VERMONT
AGENCY OF NATURAL RESOURCES
Department of Fish & Wildlife
Department of Forests, Parks and Recreation

Long Range Management Plan
ROARING BROOK
WILDLIFE MANAGEMENT AREA

Prepared by: Springfield Stewardship Team

Date: March 1, 2012

Approved by: _____ 3/19/12
Patrick Berry, Commissioner, F&W — Date

Reviewed by: _____ 3/9/12
Michael Snyder, Commissioner, FP&R — Date

Approved by: _____ 3-21-12
Deborah Markowitz, ANR Secretary — Date

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ROARING BROOK WILDLIFE MANAGEMENT AREA
LONG RANGE MANAGEMENT PLAN

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I. INTRODUCTION

Executive Summary

Roaring Brook Wildlife Management Area (RBWMA) is a 1,428-acre Vermont Fish & Wildlife Department property located in southeastern Vermont. The Wildlife Management Area (WMA) is comprised of numerous parcels in the towns of Vernon and Guilford, some contiguous, some up to two miles apart. On portions of the WMA, the timber rights are retained by the previous owner, and the State retains land and/or hunting rights. Unique features of the WMA include black gum swamps, habitat for the Eastern Racer (an endangered species of snake), numerous wetlands, a large regionally significant deer wintering area, and a diversity of oak species not common in most parts of the state.

Historically, RBWMA has only seen modest levels of management for a number of reasons. The most important being:

- Disjointed parcels, without clear legal access.
- Access damage by illegal off-roading.
- Large areas of relatively unproductive soils.
- Numerous inholdings and/or lots where timber rights are owned by others.

In the past, temporary access has occasionally been granted from cooperative neighbors and allowed for the implementation of a number of projects designed to improve habitat for wildlife.

In the last 10 years management focus has been to:

- Clarify the State's legal status for use of West Hill Road, Ad Brooks Road, and Lillis Pasture Road.
- Locate and re-mark all exterior boundary lines in orange paint, and to witness in red paint all interior lots where timber is held by others.
- Research the use of the WMA by the endangered Eastern Racer and develop mitigation habitat for a Vermont Agency of Transportation (AOT) project at the old Welcome Center. This habitat project was a cooperative effort with Vermont Agency of Transportation; Vermont Fish & Wildlife Department; Vermont Department of Forests, Parks and Recreation; and Amphibian and Reptile Specialist Jim Andrews.
- Conduct a number of critical inventories and assessments in anticipation of developing this Long Range Management Plan.

With the partial resolution of access issues and the continued goodwill and cooperation of several abutters, active management of the WMA is expected to increase. To this end, we have classified land owned "fee simple[1]" within the WMA in three classes of management intensity:

1. Highly Sensitive Management *(primarily wetlands)* 34 acres
2. Special Management *(primarily deer wintering areas)* 547 acres
3. General Management 423 acres

[1] A parcel where F&W owns both land and timber rights.

A large transmission corridor managed by The National Grid bisects the parcel. Cooperation in regard to vegetation management of this corridor will be critical to the future of Eastern Racer on this site.

Critical habitat conservation and habitat improvement for white-tailed deer, turkey, Eastern Racer, and several species of bats will be a focus of management. Stabilization of interior roads and the improvement of access for management and/or the public will be a priority.

An additional complication in the management of Roaring Brook WMA was the finding of Hemlock Woolly Adelgid (HWA) in the southwestern part of the property in January 2011. Management of hemlock stands within RBWMA will be based on the annual statewide HWA response plan, Best Management Practices (BMPs), when developed, and HWA quarantines.

Overview of Wildlife Management Areas
Vermont Agency of Natural Resources

Vermont Fish and Wildlife Department

The Vermont Fish and Wildlife Department (VFWD) administers and manages Wildlife Management Areas (WMAs) as an important part of meeting its mission. Management of these areas emphasizes the conservation of fish, wildlife and their habitats and provides the public with opportunities to enjoy these resources through fish and wildlife-based activities.

Management and Administration of Wildlife Management Areas

The VFWD administers and manages over 85 WMAs throughout Vermont. The administration and management of WMAs is funded predominantly through the Federal Aid in Wildlife Restoration Program. This program was initiated in 1937 through the Federal Aid in Wildlife Restoration Act in which taxes are paid on firearms, ammunition and archery equipment by the public. Today, this excise tax generates over one hundred million dollars each year that is dedicated to state wildlife restoration and management projects across the United States. These excise tax dollars, coupled with state hunting license fees and revenues generated from timber associated with habitat management have been the predominate sources of funding for the acquisition, administration and management of Vermont's WMAs.

WMAs are distributed throughout the state and range in size from 50 acres to 25,000 acres. They are managed by VFWD wildlife biologists to promote science-based wildlife habitat management principles. WMAs are managed for a wide array of fish, wildlife, habitats and public uses ranging from wetland habitat management - to - early successional habitat - to - mast tree production. Wild turkey, ruffed grouse, white-tailed deer, bobcat and 100s of other wildlife benefit from, and are the focus of, VFWD management activities on WMAs.

Wildlife-based activities including hunting, fishing, trapping, viewing and photography are important cultural elements of life in Vermont. Based on a 2006 survey of residents involved in wildlife-based activities, Vermont ranked third in the nation in participation by residents. The U.S. Fish and Wildlife Service (2006) estimates that wildlife-based activities contribute roughly $400 million dollars to Vermont's economy each year. This ranks wildlife-based expenditures including hunting, fishing, trapping, and viewing as one of the top 5 economic contributors to the state of Vermont's economy. In fact, a survey by the Vermont Department of Tourism (2000) found that average Vermont household expenditures for various outdoor activities ranked fishing and hunting as number one, above skiing, snowmobiling, biking and other related activities (e.g., *$2,096 per household for*

hunting/fishing versus $1558 for downhill skiing). Over 545,000 residents and non-residents participated in wildlife-based activities in 2006. Clearly, fish and wildlife resources, and the lands and waters that support them, are critically important to the quality of life for those who live in and visit Vermont.

Guiding the Management of WMAs

The following sections reference various VFWD and other wildlife conservation plans that influence the administration and management of WMAs. The Vermont Agency of Natural Resources, through its departments, manages state lands in a sustainable manner by considering all aspects of the ecosystem and all uses of the natural resources (Agency Strategic Plan 2001-2005).

a. VDFW Strategic Plan:

The VFWD's Strategic Plan identifies its mission as: *"the conservation of all species of fish, wildlife and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected."* The VFWD's Strategic Plan provides guidance, support and direction for the acquisition and management of lands for fish and wildlife conservation and public use and enjoyment of those resources.

Goals established within this plan that pertain to the Department's responsibilities for WMA management include:

GOAL A: Conserve, enhance and restore Vermont's natural communities, habitats, and plant and wildlife species along with the ecological processes that sustain them.

GOAL B: Provide a diversity of safe and ethical fish and wildlife-based activities and opportunities that allow hunting, fishing, trapping, viewing, and the utilization of fish, plants and wildlife resources consistent with the North American Model of fish and wildlife conservation.

GOAL C: Maintain safe fish and wildlife-based activities and limit harmful human encounters with fish and wildlife species, and provide general public safety service incidental to our primary fish and wildlife duties.

GOAL D: Efficient operations and effective management of the Fish and Wildlife Department.

b. Vermont Wildlife Action Plan:

Vermont's Wildlife Action Plan was adopted in 2005 and is a requirement of all states in accordance with the federal State Wildlife Grants Program. This plan is intended to conserve rare, threatened and endangered species as well as keep common species common. A blueprint for comprehensive fish and wildlife conservation, this plan serves to guide the VFWD's conservation projects including its land acquisition and management efforts. There are many benefits associated with land acquisition and ownership by the VFWD, ranging

from WMAs to lands conserved by conservation easements, to streamside properties, to achieving the conservation objectives of the Wildlife Action Plan. Long range management plans developed by the VFWD with the assistance of other organizations, notably the Vermont Department of Forests, Parks and Recreation, set out conservation management goals and objectives that take into account all of the VFWD's responsibilities as set forth in the Department's Strategic Plan, Wildlife Action Plan, and others.

c. **Regional and National Wildlife Conservation Plans**:

VFWD acquisition, administration and management of WMAs is also integral to achieving broad, regional and national fish and wildlife management and conservation goals. The North American Waterfowl Management Plan, the Woodcock Initiative, recovery and delisting of federally endangered species like the bald eagle, Atlantic Coast and Brook Trout Joint Ventures, and numerous others are all tied to effective and strategic WMA acquisition and management. National, regional, and state-based climate change adaptation plans and strategies focused on fish and wildlife conservation are also important sources of information and guidance for WMA acquisition and management.

Principle Considerations for the Management of WMAs:

The following information identifies important principles that help guide and direct the administration and management of WMAs.

a. Wildlife Habitat Management:

Wildlife management activities are directed toward managing the diversity, abundance, and distribution of fish, wildlife and their habitats. These activities are designed either to sustain or alter physical, chemical, and/or biological conditions to create, protect, or enhance specific habitats. Species, habitats, natural communities and ecosystems where there is special conservation or public concern, are prioritized for management. WMAs are managed to maintain, restore, and control the diversity, abundance, and distribution of plants, fish and wildlife, and other life forms within natural habitats, communities, ecosystems, and biophysical regions.

Management practices on WMAs are used to maintain, enhance, and restore habitat conditions associated with forest and vegetative characteristics, water regimes, and other structures and habitat elements that are required to meet the management needs and interests of a specific area. WMAs are managed to provide for various habitat requirements for many species of fish and wildlife. To obtain desired wildlife habitat age class and species composition, forested habitat may be managed using commercial timber sales or non commercial management. Revenues generated from any commercial timber sale on WMAs are applied to the operations and management of WMAs. Wetland habitats may be manipulated through a variety of techniques for selected wetland water regimes or for various moist soil management conditions to benefit fish, wildlife and public interests.

b. Public Use of WMAs:

WMAs are managed to create, maintain, and enhance fish and wildlife dependent activities that are consistent with legal constraints and that do not threaten the overall value and sustainability of the natural resources. Specifically, WMAs provide unique and important opportunities for hunting, fishing, trapping, viewing and wildlife photography. Recreational uses that have been conducted on the properties prior to VFWD ownership, may be allowed to continue if they do not degrade the habitat or natural resources and are compatible with the fish and wildlife-based uses which serve as the basis for the ownership.

c. Legal Considerations and Requirements:

WMAs are managed in accordance with the purposes for which they were acquired. Many WMAs were purchased with federal funds that require management for specific purposes and may require or restrict certain activities. These legal requirements are addressed during planning and management activities on WMAs.

d. Species, Habitat, and Other Resource Inventories:

The procedure for making management decisions on Department and Agency lands includes comprehensive inventories and assessments of fish, wildlife, habitats, natural communities and other important natural resources. Inventory and assessment information is used to develop Long-range Management Plans to guide the management and use of the WMAs. These plans set forth management objectives and strategies for implementation of various management practices. VFWD works to monitor changes in species and habitat conditions, distribution and abundance on WMAs and adapt management activities to those changes.

e. Public Involvement:

State lands are a public resource. The public is involved in a variety of decisions on state lands, including acquisition, policy development, management planning, and the implementation of management actions. The Department and Agency have a rigorous process for including and incorporating public input and interests into the development of Long-range Management Plans for WMAs. These processes include public hearings, public meetings, and public open houses. The Department and Agency coordinate with various organizations with interests in public land management and use, including hunting, fishing, trapping and other fish and wildlife-based organizations.

f. Historical/Cultural and Scenic Values:

State lands are managed in a manner that is sensitive to historical, cultural, and scenic values. Archaeological and historical sites are protected under State and Federal Law equal in status to other legal constraints.

Department Mission Statements

Vermont Department of Environmental Conservation
Mission Statement

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

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Vermont Department of Fish and Wildlife
Mission Statement

The mission of the Vermont Fish and Wildlife Department is the conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected.

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Vermont Department of Forests, Parks and Recreation
Mission Statement

The mission of the Department of Forests, Parks, and Recreation is to practice and encourage high quality stewardship of Vermont's environment by monitoring and maintaining the health, integrity, and diversity of important species, natural communities, and ecological processes; managing forests for sustainable use; providing and promoting opportunities for compatible outdoor recreation; and furnishing related information, education, and services.

II. Parcel Description and Resource Summaries

A. **Purpose of Ownership**

Wildlife Management Areas (WMAs) are managed by the Vermont Fish & Wildlife Department for improved wildlife habitat and wildlife-based recreational use. A priority for management is improving habitat for game species such as white-tailed deer, turkey, grouse, and furbearers such as otter, mink, and beaver. Wildlife objectives also include nongame species such as songbirds, small mammals, amphibians, and birds of prey. These multiple objectives are accomplished by a combination of commercial and non-commercial vegetative management practices applied over time in a manner that protects unique habitats and habitats where rare, threatened, and endangered species are found.

Management goals for RBWMA are to:

- Protect and enhance wildlife habitat through management of all seral stages, maintenance of core areas of late successional forest, improvement of deer wintering areas, protection of unique habitat, and protection of rare, threatened, and endangered species.
- Provide sustainable, periodic timber harvests in appropriate areas to promote wildlife habitat and forest productivity.
- Enhance opportunities for wildlife-based recreation, particularly hunting, trapping, and wildlife viewing.
- Demonstrate exemplary wildlife management practices so that practices applied here may find broader application on private lands.
- Protect and improve public and management access.

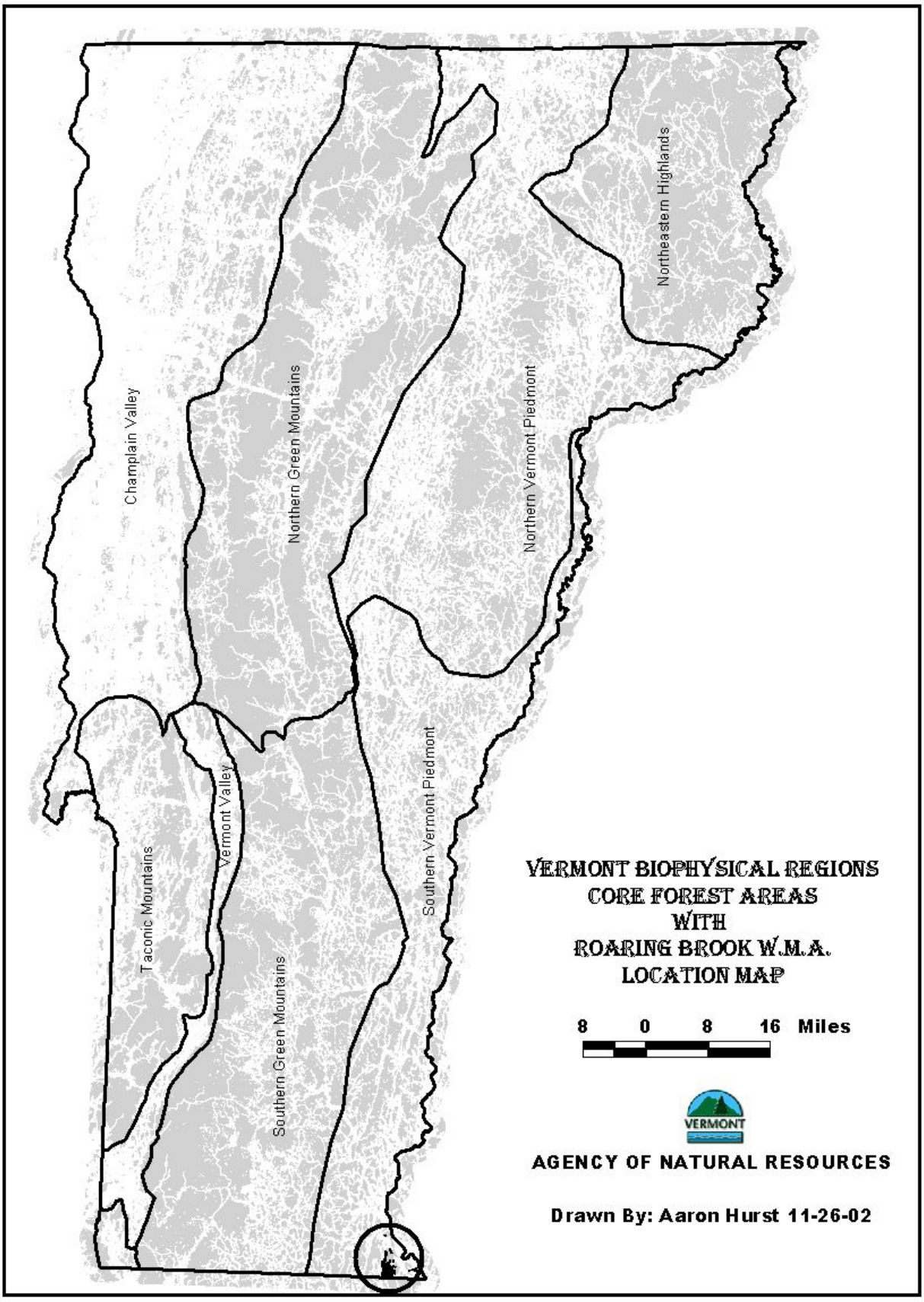
B. **Parcel Information with Maps**

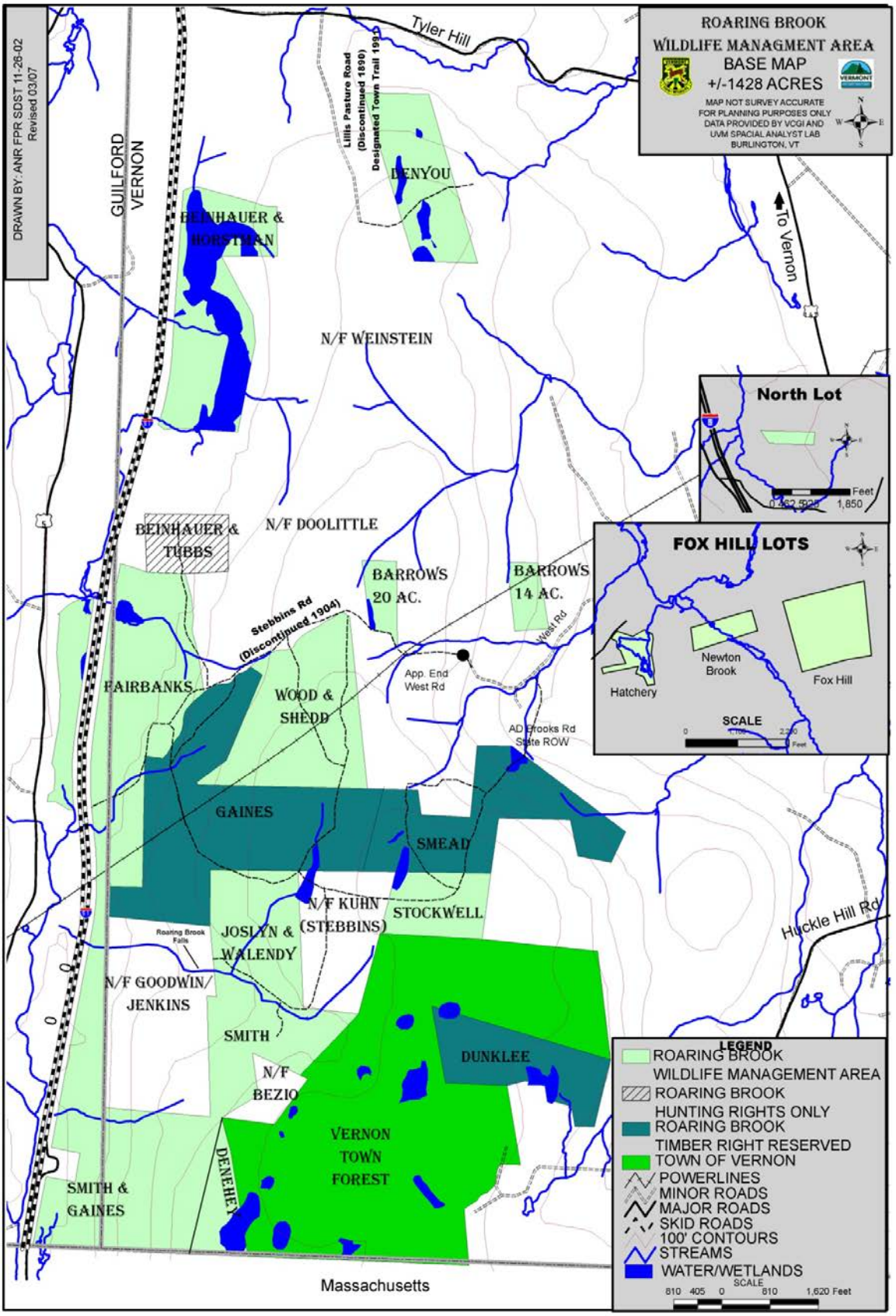
Roaring Brook Wildlife Management Area (RBWMA)[1] consists of a number of parcels totaling 1,428 acres located in the towns of Vernon (1,289.52 acres) and Guilford (138.55 acres), Vermont. The parcel abuts the northbound lane of I-91 from the Massachusetts state line northward for 2.4 miles. The entire property is on steep to gently rolling terrain. Public access to the parcel is generally poor. The parcel is composed of 1,002 acres where F&W holds all rights (fee simple), 386 acres where the timber rights are privately owned, and 38 acres where F&W owns only hunting rights.

The entire parcel is located at the extreme southerly end of the Southern Vermont Piedmont biophysical region. A number of plant and animal species are found here that are more typical of southern New England. Maps following:

- Biophysical Region and Locator Map
- Area Base Map

[1] LRMP includes 15.47-acre Hatchery Pond parcel.


Champlain Valley
Northern Green Mountains
Northern Vermont Piedmont
Northeastern Highlands
Taconic Mountains
Vermont Valley
Southern Green Mountains
Southern Vermont Piedmont
VERMONT BIOPHYSICAL REGIONS
CORE FOREST AREAS
WITH
ROARING BROOK W.M.A.
LOCATION MAP
8 0 8 16 Miles
VERMONT
AGENCY OF NATURAL RESOURCES
Drawn By: Aaron Hurst 11-26-02


ROARING BROOK
WILDLIFE MANAGMENT AREA
BASE MAP
+/-1428 ACRES
MAP NOT SURVEY ACCURATE FOR PLANNING PURPOSES ONLY
DATA PROVIDED BY VCGI AND UVM SPACIAL ANALYST LAB BURLINGTON, VT
DRAWN BY: ANR FPR SDST 11-26-02
Revised 03/07
GUILFORD
VERNON
Tyler Hill
Lillis Pasture Road (Discontinued 1890) Designated Town Trail 1993
DENYOU
BEINHAUER & HORSTMAN
N/F WEINSTEIN
To Vernon
North Lot
Feet
1,850
BEINHAUER & TUBBS
N/F DOOLITTLE
BARROWS 20 AC.
BARROWS 14 AC.
Stebbins Rd (Discontinued 1904)
West Rd
App. End West Rd
FOX HILL LOTS
Newton Brook
Fox Hill
Hatchery
SCALE
FAIRBANKS
WOOD & SHEDD
AD Brooks Rd State ROW
GAINES
SMEAD
N/F KUHN (STEBBINS)
STOCKWELL
Huckle Hill Rd
Roaring Brook Falls
JOSLYN & WALENDY
N/F GOODWIN/ JENKINS
SMITH
N/F BEZIO
DUNKLEE
VERNON TOWN FOREST
DENEHEY
SMITH & GAINES
Massachusetts
LEGEND
ROARING BROOK WILDLIFE MANAGEMENT AREA
ROARING BROOK HUNTING RIGHTS ONLY
ROARING BROOK TIMBER RIGHT RESERVED
TOWN OF VERNON
POWERLINES
MINOR ROADS
MAJOR ROADS
SKID ROADS
100' CONTOURS
STREAMS
WATER/WETLANDS
SCALE
810 405 0 810 1,620 Feet

C. **Wildlife Habitat and Species Highlights**

The proximity of the WMA, Vernon Town Forest, several undeveloped inholdings, large private parcels to the north and east devoted to forest management, and conserved lands to the south in Massachusetts, results in a large area of forested habitat that can fulfill all the needs of a number of wildlife species. White-tailed deer and turkey are common and abundant game species. The Eastern Racer, an endangered species of snake, is found on the property along with vernal pools and wetlands that support a wide variety of amphibian and bird species. Bat surveys indicated an abundance of bat species including little brown, northern long-eared, and big brown bat before white-nose syndrome had become established in Vermont. The current status of these populations is unknown.

Important habitat features include large areas of deer winter habitat, stands of oak and hickory that provide wildlife food, numerous wetlands, and Eastern Racer habitat along the Interstate and power corridor. The WMA is adjacent to several large conserved parcels in Massachusetts (conserved lands map on page 17) creating an approximately 5,000-acre area of conserved habitat in the region.

D. **Natural Community Highlights**

Black gum swamps, also found on Vernon Town Forest, are the most unique natural feature on the WMA. (Some of these black gums are among the oldest trees in Vermont at 400+ years). Occasional stumps of large American chestnut and numerous chestnut sprouts can still be found more than 100 years since the introduction of the chestnut blight fungus. Most of the forested acreage is occupied by Hemlock-Northern Hardwood Forest. There are numerous small wetlands on the parcel totaling 94 acres; the largest at 50 acres is comprised of 11 acres of open water and 39 acres of forested, shrub, and herbaceous wetland. Roaring Brook, with several scenic falls, is a small stream which drains the property flowing west into the headwaters of Falls River. Streams and wetlands, including Newton Brook, are common in the two western most Fox Hill Lots.

Nineteen of the 80 natural community types recognized in Vermont have been identified on the property. Hemlock-Northern Hardwood Forest is the most common natural community followed by Northern Hardwood. These two types cover most of the land area (95±%) of RBWMA. Thirteen of the natural community types are variations of wetlands. Two uncommon to rare upland communities, Dry Oak Forest and White Pine-Red Oak-Black Oak Forest, are also important community types on the WMA.

There are four wetland natural community types which are classified uncommon to very rare in Vermont; the remaining wetland communities are common throughout the state although they only account for a small amount of acreage statewide. There are fourteen rare, threatened, or endangered plant species found on the WMA (see page 55), all associated with wetlands or exceedingly dry areas.

E. Hemlock Woolly Adelgid

Hemlock woolly adelgid, an introduced forest pest of eastern hemlock, has been found within RBWMA. This insect, which feeds on hemlock needles, can cause extensive mortality in eastern hemlock. Hemlock is a key wildlife feature on the WMA. Natural communities with significant hemlock components comprise 92% (1,317 acres) of the 1,428 acres at Roaring Brook WMA. Hemlock stands provide winter cover for white-tailed deer, year-round habitat for a number of species of furbearers, owls, and rodents, and thermal protection for seeps and streams. The map on the following page indicates where HWA has been found, where hemlock is common, and areas that are most vulnerable to HWA.

In early 2005, a pest risk assessment for hemlock woolly adelgid was conducted for the WMA. The report integrated a GIS-based methodology developed for southern Vermont with the pest risk assessment procedure currently employed by the USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine. As indicated by this study, a high risk area is where HWA was found in January 2011.

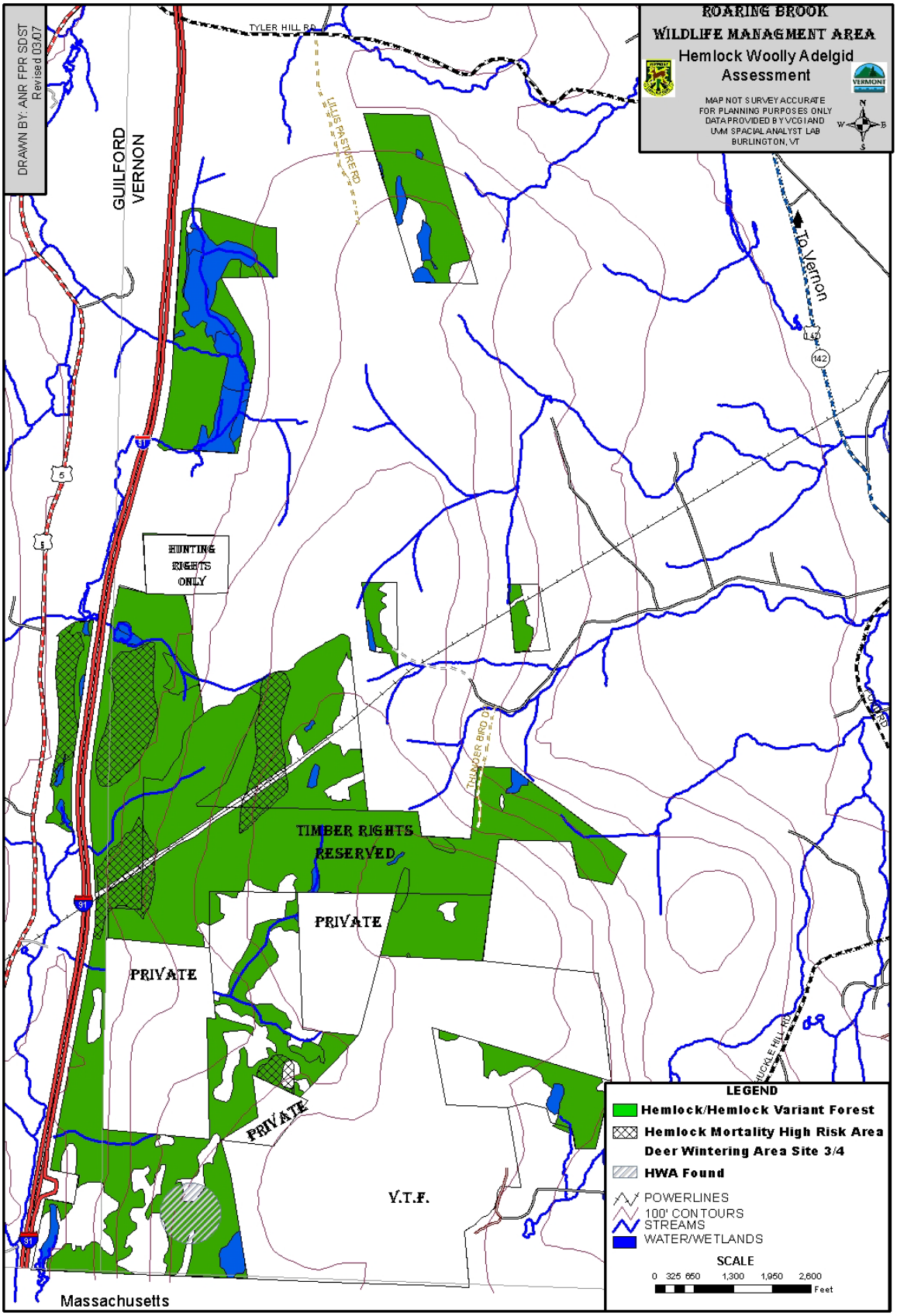
F. Land Use History/Historic Resource Highlights

Although human occupation of the region along the lower Connecticut River and its tributaries predates Euro-American settlement by several thousand years, there are only a small number of hypothesized Native American sites located within RBWMA. This is due primarily to the prevalence of steep terrain.

