this species at Camp Smith, potential effects to the fence lizard will be considered for all future actions.

Timber Rattle Snake

Sightings of timber rattlesnakes at Camp Smith have been limited to three locations in the western third of the installation. The first sighting (August 1994) was in cliff community

west of Route 6/202, the second sighting (August 1995) was southwest of Broccy Creek Reservoir, and the third sighting (June 2008) was in Training Area 3 (unnamed hill). Suitable habitat for this species ranges from Manitou Mountain and Anthony's Nose, west to the installation boundary. Areas with the highest potential for timber rattlesnakes include communities with talus and cliff, and a southeastern aspect. Similar to the fence lizard, the potential for impacts to timber rattlesnake habitat is low due to the remote rugged terrain. This species is most vulnerable to disturbance in spring and fall as it emerges or enters into hibernation. Gravid females, in particular, are most vulnerable because they stay near their den sites in the summer to give birth. The need for detailed surveys for this species and its den sites will be evaluated in consultation with NYSDEC for any proposed actions in potential habitat.

Species of Special Concern

The remaining six rare animals documented at Camp Smith (Cooper's hawk, sharp-shinned hawk, small-footed bat, eastern box turtle, spotted turtle, and wood turtle) are all listed as species of special concern. Such listing warrants attention and consideration for these species. However, species of special concern are not afforded the legal protection provided to endangered or threatened species. Documented locations and habitat preferences for these species are provided in the survey reports (Parsons ES 1996a; Parsons 2003, 2005; Woodlot Alternatives, Inc. 2007). Potential habitat for these species is widespread; therefore, potential effects of future actions will be considered.

The five-lined skink (*Eumeces fasciatus*), which was once considered a watch list species, has also been documented at several locations throughout the installation. This species is not currently listed as endangered, threatened, or special concern. Therefore, this species is not managed as a rare species at Camp Smith. However, incidental observations of this species will continue to be documented.

Atlantic Sturgeon

The New York Bight distinct population segment of the Atlantic sturgeon was listed by the National Marine Fisheries Service in 2012. Currently, critical habitat has not been designated for this species and this species is not listed by New York State. Known spawning populations exist in the Hudson and Delaware rivers within the distinct population segment.

The existing spawning population in the Hudson River is estimated to have 870 adults spawning each year (600 males and 270 females). The spawning population of this distinct population segment is thought to be one to two orders of magnitude below historical levels (NMFS 2012). Atlantic sturgeon are anadramous, spawning in freshwater, but spending most of their adult life in the marine environment. Spawning adults generally migrate upriver in April-May in mid-Atlantic systems (Atlantic Sturgeon Status Review Team 2007). Current and future activities at Camp Smith have little potential to affect the Atlantic sturgeon and its habitat.

Shortnose Sturgeon

The shortnose sturgeon is listed by the National Marine Fisheries Service and NYSDEC as endangered. Currently, critical habitat has not been designated for this species (USFWS 2001). In New York State, the shortnose sturgeon is found in the lower portion of the Hudson River from the southern tip of Manhattan upriver to the federal dam at Troy (river mile 152). This anadramous species migrates from saltwater to spawn in freshwater. In the Hudson River, it spawns from April-May. Adult sturgeon migrate upriver from their mid-Hudson overwintering areas to freshwater spawning sites, which are well upstream of Camp Smith, north of Coxsackie, New York. Riverwide population estimates in the 1990s showed the spawning population has increased substantially from that observed in the 1970s (NYSDEC 1999b). Current and future activities at Camp Smith have little potential to affect the shortnose sturgeon and its habitat.

Peregrine Falcon

The peregrine falcon is listed by NYSDEC as endangered. The USFWS delisted this species in August 1999. A record of 44 territorial peregrine falcon pairs was recorded in New York State in 2000 (NYSDEC 2000). The current breeding range in New York includes most of the lower Hudson Valley and nesting has been documented immediately northwest of Camp Smith. Most nesting sites in the Hudson Valley are located on bridges over the Hudson or on high cliffs.

Given the recently observed increases in nesting activity in the Hudson Valley, peregrine falcon abundance in the vicinity of Camp Smith is expected to increase in the future.

While peregrine falcon nesting is not expected on the installation, potentially suitable nesting sites might be present near the western boundary of the installation on lands that were transferred to NYSDEC OPRHP. Potential nesting areas include cliff communities and talus slopes along the western slope of Anthony's Nose. Camp Smith activities are not expected to affect future nesting because limited training occurs in this area and potential for future development is constrained by the steep slopes.

Indiana Bat

The Indiana bat is federally listed as endangered. Critical habitat has not been designated for this species in New York. An Indiana bat roost site has been documented within 16 miles of Camp Smith, which is the closest known occurrence of this species (Robyn Niver, USFWS, personal communication, July 20, 2006). Potentially suitable roosting habitat might exist for this species at Camp Smith. Therefore, surveys were conducted in 2007 at Camp Smith to determine the potential presence of this species. USFWS guidelines for Indiana bat mist-netting surveys were used. No Indiana bats were captured during the surveys, suggesting that this species is not currently using the installation for roosting. The survey report indicated that Camp Smith contains a minimal amount of appropriate habitat for Indiana bat maternity roosts (Woodlot Alternatives, Inc. 2007). Despite the lack of optimal habitat, it is still possible that the training lands could provide habitat for Indiana bats. As such, it is recommended that additional surveys be programmed approximately every 10 years.

Bog Turtle

The bog turtle is federally listed as threatened. Critical habitat has not been designated for this species. A historic bog turtle site is located within 4 miles of Camp Smith, which is the closest documented occurrence of this species (Robyn Niver, USFWS, personal communication, July 20, 2006). Surveys have not yet been conducted a Camp Smith to determine the presence or probable absence of the bog turtle. Potentially suitable bog turtle habitat at Camp Smith is limited to emergent wetlands along the northern fringes of Broccy Creek Reservoir in the northwestern part of the training area. Based on the remote location of this potentially suitable habitat, it is not likely to be affected by training or other installation activities. Rare Species Objective #2 has been established to conduct bog turtle surveys in accordance with USFWS guidelines (Appendix F) during spring 2014. Surveys will be

conducted by a professional herpetologist that is recognized by the USFWS as a qualified bog turtle surveyor.

6.2 MANAGEMENT GOALS AND OBJECTIVES

Management goals, objectives, and projects for the NYARNG Rare Species Management Program are outlined in this section. Implementation information is provided in Section 11.

Rare Species Goal #1 – Avoid impacts to rare species and their habitat by maintaining accurate, updated information on the presence of rare species and integrating this information into installation planning processes.

Objective #1 – Continue to conduct routine monitoring for rare species at Camp Smith.

1. Document incidental sightings of rare animals that are made during the course of other natural resources management activities at Camp Smith.
2. Conduct monthly bald eagle surveys in areas of known and potential nesting habitat from December through April annually.
3. Conduct annual qualitative monitoring of spongy arrowhead relative abundance in the Camp Smith tidal marsh.
4. Prepare annual rare species survey status report and update GIS, as necessary.

Objective #2 – Conducted bog turtle surveys in areas of potentially suitable habitat in accordance with USFWS guidelines.

1. Conduct surveys in spring of 2014.
2. Prepare survey report, update GIS, and share data with USFWS and NYSDEC. Develop species-specific management actions, as necessary.

SECTION 7

OUTDOOR RECREATION PROGRAM

7.1 INTRODUCTION AND PROGRAM OVERVIEW

7.1.1 Administrative Responsibilities and Requirements

The Outdoor Recreation Program is primarily the responsibility of the Environmental Management Office and Camp Smith Range Control. The Environmental Office coordinates administrative aspects of the hunting program with NYSDEC and Greenway Trail issues with OPRHP. Natural resources law enforcement responsibilities are handled by NYSDEC. Certain outdoor recreation activities, such as fishing and hunting, are conducted in compliance with state regulations.

7.1.2 Program Description

The Outdoor Recreation Program addresses consumptive and non-consumptive natural resources-based recreation at the installation. Since the program emphasizes natural resources-based outdoor activities, outdoor sports such as basketball, baseball, tennis, and golf are not addressed. Camp Smith and the surrounding region provide many recreational opportunities including fishing, hunting, hiking, and wildlife viewing. The focus of the Outdoor Recreation Program is to allow maximum use of Camp Smith for natural resources-based activities in a manner that does not interfere with mission activities. Increasing outdoor recreation opportunities provides quality of life benefits to military personnel and their families, which ultimately supports military recruiting objectives. In addition, participation in these activities tends to increase natural resources awareness and foster good stewardship of the land.

7.1.3 Program Status and Issues

7.1.3.1 Access for Outdoor Recreation

Public access to the installation for natural resources-based outdoor recreation is allowed to the extent that:

- The use is not inconsistent with the needs of fish and wildlife resources; and
- The use is subject to requirements necessary to ensure safety and military security.

Access to Camp Smith for outdoor recreation must be strictly controlled and limited due to safety issues associated with the small arms ranges and to ensure that recreational activities do not interfere with the military mission. The installation is generally closed to public entry, except for the Greenway Trail, which is open to the general public. Public access can also be arranged for organized groups to participate in special events on a case-by-case basis. Military and civilian DMNA personnel and their families are permitted access to the installation for outdoor recreation, with restrictions discussed below.

7.1.3.2 Hudson River Greenway Trail

A leg of the Hudson River Greenway Trail runs through the western portion of Camp Smith. The trail starts at the Bear Mountain Bridge Toll House and runs approximately 1.9 miles to Anthony's Nose, where it connects with the Appalachian Trail, just north of the installation boundary (Figure 2-2). The trail, which is open to the general public, was established in cooperation with the OPRHP and the Greenway Conservancy for the Hudson River Valley, Inc. The Greenway Conservancy is helping communities and trail groups throughout the Hudson Valley establish a system of trails that links cultural and historic sites, parks, and open spaces. The DMNA has granted a 100-foot wide trail easement to the OPRHP, which is responsible for maintenance of the trail.

The trail offers opportunities for wildlife viewing and several scenic views of the Hudson Valley. As discussed in Section 6, the trail passes through documented rare plant habitat and potential rare animal habitat.

7.1.3.3 Fishing

Recreational fisheries resources at Camp Smith include Broccy Creek Reservoir and Dickiebusch Lake. Fishing is authorized on these impoundments in accordance with the Camp Smith Fishing Rules (Appendix E) and NYSDEC regulations. Additional information about fisheries management is provided in Section 5.

7.1.3.3 Hunting

Historically, Camp Smith has not been open to hunting. However, a controlled recreational hunting program for white-tailed deer, wild turkey, and resident Canada geese was started in 2008 under the Fish and Wildlife Management Program (Section 5). Access to Camp Smith for hunting is limited based on safety and military mission constraints. Additional information about the hunting program is provided in Section 5 and in the Camp Smith Hunting Rules (Appendix D).

7.2 MANAGEMENT GOALS AND OBJECTIVES

The overall program goal is to enhance the quality of life for the NYARNG community by allowing for maximum natural resources-based recreational use of Camp Smith in a manner that does not interfere with the military mission. Management criteria for the program include the following:

- Ensure that outdoor recreation does not interfere with the military mission;
- Optimize the number of safe outdoor recreational opportunities for the NYARNG; and
- Promote the sustainable use of existing resources, thereby minimizing inherent disturbances to the natural environment.

Specific objectives and projects for development and implementation of the hunting program are included under the Fish and Wildlife Management Program (Section 5).

SECTION 8

WETLANDS MANAGEMENT PROGRAM

8.1 INTRODUCTION AND PROGRAM OVERVIEW

8.1.1 Administrative Responsibilities and Requirements

The Wetlands Management Program is primarily the responsibility of the Environmental Office, which conducts and oversees wetland surveys, delineations, and GIS mapping. This program is integrated with the ITAM, real property master planning, Range and Training Land Program, and Range Development Plan processes through continuous coordination with the Facilities Management and Engineering Office, POTO, and Training Site staff. In addition, individual training site users are responsible for ensuring that their activities do not impact wetlands. When necessary, the Environmental Office coordinates wetland permitting and management activities with federal and state agencies such as the U. S. Army Corps of Engineers (COE) and NYSDEC.

Wetland areas at Camp Smith are regulated as Waters of the United States under Section 404 of the Clean Water Act (CWA), Executive Order (EO) 11990 – *Wetland Protection*, and EO 11988 – *Floodplain Protection*. The COE regulates dredging, discharges of dredged or fill material, and the construction of certain structures in waterways and wetlands, and issues permits through a Joint Permit Application procedure. Information about permitting procedures and application forms can be obtained from the COE New York District's web page (http://www.nan.usace.army.mil/business/buslinks/regulat/).

Wetlands in New York State are also regulated by NYSDEC under the Freshwater Wetlands Act (Article 24 of the Environmental Conservation Law) and the Tidal Wetlands Act (Article 25 of the Environmental Conservation Law). The Freshwater Wetlands Act regulates wetland areas that have been mapped by NYSDEC in accordance with the Act and are 12.4 acres or larger. Wetlands at Camp Smith do not meet the criteria for regulation under the Freshwater Wetlands Act. However, a Coastal Consistency Determination must be obtained

from the New York State Department of State for any permit issued by the COE because Camp Smith is located in a coastal area. A NYSDEC Protection of Waters Permit is also required for disturbing the bed or banks of a stream with a classification and standard of C(T) or higher.

Under the Tidal Wetlands Act, NYSDEC administers a permit program regulating activities in tidal wetlands and their adjacent areas. In general, tidal wetlands consist of all the salt marshes, non-vegetated as well as vegetated flats, and shorelines subject to tides. The adjacent areas extend up to 300 feet inland from the wetland boundary. A permit is required from NYSDEC for almost any activity that will alter tidal wetlands or the adjacent areas. The Camp Smith tidal marsh, located at the confluence of Dickiebush Creek and Annsville Creek, is the only tidal wetland at Camp Smith. Permitting procedures and application forms can be obtained from the NYSDEC web page (http://www.dec.state.ny.us/website/dcs/tidalwet/index.html).

In addition, NGB policy requires that an Environmental Assessment (EA) be prepared for all actions that require a wetland permit. An Abbreviated EA can be prepared for projects where the proposed action has no potential to affect resources other than wetlands. Guidance for preparing EA documents is provided in the NGB NEPA Handbook (NGB 2002).

8.1.2 Program Description

The focus of the Wetlands Management Program at Camp Smith is to ensure compliance with federal and state regulations. This involves obtaining accurate information regarding the presence of wetlands and integrating this information into the overall planning processes at the installation to ensure that potential impacts to wetlands are avoided. Many of the other natural resources management programs at the installations are integrated with wetland management activities.

8.1.3 Program Status and Issues

8.1.3.1 Wetlands Surveys and Mapping

A key component to this program is having accurate and accessible information about the location of wetlands at Camp Smith. Wetlands and other areas regulated by Section 404 of the CWA were identified and mapped in the NYARNG GIS during PLSs conducted by WES in

1999. Section 2.14 describes wetlands identified at the installation during these surveys. The survey methods used aerial photography and extensive ground truthing to identify wetlands based on criteria in the COE Wetlands Delineation Manual (Environmental Laboratory 1987). The data from these surveys are suitable for planning purposes. However, project-specific wetland delineations and jurisdictional determinations are required for proposed actions that require a Section 404 permit.

Project-specific wetlands delineations will be conducted at Camp Smith in accordance with the 1987 COE Wetlands Delineation Manual on an as needed basis for all proposed activities that could potentially require a Section 404 permit. GIS mapping, attribute data, and metadata will be produced for all wetland delineations in accordance with Army standards.

8.1.3.2 Wetlands Planning, Protection, and Impact Avoidance

The wetland survey data contained in the NYARNG GIS are available to a variety of users to ensure that wetlands issues are integrated into the Range Development Plan, Real Property Master Plan, ITAM Program, and other mission planning processes at Camp Smith. All proposed development and training activities at Camp Smith are coordinated with the Environmental Office early in the planning process to ensure that wetlands issues do not impact mission activities. The Environmental Office provides assistance in identifying potential alternatives to ensure compliance with regulations and to ensure that impacts to wetlands are avoided and minimized to the extent possible. In addition, the Environmental Office also coordinates with NYSDEC and the COE early in the planning process to ensure that all potential wetlands issues are identified and appropriate permits are obtained.

The Environmental Office also coordinates with the Facilities Management and Engineering Office, POTO, Training Site staff, Engineer Units, and contractors to ensure that BMPs are incorporated into project design and implementation. Potential training-related impacts to wetlands include erosion and direct impacts associated with road maintenance and/or improvement. Wetlands issues associated with road maintenance and improvement are addressed through implementation of BMPs and the permitting process, if necessary. BMPs such as sedimentation basins, rock filters, riprap, and silt fences are incorporated into project designs to reduce runoff into wetlands and surface waters. The New York NRCS provides guidance on wetland protection measures and BMPs. In some areas, the protection of wetlands may also involve protecting wetland communities from threats such as erosion or sediment

deposition and invasive species. Erosion issues are addressed under the ITAM Program (Section 4) and invasive species issues are addressed under the Invasive Species Management Program (Section 10).

Current training activities at Camp Smith have little potential to impacts wetlands. All vehicle maneuver and driver training is limited to existing installation roads and maneuver trails. Limited dismounted maneuver and land navigation training occasionally occurs in wetland areas at Camp Smith. This occasional foot traffic is considered compatible, except in wetland areas known to support rare species.