In Vermont, early agriculture and settlement began in the late 1700s. Vernon has the unique distinction of holding the first Vermont Town Charter. Several farms were located along two early roads on the western portions of what is now RBWMA. Stonewalls on the property are scarce but remnants can be found of barbed wire fencing.

G. Recreation Resources

Roaring Brook is used primarily for hunting, hiking, and snowmobiling. There is evidence of considerable and destructive off-roading activity. Currently there is limited legal access to the parcel. The Vernon Town Forest, which abuts this parcel on the east, has good access and a trail system linking the parking area to the more prominent black gum swamp on the town forest.


ROARING BROOK
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Hemlock Woolly Adelgid
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Revised 03.07
TYLER HILL RD
GUILFORD
VERNON
To Vernon
HUNTING
RIGHTS
ONLY
TIMBER RIGHTS
RESERVED
PRIVATE
PRIVATE
PRIVATE
V.T.F.
Massachusetts
LEGEND
Hemlock/Hemlock Variant Forest
Hemlock Mortality High Risk Area
Deer Wintering Area Site 3/4
HWA Found
POWERLINES
100' CONTOURS
STREAMS
WATER/WETLANDS
SCALE
0 325 650 1,300 1,950 2,600
Feet

H. **Timber Resources**

Forest stands on RBWMA are primarily composed of hemlock, red oak, red maple, and white pine. In the center of the largest block of woodland is a 386-acre parcel where the timber rights have been reserved by the previous owners. Historically, this has resulted in several timber trespass violations over the past 40 years both intentional and unintentional. In the last 10 years, FPR staff located and painted interior boundary lines to clearly delineate where timber rights are held by others. Legal access to most of the property has been uncertain for many years and continues to be an area where more research is needed. All past timber sales have required cooperation with neighboring landowners. It is the State's intent to continue this cooperative approach. Access from the west is blocked by I-91 though access was granted by the federal highway department to a special VT Agency of Transportation project to mitigate habitat loss from an AOT project on Fish & Wildlife lands.

With the introduction of HWA to RBWMA, timber management of the majority of the parcel will be more complicated. Management will be based on the Best Management Practices (BMPs), quarantine regulations, and the annual statewide response plan. Recent surveys of the infected stands indicate no health impact yet on hemlock trees. Crown health evaluations will continue both in established research plots and during management activities.

Illegal use by four-wheel drive and all-terrain vehicles has, and is having a major impact on roads and, to some extent wetlands, causing erosion and water quality problems. Many interior roads are impassable after years of erosion from off-road use adding difficulties to management. Soil productivity over much of this parcel is moderate to poor. There are numerous small wetlands and steep exposed ledge which further limit access for commercial timber harvesting.

I. **Acquisition History**

Most of RBWMA was acquired in the early 1960s when the right-of-way acquisition was occurring for the I-91 interstate. Excess property was transferred to the Fish & Wildlife Department by an executive order in 1964. Other parcels were acquired in the same time period that completed the structure of RBWMA as it exists today.

J. **Legal Constraints, Management Agreements**

The following legal constraints apply to RBWMA:

- F&W retains Right of First Refusal for the Cersosimo Lot (formerly Goodwin-Jenkins).
- New England Power Service Co. transmission line 300' right-of-way, managed by National Grid.
- Timber Rights reserved on Smead, Dunklee, and Gaines Lots.
- Access/Road Status: West Hill – management access historically by agreement with Merritts; Ad Brooks Road – status unclear; Lillis Pasture Road – management access unclear; Fox Lot – access via Act 250 mitigation agreement.

- Eastern Racer Habitat Agreement: AOT maintains openings on the WMA; F&W allowed management access via old Welcome Center for racer habitat work.
- Snowmobile Trail Maintenance: in cooperation with Vernon Trailbreakers.
- Private in-holding access rights unknown, with the exception of Doolittle Mountain Estate (see page 83) which was settled in a recent suit and appeal between private landowners.

The issue of ancient roads presents a potential management concern on the WMA. ANR will continue to follow this issue closely and provide input to the Town as appropriate.

K. **Relationship to the Region**

The Long Range Management Plan for the RBWMA is consistent with the rural lands, natural resources, and community resources policies within the existing Regional Plan developed by the Windham Regional Planning Commission.

The WMA is located within a 'resource district' identified by the Vernon Town Plan as an area with "high natural, recreational, scenic values, or substantial limitations for development." The Town Plan further states, "Resource lands generally have poor access to improved public roads and should be used primarily to protect resource values and perpetuate the settlement patterns which have traditionally characterized such lands."

RBWMA is part of a large area of conserved land straddling the Massachusetts/Vermont State line. This area (see page 17) is comprised of over 5,000 acres of public and easement lands which include RBWMA, the "Satan's Kingdom" holdings of the state of Massachusetts, and the private lands along I-91 in Massachusetts that are reserved from development by conservation easements.

L. **Future Acquisition/Disposition**

Through its October 1999 *Vermont Agency of Natural Resources Lands Conservation Plan*, the Agency outlined priorities for acquiring new lands as well as for acquiring additions to existing ANR lands. Four priorities for adding to existing lands are as follows:

1. Lands necessary for maintaining or enhancing the integrity of existing State holdings;

2. Inholdings and other parcels that serve to consolidate or connect existing State holdings and contain important public values;

3. Parcels that facilitate public access to agency lands; and

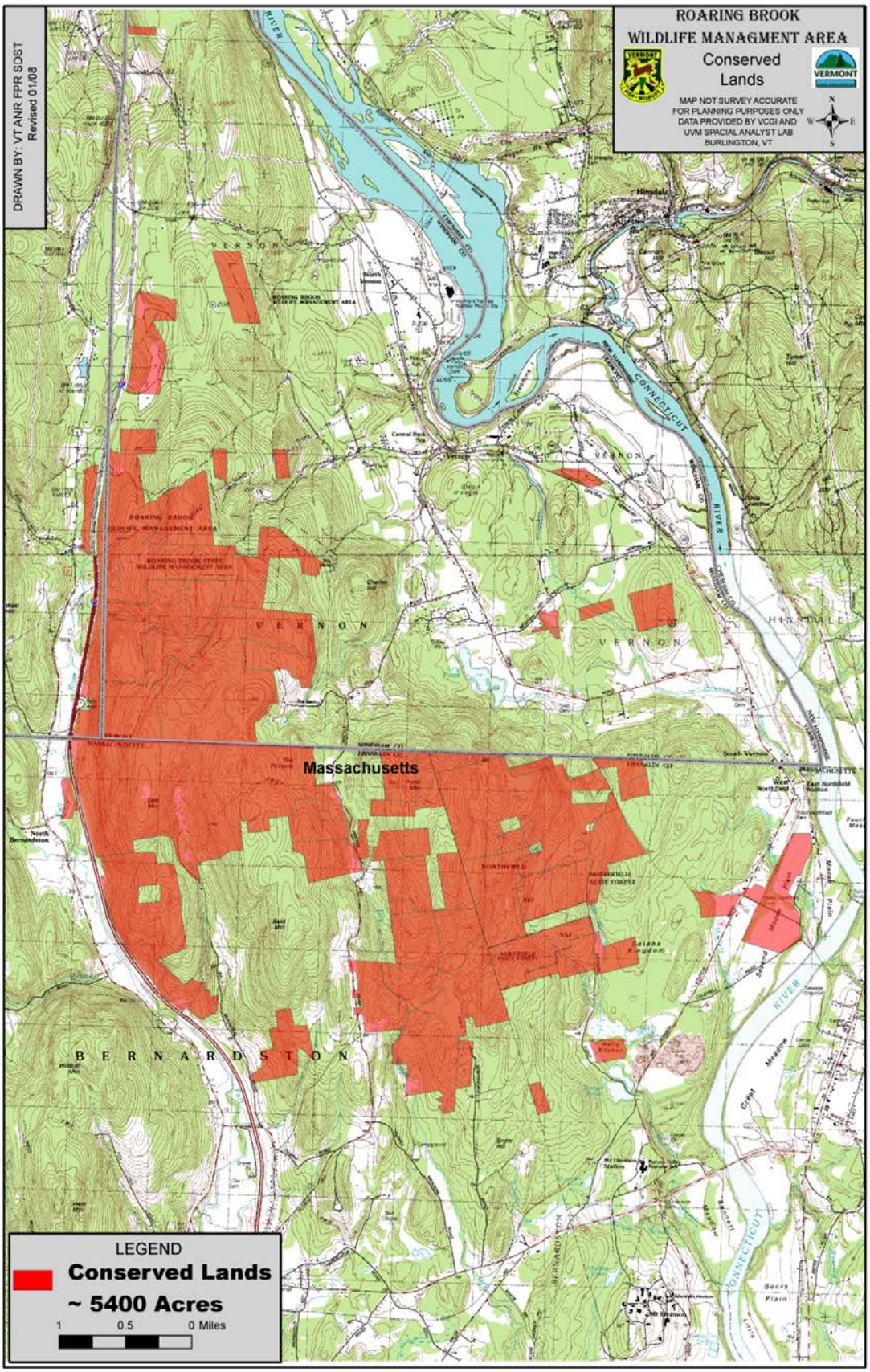
4. Parcels that serve an identified facility, infrastructure, or program need.

All ANR land acquisitions must have a willing seller, as the Agency does not have the authority to exercise eminent domain. Any future acquisition opportunities near the WMA may include consultation with both the appropriate town(s) and Windham Regional Planning Commission.

Cooperative conservation efforts with land trusts and landowners could solidify a strong local base of undeveloped lands surrounding the WMA. The experience of the State has been that development of parcels interior to, or adjoining, WMAs leads to conflicts with management and pressures of non-wildlife related recreational use of the property. Conflicts commonly arise between hunting on WMAs, nearby homeowners, and non-hunting users of the property. Conservation of interior and adjacent lands that limit residential and commercial development creates opportunities for complementary management and far fewer conflicts between users of state lands and owners of adjacent lands.

Priority for acquisition or purchase of development rights include lands that would connect and/or buffer the highly ecologically-significant Fox Hill Lots, the recently-acquired spotted turtle habitat site, inholdings within the WMA, and lands adjacent to multiple rare, threatened, and endangered species-rich sites within the WMA.

A small distant parcel of the WMA, known as the “North Lot” (see page 10) appears to serve no function for the WMA. In addition, no records of access or management are found in the district office. Staff inspected the parcel in 2007. This small plot, less than 15 acres, is similar to the lands around it, being rocky and rough woodland comprised of white pine, Eastern hemlock, and low quality mixed hardwood in the overstory and no outstanding features. Boundary evidence was sparse, and there was no obvious access for management or the public. The Springfield District Stewardship team recommends it be designated by Fish & Wildlife as surplus land.



Roaring Brook WMA Long Range Management Plan – Parcel Description and Resource Summaries

III. PUBLIC INPUT

The public involvement process for Roaring Brook began in 2009 when the Stewardship Team consulted the town selectboard and the regional planning commission informing them that the planning process was underway. A special website was also established for this effort.

On Wednesday April 6, 2011 an advertised public input meeting to discuss all aspects of the management of RBWMA was held at the Vernon Town Office in Vernon, Vermont. Agency staff presented a draft plan for the forest allowing a 30-day public comment period following. People were encouraged to respond by postcard, letter, or by e-mail directly to the website established for this purpose.

After the 30-day public comment period, the comments were reviewed and analyzed by the Springfield Stewardship Team using a technique known as "content summary." The substance of comments recorded and summarized with no tabulation made of the number of persons expressing or endorsing opinions made at the meetings when compiled by Forests, Parks and Recreation staff. After compiling all comments received by the meeting and in writing or by e-mail, comments were grouped into similar areas and responses developed for each group of similar comments received.

Overall, comments made by the public supported the draft plan presented with the exception of the development of the Fox Hill Lot access and the concept of 'closing' interior roads on the main block of the WMA. This concern was incorporated by reducing the scope of the access at the Fox Hill Lot to employee monitoring access only. Because of the environmental damage and wildlife disturbance that is ongoing due to off-roading, stabilizing interior roads and blocking secondary trails from unauthorized off-roading will remain a priority. Main interior woods roads will require additional legal research before decisions regarding use are made. All comments are addressed within the responsiveness summary with an explanation of the Department's decision in Appendix L (page 98).

IV. MANAGEMENT STRATEGIES AND ACTIONS

Four categories of management have been identified for the lands administered by the Vermont Agency of Natural Resources (ANR). These categories indicate where different levels of use or types of management will be emphasized on the land. In this section of the plan, the recommended levels of use or types of management will be shown for all the land area in this parcel. This section also describes generally how the land will be managed so that the activities occurring on the land are compatible with the category assigned. The four categories are: (1) Highly Sensitive Management; (2) Special Management); (3) General Management; and (4) Intensive Management.

As part of the planning process, the lands, resources, and facilities held by the ANR are evaluated and assigned to the appropriate land management category. Assignment of management categories for RBWMA is based on a thorough understanding of the resources identified and the application of the overarching lands management standards presented in the introduction section of the plan. The resources include natural communities, plants, and wildlife as well as recreation, historic, timber, and water resources. The 11 lands management standards or principles (found in the introduction of this plan) include maintaining biodiversity and involving the public, as well as implementing legal constraints, such as easements, wherever they are applicable.

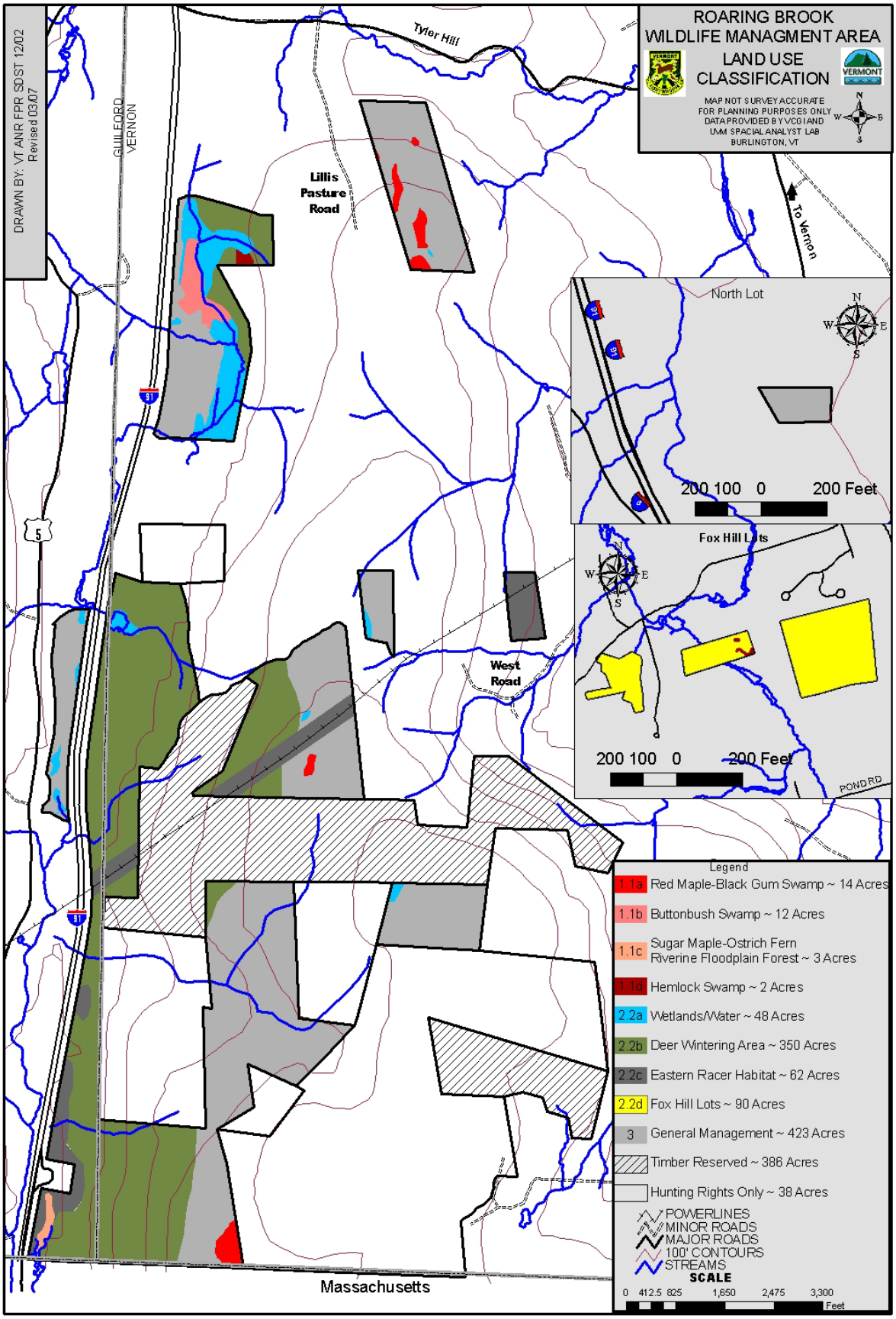
Definitions of Land Management Categories (Classification)

1) **Highly Sensitive Management** – An area with uncommon or outstanding biological (including wildlife habitat), ecological, geological, scenic, cultural, or historic significance where protection of these resources is the primary consideration for management. Human activities and uses should not compromise the exceptional feature(s) identified.

2) **Special Management** – An area with unique or special resources where protection and/or enhancement of those resources is an important consideration for management. These areas do not require the same level of protection given to highly sensitive areas and may be intensively managed for specific purposes. However, vegetative management for timber and wildlife habitat, roads, and recreational activities should not compromise the unique or special resource(s) identified.

3) **General Management** – An area where the dominant uses are vegetative management for timber and wildlife habitat, concentrated trail networks, dispersed recreation, or other general land uses. In these areas, a primary management consideration is minimizing conflict between the activities, as well as with lands categorized as more sensitive where they are adjacent to a general management area. In addition, more sensitive resources that occur within these areas may require special attention.

4) **Intensive Management** – An area that is easily accessible and characterized by a high level of human activity and high intensity development on or adjacent to state land. Aesthetics and safety are the primary management considerations in these areas. However, more sensitive resources that occur within these areas may require special attention.



Roaring Brook WMA Long Range Management Plan – Management Strategies and Actions

Management Goals and Objectives for RBWMA:

1. Remedy the fragmented nature of the WMA created by inholdings and parcels where timber rights are held by others. Work with the users of the WMA to protect wildlife and the environment within the WMA.

    a. Develop a working relationship with neighboring and interior landholders regarding common goals.

    b. Develop support locally for the acquisition of timber rights and fee simple in-holdings, if available, to allow for complementary habitat management and protection of rare, threatened, and endangered species throughout the WMA.

2. Protection and improvement (condition and resiliency) of important biological resources.

    a. Habitat for rare, threatened, or endangered species will take precedence over habitat for more common species.

    b. Maintain existing Core Forest and increase its size and resiliency through acquisition, conservation agreements, and management.

    c. Maintain or improve the quality ranking of rare and important natural communities:

        - Vernal Pools
        - Hemlock Swamps
        - Buttonbush Swamps
        - Matrix (core) Forest: Hemlock-Northern Hardwood
        - Dry Oak Forest
        - Red Maple
        - Red Maple-Black Gum Swamps
        - Floodplain Forest
        - White Pine-Red Oak-Black Oak Forest

    d. Manage interior stands of hemlock for a high density condition to provide winter deer cover and to maintain an unfragmented core area of 500 acres through uneven-aged management techniques in contrast with the lower densities of trees remaining on recently-harvested non-fee and town lands within and adjacent to the WMA.

    e. Manage hemlock stands according to the BMPs (once drafted) and annual statewide response plan.

3. Protect and enhance important wildlife habitats and features.

    a. Monitor and manage hemlock woolly adelgid infestations.

    b. In anticipation of the possible loss of eastern hemlock to the hemlock woolly adelgid, promote the health of individual conifer trees and stands wherever feasible.

c. Allow dry south and west-facing slopes and ridge tops to continue to provide winter habitat for white-tailed deer and other species and minimize development of roads and trails into these areas.

d. Produce a sustainable supply of timber products where this production improves habitat and opportunities for habitat improvement.

e. Promote the growth of mast-producing trees, particularly oaks and hickories.

f. Manage riparian areas and adjacent lands as buffer management areas. Buffer guidelines followed during management activities will be designed to protect water quality and to protect and enhance habitat for amphibians, reptiles, and mammals near waterbodies. Augment district guidelines in the black gum swamps and Denyou Lot wetlands by increasing buffer width and equipment restrictions. Manage travel corridors between seeps and wetlands to maintain or improve conditions for amphibians.

g. Retain eight large (>10") old trees per acre for bat habitat, dens, snags, and dead and down material.

h. Minimize the spread of exotic species through appropriate management activities.

i. Retain and release potential bat roost trees near key wetland feeding areas.

j. Maintain crown closure at 70-80%, particularly around wetlands, to retain bat foraging habitat.

k. Monitor impacts of deer browsing of seedlings and saplings for excessive damage and adjust management as appropriate.

4. Develop and improve appropriate non-motorized recreation opportunities for wildlife-based activities including hunting, fishing, trapping, and wildlife viewing while maintaining and protecting infrastructure, wildlife habitat, and historic sites.

    a. Improve public access, parking facilities, and signage where compatible with wildlife habitat and longevity.

    b. Minimize recreational conflicts with deer wintering areas and Eastern Racer habitat and provide for non-motorized recreational use.

    c. Restore and/or stabilize heavily-eroded interior roads and prevent continued damage by off-roading with trucks, ATVs, and motorcycles.

    d. Provide better access for the public and post clear guidelines for use.

5. Dedicate key areas of the WMA to improving the viability of the Eastern Racer population.

    a. Develop additional foraging habitat.

b. Enhance the quality and quantity of egg laying and denning habitat.

c. Protect and enhance hibernaculum habitats.

A. **Highly Sensitive Management** (34 acres)

Within RBWMA the majority of the lands classified as Highly Sensitive Management are open or wooded wetlands. Nine rare, threatened, and endangered plant species were found on various wetland sites (see page 55). Management and use should be minimal and focused on protecting these exceptional ecological and habitat features. Most of these areas are adjacent to, or near, existing woods roads and trails and embedded in areas scheduled for management. A primary management goal of the parcel is to minimize existing or potential negative impacts to these areas. No logging and new road or trail construction will occur in these areas.

Primary Emphasis:

- Protect rare, threatened, and endangered plants, animals, and natural communities.
- Protect water resources and aquatic habitats.
- Protect significant and unique wildlife habitats.
- Continue to provide dispersed recreational opportunities where appropriate and compatible with other goals.

1) **Roaring Brook Sensitive Wetlands** – There are 13 wetland natural community types on RBWMA totaling 34 acres. Of these, four are considered uncommon, rare, or very rare in Vermont and thus warrant this level of protection. These communities are:

1.1a Red Maple-Black Gum (very rare) 13 acres
1.1b Buttonbush Swamp (uncommon) 12 acres
1.1c Sugar Maple-Ostrich Fern Riverine Floodplain Forest (uncommon) 3 acres
1.1d Hemlock Swamp (rare) 6 acres

1.1a **Red Maple-Black Gum Swamps** – In Vermont these areas occur only in southeastern and southwestern portions of the state and are more common south of Vermont. Black gum is a rare tree in Vermont. Some are known to be up to 435 years old. These swamps occur in small basins surrounded by upland forest. The southern-most site near the more prominent black gum swamps on the Vernon Town Forest is the oldest on the parcel. No known cultural or historic sites were identified in these areas though they are often surrounded by old pasture fence.

Four other rare plants occur in the swamps, and one of these occurs nowhere else in Vermont. Black gum swamps also make excellent habitat for black bear and wood duck.

An old road used for illegal off-roading, management access, and snowmobiling passes between two black gum swamps in the Denyou Lot.

Likelihood of prehistoric use by humans of areas adjacent to black gum swamp is rated as moderate.

Black gums in swamps located within stream drainages are at risk of being felled by locally-expanding beaver populations.

1.1b **Buttonbush Swamps** are scattered in the warmer regions of Vermont being more common in the Champlain Valley. Within RBWMA a rare occurrence is found on the west side of the Beinhauer-Horstman Lot near I-91. Located in the Fall River Headwaters, this is a low quality example of fairly resilient buttonbush natural communities. Three rare plants are associated with this natural community. Beavers are active in this area but are not considered a threat to the natural community.

Eastern ribbon snake, four-toed salamander, and a blue spotted salamander are three species that would use this habitat. It is considered important habitat for common amphibians and songbirds.

Historically, the area was known as 'Great Pond', and records indicate a water-driven mill existed here at one time though no evidence has been found. The area rates high for potential prehistoric use.

1.1c **Sugar Maple-Ostrich Fern Riverine Floodplain Forest** – A natural community characteristic of floodplains associated with higher energy, high gradient rivers, primarily in areas of calcareous or surficial geology. Intact examples of this community type are rare in Vermont.

On RBWMA there is one example of this community located on the southwest corner of the parcel just below the former I-91 rest area. This natural community is a low quality example of an "S2" (rare) ranked natural community. Its low quality ranking is due to the presence of invasive exotic shrubs, beavers, and its small size.

This natural community is located in the center of two clearings put in place for habitat for the Easter Racer, an endangered species. Layout of the clearings minimized impact to the natural communities with buffers and a narrowing of the project footprint where it passes through this type.

1.1d **Hemlock and Hemlock Hardwood Swamp** – Six small hemlock and hemlock-hardwood swamps are found on RBWMA. Most extend onto adjacent parcels. The quality ranking of the S2 natural communities ranges from low to moderate. The northern most occurrence on the Beinhauer-Horstman Lot is the best example. A limited portion of each is in state control. They are utilized by deer for winter cover.

Management Activities on RBWMA Sensitive Wetlands:

- Where feasible, use beaver baffle devices to control water levels.

- Instigate beaver trapping program if monitoring indicates beaver feeding is likely to eliminate black gum trees or endanger RTE species.
- Maintain well-shaded buffer zones (70% or greater) for 100' around sensitive wetlands. Strictly limit equipment use in these zones.
- Control of invasive shrubs where feasible.
- Monitor all sites for negative impacts from foot and/or vehicle travel. Re-route roads and trails to mitigate impact if necessary.

B. **Special Management** (762 acres)

2.2a **Wetland/Water 48 acres** – The majority of the 48 acres classified as 2.2a are part of a large wetland complex on the Beinhauer-Horstman Lot. A small portion is located on the southwest corner of the 20-acre Barrows Lot. The quality ranking is high, and they provide excellent wildlife habitat with a high amount of wildlife use. One community, Red Maple-Black Ash Swamp, is uncommon but not unique. Historically this area was known as 'The Great Pond' and was used as a former mill site. The area rates high for likelihood of prehistoric use discussed in Appendix C. A snowmobile/off-road trail passes along the southeast border. No vegetative or habitat management activities are prescribed for these areas. Purple loosestrife, an invasive exotic plant, is found here.

Management actions:

- Buffer from nearby timber sales, road and trail construction using district buffer considerations.
- Wildlife-based recreation is a primary use.
- Maintain and develop forested amphibian/mammal travel corridors where wetland natural communities are separated by 300 feet or less.
- Relocate roads impacting wetlands where operationally and legally feasible. Limit the Denyou Lot woods road to winter use to prevent damage to the wetland.
- Monitor beaver activity within black gum swamps. Control beavers if they begin feeding on black gum trees.
- Apply for loosestrife control with the Department of Environmental Conservation Galerucella beetle release program.

2.2b **Deer Wintering Area** – 565 acres of mapped and utilized deer wintering areas are found on RBWMA. However, only ~350 acres of these areas are managed by ANR. Primarily located on the west side of the parcel on west-facing slopes overlooking I-91, these areas are considered regionally important for wintering deer. They are made up of Hemlock, Hemlock-Hardwood, and Dry Oak communities. These areas provide excellent north-south connectivity for deer travel and winter access to wetland, oak, and grassy feeding areas.

Canopy cover will be maintained in streambank areas.

Areas of Dry Oak Natural Communities, particularly on the southwest end, are also an uncommon natural community and source of wildlife food.

Conflicts between human use and winter yarding can occur as interior woods roads and trails are sometimes used by ATVs and snowmachines. The official snowmobile trail travels along the eastern edge of the wintering area.

Due to droughty soils, tree growth can be slow. Poor soils also result in increased susceptibility to mortality due to defoliation by the hemlock woolly adelgid.

Currently designated as a regionally-significant deer wintering area, this area is at risk to defoliation and dieback due to the hemlock woolly adelgid infestation.

Management of eastern hemlock in anticipation of hemlock woolly adelgid defoliation:

Due to HWA:

- Hemlock stands will only be harvested between August and March when HWA is inactive.
- Hemlock wood products are regulated by quarantine, and timber buyers will be notified of the regulations.
- HWA impact plot will be established in Block 1, Compartment 1, Stand 1. This area plus a one chain buffer will not be harvested. Additional research plots may be required.
- Salvaging of hemlock will not be implemented due to an unknown impact of HWA on northern New England. Infested trees take years to succumb, and salvaging will remove potentially resistant trees.
- The use of synthetic pesticides will be considered in critical habitats.

Because defoliation and mortality of hemlock by the hemlock woolly adelgid is highly likely, the following actions will be implemented:

- Survey for Massachusetts fern before implementation in hemlock-northern hardwood communities.
- Maintain hemlock on rich soils and areas with high soil moisture and in protected topography. These are the areas where hemlock may be most resilient.
- Develop and implement a white spruce planting program to replace deer wintering areas lost to defoliation. This is our only native softwood that can repel deer browsing as a seedling.
- Maintain or develop softwood travel corridors between larger winter cover areas.
- Maintain higher densities of white pine in thinnings than is typical to provide replacement cover.
- Cooperate with FPR's Forest Resource Protection Division to develop an annual adelgid monitoring program.

The complex nature of the WMA's ownership and access as well as the uncertain management future of inholdings, threatens the quality of the deer wintering area.

Recently a fair amount of the hemlock cover in the Gaines and Smead Lots has been harvested. Hemlock harvest and/or development of any of three inholdings could negatively impact deer wintering areas. Development access to these three inholdings is believed to be non-existent. This opinion was confirmed by the Windham Superior Court in 2010.

Management activities:

- Should they be offered, acquisition of timber rights on the Gaines, Smead, and Dunklee Lots and fee acquisition of three private inholdings is a priority for management of the deer wintering area and to prevent fragmentation, future legal conflicts, and development in the interior of the WMA.
- Maintain or enhance large areas of mature hemlock cover for deer wintering areas and to sustain a large area of regionally-significant core forest.
- Retain pockets of dense mature hemlock on steep, erodible banks above streams.
- Improve production of mast crops (oak, beech, cherry) through thinnings.
- Construct no new recreational trails in deer wintering areas.
- In areas of poor quality hardwood, implement patch clearcuts to create browse for wintering deer.
- Repair interior roads and prevent off-roading.

2.2c **Eastern Racer Habitat** (62 acres) – Foraging and denning habitat are found on a small portion of the WMA for the Eastern Racer, a threatened species of snake in Vermont. In addition, grassy areas adjacent to I-91 serve as important feeding and travel habitat as does the abandoned I-91 rest area. The primary habitat areas on the WMA are the large National Grid power corridor and grassy leachfield on the WMA that served the former AOT rest area.

Ungated, open roads limit the ability of the State to control use of interior roads. One injured and rehabilitated Eastern Racer was run over and killed within days of release on an interior woods road in this area, presumably as a result of off-roading. In 2007 this section of road was relocated to buffer the snake denning site.

Management actions:

- Develop additional egg laying and denning habitat in the area currently used by Eastern Racers.
- Conduct additional patch cuts in hardwood along the power line, where appropriate, to develop additional habitat for snakes and game species.
- Location of patch cuts for Eastern Racer will be made in cooperation with State Lands Ecologist to mitigate risks of invasive plant and cowbird expansion into core forest areas.
- Per the agreement with AOT, AOT will mow Roaring Brook habitat annually in the fall.
- Monitor and evaluate use and success of habitat project.
- Enforce ATV laws to keep ATVs out of snake habitat.
- Where legal and appropriate, gate interior roads to protect the road surface and wildlife.

2.2d **Fox Hill Lots (Fox Hill Lot, Newton Brook Lot, Vernon Fish Hatchery Pond)** (87 acres)

a) Fox Hill Lot (56 acres)

The majority of the Fox Hill Lot is comprised of a unique natural community known as Dry Oak forest community. A dry, warm, and nutrient poor environment combined with a likely fire history, develops a forest with a number of oak species, unusual for Vermont. Oak species found here include red oak, black oak, white oak, chestnut oak, and scarlet oak. Understory tree and plant species include the common species white pine, hemlock, red maple, black birch, and witch hazel as well as the less common large whorled pogonia, sassafras, American chestnut sprouts, American hazelnut, and mountain laurel. This Dry Oak forest is of high quality relative to others in Vermont, and is thus of statewide significance.

A large high quality vernal pool found near the north boundary is of statewide significance due to its large size and good condition. This pool is found close to where the parcel's right-of-way enters the property. Access development or improvement could have a negative impact to this pool.

For many years the parcel was virtually landlocked so no management has occurred under State ownership. The north and west sides now abut a residential development. In 1999 a 20' right-of-way was to be conveyed to the State of Vermont as a condition of an Act 250 subdivision permit. Currently the right-of-way is compromised by the adjoining landowner's uses and is not a clear access for the State or public. In addition, minor encroachment over the State's boundary line is occurring that could interfere with management and public use. While the reference to the required conveyance appears in adjoining deeds, the actual conveyance to the State of Vermont remains to be completed.

Given the parcel's unique composition and a right-of-way that is inadequate for timber management due to its narrow width and proximity to a large high quality vernal pool, this parcel will see limited management. The focus will be on establishing the right-of-way on the ground for limited public and F&W employee access and researching and possibly applying vegetative management designed to promote oak species in the understory (regeneration).

Management actions:

- Prepare, activate, and file the deeded right-of-way to the State of Vermont.
- Construct gated vehicle right-of-way to allow work vehicle access and foot access by the public. No parking facilities are planned.
- Research options for vegetative management that would encourage continuation of the natural community rather than the more common tree species now found in the regeneration layer.
- Protect the vernal pool and monitor rare plant populations.

- Monitor use of site by people and dogs and impacts to rare plants and amphibians. If use becomes excessive, develop a program to allow public use while negating impacts to resources.

b) Newton Brook Lot

RBWMA includes a 16-acre parcel centered on Newton Brook. This is part of a large wetland complex and associated upland forest to which there is no known legal public access. Natural communities found here include cattail marsh, sedge meadow, shallow emergent marsh, and hemlock-northern hardwood forest. Several rare plants were found on the parcel, including lesser bur-reed, an aquatic plant that is on the state's Threatened and Endangered Species list. Purple loosestrife, an invasive exotic plant, is found here.

The wetland complex is dynamic, with evidence of past beaver activity and vegetation changes. Since most of the wetland is on adjacent land, the Fish & Wildlife Department may have limited control over maintenance and conservation of the features found here.

Management actions:

- Coordinate with the Department of Environmental Conservation's Wetlands Program to continue biological control program for purple loosestrife (release of beetles that feed on the plant) in Newton Brook marsh.
- Maintain or enhance the natural resource values found on the parcel.
- Investigate options for public access.
- Coordinate any management activities with neighboring landowners.

c) Vernon Fish Hatchery

This parcel is centered on an impoundment formerly used as a state fish hatchery. The pond covers five acres of the 15-acre parcel. The pond is used for fishing, and there is a trail around its perimeter. Natural communities of the parcel include white pine-red oak-black oak forest, hemlock forest, and shallow emergent marsh. Some uncommon or rare species occur here, including spice bush, spotted wintergreen, black gum, and northern water snake. The dam on this pond was repaired in 2005.

Management actions:

- Maintain public access.
- Continue "put and take" trout fishery.
- Locate, blaze, paint, and sign boundaries, particularly on the south and west sides.
- Develop educational materials for the kiosk regarding protection of the Northern Water Snake.

- Monitor Northern Water Snake population response to dam reconstruction. If population does not rebound, conduct habitat improvement to encourage this species.

3.0 **General Management** (423 acres) – Mixed deciduous forest types and white pine where the primary emphasis is on maintenance of mast production, maintenance of wildlife habitat, production of quality sawtimber, and passive recreation uses.

Most of the general forest management areas within the WMA are located in white pine-hardwood forest types which are common in Vermont. Several areas support the less common Mesic-Red Oak Northern Hardwood community. Timber harvesting practices will be implemented to maintain existing community types, mast-producing trees, snag trees, and aspen stands according to guidelines provided by the Vermont Fish & Wildlife Department.

Though there are historical records of settlement, to date no evidence has been found. If located, stone walls, cellar holes, and other cultural artifacts will be protected according to ANR guidelines for protection of historic and cultural sites.

Extensive non-motorized recreational activities such as hiking, snowshoeing, hunting, fishing, and cross-country skiing are allowed within these areas. An important local snowmobile trail passes through parts of this area. Public and management access is limited. Many roads are eroded and unusable due to years of off-roading.

Management actions:

- Management should seek to maintain and develop the natural community types. Control of invasive plants before harvest or other method to ensure success of native plant regeneration will be needed in some areas.
- Timber management schedule per outline on the following page.
- Develop improved public access where the State has clear access rights.
- Location of patch cuts for Eastern Racer will be made in cooperation with State Lands Ecologist to mitigate risks of invasive plant and cowbird expansion into core forest areas.
- Improve mast production of oak, beech, and cherry through thinning where appropriate.
- Repair interior roads and prevent off-roading.

Portions of the WMA managed by the private owners of the timber rights were not classified and total 424 acres.

IMPLEMENTATION SCHEDULE[1]

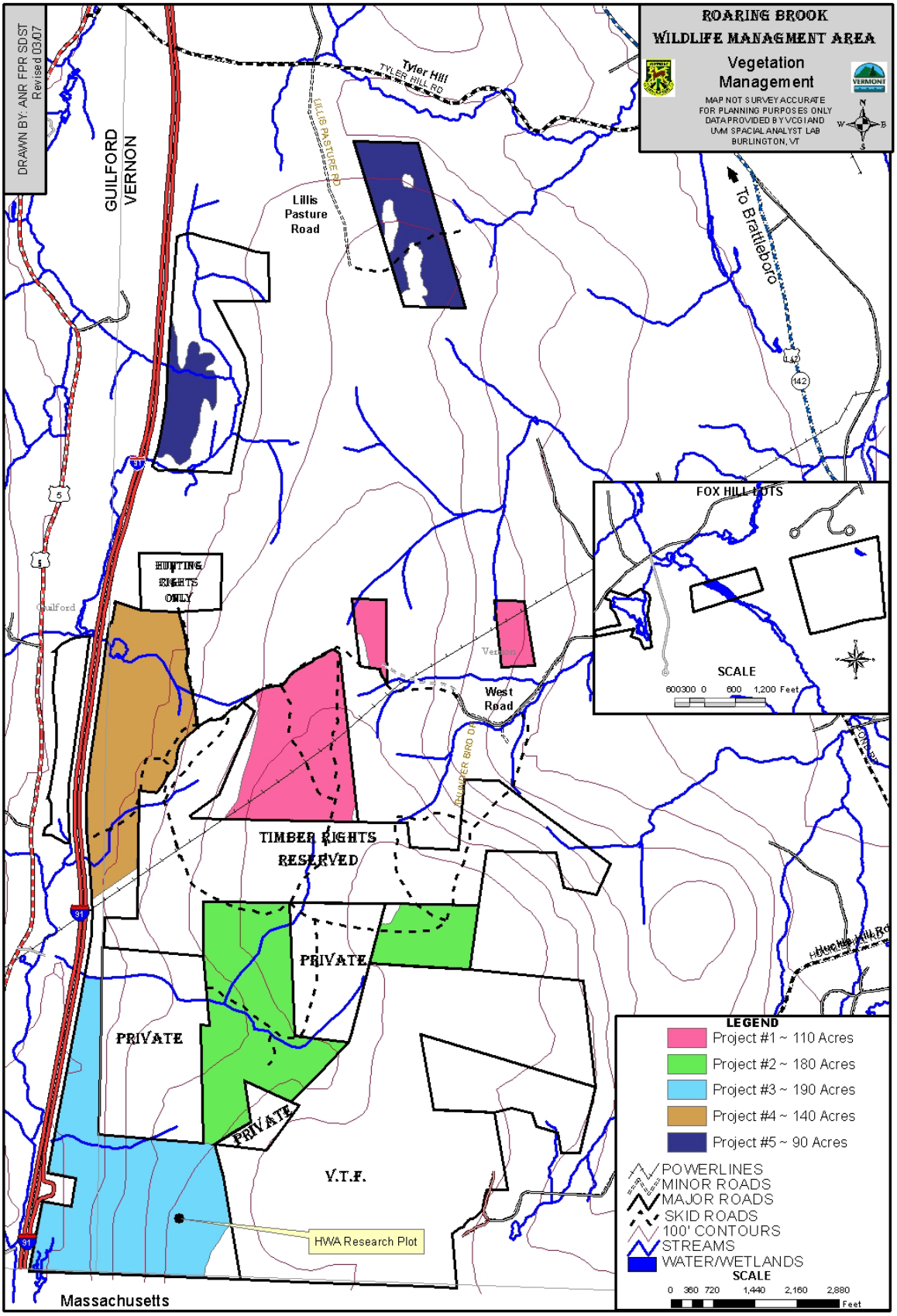
For in-house scheduling purposes

Approxi-mate Year	Sale #	Treatment/ Outcomes	Acreage	LUC's	Constraints/Special Considerations	Est. Second Entry	Block/ Comp/ Stand
2012		Establish HWA research plot.	≤2	2.2b			
	1	Single tree and group selection to release softwood and oak species. Patch clear cuts along power line to create habitat for Eastern Racer where this use doesn't conflict with "Core Forest" goals.	110	2.2b 3.0	Incorporate hemlock adelgid guidelines. Portions inope-rable. Incorporate Eastern Racer habitat. High percent-tage of hemlock and oak species. Maintain den and roost trees around wetland for bats. Maintain >70% canopy closure in stand 1 adjacent to beaver flowages as forage habitat for bats. Maintain dense stands along powerline adjacent to patch cuts. Barrows 14-acre lot will require boundary resolution and temporary right-of-way. Power corridor right-of-way is 300'.	2027	1/4/1&2 2/1/1&2 2/2/1
		Restrict Denyou Lot woods road to winter use.		2.2a	To allow safe animal movement and protect road surface.	n/a	n/a
		Work with power line manager to refine vegetative manage-ment procedures to improve habitat for Eastern Racer.		2.2c		n/a	n/a
		Eastern Racer egg laying and denning habitat development.		2.2c	In cooperation with AOT and National Grid.	n/a	1/1/1 1/4/1&3
2014	2	Thinning to promote oaks, white pine, black birch, and hemlock. Browse production through small patch clearcuts (1/2-2 acres) in low quality hardwood.	180	2.2c 3.0	Maintain deer wintering area and softwood travel corridors. Maintain access improvements done by others in 2006. Multiple stream and wetland features. Maintain hemlock canopy above streams. Maintain >70% crown closure in stand 3 adjacent to beaver wetland.	2029	1/2/1-5 1/5/1

[1] Virtually all implementation activities could require access agreements with neighboring landowners. It is also possible "management access" is a retained right. This issue may be resolved in the planning period.

Approxi-mate Year	Sale #	Treatment/ Outcomes	Acreage	LUC's	Constraints/Special Considerations	Est. Second Entry	Block/ Comp/ Stand
2014		Research possible improvement on Ad Brooks Road. Repair eroded skid roads.			Road is shared with other landowners. Any improvements done in consultation with town offices and town permits sought if needed.		n/a
		Fox Hill Lot access research and finalization of legal work if necessary. Research prescription to regenerate oak species. Propose vegetative manage-ment to Stewardship Team if feasible.	56	2.2d	A unique natural community. Timber management is not an objective. If management conducted, seek access through temporary right-of-way to east or south.	n/a	6/1/1
2016	3	Thinning with small group selection to favor crop trees of all species, in particular mast producers and softwood cover.	190	2.2c 3.0	Currently access is poor. Temporary rights-of-way will be required. Additional Eastern Racer habitat work may be a possibility. Attempt to develop permanent management access. Buffer black gum swamp and beaver wetland.	2031	1/1/1
2018	4	Thinning to promote white pine and hemlock.	140	2.2b	Parts of Stand 2 may be inoperable. Numerous stream and wetland features. Maintain deer travel corridors. Some potential for habitat work for Eastern Racer. Inoperable sections may be done pre-commercially.	2028	1/3/1&2
2020	5	Crop tree release (mast species and others) and release of white pine regeneration.	90	3.0 2.2c	May require temporary right-of-way. Multiple wetland features including gum swamps. Possible deer wintering area in Denyou Lot.	2030	3/-/172 4/1/1, 2 & 3
Annual		Fall mowing of Eastern Racer openings and travel corridors.	11	2.2c	Completed by AOT.	n/a	1/1/1
		Hemlock woolly adelgid monitoring. Develop white spruce planting program if hemlock defoliation becomes severe.			In cooperation with FPR Forest Resource Protection Division.	n/a	n/a

Approxi-mate Year	Sale #	Treatment/ Outcomes	Acreage	LUC's	Constraints/Special Considerations	Est. Second Entry	Block/ Comp/ Stand
Annual		Monitor spread of purple loosestrife at Newton Brook and Beinhauer and Horstman Lots. Release Galerucella beetles for control.			Through Department of Environmental Conservation.		n/a
		Monitor and control, where feasible, invasive exotic shrubs.			Requires Pesticide Use Impact Statement.		All
(approxi-mately 5 year intervals)		Monitor condition of significant natural community wetlands, and rare, threatened, & endangered species to evaluate impacts of public use and management.			Coincide with other scheduled activities in nearby units		All



Roaring Brook WMA Long Range Management Plan – Management Strategies and Actions

V. MONITORING AND EVALUATION

During the life of the Long-Range Management Plan for RBWMA, periodic monitoring will be conducted to ensure that the resources are protected from fire, insect and disease, other natural disturbances, encroachments, or unforeseen problems that may occur within the WMA. Management activities will be evaluated to determine how closely the results matched those projected within the plan. Minor adjustments in management may be made to reflect changed conditions or unanticipated results.

Long-range plans for the management of ANR lands provide guidance for long-term management and development of those lands. However, the future may not be fully determined at the time a plan is developed. A long-range plan may be amended when significant changes to a plan are proposed, including the following:

- Major change in use or species management direction;
- Major land acquisition to be added to an existing parcel;
- New recreation corridors not identified in a current plan;
- Major capital expenditures for new projects;
- Facility closures;
- Transfers in fee ownership;
- Designation of non-developed camping sites (via statute regarding camping on state lands);
- Leasing of new acreage (e.g., ski resort); and
- Renaming natural features (prior to recommendation to Department of Libraries) or lands.

In most cases when an amendment to a plan is proposed, the public is involved. The type and level of public involvement are determined at that time and depend on the extent of the amendment. If applicable, easement holders are notified to discuss the proposed amendment.

Occasionally public input may be sought by a district stewardship team regarding changes to a plan that are less significant than an amendment. These circumstances are left to the discretion of the district team involved.

A. **Forest Health**

The health of the forest stands within RBWMA will be monitored yearly by department personnel through a system of aerial observation and ground checking. Significant changes in forest stand conditions will be recorded and investigated by the Forest Resource Protection specialist. The specialist will provide information regarding problems so that better informed management decisions can be made.

B. **Vegetative Management**

Timber harvests and wildlife management practices completed within RBWMA will be periodically reviewed by the stewardship forester and the district stewardship team to determine how well management objectives are being met. If monitoring results indicate that there is a significant difference between the outcomes predicted by the plan and the actual conditions, changes to the plan may be recommended.

C. **Natural Communities**

Any exemplary, unique, and special natural communities and rare, threatened, and endangered (RT&E) species of plants and animals that are identified on this parcel will be periodically evaluated by the stewardship forester and the district stewardship team to determine conservation status (threats from recreational or other land uses) and successional trends.

D. **Recreational Activities**

Public recreation will be periodically monitored across the property by the district stewardship team to identify where recreational uses are in conflict or may be damaging natural resources. Changes in recreational uses may be implemented including new management strategies designed to minimize or eliminate conflicts. Game wardens will be asked to assist with maintaining compliance with state laws.

E. **Historic Resources**

Any historic sites found on the property will be periodically evaluated by the district stewardship team to ensure that these sites remain protected and unharmed. At the time the LRMP was written, none had been found.

VI. APPENDIX

Appendix A:
Ecological Assessment

A. Ecological Assessment

The Agency of Natural Resources uses the "coarse filter/fine filter" approach to the ecological inventory and assessment of state lands (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000). Widely employed as a management tool on state, federal, and private lands (see for example: Leslie et al. 1996; Committee of Scientists 1999; Stein et al. 2000; USFS 2000, 2004), it is an aid to land managers who seek to protect most or all of the species that naturally occur on their lands, but who lack the resources to make exhaustive inventories of all taxonomic groups. Because many groups of organisms are cryptic or poorly understood (for example, fungi and soil invertebrates), it is not practical to make inventory of them (Anderson et al. 1999; Willis and Whittaker 2002). Even if we could document all species, it would be impossible to manage the land with all of them in mind. Instead, natural communities are treated as a proxy for the biological organisms of which they are composed. It is thought that if examples of all of Vermont's natural communities are conserved at the scale at which they naturally occur, most of the species they contain, from the largest trees and mammals to the smallest insects, will also be conserved (NCASI 2004). Natural communities are thus a coarse filter for "catching" the majority of an area's native organisms. Because conservation of habitats (in the form of natural communities) will not protect all species, we also employ a "fine filter" to catch the remaining species that are known to require very specific conditions for their growth, reproduction, wintering, etc. Examples of organisms benefiting from the fine filter inventories described below include breeding birds, deer on their wintering areas, and rare plants.

The coarse filter assessment begins by describing landscape and climatic factors that characterize RBWMA, such as bedrock geology and water resources. It then details the 21 distinct natural community types documented and mapped during inventories of RBWMA. This is followed by a fine filter assessment describing rare species, invasive plants, and wildlife habitats found here.

1) Coarse Filter Assessment

Biophysical Region and Climate – Vermont's biological landscapes are divided into eight regions that share features of climate, topography, geology, human history, and natural communities. These regions are continuous in adjacent states, and are related to regional and national classifications of ecological systems in North America. RBWMA is located in the Southern Vermont Piedmont biophysical region. This region includes much of Vermont's Connecticut River valley as well as associated foothills to the west. This mostly forested region features productive soils and a relatively mild climate; it was thus historically an important agricultural area of the state, and many farms are still found there. The Connecticut and several large rivers run through the region. Bedrock is variable, but in many areas, contributes to mineral rich soils. The valleys in the region feature many soils derived from deep accumulations of glacial outwash and glacial lake deposits; glacial till soils predominate on the hills and mountains. The Southern Piedmont region receives less rainfall than much of the rest of

Vermont, and in some areas, particularly well drained south facing slopes, growing conditions can be very dry.

Interestingly, a publication of scientists from the U.S. Forest Service and U.S. Geological Survey (McMahon et al 2001) on North American ecological regions has placed the southeastern tip of Vermont, including all of RBWMA, in the Northeastern Coastal Plain ecoregion, along with coastal New Hampshire and Massachusetts. (The rest of Vermont is part of the "Northeast Highlands" ecoregion.) Many of the natural communities, plants, and animal species of the WMA do have southern affinities. RBWMA marks a distinctive contribution to Vermont's overall biological diversity and natural heritage.

Bedrock and Surficial Geology and Soils – The geologic history of this area has much to do with the current distribution of natural communities at RBWMA. The bedrock geology of this corner of Vermont is complex, and generally features acidic metamorphosed rocks. Most of the main WMA and associated Vernon Town Forest, the large wetland lot, and the Denyou Lot are underlain by Devonian-era metamorphic rocks of the Littleton Formation. This is gray slate and phyllite that generally weathers slowly and contributes few nutrients to the soil. Generally east of this is the Silurian-era Clough Formation, composed of quartzite and mica schist. Although these rocks are generally the setting for acidic soil conditions, they may have local lenses of calcium rich quartzite. The Clough Formation is found along the eastern margin of the Denyou lot and the main WMA, on the majority of the Fox lot, as well as in one of the Barrows lots. The Fish Hatchery and Newton Brook wetland lots are underlain by a pluton known as the Vernon Dome. This Devonian-era igneous intrusion into existing bedrock probably produced a granite, which was later metamorphosed to a gneiss. This rock does not contribute significantly to soil enrichment.

The degree to which these bedrock members affect growing conditions at RBWMA is mediated by the depth of the surficial materials deposited at the end of the last glaciation, some 15,000-12,000 years ago. As the glacier ice melted, rock fragments of all sizes, from boulders to clay, felt in an unsorted jumble known as glacial till, and most mountainous areas of the WMA feature a layer of this over the bedrock. Glacial till depths are usually less than about 40", but they may be deeper. The flatter areas closer to the Connecticut River were inundated by glacial Lake Hitchcock, which filled the river valley as the ice melted. Fast moving waters of the lake and associated river waters deposited deep piles of generally well-sorted sands, silts, and gravels. These materials are usually very well drained, and set the stage for such drought-adapted natural communities as the white pine-red oak-black oak forest found at the Fish Hatchery. There are areas of horizontally bedded gravels off the state land that facilitate great seasonal fluctuations in the water table. At nearby Lily Pond, a plant community known as a coastal plain pondshore grows in these conditions. The community and its plants are typical of the Atlantic coastal plain, but are found in Vermont at only this location. (The same gravels are found on state lands, but the natural community in question is not.) More recent deposits of muck and peat are found in many of the wetlands. These are organic materials deposited in very acidic environments that consequently decay more slowly than they are produced.

The soils of RBWMA are primarily products of these surficial deposits, though they may also be influenced by bedrock weathering. Glacial till-derived soils are the most widely distributed;

these are generally rocky silt loams of the Brayton, Dummerston, Fullam, Macomber, Taconic, and Hubbardton soil series. In most areas of the WMA these are only moderately productive soils. Soils formed on the glacial lake- and river-deposited sediments are Walpole, Windsor, Quonset, and Warwick fine sandy loams and are greater than 5' in depth. Organic soils in the wetlands have been typed as Markey muck and Lupton mucky peat. Soils in the red maple-black gum swamps were usually observed to be mucky peats, but in most cases, these soils have not been mapped by the Natural Resource Conservation Service.

Hydrology/Streams/Rivers/Ponds – RBWMA receives between 38 and 44" of precipitation annually, a relatively small amount compared to the rest of the state. The WMA is entirely within the Connecticut River watershed, but stretches across three smaller watersheds that drain to that river. Lands west of the height of land in the main area of the WMA are drained by headwaters streams of Fall River, which flows south along the I-91 corridor before joining the Connecticut River. The Denyou parcel drains to an unnamed brook the flows through north Vernon to the Connecticut. Waters of the Fish Hatchery, Newton Brook, and Fox lots drains to the Connecticut via Newton Brook and several smaller, unnamed streams. There are permanent water bodies at the large wetland lot and the Fish Hatchery, and many of the wetlands are seasonally inundated. While the flow of water plays a critical role in the structuring of natural communities and habitats associated with swamps and seeps at the WMA, it is the lack of water that characterizes most of the acreage. Many of the forested natural communities described below are feature plants that are adapted to droughty conditions.

Natural Communities

A natural community is an assemblage of biological organisms, their physical environment (e.g., geology, hydrology, climate, natural disturbance regime, etc.), and the interactions between them (Thompson and Sorenson 2000). More than a simple collection of species, a natural community is characterized by complex webs of mutualism, predation, and other forms of interaction. The 80 natural community types described in Vermont repeat across the landscape in patches (or "polygons") of various sizes. These patches (or groups of patches in close proximity to each other) are referred to as natural community *occurrences*, and are to be distinguished from broad descriptions of community types. Natural community occurrences vary greatly in their size. *Matrix* communities, such as hemlock-northern hardwood forests, occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. *Large patch* communities, such as red oak-northern hardwood forest, typically occur at scales of 10-100 acres. *Small patch* communities such as seeps and vernal pools are usually less than 10 acres in size, and owe their existence to highly localized site and disturbance characteristics.

Natural communities at RBWMA were identified through aerial photograph interpretation and field surveys. Field data were collected using a Trimble GeoExplorer II global positioning system (G.P.S.) unit, clinometer, compass, binoculars, soil augur, Cornell pH kit, and a variety of reference manuals for identification of plants, animals, fungi, etc. Many plant specimens were collected for identification in the lab. A Geographic Information System (G.I.S.) map of natural communities was produced using ArcView software from ESRI, Inc. Because some natural communities occur at very small scales (e.g., less than ¼ acre), this mapping effort is probably incomplete. Natural community mapping is an iterative process, and our knowledge improves

with each mapping effort. Thus, the map presented here should not be viewed as a final statement on community distribution at RBWMA; instead, it should be treated as a first attempt at describing natural communities in this area. Land managers and members of the public should be aware that additional examples of small patch natural communities (e.g., vernal pools and seeps) probably occur on the management unit. As subsequent inventories and site visits are conducted, this map will be improved.

Natural community occurrences are assigned a quality rank, a statement of their overall ecological value which helps guide management. An "A"-ranked occurrence is of high quality relative to others of its type in the state, while a D-ranked example is of comparatively low quality. Quality ranks are objectively assigned on the basis of three factors: occurrence size, current condition, and landscape context. The three factors vary in the degree to which they influence overall quality in different communities. For example, size and landscape quality are more important factors than current condition in the quality ranking of northern hardwood forests, while current condition and landscape context receive greater attention in the ranking of rich northern hardwood forests. It is important to recognize that assignment of low quality ranks may be due to small size rather than poor current condition. When community occurrences are either rare or of high quality (or a combination of these factors), they may be designated as being of "statewide significance." This designation is applied according to objective guidelines established by the Vermont Nongame and Natural Heritage Program, which are available upon request. It is recommended that state-significant natural communities be afforded a higher level of protection than other areas of the management unit.

Fifty-five occurrences of 19 natural community types were identified and mapped at RBWMA. A total of 48 natural community polygons were mapped. Some broad patterns emerged from this mapping effort. Forested natural communities usually favor a strong component of eastern hemlock (*Tsuga canadensis*), a softwood that tolerates the dry ledge conditions in many parts of the WMA, as well as 'central' hardwoods such as oaks. Many of the wetlands feature acidic substrates, and feature distinctive plant assemblages as a consequence. Plants whose ranges are mostly to the south of Vermont are important components of several communities, including black gum (*Nyssa sylvatica*) and scarlet oak (*Quercus coccinea*).

The topography, soils, vegetation, and wildlife associations of each natural community at RBWMA are described below.

Natural Communities of Roaring Brook WMA				
Natural Community		**Acres**	**Vermont Distribution**	**State Significant Example?**
Wetlands	Alder Swamp	2	common	
	Alluvial Shrub Swamp	2	common	
	Buttonbush Swamp	12	rare	Yes
	Cattail Marsh	9	very common	
	Deep Broadleaf Marsh	<1	common	
	Hemlock Swamp	6	rare	
	Red Maple-Black Ash Swamp	19	common	
	Red Maple-Black Gum Swamp	13	very rare	Yes
	Sedge Meadow	4	very common	
	Seep	<1	common	
	Shallow Emergent Marsh	4	very common	
	Sugar Maple-Ostrich Fern Riverine Floodplain Forest	3	uncommon	
	Vernal Pool	<1	common	Yes
Uplands	Dry Oak Forest	71	uncommon	Yes
	Hemlock Forest	43	common	
	Hemlock-Northern Hardwood Forest	1030	very common	Yes
	Mesic Red Oak-Northern Hardwood Forest	36	common	
	Northern Hardwood Forest	136	very common	
	White Pine-Red Oak-Black Oak Forest	6	rare	

An additional 31 acres of open water and open land (mainly in the power line right of way) were mapped. For more information on these and other natural communities, see Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: http://www.vtfishandwildlife.com/books.cfm?libbase_=Wetland,Woodland,Wildland

1) Northern Hardwood Forest

One hundred thirty-six acres of northern hardwood forest were mapped at RBWMA. While northern hardwood forest is the most common forested natural community type in much of Vermont, here it is less widely distributed than the related hemlock-northern hardwood forest (described below). This is a broadly defined natural community type, and it is thus variable at RBWMA. Most of this northern hardwood forest acreage occurs on glacial till-derived silt loams of the Limerick, Fullam, and Dummerston formations. These are mesic, stony soils, and are usually more than 60" deep. (By contrast, hemlock-northern hardwood forests at RBWMA are often found on shallower, somewhat droughty till soils.)