The Camp Smith tidal marsh, located at the confluence of Putnam Brook and Annsville Creek is classified as a Significant Hudson River Tidal Marsh. The marsh supports a population of spongy arrowhead, a rare plant species. The area immediately adjacent to the marsh at Camp Smith consists of a gravel vehicle storage area, with very little or no buffer between vehicle storage and the marsh. No training activities occur in the marsh and the NYARNG has implemented environmental awareness training to avoid disturbance to the marsh. The spongy arrowhead population is also monitored annually. The marsh has been subjected to moderate impacts over the years, primarily from off-post construction of roads and the railroad at the mouth of Annsville Creek.

8.2 MANAGEMENT GOALS AND OBJECTIVES

The overall goal of the program is to support the mission through compliance with Section 404 of the CWA, EO 11990, EO 11988, and state wetland regulations. Overall management goals for the program include the following:

- Comply with existing federal and state wetlands regulations;
- Maintain no net loss of installation wetlands;
- Protect and enhance the biodiversity, functions, values, and habitat availability of wetland communities; and
- Implement ecosystem management practices to achieve program goals.

Currently, no project-specific goals have been identified for the Wetlands Management Program. As discussed above, project-specific wetland issues will continue to be evaluated and addressed on an as needed basis to achieve the overall program goals.

SECTION 9

FOREST MANAGEMENT PROGRAM

9.1 INTRODUCTION AND PROGRAM OVERVIEW

9.1.1 Administrative Responsibilities and Requirements

The Forest Management Program is primarily the responsibility of the Environmental Office. The Natural Resources Manager oversees all aspects of the program. The Facilities Engineer and grounds maintenance staff is responsible for the maintenance needs of urban forests. When necessary, the Environmental Office coordinates forest management activities with NYSDEC and the U.S. Department of Agriculture (USDA) Forest Service.

9.1.2 Program Description

In accordance with DA policy, the Forest Management Program is designed to maintain, restore, and mange its forest lands on an ecosystem basis. It addresses issues related to the management of natural, commercial, and urban forests at Camp Smith. Within the tenets of this program, issues related to military training, biodiversity conservation, wildlife habitat management, forest pest management, water quality protection, wildfire management, and human health and safety are also addressed. The program is applicable to all forested areas at the installation and is integrated with all the other natural resources management programs.

9.1.3 Program Status and Issues

9.1.3.1 Natural/Commercial Forest Management

Forested upland communities at Camp Smith were described and mapped in the NYARNG GIS as part of the ecological community survey update conducted in 2010 (The Chazen Companies 2010). However, a timber inventory has never been conducted at the installation. Forested uplands comprise approximately 81 percent of the installation and include the following ecological communities:

- Mixed hardwood forest 1,279 acres;
- Chestnut oak forest 227 acres; and
- Successional hardwood forests 26 acres
- Beech-maple mesic forest 18 acres.

Descriptions of the forested communities are provided in Section 2.14 of this INRMP, in the *Camp Smith Training Site Ecological Communities and Rare Species Survey Report* (Parsons ES 1996b), and by The Chazen Companies (2010). The installation's forests provide many important functions including a realistic training environment for dismounted maneuvers, tactical concealment, wildlife habitat, watershed protection, visual and noise buffering, outdoor recreation, and production of potential commercial forest products.

Although Camp Smith contains commercially harvestable timber as defined by AR 200-1, there are no records of commercial timber harvests since the property became a military installation in 1882. The feasibility of initiating commercial timber harvests at the installation has been evaluated since 1996. At this time, such harvests are not considered feasible. Timber revenues generated on federally owned military lands are used as a source of conservation program funding. However, Camp Smith is state-owned land and the timber is considered real property, owned by the state. Therefore, state law governs timber harvesting and how any revenue generated from timber harvests would be appropriated. State procedures do not currently allow for timber revenues to remain within DMNA and/or at Camp Smith for conservation program funding. Consequently, commercial timber harvesting has been a relatively low priority.

Forest management at Camp Smith focuses on meeting military training needs and supporting multiple uses through ecosystem management. General forest management goals include the following:

- Increase the forest's usefulness for military training;
- Promote healthy forest vegetation;
- Maintain biological diversity (i.e., promote the presence of viable populations of all natural species of flora and fauna characteristic to the area); and

- Reduce hazard trees in highly used areas.

It is recognized that silviculture and commercial timber harvesting can be a useful ecosystem management tool to meet these goals. Military training is often enhanced by a diverse landscape that is representative of various conditions that may be encountered during active duty. A variety of forest management practices can be used to help achieve desired conditions and to meet military training needs. When properly implemented these practices can also improve forest health and enhance biodiversity and wildlife habitat.

Currently, no commercial timber harvests are programmed for Camp Smith. However, silvicultural practices may be used on a limited and as needed basis to meet military training and multiple use goals for the installation's forests. Specific management practices that might be implemented in the future include:

- Small timber harvests (less than 3 acres) to provide additional open areas required for training, to support Range Development Plan initiatives, or encourage forest regeneration;
- Thinning and/or improvement cuts to improve training conditions, forest regeneration, forest stand health, and wildlife habitat;
- Salvage cuts to reduce hazard trees in highly used areas or remove diseased trees; and
- Limited collection of dead and down timber for firewood.

Specific military training needs that can be met through forest management practices will be identified through the TRI component of the ITAM Program and implemented through the Forest Management Program. Assistance with implementation of specific forest management practices may be obtained through the Cooperating Forester Program sponsored by NYSDEC.

All future forest management at Camp Smith will need to address several constraints. Major constraints and methods for addressing them are outline below:

- Mission related constraints include the small arms range impact areas. These areas are generally considered off-limits to intensive forest management practices.

- Environmental constraints include steep slopes, surface waters, wetlands, and rare species habitat. These areas and appropriate buffers are generally considered off-limits to intensive forest management practice. However, selected management practices can be beneficial to certain rare species, and will be considered where appropriate. The NYARNG GIS will be used to evaluate these environmental constraints for all proposed forest management activities and site-specific surveys will be conducted, when necessary. In addition, input from a qualified wildlife biologist will be obtained for all forest management planning.
- Cultural resources constraints include known archaeological sites and areas with moderate to high potential for archaeological resources. All ground disturbing activities associated with forest management may require Section 106 consultation. The NYARNG will initiate the Section 106 process with the State Historic Preservation Office during the planning phase of all proposed forest management activities to ensure that impacts to cultural resources are avoided. Specific procedures for Section 106 consultation will be included in the NYARNG statewide Integrated Cultural Resources Management Plan (ICRMP), which is currently under development.

Issues such as soil erosion, siltation, and aesthetics can also arise from forest management practices. In order to avoid and minimize such impacts, any forest management activities implemented at Camp Smith would be conducted in accordance with NYSDEC's Timber Harvesting Guidelines. These guidelines, which are provided on NYSDEC's website (http://www.dec.ny.gov/lands/5240.html), include best management practices recommended for timber harvesting in New York State, plus additional aesthetic practices.

9.1.3.2 Forest Pest Management

Recently, the most significant forest pest at Camp Smith was the hemlock woolly adelgid (*Adelges tsugae*), which is an insect related to aphids. This exotic species is a major threat to hemlock trees in the Eastern United States. This insect has effectively eliminated hemlocks from the installation.

9.1.3.3 Forest Wildfire Management

Fire prevention and damage control are important issues addressed under the Forest Management Program. In 1992, a fire burned approximately 324 hectares (800 acres) of the

installation with effects ranging from Manitou Mountain westward to the fringe of Route 6/202, and approximately one-half way up Anthony's Nose eastward to Mine Mountain. The hottest zone for this fire was near Manitou Mountain. A second fire occurred in 1995, covering 40 hectares (100 acres). This fire was concentrated on the southeast slope of Anthony's Nose between Broccy Creek Reservoir and the mountain's ridge top. Results of ecological surveys conducted during 1996 indicated minimal long-term effects from the fires.

The primary issues concerning wildfires at Camp Smith include prevention, especially prevention of fires outside the installation boundaries, and control of damage to buildings, forests, and other communities. Current measures include fire prevention training, construction of a fire break/fire access road, and retaining the local fire company. The National Guard Bureau and NYARNG have determined that Camp Smith is exempt from DA requirements for preparation of an Integrated Wildland Fire Management Plan.

9.1.3.4 Urban Forestry

Urban forestry deals with planted and wild trees growing along streets, around buildings, in parks, and on undeveloped lands. The urban forest at Camp Smith is limited to the southeastern corner of the installation around the buildings in the main cantonment area. Urban forests can provide the following benefits to installations (Lang 1998):

- Reduce energy costs by providing shade to reduce ambient temperatures in the summer, and/or providing evergreen windbreaks in the winter;
- Reduce the amount and speed of stormwater runoff and runoff-related erosion;
- Contribute to improved air quality by reducing air pollutants (nitrogen oxides, sulfur dioxide, etc.), trapping dust particles, and releasing oxygen;
- Absorb carbon dioxide;
- Serve as visual and noise buffers;
- Provide shelter and food for wildlife;
- Increase soil fertility; and
- Improve landscape aesthetics and property values.

Urban forest management issues at Camp Smith include maintenance, including hazard tree identification and reduction; protection from pests and invasive species; protection from fire; biodiversity; and urban forest regeneration. A detailed urban forest inventory has not been conducted at the installation. The Facilities Engineer is responsible for identifying urban forest maintenance needs and the Natural Resources Manager provides technical support, as needed. Maintenance to reduce hazards is conducted on an as needed basis by the installation maintenance staff or by contractors. Currently, no urban forest pest or invasive species issues have been identified a Camp Smith.

All future urban forest plantings at the installation will focus on the use of native tree species and implementation of required maintenance measures to ensure success of the planted trees. The Natural Resources Manager will be consulted during the preparation of planting designs and tree selection.

9.2 MANAGEMENT GOALS AND OBJECTIVES

The overall goal of the Forest Management Program is to employ ecosystem management techniques to promote healthy and diverse forest communities at Camp Smith to meet military training requirements and multiple uses. Management criteria for the program include the following:

- Sustain health forests to meet military training needs;
- Sustain non-fragmented forest habitat for existing wildlife;
- Sustain ecological values and function of the forested landscape; and
- Protect real property investments for the installation.

Currently, no project-specific goals have been identified for the Forest Management Program.

SECTION 10

INVASIVE SPECIES MANAGEMENT PROGRAM

10.1 INTRODUCTION AND PROGRAM OVERVIEW

10.1.1 Administrative Responsibilities and Requirements

The Environmental Office is primarily responsible for the Invasive Species Management Program. The Natural Resources Manager coordinates invasive species inventories, monitoring, and control. The Camp Smith Facilities Engineer and maintenance staff provide program support.

The development of this program allows NYARNG to comply with EO 13112 – *Invasive Species*, which was issued on February 3, 1999. The EO requires that federal agencies coordinate complementary, cost-effective activities concerning invasive species with existing organizations addressing invasive species. A copy of the EO can be obtained on the Internet at http://www.denix.osd.mil/denix/Public/Legislation/EO/note48.html.

The Invasive Plant Council (IPC) of New York State provides coordination and guidance on the management of invasive plants in the state. The IPC was incorporated in 1999 based on needs identified by state and federal agencies and non-profit organizations. The goal of the IPC is to organize an effective partnership among public and private organizations to address the need for invasive species information and control across the state.

10.1.2 Program Description

The Invasive Species Management Program is applicable to all areas of Camp Smith that are affected by invasive plant or animal species, with a particular emphasis on plant species. The term "invasive species" may refer to any alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (EO 13112, 1999). The primary focus of the program is to reduce or eliminate invasive plant populations, in order

to protect biodiversity and ecosystem stability. Invasive Species Management is closely linked with other natural resources management programs, and produces benefits for military training and the Fish and Wildlife, Rare Species, Wetlands, and Forest Management Programs.

10.1.3 Program Status and Issues

10.1.3.1 Background

Invasive species are typically alien plants or animals that have been intentionally or accidentally introduced by human activity into a region in which they did not evolve. Unlike many exotic species, invasive species escape cultivation and result in a variety of negative impacts. They become agricultural pests, infest lawns as weeds, displace native plant species, reduce wildlife habitat, and alter ecosystem processes. The economic costs of invasive species include loss of military and recreational land value, clogging of important waterways, and increased costs in agriculture and maintaining open powerline rights-of-way. Approximately 400 alien plant species introduced to the United States are severely invasive, occupying more than 100 million acres in the U.S. From 1901 to 1991, 79 exotic species are estimated to have caused the U.S. $97 billion in damages (Office of Technology Assessment, 1993 in Pimentel et al. 1999). Invasive alien plants typically exhibit the following characteristics:

- Rapid growth and maturity;
- Prolific seed production;
- Highly successful seed dispersal, germination and colonization;
- Rampant vegetative spread;
- Ability to out-compete native species; and
- High cost to remove or control.

Invasive plants were once thought to be a problem only on farms or in lawns, but are now recognized as a threat to undisturbed natural areas. At Camp Smith, invasive plant species are not only degrading ecosystems and wildlife habitat, but are also increasing the cost of maintaining training areas. In the Management Plan developed by the National Invasive Species Council, actions to combat invasive species include prevention, early detection and rapid response, control and management, and restoration (NISC 2000).

10.1.3.2 Invasive Plant Survey

An invasive plant survey was conducted at Camp Smith in June 2003. A list of invasive plants that have been identified at the installation is provided in Table 10.1. The mapping and associated attribute data are contained in the NYARNG GIS. Additional species-specific information can be found at IPC's website (http://www.nysm.nysed.gov/ipcnys/index.html) and at http://www.invasivespecies.gov/.

TABLE 10.1

INVASIVE PLANTS IDENTIFIED AT CAMP SMITH

Scientific Name	Common Name
Ailanthus altissima	tree-of-heaven
Alliaria petiolata	garlic mustard
Berberis thunbergii	Japanese barberry
Celastrus orbiculata	oriental bittersweet
Heracleum mantegazzianum	Giant hogweed
Lonicera	bush honeysuckle
Lonicera japonica	Japanese honeysuckle
Lythrum salicaria	purple loosestrife
Myriophyllum spicatum	Eurasian watermilfoil
Paulownia tomentosa	princess tree
Persicaria perfoliata	mile-a-minute
Phragmites australis	common reed
Polygonum cuspidatum	Japanese knotweed
Robinia pseudoacacia	black locust
Rosa multiflora	multiflora rose
Trapa natans	water chestnut
Vincetoxicum nigrum	black swallow-wort

10.1.3.3 Invasive Plant Control and Management

In accordance with EO 13112 – *Invasive Species* and the goals of this program, the NYARNG will control populations of invasive plants in a cost-effective and environmentally sound manner. When practicable, control efforts will follow the recommendations of the IPC

and the NYARNG will work cooperatively with agencies and organizations involved with invasive species management. A variety of control measures will be employed based on species-specific and site-specific requirements. In some cases, a combination of control measures may be appropriate. Various options for invasive plant control include the following:

- **Prevention:** Several prevention measures are already in place at Camp Smith and include prohibiting the use of invasive plants for landscaping or other purposes, implementing best management practices (BMPs) to minimize land disturbances that promote invasion, and re-vegetating disturbed areas with native species. Avoidance will remain the preferred control measure.

- **Mechanical Controls:** This method involves physical removal of invasive plants through means such as hand pulling of individual stems, digging, cutting, and mowing. This method can be very effective for certain species on a localized basis and is often preferred to avoid impacts to non-target species and the use of herbicides. However, it can be labor intensive on a larger scale and repeated removal is typically required to ensure success. When implemented on a large scale, measures must be taken to avoid impacts to non-target species, minimize the potential for erosion, and avoid impacts to cultural resources. Mechanical methods are often used in combination with selective use of a glyphosate-based herbicide.

- **Biological Controls:** Biological controls typically involve the introduction of a species (biological control agent) that feeds on or impedes the growth of the target invasive plant. The science of biological controls has made significant advances in recent years, but effective and approved methods are currently limited. Where applicable this method can be very cost effective and avoids potential impacts associated with chemical and mechanical controls. However, many biological control agents are non-native species, which raises additional concerns. Biological control measures may be used at Camp Smith when they are determined to be the most appropriate measure available. Use of biological controls will be limited to those agents that are USDA-approved and for which NEPA documentation already exists.

- **Chemical Controls:** Herbicide application can be a very effective means of controlling invasive plants. However, herbicides have the potential to impact non-target plants, as well as fish and wildlife resources. When appropriately used, non-persistent herbicides can be the most appropriate control measure for many circumstances. Selective glyphosate-based herbicide application, in combination with mechanical methods

and/or prescribed burning, is an effective method for many common invasive plants. In accordance with DoD pest management guidelines and the NYARNG Pest Management Plan, herbicide use to control invasive plants will be limited to the extent possible. All herbicide use will be conducted in accordance with the NYARNG Pest Management Plan and a DoD-certified applicator (or equivalent) will perform all applications. Only licensed herbicides will be utilized in accordance with their approved uses. Herbicides used to control wetland or aquatic plants must be licensed for use in wetlands.

- **Prescribed Burning:** This method is typically only used in combination with selective herbicide applications and may promote the invasion of some species. At this time, prescribed burning for invasive plant control is not proposed for Camp Smith.

A successful mechanical control program (i.e., hand pulling of individual plants) has been implemented at Camp Smith to eliminate water chestnut in Dickiebusch Lake. Monitoring for water chestnut and mechanical controls will continue to ensure that re-invasion does not occur.