Average stands feature a 55-65' canopy, with about 75% closure. In many places this is overtopped by scattered, taller eastern white pine (*Pinus strobus*). Common canopy species are red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), sweet birch (*Betula nigra*), black cherry (*Prunus serotina*), and American beech (*Fagus americana*). Eastern hemlock (*Tsuga Canadensis*) is often present in low numbers; other trees noted in hardwood forest canopies are red oak (*Quercus rubra*), white ash (*Fraxinus americana*), and yellow birch (*Betula allegheniensis*). An 18-25' subcanopy is sometimes present, and includes smaller individuals of the above species (especially beech) as well as musclewood (*Carpinus caroliniana*),

hophornbeam (*Ostrya virginiana*), and witch hazel (*Hamamelis virginiana*). Tall shrubs may include striped maple (*Acer pensylvanicum*), hophornbeam, beech, and hemlock. Short shrubs are generally sparse and include sweetfern (*Myrica peregrina*; especially abundant in sunny openings), striped maple and sapling of some of the species listed above. Herbs noted include Canada mayflower (*Maianthemum canadense*), starflower (*Trientalis borealis*), stemmed yellow violet (*Viola pubescens*), wild oats (*Uvularia sessilifolia*), dwarf ginseng (*Panax trifolia*), Christmas fern (*Polystichum acrostichoides*), and sedges (*Carex* species). Some stands showed signs of minor mineral enrichment, with greater sugar maple cover and presence of blue cohosh (*Caulophyllum thalictroides*) and Dutchman's breeches (*Dicentra cucullaria*).

The northern hardwood forest at RBWMA is of only moderate ("C") quality rank due to its small size.

Management Guidance: Where possible, forest management should seek to maintain the canopy composition and natural community type.

2) Hemlock Forest

Forty-three acres of this forest type are found scattered throughout the WMA. Individual patches are mostly smaller than 10 acres, and usually integrate with the hemlock-northern hardwood forest matrix. Hemlock forests are found on some of the driest and most ledgy ground on the parcel. The soil in most patches is mapped as Macomber-Taconic complex and Taconic-Hubbardton Rock outcrop complex, both of which are rocky, glacial-till derived soils ranging from 0-40" in depth. Bedrock outcrops are common in these stands, and in some areas, the ground is strewn with cobbles and boulders similar to the bedrock. Hemlock forests feature a dense (90% cover), nearly-pure, 50-60' canopy of eastern hemlock (*Tsuga canadensis*). A few other trees may be found here also, including sweet birch (*Betula nigra*), American beech (*Fagus grandifolia*), and white pine (*Pinus strobus*). Most stands of this natural community type have little subcanopy of shrub cover, though in one case there are one or more younger age classes of hemlock in the understory. Japanese honeysuckle (*Berberis thunbergii*) and glossy buckthorn (*Rhamnus cathartica*) are invasive exotic shrubs found in the understory of some stands, especially those near I-91. Herbs are very sparse, and include Canada mayflower (*Maianthemum canadense*), starflower (*Trientalis borealis*), and Christmas fern (*Polystichum acrostichoides*).

Management Guidance: Forest management should seek to maintain the canopy composition and forest type. Hemlock woolly adelgid is a threat to these forests, and should be looked for periodically at RBWMA. Due to the likelihood of HWA infestation, focus efforts to maintain the community type on the most productive sites.

3) Hemlock-Northern Hardwood Forest

Hemlock-Northern Hardwood Forest is the 'matrix' into which all of the other natural communities at RBWMA fit. The 1,030 acres of the community has been divided into two separate occurrences, one of which consists of several small polygons in the wetland and Fox Hill Lots, the other much larger one in the main block of the WMA. Like other landscape-level forested communities, this one is variable across the many sites in which it occurs. A typical

example features a 60-65' canopy dominated by eastern hemlock (*Tsuga canadensis*). Canopy closure averages about 75%, and trees other than hemlock may account for up to 30% of that cover. These trees include red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), eastern white pine (*Pinus strobus*), red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and sweet birch (*Betula nigra*). In some areas, particularly on the Denyou lot, large diameter American chestnut (*Castanea dentata*) stumps and logs are common, indicating that this tree was once a component of the forest canopy. Tall shrubs may be abundant, including wild raisin (*Viburnum cassinoides*), striped maple (*Acer pensylvanicum*), high bush blueberry (*Vaccinium corymbosum*), serviceberry (*Amelanchier* species), and, in some areas, the uncommon mountain laurel (*Kalmia latifolia*). Advanced tree regeneration is often present in this vegetation stratum and includes hemlock, beech, and sugar maple. Short shrubs observed include maple-leaved viburnum (*Viburnum acerifolium*), bush honeysuckle (*Diervilla lonicera*), low bush blueberries (*Vaccinium angustifolium* and *V. pallidum*) and striped maple. Herb cover is variable, averages about 30%, and includes partridgeberry (*Mitchella repens*), wintergreen (*Gaultheria procumbens*), trailing arbutus (*Epigaea repens*), goldthread (*Coptis groenlandica*), bunchberry (*Cornus canadensis*), Indian cucumber (*Medeola virginiana*), false Solomon's seal (*Smilacina racemosa*), wild sarsaparilla (*Aralia nudicaulis*), common woodland sedge (*Carex communis*), hay-scented fern (*Dennstaedtia punctilobula*), and intermediate woodfern (*Dryopteris intermedia*). A very rare plant, Massachusetts fern (*Thelypteris simulata*), has been found in this community near some of the red maple-black gum swamps. Eastern racer (*Coluber constrictor*) is a very rare and state-listed threatened snake found in early successional areas of the WMA; its denning sites are found adjacent to hemlock-northern hardwood forest.

Hemlock-northern hardwood forests are common on adjacent private lands, but the treatment here includes only the lands in public ownership. The 973 acre occurrence in the main block of the WMA is of statewide significance, due to its good condition, landscape position, and moderately large size, relative to other occurrences in Vermont.

One area mapped as hemlock-northern hardwood forest has many affinities with natural communities recognized in New Hampshire and Massachusetts. In the former it is known as Appalachian Oak-Mountain Laurel Forest. This is a forest dominated by hemlock and various oak species, and with a dense tall shrub layer of mountain laurel (*Kalmia latifolia*) in the understory. The area needs more study, as it may constitute the only occurrence of this distinct natural community in Vermont. (See Sperduto et al. and Swain and Kearsley 2001 for detailed treatments of this.)

Management Guidance: Forest management should seek to maintain the canopy composition and natural community type. A survey should be conducted for Massachusetts fern before any timber harvest. Hemlock woolly adelgid is a threat to these forests, and should be looked for periodically at RBWMA.

4) Mesic Red Oak-Northern Hardwood Forest

This forest type was mapped on 36 acres of the WMA. It occurs as a small patch in six different spots, and is best developed in the two small parcels north of West Road. Soils in the red oak-northern hardwood forests here tend to be very well drained, rocky glacial tills less than 40" in

depth. This is a hardwood forest community where red oak (*Quercus rubra*) accounts for a significant portion of the canopy cover. Trees tend to be tall (60-70'), and canopy cover is about 75%. Other canopy species noted include red maple (*Acer rubrum*), black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*), white oak (*Quercus alba*), white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*). In some stands there is a well-developed subcanopy composed mainly of hophornbeam (*Ostrya virginiana*). The regeneration of canopy trees varies greatly, with red oak saplings usually reaching the subcanopy only when seeded into a sunny gap. Consequently land use history may play an important role in the structuring of these forests. Tall shrubs are usually sparse, striped maple (*Acer pensylvanicum*) being the most abundant. Short shrubs noted are low sweetfern (*Myrica peregrina*), bush blueberry (*Vaccinium* species), poison ivy (*Toxicodendron radicans*), and maple-leaved viburnum (*Viburnum acerifolium*). Herbs are moderately sparse, and include intermediate woodfern (*Dryopteris intermedia*), bracken (*Pteridium aquilinum*), Christmas fern (*Polystichum acrostichoides*), hairy woods grass (*Brachyeletrum erectum*), rice grass (*Oryzopsis asperifolia*), greenish sedge (*Carex virescens*), Indian pipe (*Monotropa uniflora*), and club mosses (*Lycopodium* species). In several areas, indicators of soil enrichment were found, including blue-stemmed goldenrod (*Solidago caesia*) and plantain-leaved sedge (*Carex plantaginea*).

The relationship of this community to hemlock-northern hardwood forests and dry oak forests at RBWMA deserves more study. The red oak-northern hardwood forests at RBWMA are in good condition, but are small relative to others in the state.

Management Guidance: Forest management should seek to maintain the canopy composition and natural community type.

5) Dry Oak Forest

Two occurrences of this uncommon forest type are found on the WMA. The first, located on a series of west facing slopes above Interstate 91, is small (19 acres), impacted by land use history, and of only moderate quality. The second, the Fox Hill Lot, is 52 acres in size, is of higher quality, and is of statewide significance due to its size, current condition, and relatively buffered landscape condition. Soils at the Fox Hill Lot are extremely well drained, stony, fine sandy loams of the Lyman, Tunbridge, and Berkshire series. The organic layer is thin, and overall soil depth may be as little as a few inches to more than 12". Soils are acidic, with a pH of 5.4 determined for two samples at different locations. The forest canopy is dominated by 45-60' hardwoods. Canopy cover is variable, but averages about 80%. The most common canopy tree species are red oak (*Quercus rubra*), black oak (*Quercus velutina*), sweet birch (*Betula nigra*), and red maple (*Acer rubrum*). Locally common species include white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), chestnut oak (*Quercus prinus*), scarlet oak (*Quercus coccinea*), and white oak (*Quercus alba*). Tall shrubs have about 10% cover, and include witch hazel (*Hamamelis virginiana*), red oak, eastern hemlock, white pine, and American chestnut (*Castanea dentata*). Short shrubs are variable in abundance, but typically have about 20% cover. The most abundant are huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium pallidum*), maple-leaved viburnum (*Viburnum acerifolium*), smooth shadbush (*Amelanchier laevis*), and mountain laurel (*Kalmia latifolia*). Herbaceous cover is about 5%; most common species are wintergreen (*Gaultheria procumbens*), partridgeberry (*Mitchella repens*), starflower

(*Trientalis borealis*), wild oats (*Uvularia sessilifolia*), rattlesnake plantain (*Goodyera repens*), Pennsylvania sedge (*Carex pensylvanica*), ricegrass (*Oryzopsis asperifolia*), and blue ground cedar (*Diphasiastrum tristachyum*). Several rare, threatened, or endangered species have been documented in the Fox Hill Lot occurrence. These include scarlet oak, a tree that is very rare in Vermont, but is somewhat common here, especially on the south slopes of the hill. Also found were American hazelnut (*Corylus americana*; rare), spotted wintergreen (*Chimaphila maculata*; rare), large whorled pogonia (*Isotria verticillata*; rare and state-listed as threatened), sassafras (*Sassafras albidum*; uncommon), and mountain laurel (uncommon).

The dry oak forest at the Fox Hill Lot is the matrix for a large, high quality vernal pool (see below). It is adjacent to areas of hemlock-northern hardwood forest. Areas of the Fox Hill Lot with deeper soils may once have supported a white pine-red oak-black oak forest, a rare natural community that has all but vanished from Vermont. Due to a lack of information, these areas are currently mapped as dry oak forest.

Based on the abundance of shrubby American chestnut clones, the tree was probably a canopy dominant here before it was decimated by chestnut blight in the early 20th century.

Management Guidance: The dry oak forest at the Fox Hill Lot is one of the best known examples of this natural community in the state, and any management at the site should take into account the sensitive natural resources there. Increased use of the forest by dogs and people from the nearby housing development may be a threat, if not managed carefully. This is especially true for some of the rare plants, which were found within a few hundred feet of the development. Amphibians that breed in the vernal pool complete almost all of their life cycle in this dry oak forest, and could be threatened by heavy use of the area. Forest management is probably not necessary to maintain the forest community and its sensitive components, and could constitute a threat to some of them.

6) White Pine-Red Oak-Black Oak Forest

This pine-oak association is restricted in Vermont to areas of deep, well-drained sands. A six-acre example is found on the Hatchery property, where the soils are mapped as Windsor loamy fine sands and Tunbridge-Lyman fine sandy loams. On examination, the soil is found to have a shallow needle-based organic layer, a 2cm sandy humus A horizon, and a B horizon composed of 10cm of fine sand over 60cm of mottled fine sand, with more sand below this. No rocks or pebbles are present and the soil drains very well.

The 75-80’ tree canopy here is dominated by emergent white pine (*Pinus strobus*), with a slightly shorter main canopy of eastern hemlock (*Tsuga canadensis*), red oak (*Quercus rubra*), and black oak (*Quercus velutina*). At 45-50’, a 50% cover subcanopy features eastern hemlock, red maple (*Acer rubrum*), white pine, paper birch (*Betula papyrifera*), and American beech (*Fagus grandifolia*). Interestingly, a dead pitch pine (*Pinus resinosa*) was also identified in this stratum. Tall shrub coverage is about 20%, with white pine and hemlock the most important species. Short shrub coverage is 10-15%, and includes low bush blueberry (*Vaccinium* species), maple-leaved viburnum (*Viburnum acerifolium*), and, in sunny gaps, white oak (*Quercus alba*). Herb cover is 20%, and includes Canada mayflower (*Maianthemum canadense*), partridge berry

(*Mitchella repens*), Pennsylvania sedge (*Carex pensylvanica*), feeble woodland sedge (*Carex debilis*), and gaywings (*Polygala paucifolia*).

White pine-red oak-black oak forest is a rare natural community in Vermont, due both to its restriction to sandy terrace landscapes and the value of those lands for agriculture and timber harvest. This forest type was probably disturbed historically by periodic fires, which would encourage its most common tree species. In the absence of such gap-producing disturbance, hemlock will become a much more dominant tree here over time. This natural community occurrence has a "C" quality rank.

Management Guidance: If possible, this area should be managed to perpetuate the forest type. The forest will slowly transition to a hemlock stand without natural or other disturbances.

7) Sugar Maple-Ostrich Fern Riverine Floodplain Forest

One small example of this floodplain wetland type is found along a tributary of the Fall River on the east side of I-91. About 3.5 acres of the forest are on the WMA in Vermont, while another two to five acres are in Massachusetts. This is a small floodplain where the disturbance of annual flooding helps to structure vegetation and habitats. Unlike many riverine floodplain systems, this one shows signs of mineral enrichment. The soil is Limerick silt loam, an alluvial deposition that is both mineral-rich and prone to flooding. The somewhat open 40' tree canopy is composed of black cherry (*Prunus serotina*), sugar maple (*Acer saccharum*), American elm (*Ulmus americana*), and sweet birch (*Betula nigra*). A 20-25' subcanopy features muscle wood (*Carpinus caroliniana*). Tall shrubs are muscle wood and speckled alder (*Alnus rugosa*). No short shrubs were noted. Herbs include ostrich fern (*Matteuccia struthiopteris*), hellebore (*Veratrum viride*), skunk cabbage (*Symplocarpus foetidus*), and sedges (*Carex* species). The community appears to be somewhat degraded by its proximity to the highway. A more thorough ecological assessment should be done.

8) Red Maple-Black Ash Swamp

This is a common swamp type in Vermont. Described as "red maple-black ash swamp" by Thompson and Sorenson (1999), a more refined ecological community classification (Sorenson 2004) now distinguishes this community from other red maple-dominated swamps found in the Champlain Valley. A total of 18.5 acres were mapped here, most of it on the I-91 Beinhauer-Horstman Lot. These are acidic (pH values for peat ranged from 5.4-5.6) swamps with peaty or mucky soils and usually some degree of groundwater seepage. They are stressful places for plants to grow, but can nonetheless be rich in species. The tree canopy is 30-35' tall, and only covers 55-65% of the ground. Most common species are red maple (*Acer rubrum*), yellow birch (*Betula allegheniensis*), and black ash (*Fraxinus nigra*). Eastern hemlock (*Tsuga canadense*) is a minor component of some examples, and is often the dominant tree in the surrounding upland forest. The tall shrub layer is often quite dense, and includes speckled alder (*Alnus rugosa*), winterberry holly (*Ilex verticillata*), highbush blueberry (*Vaccinium corymbosum*), silky dogwood (*Cornus amomum*) and the uncommon shrubs mountain laurel (*Kalmia latifolia*), maleberry (*Lyonia ligustrina*), and spicebush (*Lindera benzoin*). Also noted at one site was Morrow's honeysuckle (*Lonicera morrowii*), and invasive exotic shrub. The short shrub layer is

usually sparse, including smaller red maple, alders, and winterberry, as well as steeple-bush (*Spiraea tomentosa*). Herbs usually have 60% cover or greater, and include cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), Canada mayflower (*Maianthemum canadense*), starflower (*Trientalis borealis*), goldthread (*Coptis groenlandica*), American pennywort (*Hydrocotyle americana*), bristly dewberry (*Rubus hispidus*), blue flag iris (*Iris versicolor*), wild calla (*Calla palustris*), tussock sedge (*Carex stricta*), nodding beggar's ticks (*Bidens cernua*), and Macloskey's violet (*viola macloskeyi*). An uncommon plant, folliculate sedge (*Carex folliculata*), was found in one of these swamps. Mosses, especially peat mosses (*Sphagnum* species), cover nearly 100% of the hummocky ground. Some examples feature areas of standing water during the wetter months.

These swamps are important habitat from a wide variety of amphibians, mammals, birds, and other wildlife.

The larger occurrence is "B" ranked, while the others have lower ("C") ranks due to their small size.

Management Guidance: Maintain ecological integrity of these swamps during timber harvest. Monitor largest occurrence for impacts from highway use and maintenance.

9) Red Maple-Black Gum Swamp

The 6 red maple-black gum swamps found at RBWMA and the associated Vernon town lands are some of Vermont's most important wetland natural communities. Since black gum (*Nyssa sylvatica*), a southern tree, is found in only a few areas of the state, the swamps that are defined by this tree are quite rare (Johnson 1998). In addition, several of the gum swamps at RBWMA are genuine old growth, with large diameter black gums up to 435 years in age (Vogelman 1969; Fosberg and Blunt 1970; Kershner and Leverett 2004). The swamps are situated in shallow basins. Some are drained by small streams, but others seem to have little or no outflow. Standing water is common, especially in spring. The U.S.D.A Natural Resources Conservation Service has mapped soil in some of these swamps as Brayton silt loam, a compact, very poorly drained till soil laid down under high pressure from melting glacial ice. Soil sampling in some of the swamps revealed the soil to be a peat or peaty muck 12-40" deep, with bedrock or hardpan (the Brayton silt loam) below. Soil pH was measured at 5.0, while surface water in one swamp had a pH of 3.8. Most of these swamps have a pronounce hummock-and-hollow topography, due to fern rootstocks and the presence of rotting logs on the swamp floor. This creates a complex mosaic of water and light regimes, allowing a broad range of plant and other species to inhabit the swamp.

An emergent, 45-55' tree canopy of white pine (*Pinus strobus*) is present in some of the occurrences. The main tree canopy is 30-40' tall, and ranges from 30% (in examples on the Denyou block) to 80% (the old growth examples further south) cover. Black gum is co-dominant with red maple (*Acer rubrum*), and there are lesser amounts of red spruce (*Picea rubens*), yellow birch (*Betula allegheniensis*), sweet birch (*Betula nigra*), and eastern hemlock (*Tsuga canadensis*). Black gum attains very large diameter in these swamps, sometimes reaching 30-40" dbh with deeply furrowed bark. Tall shrub cover varies from 15-50%, including mountain laurel

(*Kalmia latifolia*), highbush blueberry (*Vaccinium corymbosum*), winterberry holly (*Ilex verticillata*), mountain holly (*Nemopanthus mucronata*), nannyberry (*Viburnum cassinoides*), red maple, and black gum. Lowbush blueberry (*Vaccinium myrtilloides*) forms a sparse short shrub layer. Herb cover ranges from 50-70%, including cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), bunchberry (*Coptis groenlandica*), goldthread (*Coptis groenlandica*), starflower (*Trientalis borealis*), Canada mayflower (*Maianthemum canadense*), and several sedges (*Carex* species). Mosses and liverworts form an almost continuous cover on the swamp floor; these include peat mosses (*Sphagnum* species) and *Bazzania trilobata*. Massachusetts fern (*Thelypteris simulata*), a very rare species in Vermont, and Virginia chain-fern (*Woodwardia virginica*), a very rare fern on the state's threatened and endangered species list, are found in a few of the swamps. Another rare plant, narrow blue-eyed grass (*Sisyrinchium angustifolium*), is also present in some of the swamps.

Red maple-black gum swamps are important habitat for wildlife, including amphibians which were observed to lay their eggs in temporary pools of water. Black bears visit the swamps in fall to excavate yellow jacket wasp colonies at the mossy bases of trees. Bumblebees were observed to nest in cavities of giant downed black gum logs. There are insects whose life histories are entirely dependent on black gum (Davis 1964), and these may inhabit the swamps. And a characteristic assemblage of native bees gather nectar and pollen from the tree, attracted by a unique floral attraction that uses nectar to concentrate sunlight (Batra 1999).

The gum swamps here are divided into six element occurrences, as some of them are in close proximity to each other. The occurrences have quality ranks ranging from "A" to "C", and all are of statewide significance.

Management Guidance: It is critical that these swamps be buffered from any impacts of timber harvest in the area. A 1982 site visit report documents trampling by 'fern enthusiasts (Zika 1982), and the swamps are easily accessed by forest roads. Consequently they should be monitored for impacts from any vehicle and/or foot traffic.

10) Hemlock Swamp

There are six small occurrences of this rare swamp type scattered across the WMA. Described as "Hemlock Swamp" by Thompson and Sorenson (2000), a more refined ecological community classification (Sorenson and Farrell 2007) now distinguishes this community from a more mineral-enriched hemlock-dominated swamp. These swamps are in shallow basins fed by slow moving streams or groundwater seeps. Surface water may be present. The soils are a peaty muck of variable depth. A few of the swamps have pronounced hummock-hollow topography due to large diameter logs on the ground, but the example at Beinhauer-Horstman Lot is very flat. Eastern hemlock (*Tsuga canadensis*) is the dominant canopy tree, and averages about 45' in height. The 85% closed canopy also features yellow birch (*Betula allegheniensis*) and red maple (*Acer rubrum*). Tall shrubs have an average cover of 30%, and include high bush blueberry (*Vaccinium corymbosum*), winterberry holly (*Ilex verticillata*), witch hazel (*Hamamelis virginiana*), and spicebush (*Lindera benzoin*), a more southern member of the laurel family that is uncommon in Vermont. Herbs are diverse and cover at least 60% of the swamp floor. Most common are cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), marsh

fern (*Thelypteris palustris*), three-seeded sedge (*Carex trisperma*), long-hair sedge (*Carex crinita*), northern club-spur orchis (*Platanthera clavellata* var. *ophioglossoides*), turtlehead (*Chelone glabra*), and swamp dewberry (*Rubus pubescens*). Many other plants are present in lesser quantities, including some seep-associated species such as pennywort (*Hydrocotyle americana*). Peat mosses and other bryophytes cover about 90% of most of these swamps.

One hemlock-hardwood swamp, a variant of this community type, was found on the WMA. This swamp varies from the description above primarily in the co-dominance of its canopy by hemlock and red maple. Cyperus-like sedge (*Carex pseudocyperus*), an uncommon plant in Vermont, was found in this swamp.

These swamps provide habitat for a wide variety of wildlife. Most are small in comparison with others found elsewhere. As occurrences of a rare natural community type, their ecological integrity should be maintained or enhanced.

Management Guidance: Buffer these swamps from any timber harvest activity.

11) Alluvial Shrub Swamp

Two acres of alluvial shrub swamp were mapped in wetlands near I-91. These are open, shrubby swamps along meandering tributaries of Fall Brook. Beavers are active in the swamps, and play a role in keeping trees from establishing. The adjacent upland tree canopy covers about 5% of the swamp. Speckled alder (*Alnus rugosa*) occupies the tall shrub layer. Short shrubs cover 20%, and include speckled alder, steeple-bush (*Spiraea tomentosa*), and a dogwood (*Cornus* species). The invasive Japanese barberry (*Berberis thunbergii*) is found in and around these swamps. Herbs noted are royal fern (*Osmunda regalis*), asters (*Aster* species), and several grasses. This community has been heavily influenced by construction of the nearby highway. A more thorough inventory is needed.

12) Buttonbush Swamp

A 12 acre buttonbush swamp occupies much of the large wetland along I-91. Trees are absent from this open shrub swamp, and there is a lot of surface water. Soil is mapped as Lupton mucky peat. The swamp is dominated by buttonbush (*Cephalanthus occidentalis*). Other shrubs present are winterberry holly (*Ilex verticillata*), steeple-bush (*Spiraea tomentosa*), meadow-sweet (*Spiraea alba*), silky dogwood (*Cornus amomum*), speckled alder (*Alnus rugosa*), high bush blueberry (*Vaccinium corymbosum*), and poison sumac (*Toxicodendron vernix*). Cattail (*Typha latifolia*), tussock sedge (*Carex stricta*), and royal fern (*Osmunda regalis*) are the dominant herbaceous plants.

This swamp has likely been impacted by human activities such as road building and logging. It is a rare natural community in Vermont, so the occurrence at RBWMA is important to protect. The swamp needs a thorough ecological inventory.

Management Guidance: Maintain hydrology and ecological integrity of the swamp.

13) Cattail Marsh

Cattail marshes are found at the Beinhauer-Horstman Lot wetland and in the Newton Brook wetland complex. Soils are mucky peat and pH was 5.6 in one soil pit. Trees are absent, although 20' dead snags are scattered throughout the wetland. Tall shrubs have about 15% cover, and include poison sumac (*Toxicodendron vernix*), speckled alder (*Alnus rugosa*), red maple (*Acer rubrum*), silky willow (*Salix sericea*), buttonbush (*Cephalanthus occidentalis*), and winterberry holly (*Ilex verticillata*). A few short shrubs were noted, including steeple-bush (*Spiraea tomentosa*) and meadow-sweet (*Spiraea alba*). Herbs have nearly 100% cover, with cattail (*Typha latifolia*) and common tussock sedge (*Carex stricta*) together accounting for nearly all of this. Other species are beggar's tick (*Bidens* species), rice cutgrass (*Leersia oryzoides*), common bluejoint grass (*Calamagrostis canadensis*), wool-grass (*Scirpus cyperinus*), jewelweed (*Impatiens capensis*), false nettle (*Boehmeria cylindrica*), and purple loosestrife (*Lythrum salicaria*). Beaver are probably associated with the cattail swamps at RBWMA; they are also important habitat for many other species of wildlife. The state-threatened lesser bur-reed (*Sparganium natans*) found in the adjacent deep broadleaf marsh may also occur in the Newton Brook cattail marsh.

Management Guidance: Current hydrological regime should be maintained. Purple loosestrife, an invasive exotic, may pose a risk to the native flora here.

14) Shallow Emergent Marsh

Shallow emergent marshes were mapped in several of the wetland complexes, usually associated with other wetland natural communities and with some degree of beaver activity. There is typically little or no tree cover. Scattered shrubs are poison sumac (*Toxicodendron vernix*), speckled alder (*Alnus rugosa*), red maple (*Acer rubrum*), buttonbush (*Cephalanthus occidentalis*), spicebush (*Lindera benzoin*), and winterberry holly (*Ilex verticillata*). Fox grape (*Vitis labrusca*) is a moderately common vine. Herb cover is nearly 100%. Most common species are tussock sedge (*Carex stricta*), stipitate sedge (*Carex stipata*), cattail (*Typha latifolia*), common bluejoint grass (*Calamagrostis canadensis*), cinnamon fern (*Osmunda cinnamomea*), and orange jewelweed (*Impatiens capensis*). Many other plants are present, including yellow jewelweed (*Impatiens pallida*), American bur-reed (*Sparganium americanum*), bog willowherb (*Epilobium leptophyllum*), bluegrass (*Poa* species), golden saxifrage (*Chrysosplenium americanum*), water purslane (*Ludwigia palustris*), marsh bedstraw (*Galium palustris*), boneset (*Eupatorium perfoliatum*), narrow-leaved goldenrod (*Euthamia tenuifolia*), and purple loosestrife (*Lythrum salicaria*). Peat mosses are found at the bases of herbaceous plants, including *Sphagnum squarrosum* and *Sphagnum magellanicum*. Jefferson's salamander, rare in Vermont, has been observed in one of the shallow emergent marshes along I-91.

Management Guidance: Current hydrological regime should be maintained. Purple loosestrife, an invasive exotic, may pose a risk to the native flora here.

15) Deep Broadleaf Marsh

One small occurrence of this community was mapped along Newton Brook in the wetland complex. Trees and shrubs are absent, and floating herbaceous plants are rooted in the mucky brook bottom. Lesser bur-reed (*Sparganium natans*), A rare plant on Vermont's Threatened Species list, occurs in this community, and possibly in the associated cattail marsh and sedge meadow. This community needs a thorough ecological inventory.

Management Guidance: Current hydrological regime should be maintained. The lesser bur-reed population should be monitored.

16) Sedge Meadow

Sedge meadows are found in the wetland complexes at the I-91 wetland and in Newton Brook. These are open herbaceous wetlands dominated by sedges (*Carex* species). The Newton Brook example contains many of the same plants found in the associated cattail marsh and shallow emergent marsh, but the sedges are dominant. These include tussock sedge (*Carex stricta*), which forms the distinctive hummocky topography of these meadows, as well as stipitate sedge (*Carex stipata*), garish sedge (*Carex lurida*), lakeshore sedge (*Carex lacustris*), and two-seeded sedge (*Carex disperma*). Other plants found in the RBWMA sedge meadows are marsh bedstraw (*Galium palustre*), blueflag iris (*Iris versicolor*), northern mannagrass (*Glyceria borealis*), common bluejoint grass (*Calamagrostis canadensis*), three-way sedge (*Dulichium arundinaceum*), boneset (*Eupatorium perfoliatum*), and sensitive fern (*Onoclea sensibilis*). The state-threatened lesser bur-reed (*Sparganium natans*) found in the adjacent deep broadleaf marsh may also occur in the Newton Brook sedge meadow.

Management Guidance: Current hydrological regime should be maintained. As with other wetlands at Newton Brook, purple loosestrife may be a threat to this community.

17) Seep

Six seeps were identified on the property, and others will probably be found in the future. These are forested areas where groundwater seepage creates a permanent source of water and thus favorable conditions for wetland vegetation. Soils are usually mucky, and formed on top of the drier soils of the area. Cover from the adjacent forest is about 75%, and shrub cover is negligible. Herb cover is 85% or more, and is comprised of orange jewelweed (*Impatiens capensis*), golden saxifrage (*Chrysosplenium americanum*), cuckoo-flower (*Cardamine pratensis*), hairy woods grass (*Brachyeletrum erectum*), skullcap (*Scutellaria* species), violets (*Viola* species), and sedges (*Carex* species).

Seeps are important habitat for many species of wildlife, ranging from large mammals to amphibians and invertebrates.

Management Guidance: Protect seeps from disturbance during timber harvest by establishing an undisturbed buffer strip.