10.2 MANAGEMENT GOALS AND OBJECTIVES

Management goals, objectives, and projects for the NYARNG Invasive Species Management Program are outlined in this section. Implementation information is provided in Section 11.

Invasive Species Goal #1 – Protect ecosystems and native plant and animal species from invasive species through compliance with EO 13112.

Objective #1 – Implement invasive plant controls and monitor invasive plants.

1. Implement invasive plant controls based on findings of invasive plant survey.
2. Monitor effectiveness of control and adapt management practices, as necessary.

SECTION 11

PLAN IMPLEMENTATION SUMMARY

11.1 OVERVIEW

This section discusses staffing and funding requirements for implementation of the Camp Smith INRMP, as well as the implementation schedule. The NYARNG intends to implement the overall management approach and project-specific goals contained in this INRMP based on authorized funding, resource availability, and time constraints. The NYARNG recognizes the need for an adaptive management approach to address changing land use requirements, natural resources conditions, and other unforeseen factors. Consequently, unforeseen factors might prohibit the NYARNG from implementing some or all of the project-specific goals in accordance with the implementation schedule. In addition, implementation of projects is contingent upon the availability of funding and other project funding priorities within the DA, NGB, and NYARNG. As discussed in Section 3, the INRMP will be routinely reviewed and updated to address changing conditions.

11.2 STAFFING REQUIREMENTS

11.2.1 NYARNG/DMNA Staff

Effective implementation of the INRMP will require a variety of NYARNG and DMNA staff including personnel from the Environmental Office, Facilities Management and Engineering, POTO, Camp Smith, and Engineer units.

Currently, the Natural Resources Manager within the Environmental Office and the Camp Smith Environmental Analyst are the primary source of labor for implementing both project-specific and routine INRMP activities. The Natural Resources Manager is responsible for routine coordination of INRMP activities, program administration, and other conservation related activities. These activities include, but are not limited to, the following: reviewing and updating the INRMP; providing input for program funding requirements; coordinating efforts

with cooperating agencies, contractors, installation personnel, and the general public; providing technical support to internal stakeholders; providing natural resources subject matter expertise and input to the real property and mission planning processes; implementing the NEPA process; and obtaining environmental permits, when necessary. Approximately 5 percent of the Natural Resources Manager's time is available for natural resources management activities at Camp Smith. Approximately 15 to 20 percent of the Camp Smith Environmental Analyst's time is available for natural resources management activities.

Engineer units within the NYARNG will provide vital implementation support for the INRMP, especially within the LRAM Program. To the extent possible, INRMP projects that require specialized design and engineering services will be integrated into Engineer unit's AT and IDT training. However, there may be an instance where this is not feasible (e.g., overseas deployment of units) and the work must be contracted out. These activities will be coordinated between the Environmental Office, POTO, and unit commanders. The Facilities Management and Engineering Office will also provide design support.

11.2.2 Contractors and Cooperating Agencies/Organizations

The RTLA inventory identified in Section 4 and the bog turtle survey identified in Section 6 are the only projects that require direct support from contractors or cooperating agencies/organizations.

11.3 FUNDING REQUIREMENTS

Primary funding sources include the ITAM Program, the NGB Conservation Program, RPOM, and RTLP. Funding from alternative sources such as the DoD Legacy Program and the USDA Wildlife Habitat Incentive Program will be sought, if appropriate. Estimated funding requirements are included in Table 11.1.

11.4 INRMP IMPLEMENTATION SCHEDULE

All of the INRMP goals, objectives, and projects are listed in Table 11.1 along with estimated implementation costs and the implementation schedule.

TABLE 11.1

CAMP SMITH INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN GOALS, OBJECTIVES, PROJECTS, COSTS, AND IMPLEMENTATION SCHEDULE

Goals, Objectives, and Projects	Estimated Cost	Implementation (Fiscal Year)
ITAM Goal #1 – Achieve optimal sustained use of lands for the execution of realistic training, by providing a sustainable core capability, which balances usage, condition, and level of maintenance		
Objective #1 – Conduct RTLA inventory of heavily used training areas at Camp Smith to identify existing training related impacts and establish a long-term monitoring program.	$70,000	2013
1. Identify and map heavily used training areas (e.g., maneuver trails, roads, open areas, bivouac sites, command post sites) in the NYARNG GIS using GPS and digital aerial photography.		
2. Collect detailed attribute data for trail/road segments including: classification, physical description, uses, and condition, as well as information on rehabilitation and maintenance activities that have taken place or are planned.		
3. Define training area uses, as well as frequency and intensity of use, and incorporate information into a GIS attribute database.		
4. Document existing natural resources and existing impacts.		
5. Incorporate data into the NYARNG GIS and analyze data.		
6. Prepare initial RTLA inventory report, including potential LRAM project sites, refined RTLA objectives, and long-term monitoring protocols.		
Objective #2 – Implement routine, long-term RTLA monitoring program to identify land condition trends at Camp Smith.	DMNA Labor	2014-2017
1. Conduct routine RTLA monitoring annually.		
2. Incorporate data into the NYARNG GIS and analyze data.		
3. Prepare annual RTLA report, including potential LRAM project sites.		
Objective #3 – Implement LRAM projects in accordance with ITAM Work Plan.	$125,000 ($25,000/year) DMNA Labor	2013-2017
1. Prepare project-specific designs.		
2. Coordinate and schedule project implementation.		
3. Implement project.		
Fish and Wildlife Goal #1 – Maintain deer population at levels necessary to ensure compatibility with mission land uses and natural ecological communities.		
Objective #1 – Collect deer population data and establish harvest targets.	DMNA Labor	2013-2017
1. Conduct monthly white-tailed deer surveys to develop a relative population index.		
2. Collect hunter survey and harvest data.		
3. Compile and analyzed data, prepare annual summary report, and update Camp Smith Hunting Rules annually.		
4. Share data and consult with NYSDEC regarding management issues, as necessary, to establish harvest targets.		
Objective #2 – Implement hunting program to manage deer population and achieve harvest targets.	DMNA Labor	2013-2017
1. Review and update Camp Smith Hunting Rules annually and submit for approval by 1 March.		
2. Announce and advertise approved Camp Smith Hunting Rules by 1 April annually.		
3. Announce and advertise dates, times, and locations of Camp Smith Hunting briefings by 1 August and 1 April annually.		
4. Conduct Camp Smith Hunting briefings annually.		
5. Process and issue Camp Smith Hunting Permits.		

TABLE 11.1 (continued)

CAMP SMITH INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN GOALS, OBJECTIVES, PROJECTS, COSTS, AND IMPLEMENTATION SCHEDULE

Fish and Wildlife Goal #2 – Maintain resident Canada goose population below 25 birds observed during monthly counts to ensure aviation safety.		
Objective #1 – Collect resident Canada goose population data and establish harvest targets.	DMNA Labor	2013-2017
1. Conduct monthly Canada goose surveys to determine specific population numbers.		
2. Conduct weekly Canada goose nesting surveys from March through June, annually.		
3. Collect hunter survey and harvest data.		
4. Compile and analyzed data, and prepare annual summary report.		
Objective #2 – Implement management activities for resident Canada geese.	DMNA Labor	2013-2017
1. Use frightening/harassment techniques or other acceptable methods to deter resident Canada geese from using Camp Smith.		
2. Conduct egg addling during the nesting season and in accordance with applicable regulations/permits.		
3. Implement controlled, recreational hunting program for resident Canada geese.		
4. Prepare annual resident Canada goose management status report, evaluate success of management activities, and consider alternative management actions, as necessary.		
Rare Species Goal #1 – Avoid impacts to rare species and their habitat by maintaining accurate, updated information on the presence of rare species and integrating this information into installation planning processes.		
Objective #1 – Continue to conduct routine monitoring for rare species at Camp Smith.	DMNA Labor	2013-2017
1. Document incidental sightings of rare animals that are made during the course of other natural resources management activities at Camp Smith.		
2. Conduct monthly bald eagle surveys in areas of known and potential nesting habitat from December through April annually.		
3. Conduct annual qualitative monitoring of spongy arrowhead relative abundance in the Camp Smith tidal marsh.		
4. Prepare annual rare species survey status report and update GIS, as necessary.		
Objective #2 – Conducted bog turtle surveys in areas of potentially suitable habitat in accordance with USFWS guidelines.	$30,000	2013
1. Conduct surveys in spring of 2014.		
2. Prepare survey report, update GIS, and share data with USFWS and NYSDEC. Develop species-specific management actions, as necessary.		
Invasive Species Goal #1 – Protect ecosystems and native plant and animal species from invasive species through compliance with EO 13112.	$5,000 ($1,000/year) DMNA Labor	2013-2017
Objective #1 – Implement invasive plant controls and monitor invasive plants.		
1. Implement invasive plant controls based on findings of invasive plant survey.		
2. Monitor effectiveness of control and adapt management practices, as necessary.		

SECTION 12

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APPENDIX A

EXCERPTS FROM THE SOILS SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Charlton loam, 2 to 8 percent slopes, is a phase of the Charlton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Chatfield-Hollis-Rock outcrop complex, hilly, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Palms and Carlisle soils, ponded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarry, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

✳ **Ce—Carlisle muck.** This soil is nearly level, very deep, and very poorly drained. It formed in well decomposed organic material more than 51 inches thick. It occurs in broad, basinlike or other depressional areas between hills and on outwash or till plains. Individual areas are commonly oval and range from 2 to 200 acres in size. Slopes are less than 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, dark reddish brown muck

Subsurface layer:
4 to 52 inches, black muck that has some woody fragments

Bottom layer:
52 to 60 inches, dark reddish brown muck

Included with this soil in mapping are small areas of the very poorly drained Palms and Sun soils. These soils commonly occur around the perimeter of the unit. Palms soils are underlain by loamy material within a depth of 51 inches. Sun soils formed entirely in mineral material. Also included, in areas where fast-flowing streams enter the map unit, are Fluvaquents and Udifluvents. Included areas make up about 20 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 6 inches above to 12 inches below the surface from September through June
Permeability: Moderately slow to moderately rapid (0.2-6.0 in/hr) throughout the profile
Available water capacity: High
Reaction: Moderately acid to neutral throughout the profile
Surface runoff: Very slow or ponded
Erosion hazard: Highly susceptible to wind erosion

Most areas are wooded or are covered by brushy or herbaceous, water-tolerant plants. Some areas are in parks, and other areas have been partly filled for community development (fig. 5).

The main limitations on sites for dwellings with basements are the seasonal high water table, the ponding, and low strength. Extensive alterations are necessary to overcome these limitations. Better suited soils are in nearby areas.

The ponding and slow percolation are limitations on sites for septic tank absorption fields. Extensive alterations are necessary to overcome these limitations. Better suited soils are in nearby areas.

The main limitations on sites for local roads and streets are the ponding, frost action, and the low strength. Coarse grained base material and an adequate drainage system are necessary to overcome these limitations. Roads should be routed around areas of this soil if possible.

This soil is not suited to cultivated crops, hay, or pasture because of the seasonal high water table and the ponding.

The potential productivity of this soil for red maple is moderate. The use of planting and harvesting equipment is limited by the ponding and the organic soil material. The seedling mortality rate is high because of the wetness. The seasonal high water table restricts root growth and thus increases the windthrow hazard.

The capability subclass is Vw.

ChB—Charlton loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have a stony, very stony, or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development or for recreation. Other areas are wooded,

included areas and the nearby soils are better suited to recreational development.

The capability subclass is VIe.

CIB—Charlton loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They occur as scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

No major limitations affect the use of this soil as a site for dwellings with basements, for septic tank absorption fields, or for local roads and streets. During construction, minimizing the removal of vegetation, mulching, and quickly establishing a plant cover help to control erosion and sedimentation.

This soil is not suited to cultivated crops because of stoniness. It is only poorly suited to permanent pasture because of the stoniness. Maintaining an adequate cover of sod is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Surface stoniness is the main limitation on sites for recreational development. The slope also is a limitation on sites for playgrounds. Land shaping and grading help to overcome the slope. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

CIC—Charlton loam, 8 to 15 percent slopes, very stony. This soil is strongly sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have an extremely stony or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome these limitations. Removing the stones facilitates excavation. Erosion is a hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Surface stones interfere with the trenching for distribution lines. Installing the distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops because of the stoniness. It is only poorly suited to permanent pasture because of the stoniness. Maintaining an adequate cover of sod is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Surface stoniness is the main limitation affecting recreational development. The slope also is a limitation on sites for playgrounds. Land shaping and grading help to overcome these limitations. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

CID—Charlton loam, 15 to 25 percent slopes, very stony. This soil is moderately steep, very deep, and well drained. It is on hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately

deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome these limitations. Removing the stones facilitates excavation. Erosion is a severe hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Surface stones interfere with the trenching for distribution lines and structures. Installing the distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops because of the stoniness. It is only poorly suited to permanent pasture because of the stoniness and the slope. Maintaining an adequate cover of vegetation is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Land shaping and grading help to overcome the slope, or intensively used areas can be limited to the less sloping included areas. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

CIE—Charlton loam, 25 to 35 percent slopes, very stony. This soil is steep, very deep, and well drained. It is on hillsides and valley sides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of

Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

Most areas are wooded. Some areas are used for community development or for recreation.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited as sites for dwellings.

The slope is the main limitation on sites for septic tank absorption fields. The surface stones interfere with the trenching for distribution lines and structures. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops or pasture because of the stoniness and the slope.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer stones are better suited to recreational development.

The capability subclass is VIIs.

CIF—Charlton loam, 35 to 45 percent slopes, very stony. This soil is very steep, very deep, and well drained. It is on hillsides and valley sides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 8 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid

Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

Most areas are wooded.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to dwellings.

The slope is the main limitation on sites for septic tank absorption fields. The surface stones interfere with the trenching for distribution lines and structures. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops or pasture because of the stoniness and the slope.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are severe because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer stones are better suited to recreational development.

The capability subclass is VIIs.

CrC—Charlton-Chatfield complex, rolling, very rocky. This unit consists of the very deep and moderately deep, well drained and somewhat excessively drained Chatfield soil and the well drained Charlton soil. It is on hilltops and hillsides that are underlain by highly folded bedrock. Slopes range from 2 to 15 percent. Individual areas are highly irregular in shape and range from 3 to 100 acres in size. They are about 50 percent Charlton soil, 30 percent Chatfield soil, and 20 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

Included in mapping are areas of the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester soils, and the poorly drained and very poorly drained Sun soils. Sutton soils are along drainageways and in concave interridge areas. Leicester and Sun soils are in shallow depressions and along drainageways. Also included are the poorly drained Carlisle and Palms soils, the somewhat excessively drained and well drained Hollis soils, and areas of soils that are similar to the Chatfield soil but are deep over bedrock. Carlisle and Palms soils are in closed depressions. Hollis soils are shallow over bedrock. They are in scattered areas throughout the unit but are mostly on ridgetops. The soils that are similar to the Chatfield soil are in the western part of Putnam County, in areas where the surface is extremely stony or bouldery. Included areas make up about 25 percent of the map unit and range to about 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 20 to 40 inches

Most areas of this unit in Putnam County are wooded. In Westchester County, many areas are used for community development. Other areas are wooded or are used for pasture.

The major limitation on sites for dwellings with basements is the moderate depth to bedrock in areas of the Chatfield soil and the rock outcrop. Also, because of the irregular topography, careful investigation is needed when potential dwelling sites are selected. Where possible, dwellings with basements should be constructed in areas of the very deep Charlton soil. The Chatfield soil is more suited to dwellings without basements than to dwellings with basements. Erosion is a hazard during construction, especially on the steeper slopes. Reestablishing a plant cover as soon as possible after construction and using mulch and siltation basins can help to control erosion.

The moderate depth to bedrock in the Chatfield soil and the rock outcrop are the main limitations on sites for septic tank absorption fields. The Charlton soil is better suited than the Chatfield soil to septic systems; however, the depth to bedrock is variable throughout the unit. The irregular topography is also a concern when sites for absorption fields are selected.

The variable depth to bedrock is the main limitation on sites for local roads and streets. The rock outcrop also hinders land shaping and grading. Blasting or ripping is necessary to remove the rock. Grading and street locations should be planned to avoid the areas of rock outcrop.

These soils are unsuited to cultivated crops because of the exposures of bedrock. The use of machinery is limited because of the uneven slopes. The soils are only poorly suited to permanent pasture. The short, uneven slopes and the areas of exposed bedrock are the main limitations. Both of these limitations interfere with equipment use. Overgrazing is also a management concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of these soils for northern red oak is moderate. The shallow depth to bedrock in the Chatfield soil and the areas of exposed bedrock restrict the rooting depth of some tree species. Planting early in the spring reduces the effects of summer droughtiness. Establishing logging trails across the slope reduces the hazard of erosion.

The irregular topography, the shallow depth to bedrock, and the rock outcrop are limitations affecting most kinds of recreational development. Some areas are suitable for hiking trails and bridle paths.

The capability subclass is VIs.

CsD—Chatfield-Charlton complex, hilly, very rocky. This unit consists of the very deep and moderately deep, well drained and somewhat excessively drained Chatfield soil and the well drained Charlton soil. It is on the tops and sides of hills that are underlain by highly folded bedrock. Slopes range from 15 to 35 percent. Individual areas are highly irregular in shape and range from 3 to 75 acres in size. They are about 45 percent Chatfield soil, 35 percent Charlton soil, and 20 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included in mapping are areas of the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester soils, and the poorly drained and very poorly drained Sun soils. Sutton soils are

along drainageways and in concave interridge areas. Leicester and Sun soils are in shallow depressions and along drainageways. Also included are the very poorly drained Carlisle and Palms soils, the somewhat excessively drained and well drained Hollis soils, and areas of soils that are similar to the Chatfield soil but are deep over bedrock. Carlisle and Palms soils are in closed depressions. Hollis soils are shallow over bedrock. They are in scattered areas throughout the unit but are mostly on ridgetops. The soils that are similar to the Chatfield soil are in the western part of Putnam County, in areas where the surface is extremely stony or bouldery. Included areas range to about 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 20 to 40 inches

Most areas of this unit in Putnam County are wooded. In Westchester County, many areas are used for community development. Other areas are wooded or are used for pasture.

The major limitation on sites for dwellings with basements is the irregular topography. The moderate depth to bedrock in the Chatfield soil and the areas of rock outcrop also are limitations. Where possible, dwellings with basements should be constructed in areas of the very deep Charlton soil. The Chatfield soil is more suited to dwellings without basements than to dwellings with basements. Erosion is a severe hazard during construction, especially on the steeper slopes. Minimizing the removal of vegetative cover, reestablishing a plant cover as soon as possible after construction, and using mulch and siltation basins can help to control erosion.

The moderate depth to bedrock, the rock outcrop, and the slope are the main limitations in areas of the Chatfield soil used as sites for septic tank absorption fields. The Charlton soil is better suited than the Chatfield soil to septic systems; however, the depth to bedrock is variable throughout the unit. The irregular topography is also a concern when sites for absorption fields are selected.

The slope and the variable depth to bedrock are the main limitations on sites for local roads and streets. The rock outcrop also limits land shaping and grading. Blasting or ripping is necessary to remove the rock. Grading and street locations should be planned to avoid the rock outcrop.

These soils are unsuited to cultivated crops because of the rock outcrop and the uneven topography. The use of machinery is limited because of the slope. The soils are only poorly suited to permanent pasture. The short, uneven slopes and the areas of exposed bedrock are the main limitations. Both of these limitations interfere with equipment use. Overgrazing is also a management concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of these soils for northern red oak is moderate. The shallow depth to bedrock in the Chatfield soil and the rock outcrop restrict the rooting depth of some tree species. Planting early in the spring reduces the effects of summer droughtiness. The slope limits the use of equipment. Establishing logging trails across the slope reduces the hazard of erosion.

The irregular topography, the shallow depth to bedrock, and the rock outcrop are limitations affecting most kinds of recreational uses. Some areas are suitable for hiking trails and bridle paths. Included areas that are less sloping and that have less rock outcrop are better suited to recreational development.

The capability subclass is VIs.

CtC—Chatfield-Hollis-Rock outcrop complex, rolling. This unit consists of the rolling, moderately deep, well drained and somewhat excessively drained Chatfield soil, the shallow, well drained and somewhat excessively drained Hollis soil, and areas of Rock outcrop, dominantly granite, gneiss, and schist. The unit is on hilltops and narrow ridges in bedrock-controlled landscapes. Slopes dominantly range from 3 to 15 percent. Individual areas of this unit are mostly irregular in shape and range from 2 to 100 acres in size. They are typically about 30 percent Chatfield soil, 30 percent

Hollis soil, 20 percent Rock outcrop, and 20 percent other soils.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface layer:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, folded granitic bedrock

Included in mapping are the somewhat poorly drained and poorly drained Leicester soils, the very poorly drained Sun and Palms soils, and the moderately well drained Sutton soils. Leicester soils are in concave areas between ridges and along drainageways. Sun and Palms soils are in closed depressions. Sutton soils also are in concave areas between ridges but are slightly higher on the landscape than the Leicester soils. Also included are areas of the very deep and well drained Charlton soils, areas of soils that are very shallow over bedrock, and areas of soils that have stones and boulders at the surface. Charlton soils are in scattered areas throughout the unit. The very shallow soils are adjacent to areas of Rock outcrop. The stony and bouldery soils are mainly on the lower part of slopes. Included areas range to about 2 acres in size.

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 20 to 40 inches

Properties of the Hollis soil—

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 10 to 20 inches

Most areas are wooded or covered by brush. A few areas are used for pasture. Some scattered areas are used for community development.

The main limitation on sites for dwellings with basements is the shallow depth to bedrock. The irregular topography also is a limitation. Fewer limitations affect dwellings without basements than dwellings with basements. The dwellings can be built above the bedrock and landscaped with additional fill. Erosion is a hazard during construction. Quickly establishing a plant cover, mulching, and using siltation basins or other temporary structures can help to control erosion and sedimentation during construction.

The main limitation on sites for septic tank absorption fields is the shallow depth to bedrock. The irregular topography also is a limitation affecting the design of septic systems. The soils are not deep enough over bedrock to adequately filter the effluent. More suitable sites are available in areas of included or nearby soils.

The main limitation on sites for local roads and streets is the shallow depth to bedrock. Grading and road locations should be planned to avoid the areas of Rock outcrop.

This unit is not suited to cultivated crops because of the shallow depth to bedrock, the irregular topography, and the Rock outcrop. It is only poorly suited to permanent pasture. The low available water capacity results in droughtiness and slow plant growth. Overgrazing is also a management concern. Restricted use during dry periods, pasture rotation, applications of fertilizer, and weed and brush control can increase forage yields.

The potential productivity of this unit for northern red oak is moderate. In areas of the Hollis soil, droughtiness limits tree growth. The shallow depth to bedrock restricts rooting depth and increases the windthrow hazard.

The shallow depth to bedrock, the uneven topography, and the Rock outcrop are the main limitations affecting recreational development. The unit is suited to paths and hiking trails.

The capability subclass is VIs.

CuD—Chatfield-Hollis-Rock outcrop complex, hilly. This unit consists of the moderately deep, well drained and somewhat excessively drained Chatfield soil, the shallow, well drained and somewhat excessively drained Hollis soil, and areas of Rock outcrop, dominantly granite, schist, and gneiss. The unit is on hillsides in bedrock-controlled landscapes. Slopes are dominantly 15 to 35 percent. Very steep or nearly vertical bedrock escarpments are common landscape features. Individual areas of this unit are mostly long and narrow and range from 2 to 200 acres in size. They are typically about 30 percent Chatfield soil, 30 percent Hollis soil, 25 percent Rock outcrop, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface layer:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, folded granitic bedrock

Included with this unit in mapping are the somewhat poorly drained and poorly drained Leicester soils, the very poorly drained Sun and Palms soils, and the moderately well drained Sutton soils. Leicester soils are in concave areas between ridges and along drainageways. Sun and Palms soils are in closed depressions. Sutton soils also are in concave areas between ridges but are slightly higher on the landscape than the Leicester soils. Also included are areas of the very deep and well drained Charlton soils, areas of soils that are very shallow over bedrock, and areas of soils that have stones and boulders at the surface. Charlton soils are in scattered areas throughout the unit. The very shallow soils are immediately adjacent to areas of Rock outcrop. The stony and bouldery soils are mainly on the lower part of the slopes. Included areas are as much as 2 acres in size.

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 20 to 40 inches

Properties of the Hollis soil—

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 10 to 20 inches

Most areas of this unit are wooded or covered by brush. A few areas are used for pasture (fig. 6). Some scattered areas are used for community development.

The main limitations on sites for dwellings with basements are the shallow depth to bedrock and the irregular topography. Extensive alterations are necessary to overcome these limitations. Included areas and the less sloping nearby soils that are deeper over bedrock are better suited to dwellings.

The main limitations on sites for septic tank absorption fields are the shallow depth to bedrock and the irregular topography. The soils are not deep enough over bedrock to adequately filter the effluent. More suitable sites are nearby.

The main limitations on sites for local roads and streets are the shallow depth to bedrock and the irregular topography. Grading and road locations should be planned to avoid the areas of Rock outcrop.

This unit is not suited to cultivated crops or pasture because of the shallow depth to bedrock, the irregular topography, and the Rock outcrop.

The potential productivity of this unit for northern red oak is moderate. In areas of the Hollis soil, droughtiness limits tree growth. The shallow depth to bedrock limits the growth of roots and increases the windthrow hazard. The irregular topography limits the use of equipment.

The shallow depth to bedrock, the irregular topography, and the Rock outcrop are the main limitations affecting recreational development. The unit is suited to paths and hiking trails.

The capability subclass is VIIs.

HnD—Hinckley gravelly loamy sand, 15 to 25 percent slopes. This moderately steep soil is very deep and excessively drained. It is on the sides of terraces, on valley sides, and on small rounded hills. Individual areas are rounded and range from 2 to about 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loamy sand

Subsurface layer:
3 to 7 inches, dark brown gravelly loamy sand

Subsoil:
7 to 17 inches, dark yellowish brown very gravelly loamy sand

Substratum:
17 to 31 inches, light olive brown very gravelly sand
31 to 44 inches, light olive brown very gravelly coarse sand
44 to 49 inches, brown coarse sand
49 to 60 inches, brown very gravelly coarse sand

Included with this soil in mapping are areas of the moderately well drained and somewhat poorly drained Pompton soils. Pompton soils are slightly lower on the landscape than the Hinckley soil. Also included are small areas of Knickerbocker and Riverhead soils, areas of Hinckley soils that contain more gravel at the surface, and areas that are more sloping than the Hinckley soil. Knickerbocker and Riverhead soils are less gravelly than the Hinckley soil. Included areas make up about 15 to 20 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Rapid (6.0-20 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Very low
Reaction: Extremely acid to moderately acid throughout the profile
Surface runoff: Medium or rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. Large areas have been mined for sand and gravel. A few areas are covered by brush, are wooded, or are used for pasture and hay.

The slope is the main limitation on sites for dwellings with basements. Designing the dwellings so that they conform to the natural slope of the land and land shaping and grading can help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is the rapid or very rapid permeability, which results in poor filtering of effluent and can cause contamination of ground water. Better suited sites should be selected.

The slope is the main limitation on sites for local roads and streets. Designing the roads so that they conform to the natural slope of the land and cutting and filling as needed help to overcome this limitation.

This soil is not suited to cultivated crops because of the slope. It is only poorly suited to permanent pasture. Dry periods in midsummer result in poor growth. Grazing early in the spring is practical, but restricting grazing during dry periods can help to maintain the quality of the pasture. Applications of fertilizer, weed and brush control, and rotation grazing can improve forage yields.

The potential productivity of this soil for eastern white pine is high. The seedling mortality rate is high because of droughtiness. The equipment limitation and the hazard of erosion are moderate because of the slope.

The slope is the main limitation affecting most kinds of recreational development. It is a particular concern in intensively used areas, such as playgrounds. Land grading and shaping can help to overcome this limitation. Small stones also are a limitation on sites for playgrounds. Sandy fill material can be added to cover the stones.

The capability subclass is VIs.

HrF—Hollis-Rock outcrop complex, very steep. This unit consists of the shallow, very steep, well drained and somewhat excessively drained Hollis soil and areas of Rock outcrop, dominantly granite, gneiss, or schist. It is on hillsides in bedrock-controlled landscapes. Slopes range from 35 to 60 percent. Individual areas are long and narrow and range from 2 to 120 acres in size. They are typically about 60 percent Hollis soil, 20 percent Rock outcrop, and 20 percent other soils.

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, fractured and folded granite

Included in mapping are narrow areas of the somewhat poorly drained and poorly drained Leicester soils, areas of the deep and very deep Charlton soils, and areas of the moderately deep Chatfield soils. Leicester soils are along drainageways. Charlton soils are along the base of the slopes. Chatfield soils are on the upper part of the slopes. Also included, generally in areas adjacent to the Rock outcrop, are soils that are less than 10 inches deep over bedrock. Included areas are as much as 2 acres in size.

Properties of the Hollis soil—

Water table: At a depth of more than 6 feet
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: 10 to 20 inches

Most areas of this unit are wooded. Some scattered areas are used for community development.

The main limitations on sites for dwellings with basements are the slope, the shallow depth to bedrock, and the Rock outcrop. More suitable sites should be selected.

The main limitations on sites for septic tank absorption fields are the slope, the shallow depth to bedrock, and the Rock outcrop. The soil is not deep enough over bedrock to adequately filter the effluent. Ground-water contamination is a hazard. More suitable sites should be selected.

The main limitations on sites for local roads and streets are the slope and the shallow depth to bedrock. Grading and road locations should be planned to avoid areas of this map unit.

This unit is not suited to cultivated crops, hay, or pasture because of the slope, the shallow depth to bedrock, and the Rock outcrop.

The potential productivity of this unit for northern red oak is moderate. The equipment limitation, the hazard of erosion, and the windthrow hazard are severe because of the slope and the shallow depth to bedrock. The seedling mortality rate is moderate because of droughtiness.

The capability subclass is VIIs.

Ip—Ipswich mucky peat. This soil is nearly level, very deep, and very poorly drained. It is in tidal marshes along the Hudson River and Long Island Sound. It is subject to daily tidal flooding. Individual areas are relatively long and narrow and range from 5 to 50 acres in size. Slopes range from 0 to 2 percent but are dominantly less than 1 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark gray mucky peat

Subsurface layers:
8 to 20 inches, very dark gray muck
20 to 33 inches, very dark gray mucky peat

Bottom layer:
33 to 60 inches, very dark grayish brown mucky peat

Included with this soil in mapping are areas of Fluvaquents and Udifluvents and small areas of the Udorthents that have a wet substratum. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Soil properties—

Water table: At the surface to 1 foot above throughout the year
Permeability: Moderate to rapid (0.6-2.0 in/hr) throughout the profile
Available water capacity: Very high
Reaction: Strongly acid to neutral throughout the profile
Surface runoff: Very slow or ponded
Depth to bedrock: More than 60 inches
Flooding: Frequent for very brief periods throughout the year

Most areas of this soil are covered by nonwoody, water-tolerant plants.

Wetness and flooding are the main limitations on sites for dwellings with basements, local roads and streets, septic tank absorption fields, and recreational development. Extensive alterations are necessary to overcome these limitations. Better suited sites should be selected for these uses.

This soil is not suited to cultivated crops or pasture because of the wetness and the flooding.

The capability subclass is VIIIw.

KnB—Knickerbocker fine sandy loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat excessively drained. It is in benchlike areas along streams and on rounded hilltops. Individual areas are somewhat oblong or rounded and range from 2 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

LcB—Leicester loam, 3 to 8 percent slopes, stony. This soil is gently sloping, very deep, and somewhat poorly drained and poorly drained. It is on the lower parts of hillsides and along small drainageways in bedrock-controlled areas. Stones larger than 10 inches in diameter cover 0.01 to 0.1 percent of the surface and are about 25 to 75 feet apart. Individual areas of this unit are irregularly shaped or occur as long and narrow strips about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 18 inches, dark grayish brown sandy loam that has yellowish brown mottles
18 to 26 inches, brown sandy loam that has yellowish brown and grayish brown mottles

Substratum:
26 to 60 inches, brown sandy loam that has yellowish brown, strong brown, and gray mottles

Included with this soil in mapping are areas of the poorly drained and very poorly drained Sun soils in depressions and the moderately well drained Sutton soils in the slightly higher landscape positions. Also included are areas of the well drained Charlton soils in the higher areas and the gravelly, very stony, or bouldery Leicester soils. Included areas are generally 1 to 3 acres in size and make up about 15 percent of the map unit.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and moderate to rapid (0.6-20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or covered by brush. Some areas are used for community development or agriculture.

The main limitation on sites for dwellings with basements is wetness. This soil is more suited to dwellings without basements than to dwellings with basements. Selecting a high area of the map unit, land shaping and grading, and installing a drainage system around the footings help to overcome the wetness.

The wetness is the main limitation on sites for septic tank absorption fields. Installing a drainage system around the absorption fields and installing diversions to intercept water from the higher areas help to overcome this limitation.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Constructing the roads on raised fill material of coarse grained subgrade and installing a drainage system help to overcome these limitations.

This soil is only moderately suited to cultivated crops because of the wetness. Erosion also is a hazard. Installing diversions to intercept water from the higher areas and providing surface ditches help to overcome the wetness. A conservation tillage system that leaves crop residue on the surface helps to control erosion.

This soil is moderately well suited to hay and pasture. The wetness can interfere with some farming activities and can limit the varieties selected for planting. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

LeB—Leicester loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and somewhat poorly drained and poorly drained. It is on the lower parts of hillsides and along small drainageways in bedrock-controlled areas. Stones larger than 10 inches in diameter cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas of this unit are irregular in shape and range from about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 18 inches, dark grayish brown sandy loam that has yellowish brown mottles

18 to 26 inches, brown sandy loam that has yellowish brown and grayish brown mottles

Substratum:
26 to 60 inches, brown sandy loam that has yellowish brown, strong brown, and gray mottles

Included with this soil in mapping are areas of the poorly drained and very poorly drained Sun soils in depressions and the moderately well drained Sutton soils in the slightly higher areas. Also included are areas of the well drained Charlton soils in the higher areas and areas of Leicester soils that are gravelly, extremely stony, or bouldery. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and moderate to rapid (0.6-20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or support brushy plants. Some areas are used for community development.

The main limitation on sites for dwellings with basements is wetness. This soil is more suitable for dwellings without basements than for dwellings with basements. Selecting a high area of the map unit, land shaping and grading, and installing a drainage system around the footings help to overcome the wetness.