18) Vernal Pool

Three vernal pools were mapped at RBWMA. These seasonally inundated woodland pools are critical wildlife habitat, functioning as breeding habitat for pool-specialist invertebrates and amphibians as well as seasonal feeding sites for many other species of wildlife. The pools here range in size from about $1/10^{th}$ of an acre to almost half an acre. All are of good quality, and one at the Fox Hill Lot is of state-wide significance due to its large size and excellent condition. Soils in these pools are poorly drained, and there is usually no obvious drainage for them. A layer of decomposing leaf litter 1-2" deep sits on top of a saturated muck ranging in depth from 2 to 12"; in some pools, this muck overlays sandy or silty surficial material. Bedrock is found anywhere from 6-45" beneath the surface. Soil is acidic, with a pH of 5.0 in one sample.

Vernal pools at RBWMA have a canopy cover from adjacent hemlock and/or hardwood forests of 30-70%. Wetland shrubs are often found around the sunny perimeter of these pools, including high bush blueberry (*Vaccinium corymbosum*), mountain holly (*Nemopanthus mucronata*), and leatherleaf (*Chamaedaphne calyculata*). Sassafras (*Sassafras albidum*), rare in Vermont, is associated with one of the pools. There is little vegetation in the pools, though some support a few sedges (*Carex* species), royal fern (*Osmunda regalis*), and peat mosses (*Sphagnum* species). The occurrence at the Fox Hill Lot sometimes contains a large mat of greenish algae; the impacts of this to the ecology of the pool have not been studied.

Management Guidance: Vernal pools and the species they support are very sensitive to changes in hydrology and shading caused by nearby logging. The amphibians that breed in the pools can be negatively impacted by these changes. Consequently, the pools should be appropriately buffered during any timber harvest operations. An additional concern is the use of the Fox Hill Lot pool by dogs and people from the adjacent housing development. These impacts should be monitored.

19) Alder Swamp

A 2-acre occurrence of this shrub swamp type is found on the lands to the West side of I-91. This example probably has a long history of human disturbance, as it is in close proximity of houses and I-91. Seasonal flooding and standing water are common. Soils are a mix of mucky organic material and sandy and gravelly alluvium brought by rushing waters from areas of upland soil nearby.

These swamps are dominated by speckled alder *(Alnus incana),* winterberry *(Ilex verticillata),* high bush blueberry *(Vaccinium corymbosum),* and arrow-wood *(Viburnum dentatum).* Glossy false buckthorn *(Frangula alnus),* an invasive shrub, is also common. Shorter shrubs include meadowsweet *(Spiraea latifolia),* roses *(Rosa* species), sweetgale *(Myrica gale),* red maple *(Acer rubrum),* and leatherleaf *(Chamaedaphne calyculata).* Bluejoint *(Calamagrostis canadensis),* three-way sedge *(Dulichium arundinaceum),* turtlehead *(Chelone glabra),* blue flag iris *(Iris versicolor),* fowl manna grass *(Glyceria canadensis),* cinnamon fern *(Osmunda cinnamomea),* royal fern *(Osmia regalis), Carex stipata, Carex crinite,* and several other sedges *(Carex* species).

Management Recommendations: None.

2) Fine Filter Assessment

Rare, Threatened, and Endangered Species

RBWMA is home to a number of rare, threatened, and endangered species of animals and plants. The species and their management needs are summarized below.

PLANTS
Eight species of rare or very rare plants have been located on the WMA. Three of these are listed as "threatened" by Vermont state endangered species statute (10 V.S.A. 123). Their occurrence at RBWMA is thus very important on a statewide basis. RBWMA and the adjacent Vernon Town Forest are the only known stations for smooth winterberry in Vermont. Five plants that are uncommon in the state were also found. These plants are summarized in the table below. Another of Vermont's rare plants, plains frostweed (*Helianthemum bicknellii*), may also occur on the WMA. A specimen collected in 1901 by a W.H. Blanchard currently resides in the UVM herbarium, and is labeled "Vernon." It is not known where in Vernon Blanchard found the plant, but the lands of RBWMA feature some potential habitat. Plains frostweed favors dry, sunny sandy sites. Land managers should be familiar with the plant, and look for it at RBWMA.

Rare, Threatened, and Endangered Plants of Roaring Brook WMA

Species Name	Common Name	Sites Where Found	State Rarity Rank	Rarity*	Legal Status
Sparganium natans	Lesser bur-reed	Newton Brook	S1	very rare	threatened
Woodwardia virginica	Virginia chain fern	Black gum swamps	S1	very rare	threatened
Quercus coccinea	Scarlet oak	Fox Hill Lot	S1	very rare	
Ilex laevigata	Smooth winterberry	Black gum swamps	S1	very rare	
Isotria verticillata	Large whorled pogonia	Dry oak Forests	S2	rare	threatened
Sisyrinchium angustifolium	Narrow blue-eyed grass	Gum swamps; woods	S2	rare	
Corylus americana	American hazelnut	Fox Hill Lot	S2	rare	
Nyssa sylvatica	Black gum	Black gum swamps	S3	uncommon	
Chimaphila maculata	Spotted wintergreen	Dry forests	S2	rare	
Sassafras albidum	Sassafras	Dry oak forests	S3	uncommon	
Carex pseudocyperus	Cyperus-like sedge	Hemlock swamp	S3	uncommon	
Kalmia latifolia	Mountain laurel	Woods, swamps	S3	uncommon	
Lindera benzoin	Spice bush	Swamps, wet woods	S3S4	uncommon	

*for an explanation of these rarity ranks, visit the Vermont Nongame and Natural Heritage Program's website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm

Non-Native Species

A number of non-native plant species were found at RBWMA. Most are not a threat to native vegetation, habitats, or wildlife; however, there are a few notable exceptions. Glossy buckthorn (*Rhamnus cathartica*), Morrow's honeysuckle (*Lonicera morrowii*), and Japanese barberry (*Berberis thunbergii*) are all discussed above as weeds in the understory of some of the forests of the WMA. These shrubs are particularly common in the hemlock forests along I-91, but they have been found in many other areas. Timber harvest and other canopy gap producing activities can allow these aggressive shrubs to spread to the interior of forests. Consequently, forest management activities need to address means of controlling the plants or of ensuring the understory is "captured" with native plant regeneration after harvest.

Purple loosestrife (*Lythrum salicaria*) was found in a number of wetlands. More work is needed to determine whether this plant is negatively impacting the vegetation communities here. A biological control agent, one of several beetles (*Galerucella* species) that feed only on loosestrife, has been used by the Department of Environmental Conservation to combat purple loosestrife in Vermont. Beetles have been released on loosestrife plants in the Newton Brook wetland on at least two occasions, most recently in 2006, when some 600 beetles were introduced to plants in two acres of the wetland (Vermont Department of Environmental Conservation 2006). Stewardship staff may want to consider requesting that the DEC release beetles in the I-91 wetlands, where purple loosestrife is a nuisance.

Hemlock woolly adelgid is a non-native species that is decimating eastern hemlock in other parts of the northeast, and has recently turned up in Vermont, with one population as close as Brattleboro. The animal has not been found on hemlock trees at the WMA, but it should be monitored. A serious infestation of the adelgid could alter many of the natural resource values described above.

Core Forest

Vermont's 'core' or interior forest habitats are those areas where impacts from roads, residences, agriculture, and other forest canopy openings (including ponds, open wetlands, and natural rock outcrops) are minimal. Core forest has been defined as forested areas that are 100 meters or more from these openings. This type of habitat is favored by a wide array of wildlife species, so it is important to know how broadly it is distributed. Nearly all of RBWMA has been mapped as core forest. RBWMA and the adjacent Town Forest support the majority of the core forest acreage in the Town of Vernon. Exceptions include the forests on the Beinhauer-Horstman, Hatchery, and Newton Brook lots. While not all wildlife species require this habitat type, its prevalence here on the WMA is significant for those that do.

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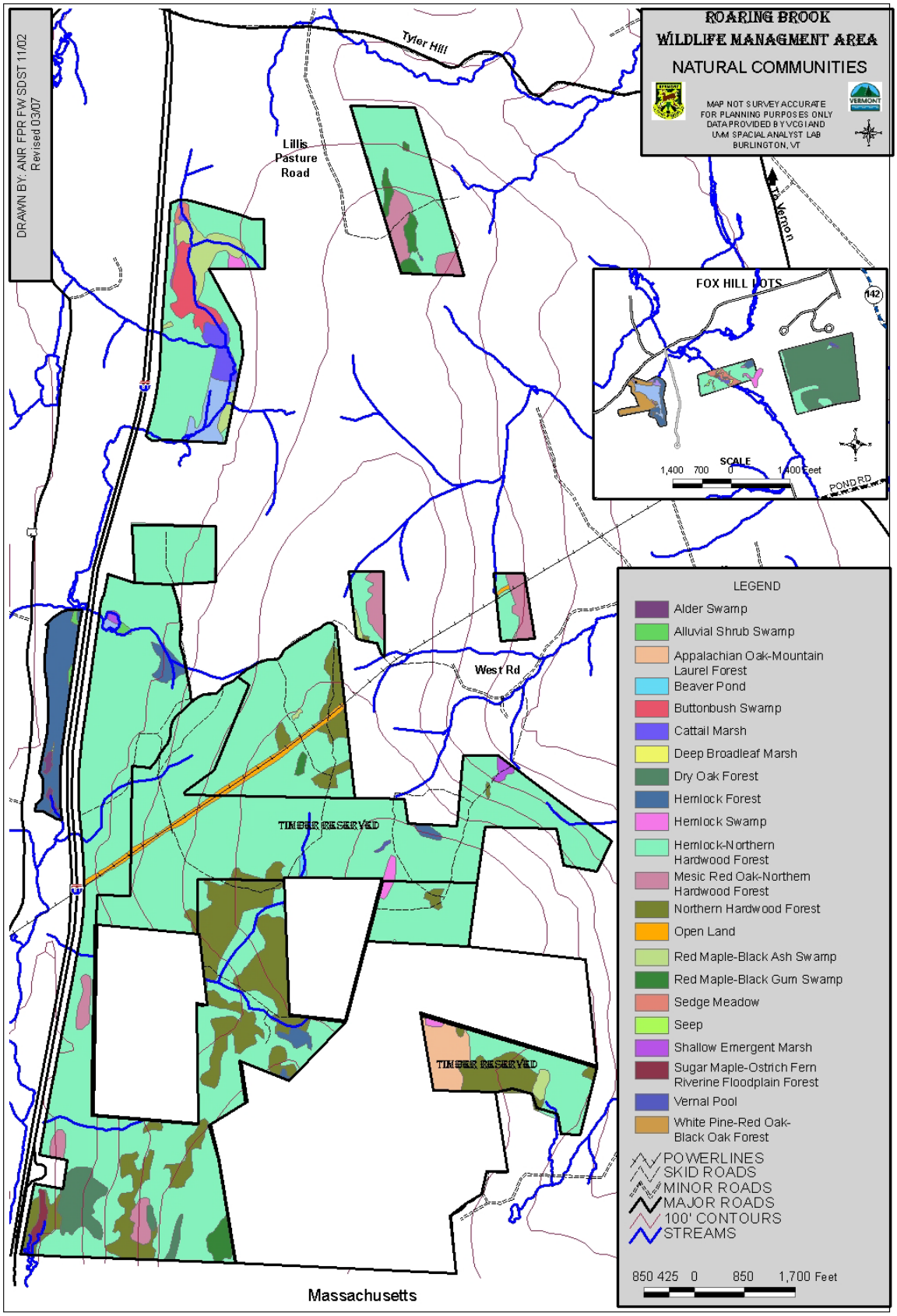


Roaring Brook WMA Long Range Management Plan – Appendix A

Appendix B:
Wildlife Resource Assessment

Amphibians and Reptiles:

The Fish & Wildlife Department contracted with James Andrews from Middlebury College to survey reptiles and amphibians on the RBWMA. A total of seven frogs, six salamanders, four snakes, and two turtle species were found on the WMA (see Appendix K). Two of the salamanders and three of the snakes were uncommon, rare or endangered.

Birds:

In 2004, the Fish & Wildlife Department contracted with Dr. Sylvia D. Harris, Wildlife Biologist, to conduct a bird survey of the RBWMA (see Appendix K for listing). A total of 64 species of birds were detected during station counts and an additional six species were found outside of the survey stations. The most commonly detected species were red-eyed vireo, black-capped chickadee, oven bird, and blue jay. The significant findings include:

- No rare, threatened, endangered, or uncommon bird species were found using the parcel.
- There was no evidence of cowbirds on the property.

Management Recommendations: Reduce risk of attracting cowbirds to the mature portions of the property by limiting the creation of additional forest openings greater than .5 acre in size within the 150-300 feet of edge of the mature forest habitat.

Small Mammals:

Bat Population and Habitat Survey and Assessment: On July 27, 2006 Fish & Wildlife biologists conducted a mist net survey along woods roads near an active beaver pond in the east-central part of the property. Twenty-nine bats of three different species were captured: little brown bat *(Mytosis lucifugus)*, northern long-eared *(M. septentrionalis)*, and the big brown bat *(Eptesius fuscus)*.

Because a relatively large number of bats were captured in weather not normally conducive to success (rainy and foggy), it is likely that the combination of wetlands and nearby dense forest create excellent bat habitat on the WMA. Features important to bats are: active beaver wetlands; a limited road system; dead and dying trees with loose bark and cavities near water; sunlight on roost trees; a relatively open understory; and stand crown closures of greater than 70%.

This survey was conducted before the White-Nose Syndrome (WNS) was found in Vermont. WNS in VT was first discovered during the winter of 2007-2008. It is estimated that for two species, the little brown and the northern long-eared bat, populations have declined by approximately 90%. As of May 2011 these two species have been suggested for the states endangered species list. Six of Vermont's nine species of bats are affected by WNS, although population declines in these other species is not as severe.

Other: No surveys were conducted to collect baseline data on other small mammals.

Critical Wildlife Habitats

Some wildlife species have specific critical habitat needs that are important for maintaining their populations. In general, such sites provide seasonal cover or food during critical time periods for species survival or reproduction. In many cases, wildlife may be concentrated in these particular habitats. The following critical wildlife habitats have been identified on the RBWMA in the past or were mapped during the FOREX inventory process.

Wetlands: A variety of wetland habitats exist on the RBWMA including: alluvial shrub swamp, beaver pond, buttonbush swamp, cattail marsh, open water wetlands, sedge meadow, red maple-black gum swamp, seeps, shallow emergent marsh, sugar maple-ostrich fern swale, and riverine floodplain forest (see map). These wetlands provide a mixture of habitat needs as well as critical ecological functions. Species associated with the RBWMA include beaver, otter, geese, mallards, wood ducks, fisher, mink, muskrat, amphibians, reptiles, invertebrates, and the occasional moose and black bear.

> Management Recommendations: Protection of wetland and buffer functions to provide wildlife habitat and protection of water quality.

Amphibian Breeding Sites: These sites are wetlands, streams, and vernal pools that provide the habitat conditions for breeding amphibians. Species such as wood frogs and spotted salamanders require temporary vernal pools to breed. Other species such as the green frog, eastern newt, and pickerel frog breed in more permanent bodies of water. Four vernal pools were identified on the property. Maintaining connectivity between wetland habitats so amphibians can move from one wetland to another within the WMA and to wetlands outside of the WMA is critical. In particular, identifying and maintaining amphibian movement corridors north/south between Vermont and Massachusetts, as well as establishing east/west connectivity between the Connecticut River Flood Plain and the upland habitats of Vernon and Guilford may be important to maintaining future populations of some of the rare and/or declining amphibian species.

> Management Recommendations: In key areas, focus on management of amphibian breeding sites, adequate buffers and, where feasible, recolonization corridors to other breeding sites.

Streams, Lakes, Ponds: These aquatic sites provide habitat conditions for a wide variety of species ranging from amphibians, invertebrates, reptiles, fish, birds, and mammals. Species not only directly use the waters, but most species depend on the habitat around the water (i.e., riparian zone), sometimes as far as 1,000 feet. The RBWMA is the headwaters for at least six streams.

> Management Recommendations: Adequately buffer for wildlife-associated species. Fifteen important water features were located and mapped on RBWMA (see preceding map).

Deer Wintering Habitat: Deer wintering habitat is the largest and most widespread critical habitat element on RBWMA. Mapped deer wintering areas cover approximately 565 acres – 40% of the parcel. The habitat is generally found on the steep west-facing slopes occupied mostly by a mixture of hemlock and white pine and generally parallels the Interstate.

Management Recommendations: Maintain or improve quality of deer wintering area because hemlock woolly adelgid exists within seven miles of the border and could devastate hemlock wintering areas, manage hemlock following developing protocols and grow other conifers where feasible.

Mast Stands: Mast stands provide important foods in the form of beechnuts, acorns, hickory nuts, cherries (soft mast), etc. for wildlife species such as bear, deer, grouse, turkey, gray squirrels, small mammals, and songbirds. There is a very high component of beech and/or oak on most of the RBWMA and several areas with a high component of black cherry. Gypsy moth outbreaks occurred in 1982 which resulted in significant oak mortality. Today remaining oaks have recovered from this defoliation.

Management Recommendations: Manage oak, beech, and cherry stems to provide mast for wildlife; monitor the effects of gypsy moth and beech scale/nectria; minimize wildlife disturbance from recreational activities within and adjacent to mast stands.

Raptor Nest Trees: Trees that host viable raptor nests are important to document and protect. Inventory of these sites is done opportunistically and during stand inventory, sale marking, and boundary maintenance procedures.

Management Recommendations: Identify and buffer raptor nest trees actively in use.

Wildlife – A wide variety of wildlife found on this property which includes all species typically found in the southern Vermont Piedmont. Approximately 40% of this area is mapped as critical deer winter habitat.

Bear – RBWMA falls in the area mapped as 'infrequently used by bear'. Signs of bear, however, are seen here especially in years when foods are regionally scarce and bears cover more ground in search of food.

Deer – White-tailed deer is an extremely adaptable species found in all Vermont towns, but are more abundant in southern and Champlain valleys, and central regions. The summer home range of deer is approximately 640 acres. The Vermont Fish & Wildlife Department has divided the state into management units based on elevation and biophysical regions. The parcel is located in Management Unit Q, the most southeasterly unit in Vermont. About 40% of this parcel is mapped as critical deer wintering area. This property has a significant oak component in comparison to other public lands in southeastern Vermont.

Turkey – A forest bird that prefers mature hardwood stands of mast-producing trees such as beech, oak, hickory, cherry, hophornbeam, and white ash. Together, beech and oak comprise 24.7% of the trees in the main canopy on RBWMA and hophornbeam occurs in the understory. Ferns and sedges, another winter mast source, are common along the wetlands and streams.

Grouse (Partridge) – An upland bird closely associated with early successional tree species such as aspens and birches. Superior grouse habitat contains three critical age classes of forest (0-10, 10-25, and 25+ years) all located within a 10- to 15-acre area. There is very limited aspen on this parcel; however, birches, mostly black birches, make up 8% of the main crown canopy. Habitat created in 2006 for the Eastern Racer should be beneficial to grouse.

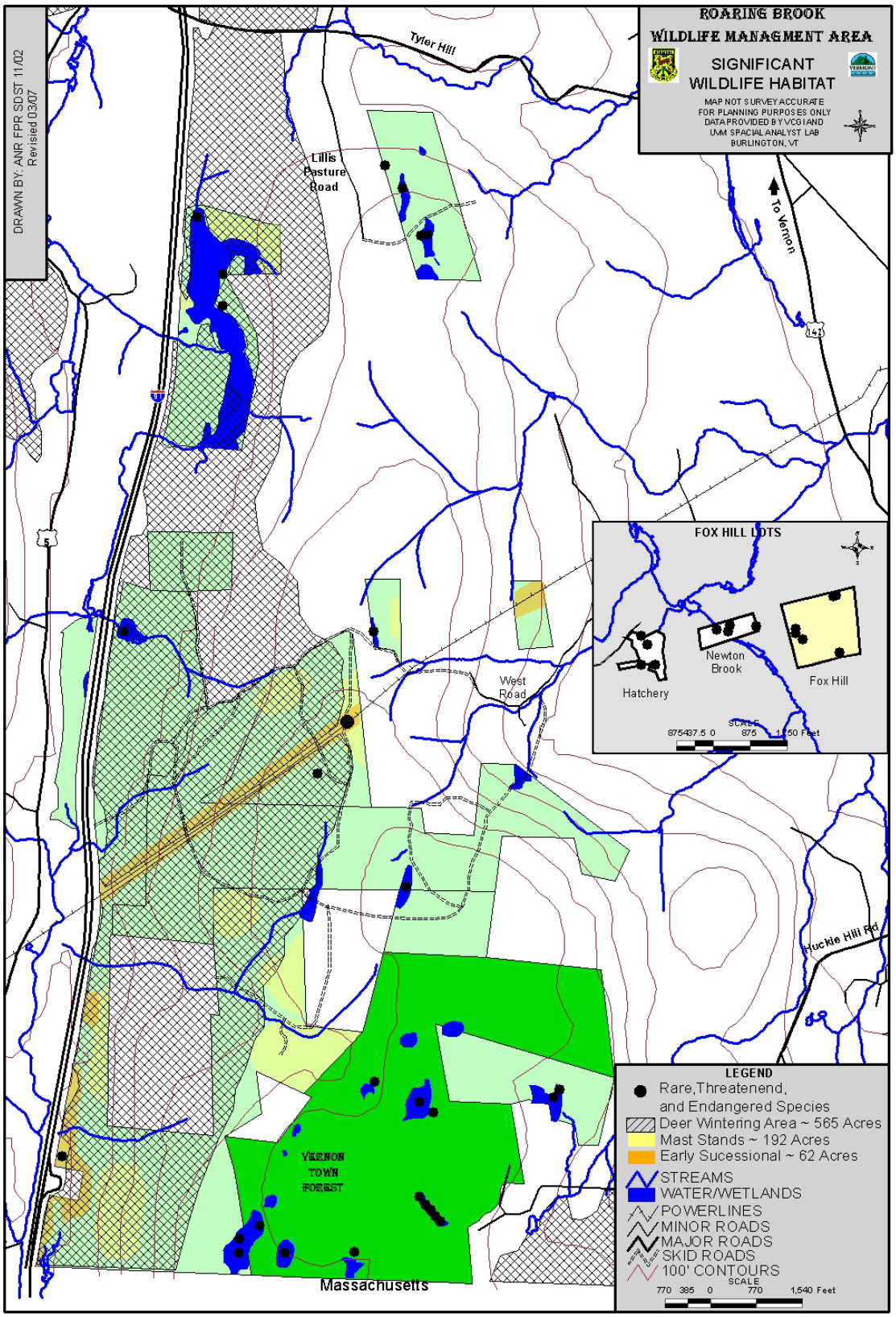
3) **Other Quality of Habitat Concerns**

Non-native Species – Exotic species can pose a threat to biodiversity and natural community health. They can also affect silviculture and other management considerations.

Problematic invasive species at RBWMA, including glossy buckthorn, Morrow's honeysuckle, Japanese barberry, and purple loosestrife, are discussed in the ecological assessment section. Other exotic species may become important within the current planning period. The Asian insect, Hemlock Woolly Adelgid, is spreading northward and was located on this property during the fall of 2010. It is expected to cause dieback and mortality of hemlock trees, especially on exposed sites or where the soil is shallow. Ground application of pesticides and introduction of biocontrol agents are the only strategies being used to manage this insect.

Core Forest – RBWMA is part of a large complex of private, state, and town land that encompasses approximately 5,000 acres of undeveloped, managed forestland. As such, it provides a large unfragmented forested landscape within the relatively fragmented Southern Piedmont Biophysical Region (see page 9). Because several parcels of privately-owned land exists interior to the State property, the risk of development on the WMA is high. Roads and houses on any of the inholdings would seriously degrade the core forest attributes of the area.

Wildlife Movement Corridors – A long north-south ridgeline, wetland features, and softwood stands that run parallel to the contour of the land provide many travel corridors connecting privately-owned woodlands and wetlands in the north with conserved lands in Massachusetts to the south. Interstate 91, running along the west side of the WMA, impedes east/west movement thereby reinforcing the importance of this north/south corridor. The portion of the WMA being converted from woodland to open herbaceous cover, around the former rest area, will provide a critical travel corridor for Eastern Racers to access key habitat areas on and off the WMA. Maintaining connectivity up to and within the powerline will also facilitate movement of Black Racers.


ROARING BROOK
WILDLIFE MANAGMENT AREA
SIGNIFICANT
WILDLIFE HABITAT
MAP NOT SURVEY ACCURATE
FOR PLANNING PURPOSES ONLY
DATA PROVIDED BY VCGI AND
UVM SPACIAL ANALYST LAB
BURLINGTON, VT
DRAWN BY: ANR FPR SDST 11/02
Revisied 03/07
Tyler Hill
Lillis
Pasture
Road
To Vernon
142
FOX HILL LOTS
Newton
Brook
Hatchery
Fox Hill
West
Road
SCALE
875 437.5 0 875 1,750 Feet
Huckle Hill Rd
VERNON
TOWN
FOREST
Massachusetts
LEGEND
Rare,Threatenend,
and Endangered Species
Deer Wintering Area ~ 565 Acres
Mast Stands ~ 192 Acres
Early Sucessional ~ 62 Acres
STREAMS
WATER/WETLANDS
POWERLINES
MINOR ROADS
MAJOR ROADS
SKID ROADS
100' CONTOURS
SCALE
770 385 0 770 1,540 Feet

Explanation of Legal Status and Information Ranks

State Status: As per the Vermont Endangered Species Law

E: Endangered – In immediate danger of becoming extirpated in the state.
T: Threatened – High possibility of becoming endangered in the near future.

Information Categories: Not established by law

PE: Proposed for endangered.
PT: Proposed for threatened.
SC: Special Concern – rare, status should be watched.

State Ranks of Plants, Animals, and Natural Communities

State ranks are assigned by the Nongame and Natural Heritage Program based on the best available information. They are not established by law. Ranks are reviewed annually.

S1: Very rare, generally only 1 to 5 populations believed to occur in the state and/or some factor(s) making it especially vulnerable to extirpation.
S2: Rare, generally 6 to 20 populations believed to occur in the state and/or some factor(s) making it vulnerable to extirpation.
S3: Uncommon, but believed to be more than 20 populations in the state and/or there is some threat to it.
S4: Apparently secure in the state, often with more than 100 populations.
S5: Demonstrably secure in the state.

Rare amphibian/reptile species documented or possible on the RBWMA:

Eastern Racer (*Colubar constrictor)* Status: S1 – The eastern racer is listed as threatened in Vermont and being considered for listing in Vermont as endangered. These snakes are known to use the old rest area east of I-91 and the powerline that intersects the RBWMA. This is the only confirmed report of this species in the state since 1985. Two adult males were implanted with transmitters in July 2004 and have been monitored since. The snakes were captured at the site of the old rest area, but subsequently spent the bulk of the summer, fall, and winter on the powerline. They hibernated in a rocky outcrop on the powerline and emerged the spring of 2005 with five additional Eastern Racer snakes, three of which were female. In addition to the powerline, the two transmitted males use the grassy area adjacent to the interstate. It is possible that these snakes also use other areas of the WMA including the dry oak forest, the floodplain south of the old welcome center, and the septic field north of the old welcome center.

The Vermont Agency of Transportation (AOT) plans to develop the former rest area into a weigh station, salt/sand storage area which is known to be important habitat and travel area for the snakes. To assist AOT in mitigation efforts, F&W entered into an MOA with AOT in 2005 to create replacement habitat for the snake on the WMA. This project has created an additional 11

acres of cleared land to replace foraging sites lost in construction and to provide for the long-term travel corridor around the site so that the snakes can move north-south and continue accessing habitat along I-91.

Portions of the new habitat area abut streams, a rare natural community, and a large deer wintering area. The project was designed to mitigate impacts to these features. A woods road next to a critical denning site has resulted in at least one snake being run over and killed. ATVs use several key areas putting the snakes at extreme risk. The woods road was relocated in 2007 to protect snakes using this denning site.

> Management Recommendations: Where feasible, control development activities and maintenance associated with the powerline, interstate, right-of-way, and old rest area to limit impacts to the Eastern Racer population on the WMA. The Eastern Racer is a snake associated with open, early successional habitat which is limited on the RBWMA. Because federal aid cannot subsidize management for herp species, improvement to this habitat will rely on cooperative efforts with other parties.

Jefferson Salamander (*Ambystoma jeffersonianum)* Status: S2 – The Jefferson Salamander is a species of special concern in Vermont. Fewer than ten animals have been reported in Windham and Windsor Counties since 1988. An adult was found crossing Tyler Hill Road north of the WMA, and two egg masses were found in a vernal pool on the northern boundary of the main parcel of the WMA. Historically, biologists have reported egg masses in the old gravel pit pool, although these sitings were never confirmed. The Jefferson Salamander prefers rocky areas with neutral pH. They often inhabit semi-permanent ponds in mature oak-hickory woods (J. Andrews, Appendix K).

Northern Water Snake (*Nerodia sipedon*) Status: S3 — The Northern Water Snake has a very spotty distribution in Vermont. They were consistently found at Vernon Pond (Hatchery site) – one of only three sites in eastern Vermont (all in Vernon).

> Management Recommendations: Monitor human activity at Vernon Pond for impacts to snakes using the pond.

Ring-necked Snake (*Diadophis punctatus*) Status S3: Ring-necked snakes were found on the WMA and have been confirmed using the powerline both on and off the RBWMA.

The following four rare species were not found on the RBWMA but have been documented close by and could exist on the WMA:

- Four-toed salamander (*Hemidactylium scutatum*) (S2): This species would most likely be found in the black gum swamps, the Beinhauer-Horstman marsh or the Newton Road marsh.
- Eastern ribbon snake (*Thamnophis sauritus*) S2: This species would most likely be found in emergent marshes, swamps, and vernal pools at warm sites like the Beinhauer-Horstman Lot, the beaver pond area at the Joslyn-Walendy Lot, Fox Hill Lot vernal pool, and Newton Road marsh.

- Blue-spotted salamander (*Ambystoma laterale*): The blue-spotted salamander has only been reported once from Windham County, but appropriate habitat exists on the WMA at the Beinhauer-Horstman (Great Pond), the Newton Road marsh, and the black gum swamps.
- Fowlers Toad (*Bufo fowleri*) (S1): The Fowlers Toad is usually associated with flood plain forest and, if present, would likely be found at the Sugar Maple-Ostrich Fern Natural Community just south of the Old Welcome Center.