The wetness is the main limitation on sites for septic tank absorption fields. Installing a drainage system around the absorption fields and installing diversions to intercept water from the higher areas help to overcome this limitation.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Constructing the roads on raised fill material of coarse grained subgrade and installing a drainage system help to overcome these limitations.

This soil is not suited to cultivated crops because of surface stones and the wetness. It is only poorly suited to permanent pasture. Installing diversions to intercept water from the higher areas and providing surface ditches help to overcome the wetness. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is VIIs.

Pa—Palms muck. This soil is nearly level, very deep, and very poorly drained. It consists of 16 to 51 inches of organic material over mineral soil material. It is in depressions between hills and adjacent to streams. Individual areas are commonly oval or narrow and range from 2 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, very dark brown muck

Subsurface layers:
10 to 34 inches, black muck
34 to 48 inches, dark brown muck

Substratum:
48 to 60 inches, dark gray loam

Included with this soil in mapping are small areas of Carlisle soils that have organic material more than 51 inches thick; Fluvaquents and Udifluvents along drainageways where flooding is frequent; small areas of organic material over sand and gravel; and the poorly drained or very poorly drained, mineral Sun soils surrounding areas of the Palms soil. Also included are small islandlike areas of mineral soils. Included areas make up about 20 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 6 inches above to 12 inches below the surface from September through June, receding to a depth of 24 inches during dry periods
Permeability: Moderately slow to moderately rapid (0.2-6.0 in/hr) in the surface layer and subsurface layer and moderately slow or moderate (0.2-2.0 in/hr) in the substratum
Available water capacity: High
Reaction: Strongly acid to mildly alkaline in the surface layer and subsurface layer
Surface runoff: Very slow or ponded
Depth to bedrock: More than 60 inches

Most areas are wooded or are covered by brush or water-tolerant herbaceous plants.

The main limitations on sites for dwellings with basements are the seasonal high water table, the

ponding, and low strength. Better suited soils are in nearby areas.

The main limitations on sites for septic tank absorption fields are the ponding and slow percolation. Better suited soils are in nearby areas.

The main limitations on sites for local roads and streets are the ponding, frost action, and the low strength. Coarse grained base material and an adequate drainage system are necessary to overcome these limitations. Roads should be routed around areas of this soil if possible.

This soil is poorly suited to cultivated crops, hay, and pasture because of the seasonal high water table, the ponding, and the low strength.

The potential productivity of this soil for timber is moderate. The use of planting and harvesting equipment is limited by the ponding and the low strength. The seedling mortality rate is high because of excess wetness. The seasonal high water table restricts root growth and thus increases the windthrow hazard. Water-tolerant species of ornamental trees and shrubs should be selected for planting.

This soil has good potential as wetland wildlife habitat. Water-tolerant plants provide food and cover for waterfowl, muskrat, mink, and beaver.

The capability subclass is Vw.

Pc—Palms and Carlisle soils, ponded. This unit consists of nearly level, very deep, very poorly drained soils in depressions or in areas bordering lakes or streams. These soils are inundated throughout most of the year. The relative proportion of the two soils varies from one area to another. Some areas are made up entirely of one of the soils, and other areas contain both soils. Slopes are 0 to 1 percent. Individual areas are irregularly shaped or roughly oval and range from 2 to 30 acres in size. They are about 45 percent Palms soil and 40 percent Carlisle soil.

The typical sequence, depth, and composition of the layers of the Palms soil are as follows—

Surface layer:
0 to 10 inches, very dark brown muck

Subsurface layers:
10 to 34 inches, black muck
34 to 48 inches, dark brown muck

Substratum:
48 to 60 inches, dark gray loam

The typical sequence, depth, and composition of the layers of the Carlisle soil are as follows—

Surface layer:
0 to 4 inches, dark reddish brown muck

Subsurface layers:
4 to 52 inches, black muck that has some woody fragments
52 to 60 inches, dark reddish brown muck

Included with these soils in mapping are small areas of inundated mineral soils. Also included in a few areas are small islands of mineral soils above the water level. Bedrock is commonly near the surface of these islands. Small areas of Fluvaquents and Udifluvents are also included at the edge of the mapped areas near streams. Some areas near the edge of the unit may not be covered with water, particularly during the summer. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Properties of the Palms soil—

Water table: 1 foot above to 1 foot below the surface from November through May
Permeability: Moderate or moderately rapid in the organic layers and moderate or moderately slow in the substratum
Available water capacity: Very high
Reaction: Strongly acid to mildly alkaline in the organic layers and slightly acid to moderately alkaline in the substratum
Surface runoff: Ponded
Depth to bedrock: More than 60 inches
Erosion hazard: Susceptible to wind erosion
Flooding: None

Properties of the Carlisle soil—

Water table: 0.5 foot above to 1.0 foot below the surface from September through June
Permeability: Moderately slow to moderately rapid throughout the profile
Available water capacity: Very high
Reaction: Very strongly acid to neutral throughout the profile
Surface runoff: Ponded
Depth to bedrock: More than 60 inches
Erosion hazard: Susceptible to wind erosion
Flooding: None

Areas of these soils are covered by freshwater marshes and support various wetland plants, shrubs, and a few trees.

The main limitations on sites for dwellings, local roads and streets, and septic tank absorption fields are low strength and the prolonged periods of wetness. Adjacent areas of mineral soils in the uplands are more suited to these uses.

These soils are not suited to cultivated crops, hay, or pasture because of the wetness and the ponding.

The potential productivity of these soils for red maple

is moderate. The equipment limitation is severe because of the wetness and the high content of organic matter. The windthrow hazard is severe because of the wetness, which restricts root growth. Seedling mortality also is severe because of the wetness. Trees are generally not grown in areas of these soils.

The capability subclass is VIIIw.

PnB—Paxton fine sandy loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained Ridgebury soils, small areas of Charlton soils that do not have a dense substratum, and areas of rock outcrop. Woodbridge soils are on the lower concave side slopes and at the bottom of hills. Ridgebury soils are along drainageways. The rock outcrop is in a few areas, generally near areas of Chatfield or Hollis soils. Also included are a few soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. A few areas are used for farming, and other areas are wooded (fig. 7).

The main limitation on sites for dwellings with basements is the seasonal wetness. The wetness can be overcome by installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are wetness and frost action. Constructing the roads on raised fill of coarse grained material helps to overcome these limitations.

This soil is suited to pasture, hay, and cultivated crops. Erosion is a slight hazard in cultivated areas. Contour farming and a conservation cropping system that leaves crop residue on the surface help to control erosion.

The potential productivity of this soil for northern red oak is moderate. The seedling mortality rate is moderate because of the wetness.

The capability subclass is IIe.

PnC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and well drained. It is on the sides and tops of broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained Ridgebury soils, small areas of Charlton soils that do not have a dense substratum, and areas of rock outcrop. Woodbridge soils are on the lower concave side slopes and at the bottom of hills. Ridgebury soils are along drainageways. The rock outcrop is in a few areas, generally near areas of Chatfield or Hollis soils. Also included are a few soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

pasture and hay. Other areas are covered by brush or are wooded.

The main limitations on sites for dwellings with basements are seasonal wetness and the slope. Installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings help to overcome the wetness. Land shaping and constructing the dwellings so that they conform to the natural slope of the land help to overcome the slope.

The main limitations on sites for septic tank absorption fields are the slow or very slow permeability in the substratum and the slope. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed. Installing distribution lines on the contour and adding distribution boxes or other structures to ensure even distribution of effluent can help to overcome the slope.

The main limitations on sites for local roads and streets are the seasonal wetness, the slope, and frost action. Building on raised fill material and installing a drainage system help to overcome the wetness. Adding coarse grained subgrade or base material to the soil at frost depth reduces the effects of frost action. Land shaping and grading can help to overcome the slope, or the roads can be designed so that they conform to the natural slope of the land.

This soil is not suited to cultivated crops because of the large stones on the surface. It is suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and increases the hazard of erosion.

The potential productivity of this soil for northern red oak is moderate. The windthrow hazard is moderate because of the restricted rooting depth.

The capability subclass is VIs.

Pt—Pits, gravel. This unit consists of areas that have been excavated for sand and gravel. Individual areas are irregularly shaped and range from 5 to 100 acres in size. Many of the pits have short, steep slopes along the edges.

The rate of water movement through the material is rapid or very rapid. In some areas the water table is at or near the surface throughout most of the year. A few areas are adjacent to streams and are subject to periodic flooding.

Included in mapping are small areas of undisturbed soils. These soils include the excessively drained Hinckley soils, the well drained Riverhead soils, the somewhat excessively drained Knickerbocker soils, and some small areas of the wetter Pompton or Fredon soils. Also included are areas of exposed bedrock, areas of spoil consisting of sandy or gravelly overburden, and a few small ponds.

A few abandoned gravel pits are used for community development. Onsite investigation is needed to determine the feasibility for most uses.

A capability subclass is not assigned.

Pv—Pits, quarry. This map unit consists mostly of exposed bedrock in areas that have been partially mined for rock. Many of these pits have rolling or hilly surfaces and steep or very steep slopes along the edges. Individual areas are irregularly shaped and range from 2 to 40 acres in size.

Included with this unit in mapping are small areas of Charlton, Chatfield, and Hollis soils where the overlying soil material is undisturbed and areas of disturbed soils or soil material. Also included are small areas that are poorly drained or ponded.

Surface runoff ranges from slow to very rapid. Other soil properties vary greatly and can be determined only by onsite investigation. Some abandoned quarries are used for community development. Onsite investigation is needed to determine the potential for most uses (fig. 8).

A capability subclass is not assigned.

Pw—Pompton silt loam, loamy substratum. This soil is nearly level, very deep, and moderately well drained and somewhat poorly drained. It is in flat areas near streams and on small plains in the lowlands. It is subject to rare flooding. Individual areas are long and narrow or are irregularly shaped. They range from about 2 to 15 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, dark brown silt loam

Subsoil:

8 to 15 inches, yellowish brown fine sandy loam

15 to 21 inches, yellowish brown gravelly fine sandy loam that has brown mottles

21 to 26 inches, light olive brown gravelly sandy loam that has grayish brown mottles

Substratum:

26 to 44 inches, dark yellowish brown and dark brown very gravelly loamy sand

44 to 50 inches, dark yellowish brown and brown gravelly sand

50 to 60 inches, yellowish brown gravelly loam that has light brownish gray and yellowish brown mottles

Included with this soil in mapping are areas of the

drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Also included are some areas of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. They are near fast-flowing streams. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Some small areas are susceptible to flooding. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas are mined for sand and gravel or are used for farming.

The slope is the main limitation on sites for dwellings. Land shaping and designing the dwellings so that they conform to the natural slope of the land help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitations on sites for local roads and streets are the slope and a moderate potential for frost action. Adding coarse grained base material during road construction reduces the effects of frost action. Designing the roads so that they conform to the natural slope of the land helps to overcome the slope.

This soil is suited to cultivated crops. The hazard of erosion generally is moderate, but on long slopes it is severe. Contour farming or terraces and a system of conservation tillage that leaves crop residue on the surface help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil tilth and increase the available water capacity.

This soil is well suited to pasture and hay. Periods of droughtiness may reduce yields, but the droughtiness generally is not a significant problem. Erosion is a hazard in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIIe.

RhD—Riverhead loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on the sides of terraces and on small hills adjacent to the uplands. Individual areas are long and narrow or rounded and range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and some areas of Charlton soils. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe

Most areas are wooded. Some areas are used for community development.

The slope is the main limitation on sites for dwellings.

Land shaping and grading can help to overcome this limitation, or the dwellings can be designed so that they conform to the natural slope of the land.

The main limitations on sites for septic tank absorption fields are the slope and a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites, such as areas of Charlton soils on adjacent uplands, should be considered.

The main limitations on sites for local roads and streets are the slope and a moderate potential for frost action. Adding coarse grained base material during road construction reduces the effects of frost action. Designing the roads so that they conform to the natural slope of the land helps to overcome the slope.

This soil is suited to cultivated crops, but the hazard of erosion is severe. A system of conservation tillage that leaves crop residue on the surface, contour farming or terraces, and a conservation cropping system that includes one or more years of close-growing crops help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil tilth and increase the available water capacity.

This soil is suited to pasture and hay. Periods of droughtiness may reduce yields. The hazard of erosion is severe, especially in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is moderate because of the slope.

The capability subclass is IVe.

RhE—Riverhead loam, 25 to 50 percent slopes. This soil is steep, very deep, and well drained. It is on the sides of terraces and on small hills adjacent to the uplands. Individual areas are long and narrow and range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and some areas of Charlton soils. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Very rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Very severe

Most areas are wooded. Some areas are used for community development.

The slope is the main limitation on sites for dwellings. Adjacent areas of Riverhead soils that are less sloping are better suited to this use.

The main limitations on sites for septic tank absorption fields are the slope and a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites are available in adjacent areas of Charlton soils.

The main limitation on sites for local roads and streets is the slope. Designing the roads so that they conform to the natural slope of the land helps to overcome this limitation.

This soil is not suited to cultivated crops because of the very severe hazard of erosion and the slope.

This soil is only poorly suited to pasture and hay. Periods of droughtiness may reduce yields. The hazard of erosion is severe, especially in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is severe because of the slope.

The capability subclass is VIe.

SbB—Stockbridge silt loam, 2 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the top of broad ridges and hills. Individual areas are commonly oblong and range from 3 to 40 acres in size.

Included in mapping are small areas of the well drained Charlton and Paxton soils, the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester and Ridgebury soils, the excessively drained Hinckley soils, and the well drained Riverhead soils. Charlton and Paxton soils are on hills and ridges. They have a subsoil that is more acid than that of the Stockbridge soil. Sutton soils are on slightly concave hillsides. Leicester and Ridgebury soils are in depressions and along drainageways. Hinckley and Riverhead soils are at the margins of the mapped areas on outwash plains and terraces. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Properties of the Stockbridge soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and in the upper part of the subsoil and slow or moderately slow (0.06-0.6 in/hr) in the lower part of the subsoil and in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Most areas of this unit are covered by brush or are wooded. Some areas are used for pasture and hay.

The slope and the Rock outcrop are the main limitations on sites for dwellings with basements. Designing the dwellings so that they conform to the natural slope of the land can help to overcome the slope.

The main limitations on sites for septic tank absorption fields are the slow permeability and the Rock outcrop. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

Roads, streets, driveways, and sidewalks are subject to a moderate potential for frost action. Adding coarse grained subgrade material and installing surface drains reduce the effects of frost action. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This unit is not suited to cultivated crops because of the Rock outcrop. It is suited to hay and pasture. Rotation grazing, applications of fertilizer, and weed and brush control reduce the hazard of erosion in areas used for pasture.

The potential productivity of this unit for northern red oak is moderately high.

The capability subclass is VIs.

Sh—Sun loam. This soil is very deep, nearly level, and poorly drained or very poorly drained. It is in small depressions and along drainageways on till plains. Individual areas are rounded or occur as long and narrow strips about 2 to 10 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown loam

Subsoil:
9 to 19 inches, grayish brown loam that has strong brown and brown mottles and gray ped faces
19 to 27 inches, brown gravelly fine sandy loam that has strong brown and light brownish gray mottles

Substratum:
27 to 40 inches, brown gravelly sandy loam that has gray and strong brown mottles
40 to 61 inches, light olive brown gravelly fine sandy loam

Included with this soil in mapping are areas of the very poorly drained Palms soils, the somewhat poorly drained and poorly drained Leicester and Ridgebury soils, and stony areas or areas of soils that have a surface layer of water-deposited material. Palms soils are in the center of depressions. Leicester and Ridgebury soils commonly are in the slightly higher areas. Included areas make up about 15 percent of the map unit and are generally 1 to 2 acres in size.

Soil properties—

Water table: 1.0 foot above to 0.5 foot below the surface from November through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and slow or very slow (<0.2 in/hr) in the subsoil and substratum
Reaction: Strongly acid to slightly acid in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Very slow
Depth to bedrock: More than 60 inches
Erosion hazard: None or slight

Most areas of this soil are wooded or are covered by brush.

Wetness is the main limitation on sites for dwellings with basements. Better suited sites that are higher on

the landscape should be selected.

The main limitations on sites for septic tank absorption fields are the wetness and the slow rate of water movement in the substratum. Better suited sites should be selected, or a specially designed alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

If drained, this soil is suited to cultivated crops. It also is suited to hay and pasture. The wetness limits the selection of forage crops that can be grown and interferes with farming. Proper stocking rates and restricted grazing during wet periods help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IVw.

Sm—Sun loam, extremely stony. This soil is very deep, nearly level, and poorly drained or very poorly drained. It is in small depressions and along drainageways on till plains. Stones larger than 10 inches in diameter cover 3 to 15 percent of the surface and are 1.5 to 3.0 feet apart. Individual areas are rounded or occur as long and narrow strips about 2 to 10 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown loam

Subsoil:
9 to 19 inches, grayish brown loam that has strong brown and brown mottles and gray ped faces
19 to 27 inches, brown gravelly fine sandy loam that has strong brown and light brownish gray mottles

Substratum:
27 to 40 inches, brown gravelly sandy loam that has gray and strong brown mottles
40 to 61 inches, light olive brown gravelly fine sandy loam

Included with this soil in mapping are areas of the very poorly drained Palms soils and the somewhat poorly drained and poorly drained Leicester and Ridgebury soils. Palms soils are in the center of depressions. Leicester and Ridgebury soils commonly are in the slightly higher areas. Also included are areas that are not stony or areas of soils that have a surface layer of water-deposited material. Included areas make up about 15 percent of the map unit and are generally 1 to 2 acres in size.

Soil properties—

Water table: 1.0 foot above to 0.5 foot below the surface from November through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and slow or very slow (<0.2) in the subsoil and substratum
Reaction: Strongly acid to slightly acid in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Very slow
Depth to bedrock: More than 60 inches
Erosion hazard: None or slight

Most areas of this soil are wooded or are covered by brush.

Wetness is the main limitation on sites for dwellings with basements. Better suited sites that are higher on the landscape should be selected.

The main limitations on sites for septic tank absorption fields are the wetness and the slow rate of water movement in the substratum. Better suited sites should be selected, or a specially designed alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is not suited to cultivated crops or to hay and pasture because of the surface stones and prolonged periods of wetness.

The potential productivity of this soil for red maple is moderate. The equipment limitation is severe because of the wetness. The seedling mortality rate and the windthrow hazard are also concerns.

The capability subclass is VIIs.

positions similar to those of the Sutton soil. They have a dense substratum. Also included are areas of rock outcrop and areas of Sutton soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through April
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: High
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Most areas are used for urban development or are forested. Some areas are covered by brush or are open fields.

The seasonal high water table is the main limitation on sites for dwellings with basements. Installing foundation drains, sealing the foundation, and diverting runoff away from the buildings help to overcome this limitation.

The wetness is a limitation on sites for septic tank absorption fields. It can be reduced by installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas.

The wetness and the potential for frost action are limitations on sites for local roads and streets. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is suited to cultivated crops, but the wetness may hinder some farming activities. Erosion is a moderate hazard. Species that are tolerant of some seasonal wetness should be selected for planting. A conservation tillage system that leaves crop residue on the surface, contour farming, stripcropping, and terraces help to control erosion.

This soil is well suited to pasture and hay. Overgrazing and grazing when the soil is wet are the main management concerns.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIe.

Ub—Udorthents, smoothed. This unit consists of very deep, excessively drained to moderately well drained soils that have been altered by cutting and filling. It is mainly in and adjacent to urban areas, highways, and borrow areas. It is made up of soil material in alternating layers ranging from sand to silt loam. Individual areas are commonly rectangular and range from 5 to 100 acres in size. Slopes are mainly 3 to 15 percent, but they range from 0 to 25 percent. The steeper slopes are at the edges of the mapped areas.

Because of the variability of the Udorthents, a typical pedon is not described. The fill material is commonly more than 20 inches deep over the original soil. The content of rock fragments ranges from 0 to 60 percent.

Included with this unit in mapping are small areas of Udorthents that have a wet substratum, areas of urban land, areas of rock outcrop, and areas of undisturbed soils, such as Riverhead, Charlton, Hollis, Leicester, and Sun soils. The rock outcrop is mainly in areas that have been cut. The undisturbed soils are in small areas adjacent to the unit and in areas within the unit where the fill material is very thin. The Udorthents having a wet substratum are in areas that have been filled but that were formerly somewhat poorly drained to very poorly drained. Included areas are as much as 3 acres in size and make up 15 to 25 percent of the map unit.

The properties and characteristics of the Udorthents are so variable that onsite investigation and evaluation are required to determine the suitability and limitations for proposed uses.

A capability subclass is not assigned.

Uc—Udorthents, wet substratum. This unit consists of somewhat poorly drained and very poorly drained soils that have been altered mainly by filling. Filled areas are in the lower landscape positions, such as depressions, drainageways, and areas of tidal marsh. The fill material ranges in texture from sand to silt loam. Individual areas of this unit are commonly rectangular and range in size from 5 to 50 acres in size. Slopes are dominantly 0 to 3 percent, but they range from 0 to 15 percent.

Because of the variability of the Udorthents, a typical pedon is not described. Fill material is usually more than 20 inches deep over the original soil material. The buried soils range from loamy or sandy mineral material to organic deposits. The fill material includes manufactured materials in some places.

Included with this unit in mapping are small areas of Udorthents that are better drained, areas of urban land, areas of rock outcrop, and areas of undisturbed soils, such as Hinckley, Paxton, Ipswich, Fredon, and Raynham soils. The urban land is in areas of residential or commercial development. The rock outcrop is in areas where the soil has been removed. The undisturbed soils are adjacent to the fill areas and in areas where the fill is very thin. Included areas are as

much as 3 acres in size and make up about 20 percent of the map unit.

The properties and characteristics of the Udorthents are so variable that onsite investigation and evaluation are required to determine the suitability and limitations for proposed uses.

A capability subclass is not assigned.

UdB—Unadilla silt loam, 2 to 6 percent slopes. This soil is gently sloping, very deep, and well drained. It is on stream terraces along valleys. Individual areas are mostly long and narrow and range from about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown silt loam

Subsurface layer:
2 to 7 inches, dark brown silt loam
7 to 13 inches, brown very fine sandy loam

Subsoil:
13 to 28 inches, dark yellowish brown very fine sandy loam
28 to 32 inches, light olive brown very fine sandy loam

Substratum:
32 to 60 inches, yellowish brown very fine sandy loam that has light olive brown mottles

Included with this soil in mapping are areas of the moderately well drained Pompton soils, areas of Riverhead and Knickerbocker soils, and areas of soils that are similar to the Unadilla soil but are moderately well drained. Pompton soils are in the more level areas. Riverhead and Knickerbocker soils are more gravelly or more sandy than the Unadilla soil. They commonly are in the higher positions on the landscape. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer, subsurface layer, and subsoil and moderately rapid or rapid (2.0-20 in/hr) in the substratum
Available water capacity: High
Reaction: Very strongly acid to moderately acid in the surface layer, subsurface layer, and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Areas of this soil are used for community development, farming, or recreation, or they are forested or covered by brush and nonwoody plants.

No major limitations affect the use of this soil as a site for dwellings with basements or for septic tank absorption fields. Erosion is a hazard during construction. Temporary erosion-control structures should be used during construction.

Local roads and streets are subject to a high potential for frost action. Replacing the upper layers of this soil with more suitable base material can reduce the damage caused by frost heave.

This soil is well suited to crops, hay, and pasture. It can be easily tilled and can be farmed intensively if well managed. Erosion is the main hazard. Contour farming and a system of conservation tillage can help to control erosion. Using cover crops and returning crop residue to the soil can help to maintain soil tilth and increase the rate of water infiltration. Proper stocking rates, rotation grazing, and restricted grazing during very wet periods help to prevent surface compaction and deterioration of the sod cover and help to control erosion.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIe.

Uf—Urban land. This unit consists of areas where at least 60 percent of the land surface is covered with buildings or other structures. The areas include parking lots, shopping centers, industrial parks, and institutional sites. Much of the Urban land is in the business centers of villages and cities. Most areas are long and narrow or are rectangular. The long and narrow areas are mainly along highways. Individual areas of this unit range from 5 to 600 acres in size. Slopes range from 0 to 8 percent.

Included in mapping are small areas of soils that have not been appreciably altered, such as Riverhead, Chatfield, Sutton, and Unadilla soils. The undisturbed soils are in areas between buildings or other structures. Also included are areas of Udorthents in disturbed areas that are not covered by buildings or other structures. Included areas make up 5 to 20 percent of the map unit.

Reclamation is required if Urban land is converted from its present use. The areas of included soils that are not covered by structures are suitable for uses that are compatible with Urban land.

A capability subclass is not assigned.

UhB—Urban land-Charlton complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, and gently sloping Charlton

foundation, and land shaping to divert surface water away from the buildings.

The main limitations on sites for septic tank absorption fields are the slope and the slow or very slow permeability in the substratum. More suitable sites should be selected, or a specially designed system can be installed.

The main limitation on sites for local roads and streets is the slope. Constructing the roads on the contour and land shaping and grading help to overcome this limitation.

A capability subclass is not assigned.

UrB—Urban land-Ridgebury complex, 1 to 8 percent slopes. This unit consists of areas of Urban land and the gently sloping, very deep, poorly drained and somewhat poorly drained Ridgebury soil. It is on the lower parts of hillsides in the uplands and along small drainageways. Individual areas are irregularly shaped or blocky and generally range from 5 to 75 acres in size. They are about 60 percent Urban land, 25 percent Ridgebury soil, and 15 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Ridgebury soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 16 inches, brown gravelly fine sandy loam that has light brownish gray and dark yellowish brown mottles
16 to 26 inches, grayish brown gravelly fine sandy loam that has yellowish brown and light olive brown mottles

Substratum:
26 to 34 inches, light olive brown gravelly fine sandy loam that has grayish brown and olive yellow mottles
34 to 60 inches, olive brown gravelly loam that has brownish yellow mottles

Included in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the moderately well drained Woodbridge soils, and bouldery areas. Sun soils are in depressions. Woodbridge soils are in the higher areas. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Properties of the Ridgebury soil—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Medium or rapid
Erosion hazard: Severe during construction
Depth to bedrock: More than 60 inches

Most areas of this unit are used for residential or urban development. Trees or brushy plants are in many vacant areas between buildings. Some areas are used for gardens.

The main limitation on sites for dwellings with basements is the wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings removes surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Better suited sites should be selected, or an alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

A capability subclass is not assigned.

UvB—Urban land-Riverhead complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the gently sloping, very deep, well drained Riverhead soil. It is in benchlike areas along streams and on broad plains. Individual areas are rectangular or irregularly shaped and range from 2 to 150 acres in size. They are about 50 percent Urban land, 25 percent Riverhead soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Riverhead soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included in mapping are small areas of Hinckley soils, small areas of Knickerbocker soils, areas of the moderately well drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Also included are areas of Udorthents adjacent to buildings and other structures; narrow areas of Fluvaquents and Udifluvents; and some areas, near fast-flowing streams, of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Riverhead soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas are used for community development. Areas between structures are wooded or are used for lawns and gardens.

No major limitations affect the use of the Riverhead soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitation on sites for local roads and streets is a moderate potential for frost action. Adding coarse grained base material to the soil during road construction can help to overcome this limitation.

A capability subclass is not assigned.

UvC—Urban land-Riverhead complex, 8 to 15 percent slopes. This unit consists of areas of Urban land and the strongly sloping, very deep, well drained Riverhead soil. It is along streams and hillsides. Individual areas are rectangular or irregularly shaped and range from 2 to 75 acres in size. They are about 50 percent Urban land, 25 percent Riverhead soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Riverhead soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included in mapping are small areas of Hinckley soils, small areas of Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Also included are areas of Udorthents adjacent to buildings and other structures; narrow areas of Fluvaquents and Udifluvents; and some areas, near fast-flowing streams, of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Riverhead soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the

APPENDIX B

COMMUNITY TYPE AFFILIATIONS FOR PLANTS AND WILDLIFE OBSERVED AT CAMP SMITH

APPENDIX B

COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
PLANTS (1)															
Canopy Trees															
American beech	*Fagus grandifolia*	X													
American elm	*Ulmus americana*	X		X							X				
Basswood	*Tilia americana*	X													
Bigtooth poplar	*Populus grandidentata*	X													
Black ash	*Fraxinus nigra*										X				
Black birch	*Betula lenta*	X													
Black oak	*Quercus velutina*	X	X				X								
Black willow	*Salix nigra*									X					
Chestnut oak	***Quercus montana***		**X**					**X**							
Gray birch	*Betula populifolia*			X							X				
Mockernut hickory	*Carya tomentosa*	X													
Northern hemlock	*Tsuga canadensis*	X			X										
Pignut hickory	*Carya glabra*	X													
Pitch pine	*Pinus rigida*		X		X		X								
Red maple	*Acer rubrum*	X	X	X						X					
Red oak	*Quercus rubra*	X	X					X							
Scarlet oak	*Quercus coccinea*		X				X								
Shagbark hickory	*Carya ovata*	X													
Silver maple	*Acer saccharinum*										X				
Slippery elm	*Ulmus rubra*			X											
Sugar maple	*Acer saccharum*	X						X							
Sycamore	*Platanus occidentalis*	X													
Tulip-tree	*Liriodendron tulipifera*	X													
White ash	*Fraxinus americana*	X		X				X							
White oak	*Quercus alba*	X	X				X	X							
White pine	*Pinus strobis*	X		X											
Willow	***Salix* ssp.**									**X**					
Yellow birch	*Betula alleghaniensis*										X				

(1) Names listed in synonymy, or casually mentioned as representing hybrids or introduced plants that may not be fully established in our range, are given in **bold** type.

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COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
Understory Trees															
American hornbeam	*Carpinus caroliniana*	X													
Black cherry	*Prunus serotina*	X		X											
Black locust	*Robinia pseudoacacia*			X											
Blackgum	*Nyssa sylvatica*										X				
Choke cherry	*Prunus virginiana*	X													
Devil's walking-stick	*Aralia spinosa*	X													
Eastern hop hornbeam	*Ostrya virginiana*	X	X				X								
Eastern red cedar	*Juniperus virginiana*			X		X									
Flowering dogwood	*Cornus florida*	X													
Sassafras	*Sassafras albidum*	X	X	X											
Striped maple	*Acer pensylvanicum*	X						X							
Witch hazel	*Hamamelis virginiana*	X	X												
Shrub Layer															
Alder	*Alnus incana* ssp. *rugosa*									X					
Blueberry	*Vaccinium pallidum*	X	X			X	X								
Buttonbush	*Cephalanthus occidentalis*									X	X				
Dogwood	*Cornus amomum*									X					
False indigo	*Amorpha fruiticosa*										X				
Highbush blueberry	*Vaccinium corymbosum*	X								X	X				
Hobblebush	*Viburnum lantanoides*	X													
Mountain laurel	*Kalmia latifolia*		X		X	X	X	X							
Red raspberry	*Rubus idaeus*	X													
Sweet pepper-bush	*Clethra alnifolia*									X					
Winterberry	*Ilex verticellata*									X					
Vine Layer															
Fox grape	*Vitis labrusca*	X		X											
Poison ivy	***Toxicodendron radicans***	X	X	X	X						X				
River bank grape	*Vitis riparia*										X				
Virginia creeper	*Parthenocissus quinquefolia*	X													

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COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
Herb Layer															
Alumroot	*Heuchera americana*	X													
American eel-grass	*Vallisneria americana*												X		X
Arrowhead	*Sagittaria latifolia*													X	
Arrowleaf	*Peltandra virginica*													X	
Baltic rush	***Juncus balticus***								**X**	**X**					
Bird's-foot trefoil	*Lotus corniculatus*								X				X		
Bracken	*Pteridium aquilinum*	X	X	X					X						
Bulrush	*Scirpus americanus*													X	
Bulrush	*Scirpus atrovirens*											X	X		
Christmas fern	*Polystichum acrostichoides*	X													
Cinnamon fern	*Osmunda cinnamomea*										X		X		
Common reedgrass	*Phragmites australis*												X	X	
Coontail	*Ceratophyllum demersum*														
Dogbane	*Apocynum cannabinum*	X							X						
Elodea	*Elodea* sp.												X		
Eurasion milfoil	*Myriophyllum spicatum*												X		
Fern	*Onoclea sensibilis*										X				
Hairgrass	*Deschampsia flexuosa*	X	X	X	X	X	X	X							
Hawkweed	*Hieracium venosum*	X	X	X					X						
Hog-peanut	*Amphicarpaea bracteata*	X													
Indian cucumber	*Medeola virginiana*	X													
Kentucky bluegrass	*Poa pratensis*								X						
Manna grass	*Glyceria borealis*									X	X	X	X		
Mudwort	*Limosella* sp.														X
Narrowleaf cattail	*Typha angustifolia*													X	X
Panic grass	*Panicum* spp.	X	X				X								
Pennsylvania sedge	*Carex pensylvanica*	X	X		X	X	X								
Pickerelweed	*Pontederia cordata*												X		
Pondweed	*Potamogeton* sp.												X		
Purple loosestrife	*Lythrum salicaria*													X	
Reed	*Phragmites australis*													X	
Royal fern	*Osmunda regalis*										X		X		
Sarsparilla	*Aralia nudicaule*	X	X												

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COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
Herb Layer (cont)															
Scurfy pea	*Psoralea* sp.								X						
Sedge	*Carex argyrantha*					X									
Sedge	*Carex bromoides*	X													
Sedge	*Carex comosa*											X	X	X	
Sedge	*Carex complanata*		X		X		X								
Sedge	*Carex crinita*												X	X	
Sedge	*Carex interior*	X	X			X									
Sedge	*Carex intumescens*											X	X	X	
Sedge	*Carex muhlenbergii*		X												
Sedge	*Carex seorsa*												X		
Sedge	*Carex spicata*										X		X	X	
Sedge	*Carex stipata*										X		X	X	
Sedge	*Carex stricta*										X		X	X	
Sedge	*Carex virescens*	X													
Sedge	*Carex vulpinoidea*												X		
Skunk cabbage	*Symplocarpus foetidus*									X	X	X			
Smartweed	*Polygonum sp.*													X	
Soft rush	*Juncus effusus* var. *solutus*									X	X		X		
Sweet fern	*Comptonia peregrina*		X			X	X	X							
Venus's looking-glass	***Specularia perfoliata***	X	X												
Wedge grass	*Sphenopholis intermedia*	X	X	X											
Whorled loosestrife	*Lysimachia quadrifolia*					X									
Wild strawberry	*Fragaria virginiana*	X													