Appendix C:
Historical Assessment

Land Use History of the Local Landscape

The Vermont Fish & Wildlife Department is obligated by Federal law to conduct an archaeological evaluation of land holdings before management can be implemented. Two historic assessments have been conducted on the property of RBWMA. One was a pre-contact modeling analysis conducted by the University of Vermont Consulting Archaeology Program (CAP) and the other a historic assessment conducted by the University of Maine at Farmington (UMaine). The following is a brief outline of results reported by UMaine and UVM CAP and deed research by ANR staff.

Overall Summary of Historic Resources at RBWMA:

Although human occupation of the region along the lower Connecticut River and its tributaries predates Euro-American settlement by several thousand years, there are no known Native American sites located within RBWMA. CAP recently implemented a GIS-based Precontact Site Sensitivity Model which is based on current geological features in a landscape and proximity to other known sites. This analysis was performed for the RBWMA. It indicates that most of the land within RBWMA is minimally sensitive for archeological resources primarily due to the steep mountainous terrain. However, two areas were mapped as highly sensitive. These are the Beinhauer and Horstman parcel in the north and the part of the WMA west of the interstate which drains to the Fall River. Roaring Brook and other brooks that flow through portions of the property were mapped as moderately sensitive and will be managed to reflect this analysis and to protect from disturbance any sites which may be present. Types of sites referenced in this report which may be present on RBWMA are quarries, camps, kill sites, burial sites, and 'find spots' for isolated tools which may be found anywhere.

There are five periods addressed in the report from UMaine. These are:

- Native American context
- Pre-settlement Period 1600-1760
- Early Settlement Pre-Industrial Period 1760-1850
- Industrial and Agricultural Intensification Period 1850-1900
- Industrialization – Post Industrial Period post 1900

<u>Native American Context</u>
This part of Vermont's history has received very little archaeological attention to date. Native American sites have been documented in the larger area associated with the Connecticut River and the Broad Brook tributary. The twelve known sites have been dated back to between 7000 BC to 1600 AD. These include quarry site, burials, petroglyph site, camp areas, tools, and other isolated artifacts.

<u>Pre-settlement Period 1600 to 1760</u>
Dominated by the fur trade industry, this period marked the transition between Native American and Euro-American cultural landscapes. In 1687 Native Americans deeded the "Squakheag

Province," (1672 grant by the Massachusetts Bay Colony) which included Vernon, VT to agents acting for the interests of a family by the name of Pynchon. Therefore, Vernon claims to have the oldest Vermont Town Charter. This early period was dominated by violence and hardship due to the conflicts between settlers and Native Americans. Settlers erected five fortified forts in the general area, two of which were in Vernon, all connected by a public road network built in 1737. These forts provided security for the few families who tried to clear land and settle in this region after the French and Indian War (1754-1763). Guilford was granted charter in 1754, and the first land cleared in 1758.

Early Settlement Pre-Industrial Period 1760-1850

This period represents aggressive settlement by Europeans throughout Vermont, until the Revolutionary War when much of this area was evacuated. This era also marked the near permanent displacement of Native Americans and starts a 30-year conflict between New York and New Hampshire over land claims. The Connecticut River was not recognized as the New Hampshire border until 1764, after which the town became Hinsdale, Vermont which was changed to Vernon in 1802. A resurvey of the north line of Massachusetts in 1763 found the east-west line was located one half mile north apparently due to incorrect magnetic declination used in an earlier survey. This resulted in the creation of the Northfield Gore and Fall Town Gore. The first deed written in Vernon was to Joseph Stebbins Jr. in 1790 who was one of 14 residents of Fall Town and Hinsdale Gores. The population of what is now Vernon in 1771 was 107 and 19 'heads of families'. In 1761 the first settler to Guilford arrived from Vernon. Agricultural conversion of forestland and the development of saw and grist mills ushered in the industrialization of many communities in the area. By the 1830s, many farms were making the transition to dairy and wool production. The slate and transportation industries also were established during this time. Road construction was prevalent throughout the region to connect Vernon and Guilford to other settlements such as Bennington and Brattleboro.

Industrial and Agricultural Intensification Period 1850-1900

The introduction of the railroad marks the beginning of this period. Farms, mills, villages, roads, and railroads all are displayed on the early McClellan and Chase 1856 map and the Beers 1869 map. There was a major technological shift which initiated the introduction of the factory system. Small scale, rural economies were detrimentally affected and resulted in farm abandonment and consolidation as people moved into larger communities. The tri-state corners of New Hampshire, Massachusetts, and Vermont were not officially set until 1895.

Additional Research

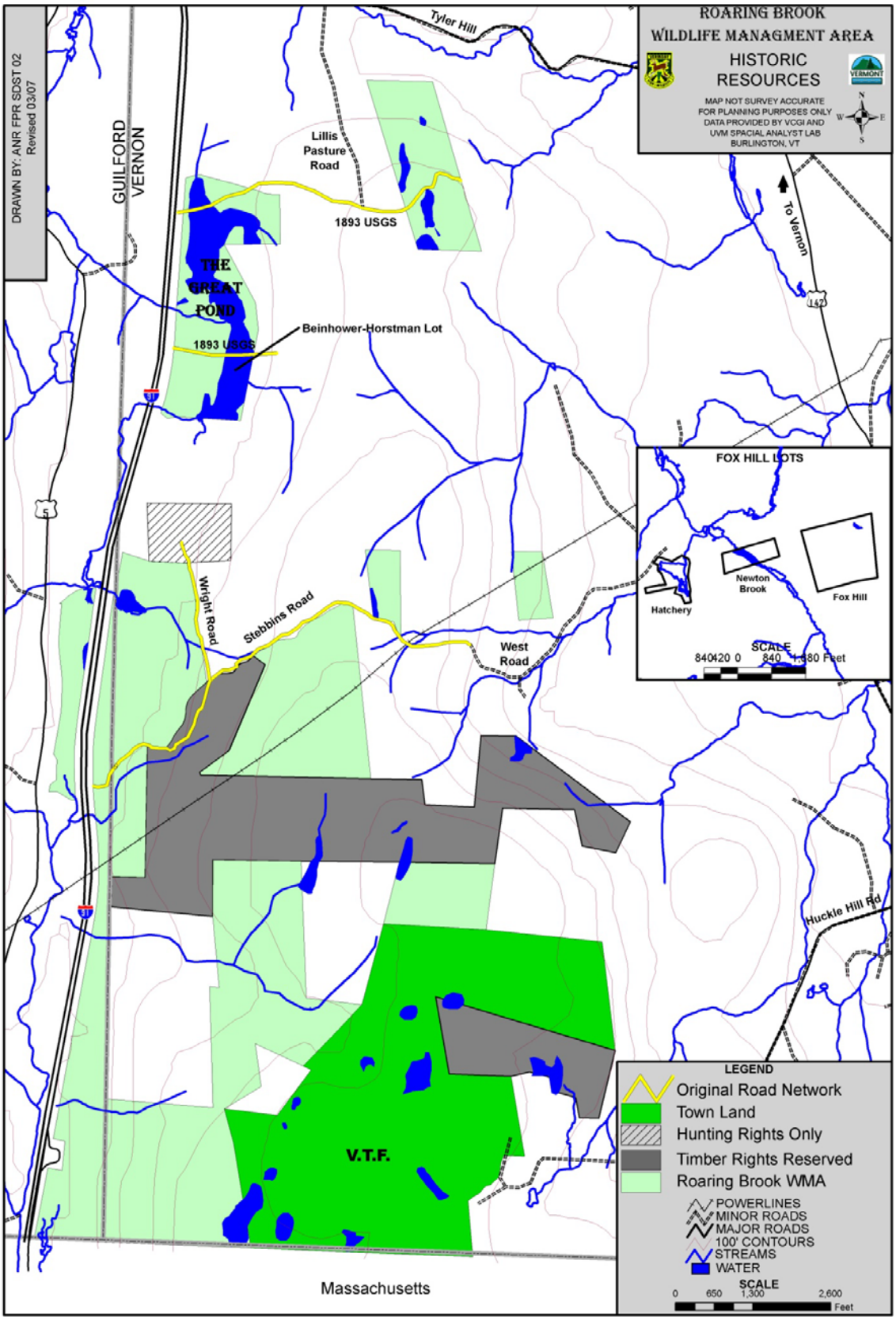
The historical maps of Vernon show one through-road on RBWMA called the Stebbins Road, now called West Road. In 1904 the Vernon selectmen met to discontinue this road from the Butterfield home (now Merritt) to the Guilford town line. The boundary maps of this property show one road intersecting Stebbins Road leading northerly paralleling I-91 and named the Wright Road. There are no records indicating the Wright Road ever had any legal status.

Deeds indicated several farms were established along the Stebbins Road and Lillis Pasture Road. Names which appear associated with these farms are Joseph Stebbins, Michael Lillis, Abishai Wright, and Marshall Lee. The Beers Atlas also shows two homesites and a sawmill in the approximate area of the Beinhower-Horstman Lot.

A second road is shown on McClellan's 1856 map which approaches portions of RBWMA from the north (Tyler Hill Road). This road is now called Lillis Pasture Road and is currently listed as a legal trail. The Beers Atlas map of 1869 shows a 'T' intersection at the home of M. Lillis with roads going east and west. The easterly portion of this road would have crossed the Denyou Lot of RBWMA and is not currently listed as a legal right-of-way nor is its original status known. Portions of this property were Glebe Lots (perpetual lease) which were in the original town charter and were intended to help support the Church of England, "to have and to hold said demised premises with all privileges and appurtenances so long as water runs and grass grows." By an act of Vermont Legislature, the selectmen were authorized to lease these lots as they saw fit for an annual fee, reserving the right to repossess and dispose of said premises, in the same manner as though this lease had never been written, and that without any suit or process whatever. The deed information mentions two Glebe Lots. A 300-acre lot was leased by selectmen to Joseph Warren in 1808; a second 100-acre lot was leased in 1844.

Surrounding a stand of white pine on the Beinhauer and Horstman Lot is a sizeable wetland which was referred to as the Great Pond in 1793.

On September 21, 1938 a hurricane swept through Vermont and left in its wake thousands of acres of damaged timberland between the main range of the Green Mountains and the Connecticut River. The worst damage was in the main valley of the Connecticut River and on adjacent mountain slopes. It is likely that damage occurred on RBWMA.


ROARING BROOK
WILDLIFE MANAGMENT AREA
HISTORIC
RESOURCES
MAP NOT SURVEY ACCURATE
FOR PLANNING PURPOSES ONLY
DATA PROVIDED BY VCGI AND
UVM SPACIAL ANALYST LAB
BURLINGTON, VT
DRAWN BY: ANR FPR SDST 02
Revised 03/07
GUILFORD
VERNON
Tyler Hill
Lillis
Pasture
Road
1893 USGS
THE
GREAT
POND
1893 USGS
Beinhower-Horstman Lot
To Vernon
FOX HILL LOTS
Newton
Brook
Fox Hill
Hatchery
SCALE
840420 0 840 1,680 Feet
Wright Road
Stebbins Road
West
Road
Huckle Hill Rd
V.T.F.
Massachusetts
LEGEND
Original Road Network
Town Land
Hunting Rights Only
Timber Rights Reserved
Roaring Brook WMA
POWERLINES
MINOR ROADS
MAJOR ROADS
100' CONTOURS
STREAMS
WATER
SCALE
0 650 1,300 2,600
Feet

Appendix D:
Recreational Assessment

Recreation Overview – RBWMA is located in the southeastern corner of Windham County approximately five miles south of the Town of Brattleboro. This WMA contains some of the most remote and inaccessible land in the southeast corner of Vermont even though major portions of it are located along Interstate 91 and the Massachusetts border. Regulations covering the instate highway system prohibit access to all lands along I-91.

RBWMA consists of one main block of land along the Vernon/Guilford town line, and several smaller parcels scattered across the town of Vernon. Because of this variability, several different categories of recreational opportunities are experienced by the public within RBWMA.

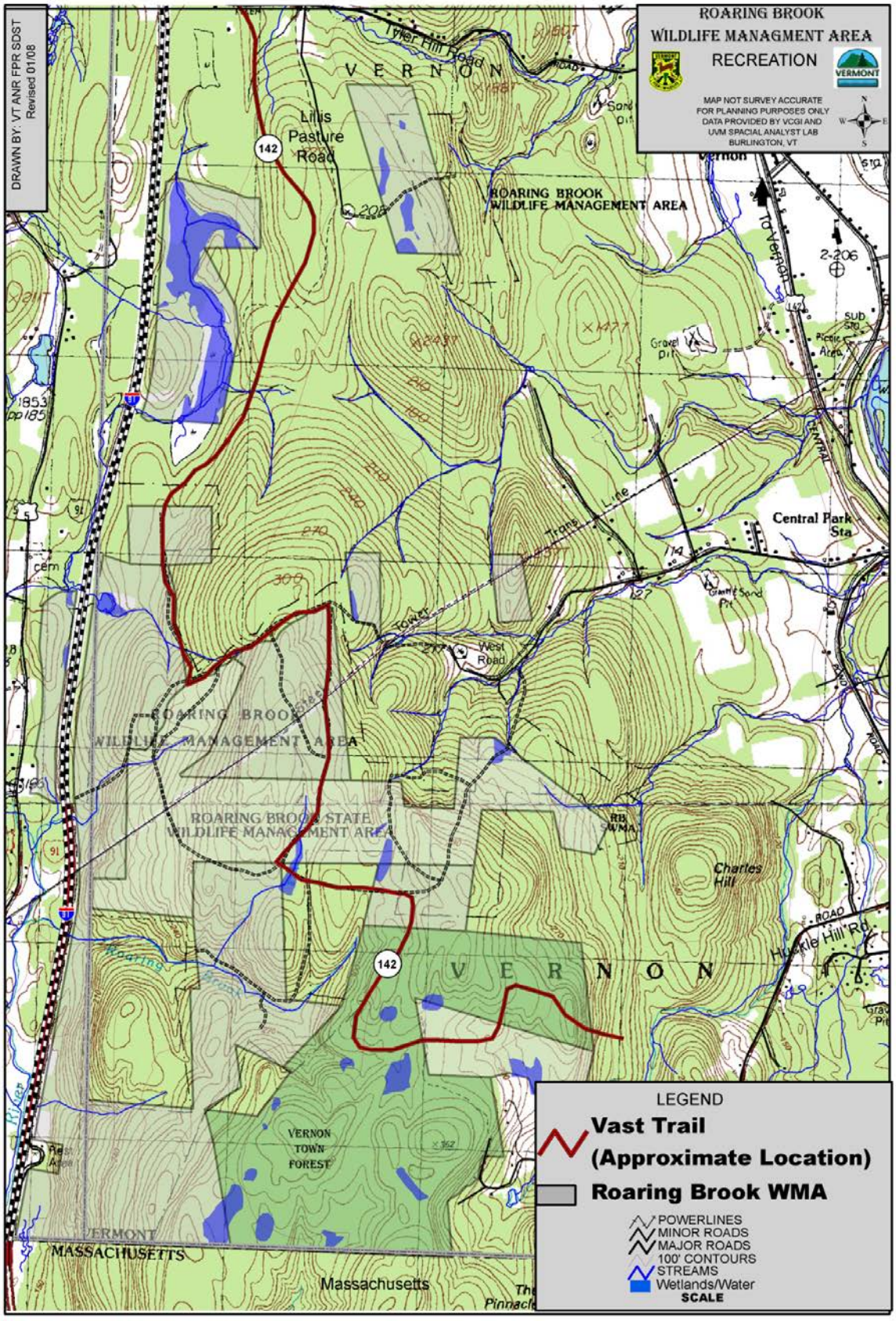
The bulk of the property provides visitors with a remote recreational experience in a natural appearing environment. However, even though the setting appears very remote, the recreational experience over a large portion of the property is influenced by human development. The western portion of the property that abuts I-91 is dominated by the sound of vehicle traffic. Depending on the topography, it is estimated that the sound of speeding traffic carries approximately 0.5 mile from the interstate. Also, a large electric transmission line with a cleared right-of-way width of 100 feet cuts through the center of the WMA.

In general, the chance of contact with other recreational users is low, but the evidence of other users is prevalent. An extensive network of woods road and trails are found in this area. Off-road motorized vehicle use is prohibited on state land, however the possibility of seeing or hearing an ATV or pickup truck in remote areas of the property is quite high due to the fragmented state ownership in the region and the inability to control this use. Timber harvesting occurs on both state and private lands on a regular basis. The timber rights on portions of the WMA are privately owned, meaning that the Vermont Fish & Wildlife Department has little control over the level of timber cutting on these areas.

Several of the smaller parcels are located very close to developments and do not provide the sense of remoteness found in the main block. The 56-acre Fox Hill Lot has a housing development along its boundary. Houses are visible and noise from the residences can be heard throughout the lot. Lawnmowers from nearby houses and construction equipment from a neighboring gravel pit can be heard on the 68 check-acre Denyou Lot. House lots are currently being sold along the boundary of the Dunklee Lot.

Hunting and Fishing – Hunting is the most popular recreational activity that occurs on this WMA. Most of the activity centers around deer season, mainly the rifle season in November. Turkeys and grouse are also hunted on this WMA. Public access points for hunting and other recreational activities within RBWMA are limited. There are no perennial streams on this WMA and no fishing opportunities on the bulk of the parcel.

Snowmobiling – Vermont Association of Snowmobile Travelers (VAST) trail #142 E&W cuts through RBWMA following the course of logging trails. This trail is maintained by the local snowmobile club named the Vernon Trail Breakers. There are also other old roads within the WMA that are used by snowmobilers but are not maintained by the local snowmobile club. Some of these provide access to local users. Roaring Brook Falls (located on private land) is a popular stop for snowmobilers.



Roaring Brook WMA Long Range Management Plan – Appendix D

Appendix E:
Timber Assessment

The RBWMA timber resource assessment was conducted using the Forest Examination (FOREX) inventory system developed by the Department of Forests, Parks and Recreation. Data on vegetation, soils, and understory plants are collected and processed statistically to characterize and quantify plant species composition and timber volumes and to aid in identifying Natural Community Types used in planning and implementing the LRMP.

This section provides a general overview of the timber resources within RBWMA based on the information derived from the FOREX inventory completed in 1999. Data from this inventory can be found in Appendix J.

History of Timber Management

Like most uplands in southern Vermont, much of RBWMA was cleared for settlement and agriculture in the late 1700s and early 1800s. Given the rough terrain and apparent lack of homesteads on most of the parcel, it was probably rough pasture for a short time before reverting back to forest. The steepest terrain may have been clearcut for lumber and was probably not cleared for agriculture. Most of the cleared land appears to have been abandoned 100 to 150 years ago.

Records indicate this area was heavily damaged by the Hurricane of 1938. It is likely the regrown forest saw heavy damage and salvage at that time. Previous owners likely harvested mature timber at approximately 20-25 year intervals. Much of this harvesting occurred when the parcels were owned or managed by local sawmills, including Blanchard and Woodward, Smead Lumber Company, Peck Lumber, Cersosimo Lumber, and Banish Lumber Company. Several of these owners retained timber rights on 386 acres or 28% of the total acreage.

Since the State acquired RBWMA, harvests have been modest and widely spaced due to the small size and low quality of the trees left following harvests that occurred before State ownership. Efforts to manage were further compounded by the unclear legal status of roads accessing the property.

Most of the RBWMA lands were in a growth phase for the last 20 years and are now well stocked with trees and timber. In addition, recent legal research by the State indicates management access is available from several points.

Current Condition of Timber Resources

RBWMA has a tree and shrub composition that, typical for this area, is relatively simple. On these moderate to low fertility upland and wetland soils, tree species composition is dominated by a small number of species, as is the sapling and shrub layer. The dominant tree species, in order are: eastern hemlock, white pine, red oak, red maple, and black birch. Forest understories are dominated by sapling hemlock, striped maple, and beech and in poor sites mountain laurel

shrubs. Species found less frequently includes: white, black and scarlet oak; sugar maple; white and yellow birch; and American chestnut sprouts.

In the last 20 years the State has conducted four timber harvests on RBWMA. In the last five years harvests have occurred on nearly all of the non-fee acreage (timber rights held privately) being the Dunklee, Gaines, and Smead Lots as well as the privately-owned Goodwin-Jenkins Lot.

Forest stands are currently well stocked with timber, pulp, and firewood and most areas will support timber management and harvest.

Current Composition and Condition of Major Forest Types

Most of the WMA is composed of the Hemlock or Hemlock-Hardwood Forest Type. Trees are generally older (90-120 years) and stands are heavily stocked with trees. Quality is variable. Trees of a high enough quality to warrant continued growth range from occasional to abundant, depending on site quality and past management. In general, the poorest soils support lower stocking of trees with cull trees more common. Regeneration is often lacking though hemlock is common in places. Portions are inaccessible and/or unmanageable due to poor soils or steep slopes. Risk of windthrow is high on ridge tops. The property between Route 5 and I-91 has a dense understory of the invasive plant glossy buckthorn. All oak species saw heavy defoliation by gypsy moth in the past and would be susceptible to defoliation and dieback in future outbreaks. The high component of eastern hemlock makes the stand susceptible to defoliation by the hemlock woolly adelgid, an exotic insect pest.

On better sites, there are many good crop trees of the dominant species to manage for both wildlife and timber. Several species including oak, black birch, white pine, and, to some extent, hemlock would respond well to small patch clearcutting and heavy thinning. Hemlock will respond better to more conservative management. Conservative thinning designed to limit canopy openings is an effective management regime for eastern hemlock. Management of eastern hemlock in this planning cycle will focus on maintaining cover and limiting susceptibility to mortality due to post-harvest decline, a known phenomenon of hemlock management, and hemlock woolly adelgid.

A small portion of the WMA is comprised of hardwood types that include maple, birch, and oak. The most productive, northern hardwood and mesic red oak, occupy rich soils while the most ecologically unique, dry oak, occupy the poorest soils found on the Fox Hill Lot and a side hill east of the former I-91 rest area. These are generally well stocked stands of medium to large trees (12-24” diameter) with poorly-developed understories. High quality trees available for timber and wildlife management are abundant on the better sites and less frequent on the poorer sites. The 56-acre area on the Fox Hill Lot is a relatively uncommon forest type and not an appropriate area for a timber harvest.

In general, access is an issue on the entire parcel. While management and public access exists, it is in poor condition and, in some cases, legally tenuous. Growing conditions are often limited by shallow soils and poor health of trees, though this is not the case on all the WMA. Prescriptions

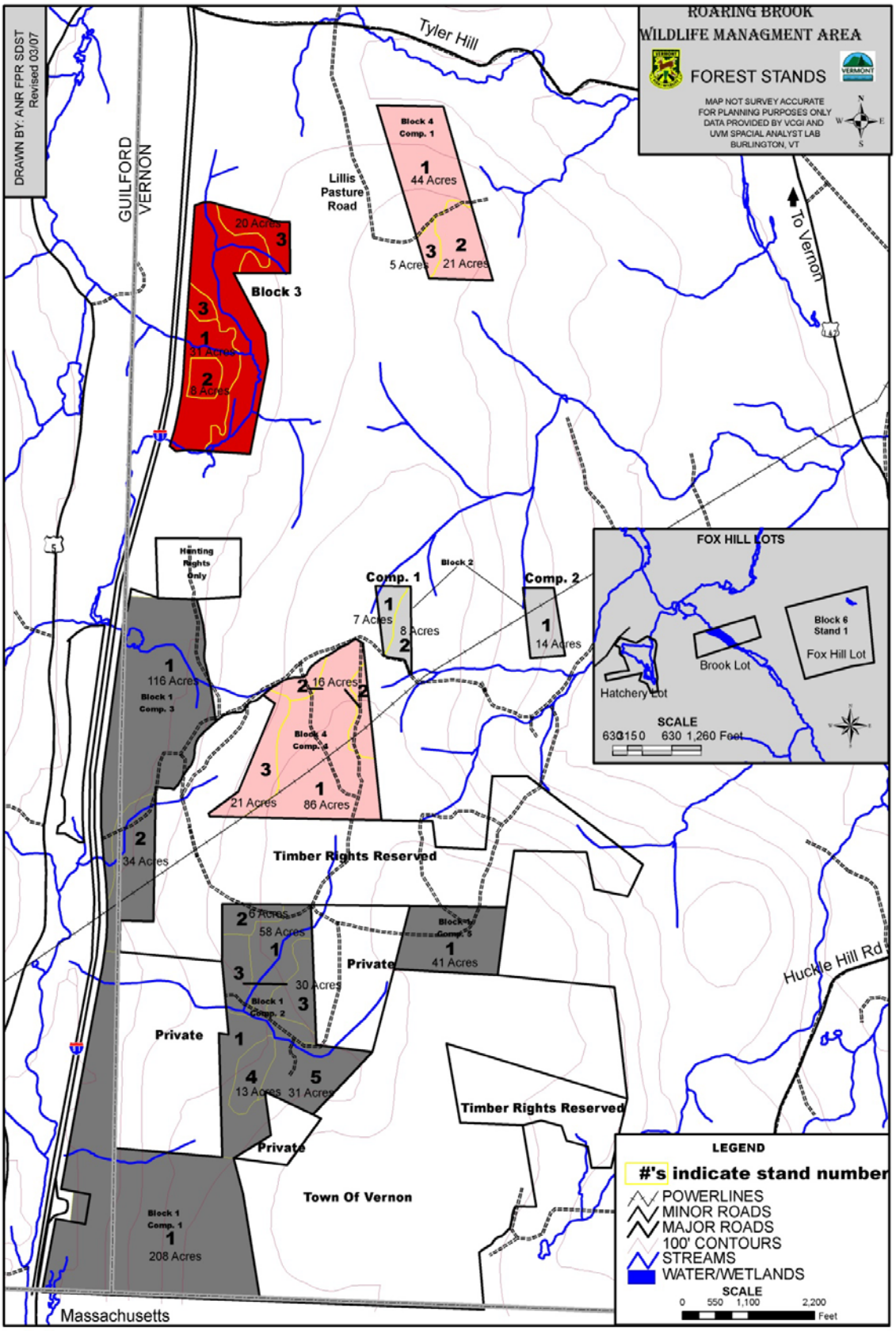
for harvest and growth will have to be carefully matched to site quality. Areas of high quality trees can support thinning while areas of low quality trees, where soils are productive, should be managed for replacement through regeneration harvests.

RBWMA Stand Composition for 615 acres
Hemlock & Hemlock-Northern Hardwood

Species	Percent
Hemlock	36.9
White Pine	14.7
Red Oak	13.9
Red Maple	10.6
Black Birch	6.9
Beech	3.2
Other Hardwood	5.6

RBWMA Stand Composition for 190 Acres
Mesic Oak/Hardwood & Northern Hardwood

Species	Percent
Red Oak	30.6
Red Maple	14.2
Hemlock	11.2
Beech	8.9
Black Birch	6.8
White Oak	5.5
White Pine	5.1
Black Oak	4.3
Sugar Maple	3.1
White Birch	3.0
Yellow Birch	2.2



Roaring Brook WMA Long Range Management Plan – Appendix E

Appendix F:
Soils Assessment

Soils – The soils on RBWMA (see page 81) are primarily the Macomber-Taconic soil type (69), site class 2. The productivity for trees on these soils is moderate to high depending on species site suitability. These soils are typically moderately deep and fertile and somewhat acidic. A relatively small portion of RBWMA is underlain by highly productive, site 1 soils. These are the Dummerston-Macomber (70), Dummerston silt loam (72), and Fullam silt loam (74) found on moderate slopes and valley bottoms. These soils typically support the more nutrient-demanding northern hardwood and mesic red oak forest types. Ridgetops, steep side hills and wetlands (site class 3 and 4) do not support good tree growth. They are typically the Taconic-Hubberton rock outcrop soil type (68). The most limiting factor is the shallow soil depth, resulting infertility, and relatively high acidity. Short, low quality white pine, hemlock, and black oak are typically found on these soils.

Forest site classes are used in this plan to express potential for forest productivity and for vegetative management. Forest site classes were developed to reflect the relative degree to which trees grow on a particular soil type. Site classification for RBWMA is based on the Windham County Soil Survey. This soil information considers soil potential, soil limitations, slope, surface features, and soil depths. The following map locates these various site classes as they occur in this management area. Soils, site class, and slopes are all important information when considering which tree species to favor for growth and how intensive the management effort should be.

Potential of forest sites is expressed in the potential height growth of tree species at the 50-year mark. Diameter is chiefly dependant on local competition while height is correlated with soil quality. The following site map is based on the following species growth potential:

Class	Species	Height growth in first 50 years
Site 1	Northern Hardwood	>59’
Site 2	White Pine Northern Hardwood	60-69’ 53-59’
Site 3	White Pine	50-59’
Site 4	White Pine	<50’

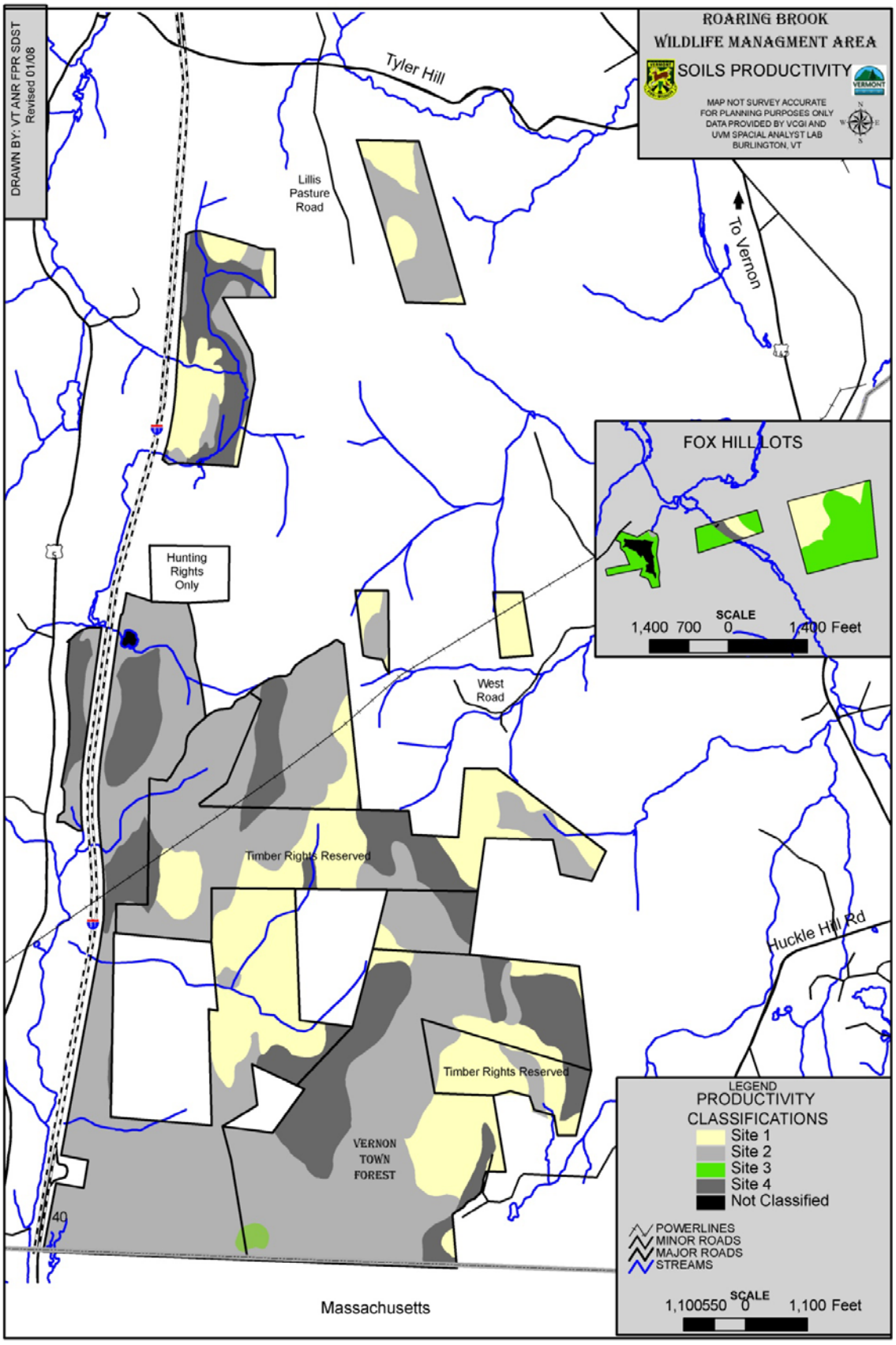
The relative values can be used for broad planning purposes. However, on-site investigations are recommended to assess variations in site conditions and slope.