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COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
WILDLIFE															
Mammals															
Eastern chipmunk	*Tamias striatus*	X	X	X	X	X	X	X	X	X					
Eastern mole (dead)	*Scalopus aquaticus*	X													
Gray fox	*Urocyon cinereoargenteus*	X													
Gray squirrel	*Sciurus carolinensis*	X	X	X	X	X	X	X	X	X	X				
Muskrat	*Ondatra zibethicus*													X	X
Raccoon (tracks)	*Procyon lotor*	X							X						X
Virginia opossum (tracks)	*Didelphis virginiana*	X													
White-tailed deer	*Odocoileus virginianus*	X	X	X		X	X	X	X	X	X			X	X
Birds															
Acadian flycatcher	*Empidonax virescens*	X	X												
American crow	*Corvus brachyrhynchos*	X							X						
Barn swallow	*Hirundo rustica*								X					X	
Black-and-white warbler	*Mniotilta varia*	X													
Blue jay	*Cyanocitta cristata*	X	X	X					X						
Brown-headed cowbird	*Molothrus ater*								X						
Canada goose	*Branta canadensis*								X						
Cedar waxwing	*Bombycilla cedrorum*	X													
Common flicker	*Colaptes auratus*	X	X					X	X						
Common grackle	*Quiscalus quiscula*								X						
Common yellowthroat	*Geothlypis trichas*													X	
Eastern bluebird	*Sialia sialis*			X											
Eastern phoebe	*Sayornis phoebe*	X	X								X				
Eastern wood-pewee	*Contopus virens*	X	X								X				
European starling	*Sturnus vulgaris*								X						
Hairy woodpecker	*Picoides villosus*	X													
Indigo bunting	*Passerina cyanea*	X													
Killdeer	*Charadrius vociferus*								X						
Least flycatcher	*Empidonax minimus*	X	X												
Mute swan	*Cygnus olor*								X						
Northern mockingbird	*Mimus polyglottos*								X						
Ovenbird	*Seiurus aurocapillus*	X													
Purple finch	*Carpodacus purpureus*	X							X						
Red-eyed vireo	*Vireo olivaceus*	X													
Red-tailed hawk	*Buteo jamaicensis*	X	X												
Red-winged blackbird	*Agelaius phoeniceus*									X				X	
Robin	*Turdus migratorius*	X	X						X		X				

APPENDIX B

COMMUNITY TYPE AFFILIATIONS FOR SPECIES OBSERVED AT CAMP SMITH
JUNE 1996 SURVEY

Common Name	Scientific Name	Mixed hardwood forest	Chestnut oak forest	Successional	Cliff community	Rocky summit grass.	Pitch pine-oak-heath	Acidic talus slope	Terrestrial cultural	Shrub swamp	Red-maple swamp	Vernal pool	Palustrine cultural	Brackish tidal marsh	Brackish mudflat
Birds (cont)															
Rufous-sided towhee	*Pipilo erythrophthalmus*	X	X												
Scarlet tanager	*Piranga olivacea*	X	X												
Sharp-shinned hawk	*Accipiter striatus*	X			X										
Song sparrow	*Melospiza melodia*	X	X	X					X					X	
Tufted titmouse	*Parus bicolor*	X							X	X					
Turkey vulture	*Cathartes aura*														
Veery	*Catharus fuscescens*	X									X	X			
White-breasted nuthatch	*Sitta carolinensis*	X													
Wild turkey	*Meleagris gallopavo*	X	X												
Wood thrush	*Hylocichla mustelina*	X									X	X			
Reptiles															
Black rat snake	*Elaphe obsoleta*	X							X						
Eastern box turtle	*Terrapene carolina*	X							X						
Eastern painted turtle	*Chrysemys picta*	X										X			
Amphibians															
American toad	*Bufo americanus*								X	X		X			
Bull frog	*Rana catesbeiana*								X	X		X			
Red-spotted newt	*Notophthalmus viridescens*	X	X									X			

APPENDIX C

AGENCY CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

August 18, 2009

Mr. Paul McDonald
Director of Facilities Management and Engineering
State of New York Division of Military and Naval Affairs
330 Old Niskayuna Road
Latham, NY 12110-3514

Dear Mr. McDonald:

This is in response to your January 9, May 6, and August 5, 2009, letters requesting review of Draft Integrated Management Natural Resource Management Plans (INRMP) for the following Army National Guard Training Sites in New York State:

Camp Smith in the Town of Cortlandt, Westchester County;
Guilderland in the Town of Guilderland, Albany County; and
Youngstown in the Town of Porter, Niagara County.

Thank you for the opportunity to review these documents. We apologize for the time that has passed since your initial request in January 2009. Given current staffing levels, we are unable to provide extensive comments. However, we offer the following technical assistance pursuant to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) by INRMP.

All

We recommend in Section 6 of each INRMP that you mention you have reviewed the U.S. Fish and Wildlife Service (Service) website* for current listed and proposed species information by county and will continue to review this site in the future.

Youngstown

As you are aware, there are currently no Federally-listed or proposed species at this site and we have no further comments at this time.

Camp Smith

We have several comments regarding Tables 2.4 and 6.1. The peregrine falcon (*Falco peregrinus*) footnote is incorrect (should be 2 instead of 1). We recommend the footnote for Indiana bat (*Myotis sodalis*) also reference the 2007 Woodlot surveys. We recommend the footnote for bog turtle (*Clemmys [=Glyptemys] muhlenbergii*) reference potential for species and planned surveys.

Indiana bat

We understand that mist-net surveys were completed in 2007 and that no Indiana bats were captured. Please provide Ms. Robyn Niver, of this office, a copy of the 2007 Woodlot bat survey report. At this time we have no further recommendations for Indiana bats at Camp Smith beyond a slight modification to your recommendation to conduct mist-netting; we encourage a shorter time interval than 10 years (3-5).

Bog turtle

We agree with your recommendation to conduct surveys for bog turtle habitat and potentially for the turtles. Rare species goal #2 states that you plan to conduct bog turtle surveys in areas of potential habitat. These are Phase 2 surveys but your text on page 6-11 seems to reference Phase 1 habitat surveys. Please note that Phase 1 and 2 surveys for bog turtles should be conducted by qualified surveyors. We have enclosed a list of current known surveyors for your use. Please coordinate these efforts with both the Service and New York State Department of Environmental Conservation (NYSDEC) and provide results (positive or negative) to us. The NYSDEC contact for the Endangered Species Program is Mr. Peter Nye, Endangered Species Unit, NYSDEC, 625 Broadway, Albany, NY 12233 (518-402-8859)

New England cottontail

The New England cottontail (*Sylvilagus transitionalis*) has the potential to occur at Camp Smith. This species is known to occur in the Town of Mount Kisco, Westchester County, and Town of Putnam Valley, Putnam County, as well as other more distant areas from Camp Smith. The New England cottontail is a candidate species which is being considered by the Service for addition to the Federal List of Endangered and Threatened Wildlife and Plants. Candidate species are species for which the Service has on file sufficient information on the biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions. Candidate species do not receive substantive or procedural protection under the ESA; however, the Service does encourage Federal agencies and other appropriate parties to consider these species in the project planning process.

Should the New England cottontail be proposed for listing as endangered or threatened, conference procedures pursuant to Section 7(a)(4) of the ESA may be necessary if proposed actions at Camp Smith may affect New England cottontails. Please visit our website* for more information on New England cottontail.

Guilderland

The footnotes appear incomplete or incorrect in Tables 2.4 and 6.1.

Indiana bat

We understand that mist-net surveys were completed in 2007 and that no Indiana bats were captured. Please provide Ms. Niver a copy of the 2007 Woodlot bat survey report. Given the close proximity of the site to a previously documented Indiana bat hibernaculum (Haile's Cave), the Service would have assumed presence of Indiana bats regardless of mist-net survey results. However, it appears that white-nose syndrome has effectively resulted in extirpation of Indiana bats from that site and the Service is not currently requesting further consultation on Indiana bats in Albany County. Please continue to review our website* every 90 days to ensure that you have the most accurate information regarding Indiana bats in Albany County.

Thank you for your time and consideration of these comments. If you require additional information please contact Robyn Niver or Sandra Doran at (607) 753-9334.

Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

*Additional information referred to above may be found on our website at: http://www.fws.gov/northeast/nyfo/es/section7.htm

cc: NYSDEC, Allegany, New Paltz, Schenectady, NY (Attn: Env. Permits)
NYSDEC, Albany, NY (Endangered Species; Attn: P. Nye)
NYSDEC, Albany, NY (Natural Heritage)
FWS, Hadley, MA (K. Hastie)

RECOGNIZED QUALIFIED BOG TURTLE SURVEYORS FOR THE HUDSON RIVER/HOUSATONIC RECOVERY UNIT IN NEW YORK

The following list includes individuals experienced in field herpetology that the U.S. Fish and Wildlife Service, New York Field Office, and the New York State Department of Environmental Conservation Endangered Species Unit currently 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. This list will be updated periodically. Inclusion of names on this list does not constitute endorsement by the Service or any other U.S. Government agency or State agency.

Scott Angus
Amy S. Greene Environmental Consultants, Inc.
Walter E. Foran Blvd., Suite 209
Flemington, NJ 08822
Work: 908-788-9676 ext. 22
sangus@amygreene.com

Dr. Rudolf Arndt
The Richard Stockton College
Jimmy Leeds Road
Pomona, New Jersey 08240
Home: (609) 965-9089
Work: (609) 652-4432
Rudolf.Arndt@stockton.edu

Tessa Mai Bickhart
Michael Torocco
Herpetological Associates, Inc.
581 Airport Road
Bethel, PA 19507
Office: 717-933-8380
Fax: 717-933-4096
mtorocco@herpetologicalassociates.com
tbickhart@herpetologicalassociates.com.
www.herpetologicalassociates.com

Stan Boder
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803
Office: (814) 689-1650
Cell: (570) 952-1169
Fax: (814) 689-1557
stanb@whmgroup.com

Kurt A. Buhlmann, Ph.D.
University of Georgia Savannah River Ecology Laboratory (SREL)
Drawer E, Building 737-A
Aiken, South Carolina 29802 USA
803-725-5293 (W) 803-725-3309 (Fax)
kbuhlmann@earthlink.net

Bryon DuBois
Trident Environmental Consultants
1658 Route 9
Toms River, New Jersey 08755
Work: (732) 818-8699
bdubois@tridentenviro.com

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31 Fayette Avenue
Staten Island, NY 10305
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or Farrell31@aol.com

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5726 Kesslersville Road
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FAX: (610) 258-0149
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Erik Kiviat, PhD
Executive Director, Hudsonia Ltd.
P.O. Box 5000
Annandale NY 12504 USA;
Work: (845) 758-7273
kiviat@bard.edu; www.hudsonia.org

Michael W. Klemens, PhD
PO Box 506
Salisbury, CT 06068
fenbois@comcast.net

Michael Kovacs
David Moskowitz
Laura Newgard
EcolSciences, Inc.
75 Fleetwood Drive, Suite 250
Rockaway, New Jersey 07866
Work: (973) 366-9500
lnewgard@ecolsciences.com

Revised 04/27/2009

APPENDIX D

CAMP SMITH TRAINING SITE

HUNTING PROGRAM INFORMATION

CAMP SMITH TRAINING SITE HUNTING RULES
NEW YORK DIVISION OF MILITARY AND NAVAL AFFAIRS
ENVIRONMENTAL OFFICE, LATHAM, NEW YORK
HUNTING SEASON: 2012-2013

1. Military training and other mission requirements at Camp Smith will take precedence over hunting. The installation may be closed to hunting at anytime when determined necessary by the Post Director or the Range Control Officer. Notices of hunting closures will be posted at the Camp Smith Range Control Office and the main gatehouse. Individual hunters are responsible for confirming hunting schedules with the Range Control Officer or by checking at the main gate.

2. Access to Camp Smith for hunting is limited based on safety and military mission constraints. Individuals eligible to hunt include active or retired New York Army National Guard and New York Division of Military and Naval Affairs personnel and their immediate family members (spouse, parents, and children/grandchildren). Minors (less than 18 years old) must be accompanied by an adult at all times. Only selected Camp Smith employees, as designated by the Post Director are authorized to hunt resident Canada geese.

3. All hunters must possess a valid New York State hunting license and adhere to all New York State Environmental Conservation Laws and New York State Department of Environmental Conservation Hunting Regulations.

4. Camp Smith will be open to hunting on selected days during hunting seasons established by New York State and specified in approved Camp Smith Hunting Rules, unless the installation is closed to hunting by the Post Director or Range Control Officer.

5. All hunters are required to receive a Camp Smith Hunter's Safety Briefing prior to being issued a permit. Briefings will be held at Camp Smith two times during October and two times during April, annually. Specific dates, times, and locations for the briefings will be announced and advertised by the Environmental Office by 1 August and 1 April annually. The Environmental Office and Range Control will maintain a record of hunters that have completed the briefing.

6. All hunters must obtain a no fee Camp Smith Hunting Permit. Permits may be obtained by submitting a completed Camp Smith Hunting Permit Application to: Natural Resources Manager (Attn. Hunting Application), New York Division of Military and Veterans Affairs, Environmental Office, MNFE-EC, Latham, NY 12110-2224, Ph. (518) 786-4318, Fax (518) 786-4319. Applications may be submitted starting 1 October (deer) and 1 April

(turkey), annually. Permits will be issued on a first-come/first-served basis. Permits may be requested for up to five consecutive days of hunting and up to a total of 15 days per season. The Camp Smith Hunting Rules, a Camp Smith Hunting Map, and a Camp Smith Hunter Survey form will be issued with each permit.

7. All hunters must sign in and sign out on the Camp Smith Hunter Log located at Camp Smith Range Control. Upon sign in, all hunters must present their Camp Smith Hunting Permit and state hunting license to the Range Control Officer.

8. The hunting permit, state hunting license, Camp Smith Hunting Rules, and Camp Smith Hunting Map must be carried on person while hunting.

9. Each Hunting Permit will specify the date(s), time(s), hunting location (Training Area number), access points, and sex and species of game allowed for each permitted hunter. Hunter density will be limited to no more than one person per training area per day, with the exception of those minors that must be accompanied by an adult. Hunters shall not leave their assigned hunting area. If an animal is hit and must be tracked outside of the hunter's assigned area, they must contact and obtain approval from the Range Control Officer prior to tracking the animal.

10. Deer and turkey hunting will be limited to Training Areas 1 through 4, contingent upon availability based on training schedules. Resident Canada goose hunting will be limited to the Range 2 and 3 footprints, firing only within the approved safety fans. Access to all "off-limits areas" shown on the Camp Smith Hunting Map is strictly prohibited for safety reasons. Hunting is prohibited within 500 feet off all "off-limits areas" shown on the Camp Smith Hunting Map. These areas include, but are not limited to; all range impact areas. Hunters are responsible for knowing the location of the boundaries for all areas shown on the Camp Smith Hunting Map.

11. The use of portable tree stands is authorized, but no permanent tree stands may be erected.

12. Cutting or removal of vegetation is not authorized.

13. Permitted hunters may be authorized access to conduct pre-season game scouting on selected days during October (deer) and April (turkey). Requests to conduct scouting must be made directly to Range Control and hunters must sign in and out at Range Control. Scouting will be limited based on training area schedules.

14. All hunters must complete Camp Smith Hunter Survey for each day that they were issued a permit, regardless of whether or not they hunted on that day. Completed surveys must be

submitted in person at Range Control prior to leaving Camp Smith. If a hunter does not hunt on an assigned day, the survey must be submit within two days of the scheduled hunting date(s) by mail or fax to: Natural Resources Manager (Attn. Hunting Survey), New York Division of Military and Veterans Affairs, Environmental Office, MNFE-EC, Latham, NY 12110-2224, Ph. (518) 786-4318, Fax (518) 786-4319. This survey provides valuable biological information for the Camp Smith Fish and Wildlife Management Program to enhance hunting opportunities at installation.

15. Failure to comply with Camp Smith Hunting Rules or New York State laws and regulations will result in loss of hunting privileges and possible prosecution under New York State law.

16. The Camp Smith Hunting Rules will be updated annually by the Natural Resources Manager and submitted for approval to the Adjutant General and Post Director before 1 March. The Environmental Office will announce and advertise approved Camp Smith Hunting Rules by 1 April annually.

17. Seasons and bag limits for 2012-2013, all NYSDEC regulations apply:

Species	Season[(1)]	Bag Limit[(1)]	Special Conditions
White-tailed deer	1 Oct – 31 Dec. Archery only	1 with regular season deer tag 1 with bow either sex deer tag 1 with bow antlerless deer tag	Antlered or antlerless. Antlered or antlerless. Antlerless.
		2 additional with DEC Deer Management Permits, 1 per day	Antlerless.
		2 additional with DEC Bonus Permits, 1 per day	Antlerless.
Wild turkey	Fall 1 Oct – 16 Nov	2 either sex, 2 per day	Fall turkey hunting at Camp Smith is limited to archery only to avoid conflicts with archery-only deer hunting.
	Spring 1 May – 31 May	2 bearded turkeys, 1 per day	
Resident Canada goose	1 – 25 Sep 27 Oct – 11 Dec 29 Dec – 15 Jan 23 Feb – 10 Mar	8 per day 5 per day 5 per day 5 per day	Selected Camp Smith employees only, as designated by Post Director. Ranges 1 and 2 only.

[(1)]Seasons and bag limited subject to change based on 2012-2013 regulations published by NYSDEC.

Recommended for Approval by:

Peter Jensen Date
Natural Resources Manager, DMNA

Approved by:

Mark Warnecke Date
Post Director, Camp Smith Training Site

CAMP SMITH TRAINING SITE HUNTING APPLICATION AND PERMIT
NEW YORK DIVISION OF MILITARY AND NAVAL AFFAIRS

Applicant Information
(a separate application must be submitted for each hunter)

(full name)	(street address)	(town)	(state and zip)
(work phone)	(home phone)	(e-mail)	
(hunting license #)	(application date)	(applicant's affiliation: unit/depart. name/location, retire/active; guests: provide name, relationship, and affiliation of sponsor)	

Requested Hunting Dates and Hunting Areas
(you may request hunting for up to 5 consecutive days and up to 15 total days per season, permits issued on a first come/first served basis)

1st Request:			
	(dates)	(TA #, 1st choice)	(TA #, 2nd choice)
2nd Request:			
	(dates)	(TA #, 1st choice)	(TA #, 2nd choice)
3rd Request:			
	(dates)	(TA #, 1st choice)	(TA #, 2nd choice)

The applicant agrees to abide by all Camp Smith Hunting Rules and understands that the installation can be closed to hunting without notice due to military training and other mission requirements.

(applicant's signature)

Submit application by mail or fax to: Natural Resources Manager (Attn. Hunting Application), New York Division of Military and Veterans Affairs, Environmental Office, MNFE-EC, Latham, NY 12110-2224, Ph. (518) 786-4318, Fax (518) 786-4319.

Permit Information
(for Environmental Office use only)

Application Received:			
	(date)	(time)	

The above applicant has permission to enter the area(s) below at the specified access point(s) during the date(s) and time(s) shown for the purpose of hunting only, subject to the New York State Environmental Conservation Law, New York State Department of Environmental Conservation Hunting Regulations, and Camp Smith Hunting Rules. Copies of the Camp Smith Hunting Rules and Camp Smith Hunting Map have been attached to this permit. Permit and attachments must be carried on person while hunting.

Permit Issued:			
	(permit #)	(issuing agent's signature)	(date issued)
1st Request:			
	(dates and times)	(TA #)	(access point)
2nd Request:			
	(dates and times)	(TA #)	(access point)
3rd Request:			
	(dates and times)	(TA #)	(access point)

Game Species and Sex Authorized:

Rev. 0, 2/23/01

CAMP SMITH TRAINING SITE HUNTER SURVEY
NEW YORK DIVISION OF MILITARY AND NAVAL AFFAIRS

This survey provides valuable information for the Camp Smith Fish and Wildlife Management Program to enhance hunting opportunities at installation. Please complete this survey for each day that you were issued a permit, regardless of whether or not you hunted on that day. Please submit the completed survey in person to Range Control prior to leaving Camp Smith. If you did not hunt on assigned day, submit within two days of your scheduled hunting date(s) by mail or fax to: Natural Resources Manager (Attn. Hunting Survey), New York Division of Military and Veterans Affairs, Environmental Office, MNFE-EC, Latham, NY 12110-2224, Ph. (518) 786-4318, Fax (518) 786-4319. Failure to submit a completed survey will result in loss of hunting privileges.

Hunter Information:			
	(full name)	(NYS hunting license #)	(Camp Smith permit #)
Date & Location:			
	(date)	(TA #)	
Did you hunt on this date?	YES	NO	
If not, why where you unable to hunt on this date?			
If yes, please complete the following:			
Hunting Time:			
	(start time)	(end time)	(total hours hunted)
Deer Observed:			
	(# bucks)	(# antlerless)	(total #)
Shoots Taken:			
	(misses)	(hits)	(kills)
Deer Harvested:			
	(buck)	(# of antler points)	(doe)
Wild Turkey Observed:			
	(total #)		
Shoots Taken:			
	(misses)	(hits)	(kills)
Wild Turkey Harvested:			
	(beard length [inches])		

How would you rate the quality of your hunting experience? (circle #)	1	2	3	4	5
	(poor)	(fair)	(average)	(good)	(outstanding)

Please use the space provided below to provide additional information about your hunt:

CAMP SMITH TRAINING SITE HUNTER LOG
(Dates: from __________ to __________)

Hunters must sign in and out at the installation main gatehouse. Upon sign in, all hunters must present their Camp Smith Hunting Permit and state hunting license to the gate attendant

Date	Name	Signature	Permit #	TA #	Time in	Time out

APPENDIX E

CAMP SMITH TRAINING SITE

FISHING PROGRAM INFORMATION

State of New York
Division of Military and Naval Affairs
Camp Smith
Cortlandt Manor, New York 10567-5000

MNCS 1 August 2008

MEMORANDUM FOR RECORD

SUBJECT: Fishing on Camp Smith Training Site

1. Fishing is authorized on Camp Smith Training Site (CSTS) effective 1 November 2005. Broccy Creek Reservoir and Dickiebush Lake are the only locations at which fishing will be authorized on post.

2. Military members, DMNA employees, retired military personnel and retired DMNA employees are the only personnel authorized to fish on post. Each member is authorized to bring family members or one non-family guest, two guests if the second guest is less than 16 years of age.

3. Upon arrival to Camp Smith, anglers will report to building 82 (Range Operations) to sign in. At this time personnel will be required to display a valid fishing license. Personnel without a valid New York State Fishing license by New York State Department of Environmental Conservation (NYS DEC) will not be allowed to fish on Camp Smith. Anglers under 16 are not required by NYS law to have a fishing license. Anglers will be required to surrender their driving license or other form of identification to Range Operations while they are fishing on post and it will be returned to them upon turning in vehicle pass and creel survey.

4. Four anglers at a time are authorized on Dickiebush Lake or Broccy Creek Reservoir at any given time. Range Operations will enforce this policy.

5. Hours of operation are from 0800-1530 daily, seven days a week, or during Range Operations duty hours (which ever is greater) only. Camp Smith will be closed for fishing on federal holidays and any other days Range Operations is not on duty. Personnel are authorized to fish during these hours only. Access to the fishing areas is always subject to weather conditions and training requirements on Camp Smith. Range Operations reserves the right to deny access to the fishing areas at any time. Fishing after

hours may be done by military members only with approval of the Post Director or Facility Manager in coordination with the Guard Force. Two man rule is in effect for after duty hours fishing. Range control will pass off Identifications for after duty to Guard Force and Guard Force will return Identification upon individuals turning in creel surveys and vehicle passes.

6. Privately owned vehicles are authorized for access to the fishing areas. Vehicles will stay on the designated roads and a strip map will be provided. Range Operations will issue a vehicle tag authorizing access to the training area. Only four wheeled drive vehicles are authorized in the training area. Range Operations will determine if vehicles are capable of accessing the training area.

7. Small boats to include rowboats, canoes and other boats capable of fitting on top of vehicles are authorized in Broccy Creek Reservoir only. Motorboats or outboard motors are not authorized at any time on Camp Smith waters. Every water vessel on the waters of New York State will have one USCG approved Personal Flotation Device (PFD) for each person in the vessel. All persons under 12 years of age will be required to wear a PFD approved by the USCG. **NO BOATS ALLOWED IN DICKIEBUSH POND.**

8. Each angler will be required to fill out a creel survey at the end of each day. This will allow CSTS personnel to monitor fishing activities throughout CSTS.

9. All personnel or guests fishing on Camp Smith property will be subject to all the rules and regulations regarding fishing on New York State waters as set forth by the NYS DEC. Violations of DEC rules and regulations may also result in enforcement actions by the NYS DEC Police.

10. The use of live or dead fish bait is strictly prohibited on Camp Smith waters. This restriction will prevent the introduction of non-native and potentially harmful fish species into our waters. The use of worms and lures authorized by Dec fishing regulations is the only authorized form of bait.

11. Any violation of Camp Smith's fishing SOP or DEC regulations may result in the revocation of fishing privileges on Camp Smith for a period to be determined by the Post Director.

MARK R. WARNECKE
POST DIRECTOR
CAMP SMITH TRAINING SITE

KURT KRONSBERG, NYARNG
Environmental Analyst

Camp Smith Training Site Creel Survey

(Please fill out survey and return to Range Operations at the end of the fishing day)

Angler Information:

Name Of Angler: _____ Phone: _____

Address: _____ Date: _____

City/Town: _____ State: _____ Zip Code: _____

Time In: _____ Time Out: _____

Catch Information:

Bait Used: Yes_____ No_____ Boat Used: Yes_____ No _____

Location Fished: Broccy Creek Reservoir: _____ Dickey Bush Pond: _____
(Note: Please complete a survey for each body of water fished)
Method Used: Live Bait (type): _____ Artificial Lures: _____
(Note: Live baitfish is prohibited)

Brief Description of Method: _____

_____

(e.g. Fly Fishing with streamers, Spin Fishing with Spoons etc….)

Species Caught

Species Caught	Number Caught	Length
Smallmouth Bass		
Largemouth Bass		
Pumpkinseed		
Bluegill		
Golden Shiner		
Brown Bullhead		
Yellow Perch		
American Eel		
Black Crappie		
Chain Pickerel		
Trout		
Other Species		

Did you keep any fish: Yes___ No___
If so, Species & Number: _____

For Marine Recreational NYS DEC Fishing Regulations Visit:
http://www.dec.state.ny.us/website/regs/part10.html#10.1

APPENDIX F

U.S. FISH AND WILDLIFE SERVICE

BOG TURTLE SURVEY GUIDELINES

GUIDELINES FOR BOG TURTLE SURVEYS[1]

(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.

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[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 (*Saggitaria* 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 ≥ 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. 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 ≥ 65° F.

5. At least one surveyor must be a recognized qualified bog turtle surveyor[4], 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. <u>At least two of these surveys must be performed in May</u>. 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.

Attachment 1

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 *(info about presence of bog turtles in or near a project area)* Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor, Hartford, CT 06106 *(to get a Scientific Collectors Permit or determine what type of marking system to use)*
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 *(info about presence of bog turtles in or near a project area)* NYS Department of Environmental Conservation Division of Fish, Wildlife, and Marine Resources Special Licenses Unit 600 Broadway, 5th Floor Albany, NY 12233-4752 *(for endangered species permit applications)*
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

Attachment 2

BOG TURTLE COUNTIES OF OCCURRENCE OR LIKELY OCCURRENCE[1]
(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.*

APPENDIX G

GLOSSARY

adaptive management - A style of natural resource management that sets specific goals and objectives for managing, protecting, monitoring, and utilizing natural resources, but uses a "trial and error" type of management to achieve the desired results. The types of management activities used may change based on their prior success or failure in producing the desired results. Managers adapt to ever-changing situations to ensure the desired management results are achieved.

air quality attainment area - Areas designated by the EPA as having met national air quality standards.

air quality nonattainment area - Areas designated by the EPA as not having met national air quality standards.

alluvium - Sand, clay, or similar material gradually deposited by moving water, as along a river or the shore of a lake.

Annual Training – Two-week military training period conducted yearly by Army National Guard troops.

battalion - A military unit consisting of a headquarters company and three to five functional (combat arms, combat support, or combat service support) companies consisting of approximately 250 to 1,000 persons, depending on the type of unit.

Best Management Practices (BMPs) - Resource management decisions and/or actions that are based on the latest professional and technical standards for the protection, enhancement, and rehabilitation of natural and cultural resources.

biodiversity - The variety of life and its processes, including genetic combinations, species functions and associations occurring in an area, the differences among species, and the communities and ecosystems in which they occur.

bivouac - A temporary encampment made by soldiers in the field. On permanent training installations, several bivouac sites may be established throughout the area to avoid overuse of any given site.

brigade - A military unit composed of several battalions, augmented by specialized units (up to approximately 5,000 persons, depending on the type of unit).

cantonment area - The developed portions (city-like areas) of a permanent military installation.

chert - A type of rock commonly used by Native Americans to form arrowheads and other tools.

company - A military unit that is the next smaller unit of a battalion; the most basic administrative and tactical unit (approximately 50 to 200 persons, depending on the type of unit).

convoy - A group of vehicles travelling together for mutual protection and convenience.

cultural resources - Buildings, structures, sites, districts, sacred sites, artifacts, and any objects eligible for or included in the National Register of Historic Places.

de minimis – air pollutant emissions rates established by EPA to determine the applicability of the General Conformity Rule.

ecosystem - A dynamic and natural complex of living organisms interacting with each other and with their associated nonliving environment.

endangered species - Any species that is in danger of extinction throughout all or a significant portion of its range.

ecosystem management - A style of natural resource management that uses a broad approach to integrate the relationships of all organisms, including humans, with each other and with the nonliving elements of their environment. Managers identify and integrate human activities, natural communities, ecosystems, and the natural disturbances found in those ecosystems. Management is goal-driven; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, State, tribal, and Federal interests.

firing range - The area or group of practice firing points designed for use by particular types of weapons.

geographic information system (GIS) - A computer system that enables a person to process natural resources and a variety of other spatially referenced data collected from various surveys and inventories. High quality color maps and management documents can be conveniently produced and manipulated and used for data and inventory management, education, and a variety of planning purposes.

hydrogeological - Of, or pertaining to, subsurface waters with related geologic aspects of surface waters.

impact area - The area where projectiles fired in gunnery training are aimed.

inactive duty training – Military training conducted by Army National Guard troops normally accomplished during a weekend training period, once per month.

Integrated Cultural Resources Management Plan (ICRMP) - A plan that defines the process for the management and protection of cultural resources on military installations.

Integrated Natural Resources Management Plan (INRMP) - A plan written to provide an overall framework and approach for managing, monitoring, protecting, and utilizing natural resources on military installations. These plans typically use an ecosystem-based approach to support sustainable military use of installation lands, while protecting and enhancing resources for multiple use, sustainable yield, and biodiversity.

Integrated Training Area Management (ITAM) – A standard land management program that is applicable to Army training areas. Establishes procedures to achieve optimum, sustainable use of training and testing lands by implementing a uniform land management program that includes: inventorying and monitoring land conditions; integrating training and testing requirements with training land carrying capacity; educating land users to minimize adverse impacts; and providing for training land rehabilitation and maintenance.

invasive species – Any alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Legacy Program - DoD program designed to encourage and promote research, conservation, and preservation of natural, cultural, and historical resources on military installations.

Land Condition Trend Analysis (LCTA) – The inventory and monitoring component of the ITAM Program that is used to identify training-related impacts to natural and cultural resources to help ensure sustained use of lands for military training.

Land Rehabilitation and Maintenance (LRAM) – The preventive and corrective component of the ITAM Program that reduces the long-term impacts of training and testing on an Army installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices, and includes training area redesign and/or reconfiguration to meet training requirements.

listed species - Any plant or animal designated as a state or federal threatened, endangered, special concern, or candidate species.

maneuver - The planned and controlled tactical movement of troops, vehicles, and/or aircraft.

mesic - Of or concerning plants and/or areas with a moderate water supply.

mitigation - Lessening the effects to natural or cultural resources caused by implementation of projects or activities that result in adverse impacts. Mitigation can include limiting the magnitude of the action; repairing, rehabilitating, or restoring the affected resource; avoiding the effect altogether; reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action; and/or compensating for the effect by providing substitute resources or environments.

multiple use - The integrated, coordinated, and compatible use of natural resources so as to achieve a sustainable yield of a mix of desired goods, services, and direct and indirect benefits while protecting the primary purpose of supporting and enhancing the military mission and observing stewardship responsibilities.

National Environmental Policy Act (NEPA) - The law requiring Federal governmental agencies to consider the potential impacts to the environment when planning and executing major actions.

National Register of Historic Places (NRHP) - The listing of officially recognized historical structures, places, buildings, objects, and districts; under the authority of the U.S. Department of the Interior; operated by the National Park Service. Items on this list are worthy of preservation consideration because of significance in American history, architecture, archaeology, engineering, or culture. Significance may be local, state, or national in scope.

natural communities - Interrelated assemblages of plants and animals found in a given area.

natural resources - All elements of nature and their environments of soil, air, and water. Those consist of two general types: earth resources, which consist of the nonliving resources such as minerals, water, and soil components and biological resources, which consist of living resources such as plants and animals.

platoon - A subdivision of a military company divided into squads or sections and usually commanded by a lieutenant.

riparian - Relating to, living, or located along the bank of a natural watercourse such as a river, stream, or sometimes a lake, etc.

safety fan - The access exclusion zone set around target areas on a firing range.

sensitive species - Those plant and animal species for which population viability is a concern because they are highly responsive or susceptible to modification by external agents or influences. These species often show decreases in population numbers or densities following modifications to their natural environments such as habitat fragmentation, changes in water quality, or increased human activities.

small arms - Weapons carried and operated by individuals. This group of weapons includes pistols and rifles carried and operated by individuals.

snags - Dead, but standing, trees.

stewardship - The management of resources entrusted to one's care in a way to preserves and/or enhances the resources and their benefits for present and future generations.

sustainable use - Managing to provide long-term availability and quality of installation lands for military training operations by not degrading existing natural resources, including living and non-living components and the processes that tie them together.

sustainable yield - Managing a renewable natural resource to provide an annual or periodic yield of goods, services, and direct and indirect benefits, into perpetuity. That may include, but is not limited to, maintaining economic benefits, ecological processes and functions, and biodiversity.

threatened species - Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

watershed - The region draining into a particular stream, river, or entire river system.

wetlands - areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in soils saturated with water. This classification includes swamps, marshes, bogs, wet meadows, and similar areas.

xeric - Of or concerning plants and/or areas with low or irregular supplies of water.