Broad Forest Type Entry* Level Interval Table

Each site class is associated with a recommended level of management. For example, land of site class 1 grows trees more rapidly than class 3 and, therefore, can be more intensively managed. The table offers guidelines for entry intervals on the WMA.

Forest Site Class	BROAD FOREST TYPE ENTRY INTERVAL IN YEARS**	
	Northern Hardwood	White Pine
1	15	10
2	15 - 25	10 -15
3	25 - 35	15 - 25
4	35 - 50	25 - 30

*Entry can be defined as the minimum interval in years before a particular stand of trees will need to be thinned again in order to maintain a constant growth rate and vigorous trees.
** Based on experience of District 1 staff since 1954.


DRAWN BY: VT ANR FPR SDST
Revised 01/08
ROARING BROOK
WILDLIFE MANAGMENT AREA
SOILS PRODUCTIVITY
MAP NOT SURVEY ACCURATE
FOR PLANNING PURPOSES ONLY
DATA PROVIDED BY VCGI AND
UVM SPACIAL ANALYST LAB
BURLINGTON, VT
Tyler Hill
Lillis
Pasture
Road
To Vernon
FOX HILL LOTS
SCALE
1,400 700 0 1,400 Feet
Hunting
Rights
Only
West
Road
Timber Rights Reserved
Huckle Hill Rd
Timber Rights Reserved
VERNON
TOWN
FOREST
40
Massachusetts
LEGEND
PRODUCTIVITY
CLASSIFICATIONS
Site 1
Site 2
Site 3
Site 4
Not Classified
POWERLINES
MINOR ROADS
MAJOR ROADS
STREAMS
SCALE
1,100550 0 1,100 Feet

Appendix G:
Special Constraints and Legal Assessment

There are a number of legal issues and constraints relevant to RBWMA and its management. These are:

- Legal status of access and interior roads.
- Ownership rights of timber.
- A 300' powerline easement.
- Access rights to interior parcels owned by others (inholdings).
- State's rights on parcels where timber is held by others.
- Management agreement with AOT at old rest area site.
- Legal status of AOT's leachfield adjacent to the former welcome center/rest area.
- Right of First Refusal – Cersosimo Lot.

Legal status of roads and access:

1) Ad Brooks Road
   - According to Department of Forests, Parks & Recreation Survey Office, State has a legal right-of-way to access the WMA on this road as does the public. The Town has classified this road as a legal trail.

2) Dunklee Lot (Basin Road)
   - Staff met with abutter (Shippee) and surveyor (Merritt) April 2005 to resolve southern boundary line along Shippee. Agreement was reached. Merritt surveyed, blazed, and painted in 2006.
   - State has a deeded right-of-way through Shippee parcel. Negotiations to move "rubber" right-of-way and mapped right-of-way through Shippee's Lot to a different, permanent location on a lot to be subdivided out of Shippee parcel to the north failed. State currently retains right-of-way over this lot and any subdivided portions.

3) Fox Hill Lot
   - Accessed via a 20' deeded right-of-way between parcels #18 and #19 off Southern Heights Drive. Access not physically in place. Some obstructions of right-of-way by abutters. Final deeds not done as of 2011.
   - Karen and Alfred Dunklee to State of Vermont 1/8/65, Vernon Land Records Book 29, Page 449.
   - An old "false blazed line" exists just to the east of the western line and another to the south of the southern line (see survey Raboin 10/85).

4) Interior Wood Roads Use for Access to Inholdings (N/F Kuhn, Bezio, Goodwin-Jenkins)
   - No record of legal rights of interior owners to use interior roads for access to their properties were found by ANR, either for management or development. The Fish & Wildlife Department could grant temporary access for timber harvesting and forest

management with a Special Use Permit and bond. There is also no documented right of Fish & Wildlife to use sections of interior roads over the inholdings. Research is needed to resolve both questions. If this is not resolved, Fish & Wildlife has the option of rebuilding portions of the road network to place all of the road system on Fish & Wildlife land or exchanging access rights with some or all of the in-holdings. Acquisition, if offered, of inholdings could be a permanent solution.

5) Lillis Pasture Road (access to Beinhauer and Denyou Parcels[1])
   - Road was reclassified to a town trail in 1991. As the road was legally discontinued decades earlier, the legality of this action is unknown.
   - The length of the original Lillis Pasture Road was 3,320 feet according to the State of Vermont and Vernon Selectboard, putting it well short of either F&W parcel.
   - The current landowners are a cooperative abutter with access to a town road who may grant F&W temporary access for management.
   - Legal public access to either parcel is unclear.

6) West Road (Stebbins Road) per Windham Superior Court 2010[1]

   - West of the Merritt residence, the road was never officially a public town road[1].
   - The Doolittle Mountain Corp. has no legal right of access[1].
   - State owns half the road on portions adjacent to the WMA.
   - State management access rights are not known.

7) Wright and Newell Roads
   - No records have been located by ANR that demonstrate that Wright or Newell Roads were ever public roads.

8) Timber rights of Gaines, Smead, and Dunklee Lots:
   Within the WMA there are three ownerships where the timber rights are retained by the previous owners. There are different deeded rights with each ownership as summarized below, ranging from complex to simple.

   Gaines Lot (101.7 acres and 97.4 acres)

   Deed Summary:
   - All timber 12" diameter and up at 12" from the ground owned by Gaines.
   - Harvests are to conform to "good forestry practices."
   - State retains rights "to construct roads, dikes, dams, and other improvements relating to its program of wildlife management…"
   - Timber cut by State is property of Gaines.
   - Gaines must be notified before work is done.
   - Gaines have right of access for the purpose of harvesting timber so long as they do not interfere with management by the State.
   - Gaines have the right to operate temporary sawmills and logging camps on the property.

[1] According to survey of Weinstein by DiBernardo Associates 12/19/02.

Gaines Access Rights on the Land

Gaines has the right to travel over the lands they conveyed to the State for the purpose of harvesting timber crops only. In doing so, they may construct and maintain logging roads, landing areas, etc. as long as they do not locate them where they will prohibit present or future improvements planned by Fish & Wildlife.

Gaines, heirs, successors, and assigns have the right to travel anywhere at any time over the land conveyed to the State as long as they are harvesting timber. The deed does not address damages caused by either party and as such would have to be settled by negotiation or litigation.

Rights of F&W on parcels Gaines have timber rights – rights and obligations relating to road building on Gaines Acquisition

1. Fish & Wildlife has the right to construct roads and other improvements relating to its program of wildlife management.

2. Prior to any improvements (road building), Gaines must be contacted and informed of the intentions especially if it involves cutting any merchantable timber. They must be given the opportunity to offer "suggestions" regarding final layout, etc.

3. If merchantable timber (12" in diameter 12" from the ground) is cut, it must be made reasonably available to Gaines who must remove the timber in a reasonable time.

Dunklee (85 acres near Basin Road)
- Timber Right Reserved with no restrictions.

Smead (50.7 acres and 53.7 acres)
- Timber reserved to 10" diameter and up measured 12" above the ground.

9) AOT leachfield at closed Welcome Center

AOT built and maintained a large leachfield serving the now closed Guilford Welcome Center in the 1960s. There are no records indicating this was a deeded right or granted through a Memorandum of Agreement or Memorandum of Understanding. Extensive records searches in 2007 by ANR and AOT staff located no legal documents or records pertaining to this site.

10) Power Line Easement

A large power line transmission corridor bisects the WMA. The deed grants "to New England Power Company, its successors and assigns, the perpetual right and easement to construct, reconstruct, repair, maintain, operate, and patrol for the transmission of high and low voltage electric current and for telephone use, lines of towers or poles or both (which may be erected at different times), with wires and cables strung upon and from the same and all necessary foundations, anchors, guys, braces, fittings, equipment and appurtenances,

including a buried ground wire and such footbridges, causeway and ways of access, if any, as may be reasonably necessary for the convenient construction, operation, maintenance, inspection and patrolling of said lines over, across, and upon a portion of said parcel of land hereinabove described, being a strip of land 300 feet in width, commencing at land now or formerly of Ida H. Belden and extending to land now or formerly of Eston L. Coffin and shown "shaded" on a plan entitled: "NEW ENGLAND POWER SERVICE COMPANY PART OF NEW ENGLAND ELECTRIC SYSTEM BOSTON, MASS. PLAN SHOWING EASEMENT ACROSS LAND IN VERNON, VERMONT TO BE RESERVED IN DEED FROM NEW ENGLAND POWER COMPANY TO STATE OF VERMONT. SCALE: 1"=200 FT. DATE: JAN. 20, 1966. L-8144", to be recorded herewith.

ALSO EXCEPTING AND RESERVING unto the Grantor, its successors and assigns, the perpetual right and easement from time to time, without payment therefore, to clear and keep cleared by physical, chemical or other means, said strip, of trees, underbrush and structures (the first clearing may be for less than the full width and may be widened from time to time to the full width), and to renew, replace, add to, and otherwise change the lines and each and every part thereof and all appurtenances thereto and the location thereof within said strip; and to pass along said strip to and from the adjoining lands to pass over the Grantee's land to and from said strip as reasonably required."

The corridor is currently owned and managed by TransCanada Corporation.

11) Eastern Racer MOU with Agency of Transportation

In 2005, a Memorandum of Understanding between the Vermont Agency of Transportation and the Vermont Fish & Wildlife Department was adopted to coordinate management of habitat for the state threatened Eastern Racer that spanned both F&W and AOT lands. This agreement documents the work done and conditions for future work to provide Eastern Racers with a travel corridor around the old Welcome Center and additional foraging habitat along the interstate. The agreement, among other things, specifics that AOT will:

- Determine how the snakes are utilizing the area and whether the snakes are denning (hibernating) on the VTrans Guilford site and, if so, where they are denning.
- Consult with a herpetological expert or experts to assist in the development and design of the new habitat.
- Have VTrans' Environmental Section conduct the natural and cultural resource review and clearance for the cut on the WMA, and review demolition and construction proposals and plans for the former rest area and new weigh stations and salt/maintenance shed, and monitor such activities.
- Provide access via VTrans property to the snake habitat area to be cut on the WMA, so that VFWD may cut the area. This is subject to VTrans obtaining authorization from the Federal Highway Administration ("FHWA"), which VTrans shall make all reasonable attempts to obtain.
- Provide a suitable temporary staging area, accessible through VTrans' site, for purposes of the cut.

- Mark the location of the existing leachfield so that heavy equipment used during the cut can avoid damage to the leachfield.
- Provide access via the new VTrans weighing station, subject to advance coordination, for VFWD to access the snake habitat area for future periodic cuts, to keep the area clear and suitable for snake habitat, and for other habitat mitigation-related activities.
- Plan the timing and methods of the removal of existing features, and the construction of new features, on the VTrans Guilford site to encourage the snakes' successful transition to the new adjoining habitat on the WMA.
- If denning or hibernation is confirmed at the former rest area, build reasonable and appropriate habitat features, and even if no hibernation is found, consider construction of possible habitat features. Explore other mitigation options for the conservation of the Eastern Racer as mutually agreed on by VTrans and VFWD.
- Mow the snake habitat on the RBWMA adjacent and in proximity to the VTrans Guilford site, conduct such mowing at sufficient intervals to keep grassed areas from being overtaken by woody vegetation.
- Develop and use techniques (such as mowing patterns, blade heights, and other considerations), as recommended by a herpetological consultant that will minimize hazards to or disruption of snakes. Such techniques will be recorded in a written mowing protocol, which will be provided to VTrans maintenance personnel and any private mowing contractors who mow the site.
- Post and maintain signs at the site to alert and educate current and future users of the site regarding the presence and proper protection of snakes.

Promptly manage, supervise, and contract or conduct the clearing that is necessary to open up the new habitat, and to construct appropriate habitat features (e.g. basking and/or denning sites) in the new habitat on the WMA, and to fund all of the foregoing activities. Provided, however, that VTrans, at its sole option and discretion, shall have the ability, but not the obligation, to also clear other areas as deemed appropriate by VFWD.

That VFWD will:

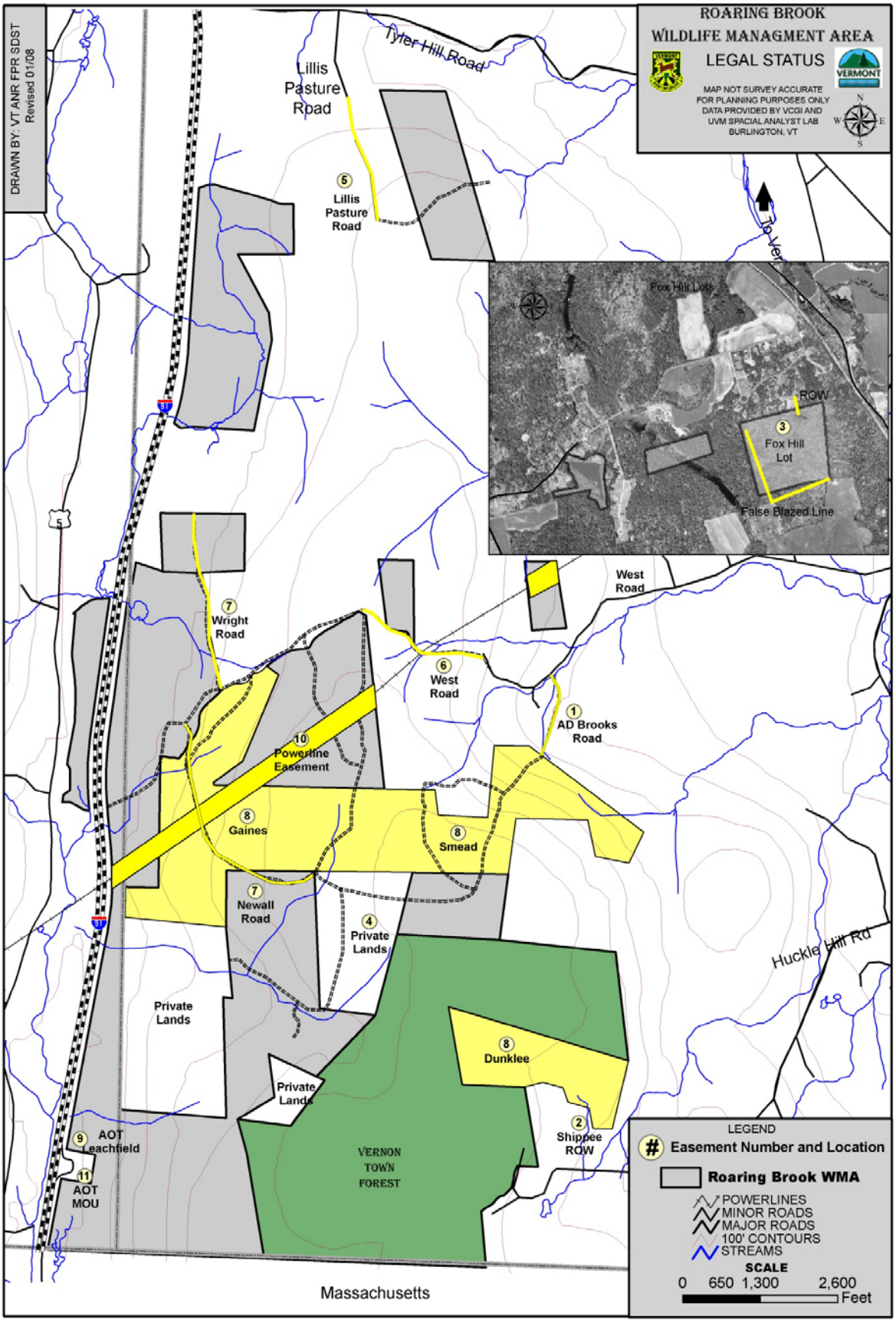
Allow VTrans to utilize WMA property adjacent to the Guilford site for habitat mitigation for the VTrans Guilford project.

And that:

Each of the parties shall make all reasonable attempts to avoid damage to the leachfield associated with VTrans' former rest area.

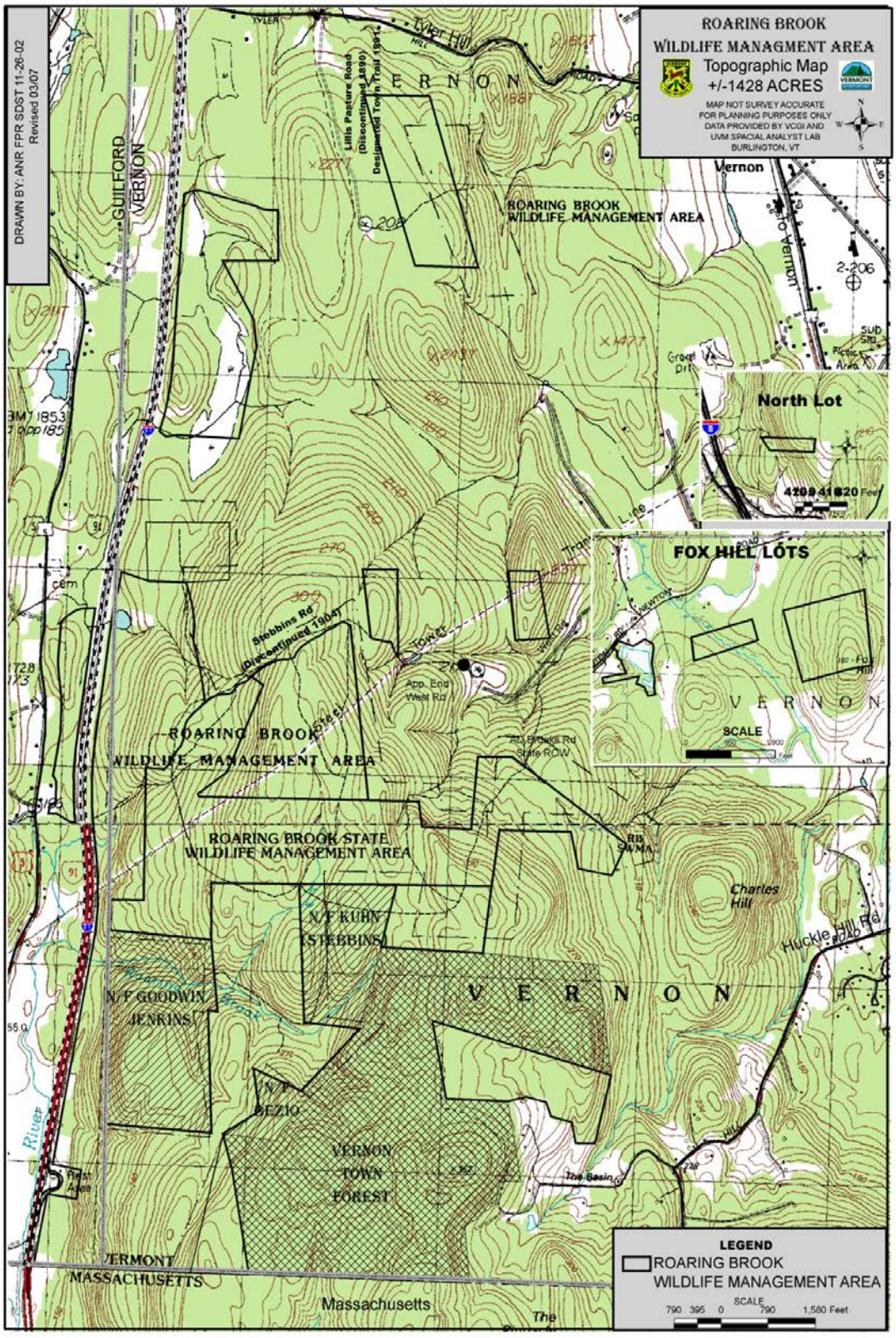
12) Right of First Refusal – Cersosimo Lot

F&W was granted a Right of First Refusal in 2011 by Cersosimo Lumber for the lands known as the Goodwin-Jenkins Lot. See Appendix P for the text of the Right of First Refusal.



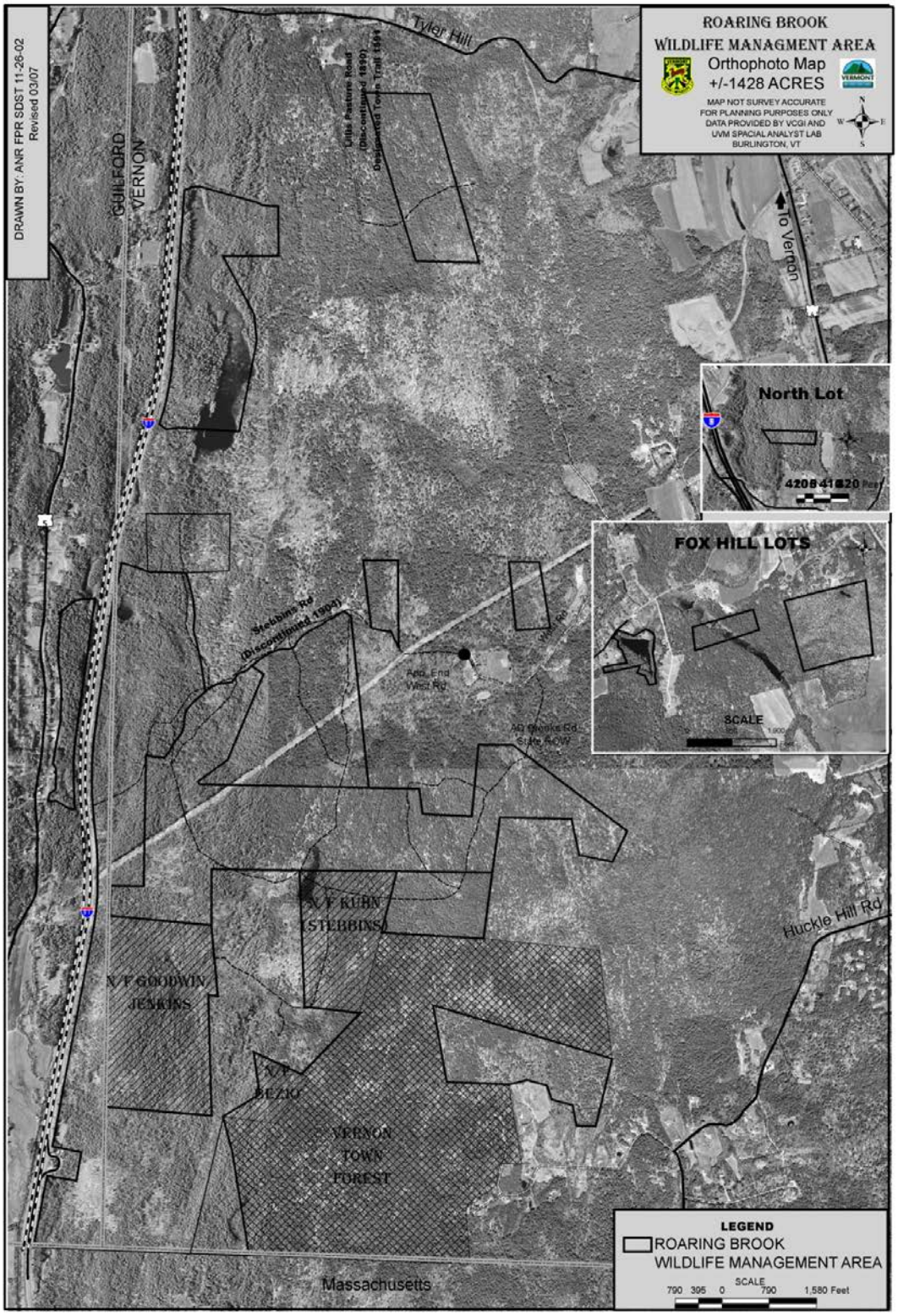
Roaring Brook WMA Long Range Management Plan – Appendix G

Appendix H:
Roaring Brook Topo Map



Roaring Brook WMA Long Range Management Plan – Appendix H

Appendix I:
Orthophoto Map



Appendix J.
Stand Data

Forest Stand Information

Management Unit: Roaring Brook WMA Forex Inventory Summary, 2005

Forest Stand Information: Management Unit: **RBWMA Block 1**

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
1	1	184	9.8	136 117	114	9	12	2	20 (mixture varies)	he-37 or-16 mr-12	Access problems- steep slope & I91, possible access through Vernon Town Forest for portions.	7 MBF 12 Cords
2	1	60	11.9	145 117	63	39	43	2	24	he-45 or-22 mr-11		8.5 MBF 8 Cords
2	2	12	4.4	43 40	23	3	17	2	54	or-38 pw-23 be-15		8 MBF
2	3	29	11.2	102 80	45	20	37	2	54	or-33 mr-25 ms-10		8 MBF 5 Cords
2	4	16	13.9	144 116	24	68	52	2	20	pw-51 mr-28 he-11		10.5 MBF 12 Cords
2	5	30	13	90 73	62	17	12	2	25	be-31 he-15 ms-9		5 MBF 7 Cords
3	1	114	11.3	143 116	118	17	9	2	22	he-45 pw-19 mr-14		9.1 MBF 11 Cords

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
3	2	27	10.3	130 125	100	5	25	4	22	pw-46 he-42 or-8	Steep side hill	5.9 MBF 5 Cords
4	1	60	10.8	141 111	107	12	22	2	23	he-55 or-20 pw-13	0.4 miles from road, ledgy, shallow to bedrock soils; moderate side hill	7.8 MBF 10 Cords
4	2	21	11.4	132 88	97	15	20	2	55	or-46 he-20 mr-10	0.5 miles from road, ledgy, moderate side hill	3.7 MBF 15 Cords
4	3	22	10.3	183 153	110	3	70	4	23	he-60 or-17 mr-8		5.7 MBF 18 Cords
5	1	41	10.9	147 119	33	53	60	3	23	he-36 or-2 pw-13	0.8 miles from road, very ridgy land	5.2 MBF 12 Cords

Forest Stand Information: Management Unit: **RBWMA Block 2**

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
1	1	10	11.2	150 120	47	57	47	2	24	he-49 or-16 mr-11	0.1 mile from road, moderate side hill	8.2 MBF 10 Cords
1	2	10	11.3	140 125	60	20	60	2	25	or-25 mr-25 bb-16	0.1 mile from road, moderate side hill	7 MBF 12 Cords
2	1	14	11.3	104 85	53	16	35	2	25	he-29 or-26 bb-14	ROW needed	5.6 MBF 8 Cords

*total basal area
dominant-codominant

Forest Stand Information: Management Unit: **RBWMA Block 3**

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
1	1	24	10.7	111.7 91.7	95	3	13	2	22	pw-46 he-30 mr-7	May require temporary access agreement from abutters to north	13.6 MBF 3 Cords
1	2	3	11.5	110 100	80	20	10	2	21	pw-64 mr-36	May require temporary access agreement from abutters to north	8 MBF 7 Cords
1	3	36	12.7	105 90	20	35	50	3	108	mr-71 cb-24 pw-5	May require temporary access agreement from abutters to north	2.2 MBF 19 Cords
1	4	41										

*total basal area
dominant-codominant

Forest Stand Information: Management Unit: **RBWMA Block 4**

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
1	1	43	11.3	113 96	92	5	16	2	24 (he-oak mix)	he-42 or-18 mr-9 pw-9	May require temporary access through abutters	6.4 MBF 12 Cords
1	2	15	11.0	75 70	60	0	15	4	52	or-67 mr-13 bb-13	May require temporary access through abutters	3 MBF 11 Cords
1	3	4	9.9	105 75	85	0	20	3	52	pw-29 or-24 ow-19	May require temporary access through abutters	3.5 MBF 11 Cords
1		6										

*total basal area
dominant-codominant

Forest Stand Information: Management Unit: **RBWMA Block 6**

Compt..	Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc.	Cull BA/A	Site	Timber Type	Species % BA	Access	Volume/ acre
1	1	56	10.6	97 69	26	28	43	3	52	or-33 mr-15 ow-15 ob-13	N/A	3.7 MBF 5 Cords

*total basal area
dominant-codominant

Appendix K:
Birds, Reptiles, Amphibians, and Bats Observed at Roaring Brook WMA during Contracted Assessments[1]

Common Name	Latin Name	Visit 1	Visit 2
Red-eyed Vireo	*Vireo olivaceous*	47	50
Black-capped Chickadee	*Poecile atricapillus*	43	32
Ovenbird	*Seiurus aurocapillus*	42	39
Blue Jay	*Cyanocitta cristata*	40	34
Red-winged Blackbird	*Agelaius phoeniceus*	28	28
Black-throated Green Warbler	*Dendroica virens*	24	24
Common Yellowthroat	*Geothlypis trichas*	19	12
Hermit Thrush	*Catharus guttatus*	13	15
Black-throated Blue Warbler	*Dendroica caerulescens*	12	13
Great-crested Flycatcher	*Myiarchus crinitus*	10	5
American Redstart	*Setophaga ruticilla*	9	16
Eastern Phoebe	*Sayornis phoebe*	9	11
Scarlet Tanager	*Piranga olivacea*	9	13
Yellow-rumped Warbler	*Dendroica coronata*	9	16
Wood Thrush	*Hylocichla mustelina*	8	11
Tree Swallow	*Tachycineta bicolor*	7	9
Yellow Warbler	*Dendroica petechia*	7	4
Black-and-white Warbler	*Mniotilta varia*	6	7
Chestnut-sided Warbler	*Dendroica pensylvanica*	6	4
Veery	*Catharus fuscescens*	6	3
White-breasted Nuthatch	*Sitta carolinensis*	6	5
American Crow	*Corvus brachyrhynchos*	5	4
Northern Waterthrush	*Seiurus noveboracensis*	5	5
Tufted Titmouse	*Baeolophus bicolor*	5	7
Brown Creeper	*Certhia americana*	4	3
Canada Warbler	*Wilsonia canadensis*	4	4
Eastern Kingbird	*Tyrannus tyrannus*	4	1
Slate-colored Junco	*Junco hyemalis*	4	2
American Robin	*Turdus migratorius*	3	4
Baltimore Oriole	*Icterus galbula*	3	3
Blackpoll Warbler	*Dendroica striata*	3	0
Blue-gray Gnatcatcher	*Polioptila caerulea*	3	2
Mourning Dove	*Zenaida macroura*	3	8
Nashville Warbler	*Vermivora ruficapilla*	3	2
Northern Flicker	*Colaptes auratus*	3	2
Ruby-throated Hummingbird	*Archilochus colubris*	3	1

[1] A breeding bird survey of the Roaring Brook Wildlife Management Area, Vernon, VT, 2004, Sylvia D. Harris MS, Brattleboro, VT, standardized survey.

A Reptile and Amphibian Survey of the Roaring Brook Wildlife Management Area in Vernon and Guilford, VT, 2003, Jim Andrews, Middlebury, VT, Active search, site checks, night time road search, trapping and interviews. Update of Eastern Racer *(Coluber constrictor)* Use of State Lands in Guilford, VT, 2005, VTrans Contract #0984559, Jim Andrews, Middlebury, VT.

Common Name	Latin Name	Visit 1	Visit 2
American Goldfinch	*Carduelis tristis*	2	3
Blue-headed Vireo	*Vireo solitarius*	2	3
Canada Goose	*Branta canadensis*	2	0
Chipping Sparrow	*Spizella passerina*	2	1
Eastern Wood-Pewee	*Contopus virens*	2	2
Great Blue Heron	*Ardea herodias*	2	1
Pileated Woodpecker	*Dryocopus pileatus*	2	6
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	2	0
Yellow-bellied Sapsucker	*Sphyrapicus varius*	2	2
Yellow-throated Vireo	*Vireo flavifrons*	2	3
Alder Flycatcher	*Empidonax alnorum*	1	0
Blackburnian Warbler	*Dendroica fusca*	1	0
Downy Woodpecker	*Picoides pubescens*	1	0
Gray Catbird	*Dumetella carolinensis*	1	1
Hairy Woodpecker	*Picoides villosus*	1	0
Magnolia Warbler	*Dendroica magnolia*	1	0
Mallard	*Anas platyrhynchos*	1	1
Red-shouldered Hawk	*Buteo lineatus*	1	0
Song Sparrow	*Melospiza melodia*	1	3
Winter Wren	*Troglodytes troglodytes*	1	0
Common Grackle	*Quiscalus quiscula*	0	3
Field Sparrow	*Spizella pusilla*	0	1
Indigo Bunting	*Passerina cyanea*	0	1
Louisiana Waterthrush	*Seiurus motacilla*	0	1
Rufous-sided Towhee	*Pipilo erythrophthalmus*	0	1
Swamp Sparrow	*Melospiza georgiana*	0	3
Wood Duck	*Aix sponsa*	0	1
		445	**436**

Common Name	Latin Name	Visit 1	Visit 2
Barred Owl	*Strix varia*	1	6
		1	**6**

Methods: Bird Survey – 36 diurnal and 7 nocturnal survey stations in pre-determined natural communities.

VT Fish & Wildlife Bat Survey Report

Roaring Brook WMA, Vernon, VT 7/2006

Nighttime Mist Net Surveying

Common Name	Latin Name
Little Brown Bat	*Myotis lucifugus*
Northern Long-eared Bat	*Myotis septentrionalis*
Big Brown Bat	*Eptesicus fuscus*

Amphibians found at selected locations within the Roaring Brook Wildlife Management Area

Amphibians found in Roaring Brook WMA	Black Gum Swamps (High Priority Area)	Oak Hickory (Low Priority Area)	Power Line & NW (High Priority Area)	Beaver Pond (Non-priority area)	Fox Hill Lot (Low Priority Area)	Large Pond & Marsh (Low Priority)	Vernon Pond (Low Priority Area)	Newton Road Marsh (Low Priority Area)	Gravel Pit Pond Area (Low Priority Area)	Old Welcome Center (Non-priority Area)	Welcome Center Floodplain (Low Priority Area)	Roaring Brook Gorge (High Priority Area)	Other Non-priority Sites on WMA
Species and State Status													
Frogs (including toads)													
American Toad (S5) *(Bufo americanus)*	**X**	**X**	**X**	**X**	**X**			**X**		**X**	**X**	**X**	**X**
Gray Treefrog (S5) *(Hyla versicolor)*	**X**				**X**	**X**	**X**	**O**	**O**				**X**
Spring Peeper (S5) *(Pseudacris crucifer)*	**X**		**X**		**X**	**X**		**X**	**O**		**X**		**X**
American Bullfrog (S5) *(Rana catesbeiana)*				**X**	**X**		**X**						**X**
Green Frog (S5) *(Rana clamitans)*			**X**	**X**	**X**	**X**	**X**	**X**			**X**	**X**	**X**
Pickerel Frog (S5) *(Rana palustris)*										**X**		**X**	
Wood Frog (S5) *(Rana sylvatica)*	**X**		**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**
Salamanders													
Jefferson Salamander **(S2, SC)** *(Ambystoma jeffersonianum)*									**O**				**e**
Spotted Salamander (S5) *(Ambystoma maculatum)*	**X**	**X**	**X**		**X**	**X**		**X**	**X**		**X**		**X**
N. Dusky Salamander (S4) *(Desmognathus fuscus)*			**X**						**X**			**X**	
N. Two-lined Salamander (S5) *(Eurycea bislineata)*			**X**									**X**	
Eastern Newt (S5) *(Notophthalmus viridescens)*	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**
Eastern Red-backed Salamander (S5) *(Plethodon cinereus)*	**X**	**X**	**X**		**X**	**X**					**X**	**X**	**X**

SC = Special Concern, PT = Proposed for state-threatened, SE = State Endangered.
X = Species located during this survey.
O = Other reports from the Vermont Reptile and Amphibian Database.
E = Probable based on egg-masses.

Reptiles found at selected locations within the Roaring Brook Wildlife Management Area

Reptiles found in Roaring Brook WMA	Black Gum Swamps (High Priority Area)	Oak Hickory (Low Priority Area)	Power Line & NW (High Priority Area)	Beaver Pond (Non-priority area)	Fox Hill Lot (Low Priority Area)	Large Pond & Marsh (Low Priority)	Vernon Pond (Low Priority Area)	Newton Road Marsh (Low Priority Area)	Gravel Pit Pond Area (Low Priority Area)	Old Welcome Center (Non-priority Area)	Welcome Center Floodplain (Low Priority Area)	Roaring Brook Gorge (High Priority Area)	Other Non-priority Sites on WMA
Species and State Status													
Snakes													
Eastern Racer **(S1,SC,ST)** *(Coluber constrictor)*		**P**	**P**					**P**		**X**	**P**		**O**
Milksnake (S5) *(Lampropeltis triangulum)*			**X**							**X**			
Northern Watersnake **(S3)** *(Nerodia sipedon)*							**X**						
Common Gartersnake (S5) *(Thamnophis sirtalis)*	**X**	**X**			**X**	**X**		**X**		**X**			**X**
Red-bellied Snake (S5) *(Storeria occipitomaculata)*			**X**										
Ring-necked Snake (S3) *(Diadophis punctatus)*			**X**										
Turtles													
Snapping Turtle (S5) *(Chelydra serpentina)*							**X**						
Painted Turtle (S5) *(Chrysemys picta)*						**X**	**X**	**X**					

SC = Special Concern, ST = State-threatened, SE = State Endangered.
X = Species located during this survey.
O = Other reports from the Vermont Reptile and Amphibian Database.
P = Other sites that Eastern Racer may use based on habitat type and/or proximity to known site.

Appendix L:
Public Input Response to Comments

Concerning the Ad Brooks Road

- How far does the Agency plan to "extend" the Ad Brooks Road? **The existing road would be improved just as required to facilitate the Agency's management activities on the WMA and ideally public access to Roaring Brook WMA.**
    - *Point of clarification – Road improvements undertaken by the Agency do not change the legal status.*

- The Agency should review the Merritt vs. Daiello case as it relates to the legal status of the Ad Brooks Road. **Agreed.**

- The Agency needs to definitively determine both the classification of the road and its location on the ground before it is 1) assumed to be a legal access and 2) improved/ altered in any way. **We will take no action until we are confident of the road's legal status and the State's rights. We will work closely with town officials and ANR legal counsel in doing so and follow any town or state procedures required.**

Concerning the Vernon Hatchery Pond

- The Agency should incorporate into the LRMP habitat improvement projects at the pond designed to restore/perpetuate the population of Northern Water Snakes which existed there prior to the 2005 dam reconstruction. **If the snakes do not reestablish in five years, we will investigate a project to reestablish.**
    - *F&W, point of clarification – The new water level (9.6" lower than before reconstruction) of the pond was set by ANR Dam Safety Engineers who calculate the safe water level based on the dam's design and the 100 year flood event. We anticipate that the snakes will repopulate the pond once the new water level has naturalized.*

Concerning the Fox Hill Lots

- Agency should consider a loop trail on the Fox Hill lots so as to avoid the potential resource impacts resulting from dispersed recreational activities which may inadvertently trample sensitive plants/natural communities or the habitats of species of concern. **Based on the lack of support for improved public access, we plan to remove this action from the LRMP. Based on the sensitivity of the natural community, a trail is inconsistent with the goals for the property.**
    - *Participants were queried to see if there was a desire on their part, one way or the other, for the Agency to develop access into the largest of the Fox Hill lots. The Participants were opposed to improving access.*

- How does the Agency plan to monitor/enforce public use of these lots especially once access to the lots have been improved? **See following item.**

- The RBLRMP should address the need for a periodic and systematic evaluation of the impact of public use on the special natural resources. **We will add into implementation schedule periodic reviews of state significant natural communities.**

- What impacts could dogs have on the ecology of the Fox Hill Lots and how do we plan to deal with dog related issues as they arise? **See above.**
    - *The primary impact of dog use on these lands would likely be more of an aesthetic/sanitary nature rather than of an ecological nature although dogs can disrupt ecological processes if their activity is not owner controlled, is highly concentrated or is occurring in a habitat sensitive to such activity (i.e., deer wintering area). Dog- related impacts would need to be monitored and evaluated on an ongoing basis and would be dealt with as necessary.*

- Participant expressed some uncertainty regarding the whereabouts of the right-of-way to the Fox Hill lots. **We will contact the landowners directly.**
    - *Public Participant, point of clarification – The Act 250 permit which created the lots defines where this right-of-way is located but was unsure if it had been monumented in the field. Staff response – The right-of-way is part of the surveyed lot and should be monumented on the ground.*

- Participant expressed concern about developing a new 20' access road and suggested the Agency use existing road/trail network to access the lots in order to avoid the impacts associated with building a new one. **We will work with the landowners to develop a minimal access point in the legal right-of-way.**
    - *Point of clarification – The 20' width refers to the legal right-of-way width not the width of what the Agency would necessarily develop into an access. This right-of-way is the public's (and Agency's) only legal access to the parcel.*

- Participant requested that the Agency notify the abutters to the Fox Hill lots prior to the commencement of any road building and management activities. Given the proximity of residences to the Fox Hill lots, participant further requested that there be an opportunity for the public to review and comment on such road building and management activities once these projects have become more clearly defined. **Given the reduced scope of access development, this should be unnecessary.**

<u>Concerning the use of ATVs and snowmobiles</u>

- The LRMP should include in its language the possibility of ATV access to these lands understanding that such use is currently illegal. The participant, representing the *Southern Vermont Trail Riders Inc.*, expressed concern that if the RBLMP specifically prohibits ATV use in its language then, if statutes are later revised, such use will be forever prohibited regardless of statute. **The future use of ATVs within RBWMA is not addressed in this LRMP. Decisions regarding ATV use on RBWMA lands in the**

future will be based on ATV laws, regulations, and Department policy existing at the time a proposal is received.

- Representative of the *Vernon Trailbreakers* snowmobile club commented that most of the trails on the property have been maintained exclusively by the club but are used by everybody for a variety of recreational pursuits (hunting, hiking, skiing, etc.). Participant also made the following points:
    - It isn't just ATVs causing trail damage, rather it is also jeeps and off- road trucks. These users have no clubs or vested interest in maintaining trails as it is their prerogative to find and churn up mud. Enforcement activities should focus on ticketing these users.
    - More focus should be given to providing recreational vehicle access to these lands (ATVs and snowmobiles) otherwise you might as well just "set it on a shelf" for everyone to admire from a distance.
    - The Agency does not provide enough law enforcement presence to curb illegal use of the trails particularly of jeeps and off road trucks (Participant did, however, acknowledge the excellent work of several Wardens in their efforts to patrol snowmobile traffic). Club members are the only ones who are currently maintaining and "patrolling" the trails in the vicinity of the WMA. Therefore, if these clubs are barred from using these lands, the trails will be exposed to an even higher risk of damage by the unabated recreational use of jeeps and off-road trucks. **Snowmobile clubs should not be using or patrolling the Roaring Brook WMA with wheeled vehicles in non-winter months; there is no agreement to do so. Because off-roading is not currently allowed, "barring" them is not a correct interpretation.**
    - The Agency should increase its efforts to partner with clubs in order to more effectively manage trails. **We need to manage the trails better and will work to do so.**

  We will work with Enforcement to curtail illegal uses of all kinds.

- Participant agrees that access to maintained trails is important as it is only on these trails that she is able to walk/hunt or otherwise enjoy the WMA given her age and physical condition.

- Participant would **not** be in favor of additional motorized recreational vehicle activity on the WMA without some means of implementing a rule to regulate the noise level of such machines. As an abutter to the VAST trail, he is often awoken by the "excessively loud" snowmobiles which sometimes pass by his house on the trail at night (off the Roaring Brook WMA).

<u>Concerning the control of invasive exotics on the WMA</u>

- The Agency should place more emphasis on invasive exotic plant/animal control. This should be one of the highest management priorities on the WMA. **Stewardship Team agrees and will endeavor to do so.**

- Participant suggests that unabated Japanese Barberry on the WMA is causing issues for him, an abutter, as he struggles to control this invasive exotic on his own property. Participant expressed concern that the Agency hasn't effectively/promptly addressed this issue. Participant agrees with an earlier comment made that invasive plant control needs to be a **high** priority on the WMA. **Agree.**

General Comments and Concerns

- The Agency should coordinate its plans and management activities on the WMA with the management that is occurring on the nearby and adjacent conserved/public lands in Massachusetts. **We have talked with State of Massachusetts about coordinating management. We will continue discussions and develop some common management.**

- Participants (2) expressed concern regarding their right and ability to continue accessing their inholding(s) via motorized vehicles. Participants questioned the Agency on how this issue will be dealt with. **Legal access to this WMA, and to the private parcels within it, is an enormous management issue for this WMA. The issues pertaining to access are both complex and difficult to resolve. The Agency will have to deal with such issues on a case-by-case basis.**

- Participant inquired as to the Agency's consideration of the potential impacts of forest fires on the WMA as well as of the implications for the WMA of forest fire prevention and control. **The RBLRMP does not specifically address forest fires on the WMA, however, the strategy for preventing/managing such events would be in line with the State's overall efforts for dealing with forest fires. Maintaining or preserving interior roads is a key part of fire control. In light of potential Hemlock Woolly Adelgid related forest dieback, special consideration may need to be given to forest fire prevention on this WMA given the prevalence of hemlock in its forest structure.**

- Participant shared his observation that the Massachusetts/Vermont border is not clearly marked on the ground. **FPR painted this, and all other borders on Roaring Brook WMA, orange 10 years ago. The state line is not marked as such by any state entity.**

- Participant would like to see the Agency develop hiking trail(s) within the WMA. **We have a process in place for entertaining proposals from the public, but the purpose of ownership is to provide diverse forms of wildlife-based recreation.**

- Participant suggested that the RBLRMP specify that when it is necessary to control beaver populations in order to protect sensitive natural resources, the use of water control devices be considered as an alternative to the lethal removal beaver. **We will make this part of our five-year review on the ecological values of the parcel.**

Appendix M:
Authorization to Plan and Manage

Statutory Authority

The Vermont General Assembly has authorized the Agency of Natural Resources and its Departments to acquire lands, hold interests in lands, and conduct land management activities. Authority is vested in several statutes that collectively empower the Agency, upon approval of the Governor or General Assembly, to acquire lands, accept donations of lands or interests in lands, exchange or sell lands or interests in lands for public benefit, and to manage those lands for a variety of public purposes.

Specific authorizing statutes are:

- **Title 3, Chapter 51, Section 2825**: The primary duties of the secretary are to coordinate the activities of the various departments and divisions of the agency for the proper development, management and preservation of Vermont's natural resources, to develop policies for the proper and beneficial development, management, and preservation of resources in harmony with the state comprehensive planning program and to promote the effective application of these policies by the departments and divisions affected.

- **Title 10, Chapter 83, Section 2601**: Establishes the general purposes and policies to acquire and manage state lands and authorizes the Department of Forests, Parks & Recreation to undertake such activities.

- **Title 10, Chapter 83, Section 2603**: Establishes the general powers and duties of the commissioner of the Department of Forests, Parks & Recreation to manage state lands.

- **Title 10, Chapter 103, Section 4144**: Authorizes the Department of Fish & Wildlife to acquire state lands.

- **Title 10, Chapter 103, Section 4147**: Authorizes the Department of Fish & Wildlife to exchange, sell, or lease lands.

- **Title 10, Chapter 37, Section 905b**: Authorizes the Department of Environmental Conservation to acquire and manage lands and the rights to protect the state's water resources.

- **Title 10, Chapter 155, Section 6301-5**: Authorizes acquisition of rights less than fee of real property.

Appendix N:
Summary of Some Policies and Guidelines Used in the Management of Vermont Agency of Natural Resources Lands

Some of the highlights of the many policies and guidelines used in managing Vermont Agency of Natural Resources lands are listed below. In general, these were in effect at the start of this long range management plan. If more information is needed, refer to current policies and guidelines which can be made available upon request. The information is grouped into some general categories to make this document easier to use.

Acquisition of Land
Lands Conservation Plan: A Land Acquisition Strategy for the Agency of Natural Resources, October, 1999 - Standards and procedures for the Agency of Natural Resources to acquire lands.

Fish and Wildlife
Vermont hunting, fishing, and trapping regulations.

WMAs Operational Procedures Manual, Vermont Department of Fish and Wildlife - Standards for management of wildlife management areas.

Management Guide for Deer Wintering Areas in Vermont, Fish and Wildlife, 1990 - Standards for managing for deer.

Landowner's Guide to Wildlife Habitat Management, Fish and Wildlife, Fish and Wildlife, 1995 - Standards for managing for a variety of wildlife species on state and private land.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994, Standards for buffer strips along lakes, streams and wetlands in Vermont.

Rare and Endangered Species - Listing of species protected under state regulations.

Gravel Pits
Forests, Parks and Recreation Policy #3, 1991 - Standards for use of gravel pits on Forests, Parks and Recreation lands.

Historic and Archaeological Resources
State of Vermont laws, rules, and guidelines applicable to historic and archeological resources, especially 22 VSA 14 and Division for Historic Preservation's *Guidelines for Conducting Archeology in Vermont*, as well as federal laws that apply.

Land Use and Development
Act 250 - Law governing plans for land use and development in Vermont.

Mountain Top Communications Facilities
Siting, Use and Management of Electronic Communication Facilities on Properties Owned by the State of Vermont, Agency of Administration, 1998.

Natural Area Designation
Natural Areas Law and Forests, Parks and Recreation Policy #7 - Standards and guidelines for designation of Natural Areas on state forest and parks lands.

Pesticides Use
Forests, Parks and Recreation Policy #9 - Regulations on the use of pesticides on state forest and parks lands.

Prescribed Fire
Prescribed Burn Directive, Vermont Department of Forests, Parks and Recreation, 1989 - Procedures for planning and execution of prescribed burns.

Recreation
Uses of State Lands, Agency of Natural Resources Policy, 1999 - Criteria for appropriate uses and when permits and licenses are and are not required.

Forests, Parks and Recreation Policies and Procedures Manual, 1990-1999 - Procedures and standards for administering recreational activities on state forests and parks lands.

State Park Ranger's Manual, Forests, Parks and Recreation, 1999 - Operating procedures, rules, regulations, and standards for recreational activity on state forests and parks land.

Scientific Research
Forests, Parks and Recreation policy # 8 - Standards and guidelines for research on state lands.

Silviculture
Silvicultural References Manual, Forests, Parks and Recreation, 1997 - Guidelines for the Intent to Heavy Cut notification process.

Acceptable Management Practices (AMP) Guidelines, 1987 - Practices for maintaining water quality on logging jobs.

Wetlands Regulations, 1990 - Regulations which outline practices for logging around wetlands in Vermont.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994 - Standards for buffer strips along lakes, streams and wetlands in Vermont.

Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites, Vermont Department of Environmental Conservation, revised September, 1983.

Vermont Streambank Conservation Manual, Agency of Natural Resources, 1982 - Guidelines for construction around streams.

Water Resources
Acceptable Management Practices (AMP) Guidelines, 1987 - Practices for maintaining water quality on logging jobs in Vermont.

Long Trail Construction and Maintenance Standards, Green Mountain Club, 1995 - Trail construction standards for public and private land.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994 - Standards for buffer strips along lakes, streams and wetlands.

Vermont Streambank Conservation Manual, Agency of Natural Resources, 1982 - Guidelines for construction around streams.

Vermont Water Quality Standards, Vermont Water Resources Panel, 7/2/00.

Vermont Wetland Rules, Vermont Water Resources Panel, 1/1/02.

Appendix O:
Glossary

The following is a series of key words and their definitions used in the development of Long Range Management Plans for Vermont Agency of Natural Resource lands.

Acceptable management practices (AMPs). In this plan, a series of erosion control measures for timber harvesting operations, as identified in state statutes. The AMPs are the proper method for the control and dispersal of water collecting on logging roads, skid trails, and log landings to minimize erosion and reduce sediment and temperature changes in streams.

All-aged (Uneven-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Basal area. A measure of the density of trees on an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) expressed in square feet per acre.

Best management practices. A practice or combination of practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

Biodiversity. The variety of plants and animals, their genetic variability, their interrelationships, and the biological and physical systems, communities, and landscapes in which they exist.

Biophysical region. A region with shared characteristics of climate, geology, soils, and natural vegetation. There are currently eight biophysical regions recognized in Vermont.

Block. A land management planning unit.

Browse. The part of leaf and twig growth of shrubs, vines, and trees available for animal consumption.

Buffer (Riparian Buffer Zone). The width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian buffer zones are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian corridor ecosystem from the impact of these land uses.

Canopy. The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Capability. The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions such as climate, slope,

landform, soils, and geology as well as the application of management practices such as silvicultural protection from fire, insects, and disease.

Cleaning (Weeding). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Clearcutting. A cut which removes all trees from a designated area at one time, for the purpose of creating a new, even-aged stand.

Commercial forest land. Land declared suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation.

Conservation. The careful protection, planned management, and use of natural resources to prevent their depletion, destruction, or waste.

Conservation easement. Acquisition of some rights on a parcel of land designed to keep the property undeveloped in perpetuity.

Cover. Vegetation which provides concealment and protection to wild animals.

Cultural operation. The manipulation of vegetation to control stand composition or structure, such as site improvement, forest tree improvement, increased regeneration, increased growth, or measures to control insects or disease. Examples of methods used are timber stand improvement, cleaning or weeding, release, and site preparation.

DBH (diameter at breast height). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Deer wintering area. Forest area with at least 70 percent conifer that provides suitable, stable habitat to meet deer needs during the winter.

Den tree. A live tree at least 15 inches DBH (diameter at breast height) containing a natural cavity used by wildlife for nesting, brood rearing, hibernating, daily or seasonal shelter, and escape from predators.

Developed (or intensive) recreation. Activities associated with man-made structures and facilities that result in concentrated use of an area. Examples are campgrounds and ski areas.

Diameter at breast height (DBH). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Dispersed recreation. Outdoor recreation activities requiring few, if any, support facilities.

Ecological processes. The relationships between living organisms and their environment. Among these processes are natural disturbances such as periodic fire, flooding, or beaver

activity; natural stresses such as disease or insects; catastrophic weather-related events such as severe storms or lightning strikes; or more subtle ongoing processes such as succession, hydrology, and nutrient cycling.

Ecological reserve. An area of land managed primarily for long-term conservation of biodiversity.

Ecosystem. A complex array of organisms, their natural environment, the interactions between them, the home of all living things, including humans, and the ecological processes that sustain the system.

Ecosystem management. The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity, uses, products, and services over the long-term.

Endangered species. A species listed on the current state or Federal endangered species list (VSA Title 10, chapter 123). Endangered species are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

Even-aged system. Timber management that produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, seed tree (seed cut) method, and shelterwood method.

Forest health. Condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity.

Forest type. A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined and named after the one or more dominant species of trees, such as the spruce-fir and the birch-beech-maple types.

Forestry. The art and science of growing and managing forests and forest lands for the continuing use of their resources.

Fragmentation. Division of a large forested area into smaller patches separated by areas converted to a different land use.

Game species. Animals habitually hunted for food, particular products, sport, or trophies.

Geographic Information Systems. A computer-based means of mapping lands and resources and communicating values associated with them (GIS).

Green certification. A process, sponsored by several international organizations, that promotes sustainable forest management practices, providing a marketplace identify for forest products certified to have been grown and manufactured in a sustainable manner.

Group Selection. The removal of small groups of trees to meet a predetermined goal of size, distribution, and species.

Habitat. A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

Hardwood. A broad leaved, flowering tree, as distinguished from a conifer. Trees belonging to the botanical group of angiospermae.

Healthy ecosystem. An ecosystem in which structure and functions allow the maintenance of the desired conditions of biological diversity, biotic integrity, and ecological processes over time.

Heritage Sites. Sites identified by the Vermont Nongame and Natural Heritage Program of the Department of Fish and Wildlife, which have rare, threatened, or endangered species of plants or animals. Heritage sites are identified using a common standards-based methodology, which provides a scientific and universally applicable set of procedures for identifying, inventorying, and mapping these species.

Intensive (or developed) recreation. Outdoor recreation activities requiring major structures and facilities.

Interior dependent species. Those wildlife species that depend on large unbroken tracts of forest land for breeding and long term survival. The term is also often used in conjunction with neotropical migratory bird species requiring large patches of fairly homogeneous habitat for population viability**.**

Intermediate treatment. Any treatment or tending designed to enhance growth, quality vigor, and composition of the stand after its establishment or regeneration and prior to the final harvest.

Land conservation. The acquisition or protection through easements of land for wildlife habitat, developed state parks, and working forests.

Landscape. A heterogeneous area of land containing groups of natural communities and clusters of interacting ecosystems. These can be of widely varying scales but normally include a range of elevations, bedrock, and soils.

Mast. The fruit (including nuts) of such plants as oaks, beech, hickories, dogwood, blueberry, and grape, used for food by certain wildlife species.

Motorized use. Land uses requiring or largely dependent on motor vehicles and roads.

Multiple-use forestry. Any practice of forestry fulfilling two or more objectives of management, more particularly in forest utilization (e.g. production of both wood products and deer browse).

Multiple-use management. An onsite management strategy that encourages a complementary mix of several uses on a parcel of land or water within a larger geographic area.

Native (species). A plant or animal indigenous to a particular locality.

Natural Area. Limited areas of land, designated by Vermont statute, which have retained their wilderness character, although not necessarily completely natural and undisturbed, or have rare or vanishing species of plant or animal life or similar features of interest which are worthy of preservation for the use of present and future residents of the state. They may include unique ecological, geological, scenic, and contemplative recreational areas on state lands.

Natural community. An assemblage of plants and animals that is found recurring across the landscape under similar environmental conditions, where natural processes, rather than human disturbances, prevail.

Nongame species. Animal species that are not hunted, fished, or trapped in this state. This classification is determined by the state legislature.

Northern hardwood. Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, white birch, black cherry, red spruce, and hemlock.

Old growth forest. A forest stand in which natural processes and succession have occurred over a long period of time relatively undisturbed by human intervention.

Outdoor recreation. Leisure time activities that occur outdoors or utilize an outdoor area or facility.

Overstory. That portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer.

Pole. A tree of a size between a sapling and a mature tree.

Pole timber. As used in timber survey, a size class definition; trees 5.0 to 8.9 inches (varies by species) at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

Regeneration treatment (harvest cut). Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.
The four basic methods used to regenerate a forest are clearcutting, seed-tree, shelterwood, and selection (group selection or single tree selection).

Regeneration methods. Timber management practices employed to either regenerate a new stand (regeneration cutting) or to improve the composition and increase the growth of the existing forest (intermediate treatment).

Regulated Hunting/Fishing/Trapping. The harvest of wildlife under regulations stipulating setting of seasons, time frame of lawful harvest, open and closed zones, methods of take, bag limits, possession limits, and reporting or tagging of species.

Release (release operation). The freeing of well-established cover trees, usually large seedlings or saplings, from closely surrounding growth.

Removal cut. The final cut of the shelterwood system that removes the remaining mature trees, completely releasing the young stand. An even-aged stand results.

Salvage Cutting. The removal of dead, dying, and damaged trees after a natural disaster such as fire, insect or disease attack, or wind or ice storm to utilize the wood before it rots.

Sanitation cutting. The removal of dead, damaged, or susceptible trees to improve stand health by stopping or reducing the spread of insects or disease.

Sapling. As used in timber surveys, a size class definition. A usually young tree larger than seedling but smaller than pole, often 1.0 to 4.9 inches at DBH.

Seedling. A very young plant that grew from a seed.

Seed-Tree (Seed Cut) method. The removal of most of the trees in one cut, leaving a few scattered trees of desired species to serve as a seed source to reforest the area.

Shelterwood method. A series of two or three cuttings which open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

Silvicultural systems. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

Single tree selection method. Individual trees of all size classes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration.

Site Preparation. Hand or mechanical manipulation of a site, designed to enhance the success of regeneration.

Snag. Includes standing dead or partially dead trees that are at least 6 inches in diameter at breast height (DBH) and 20 feet tall.

Softwood. A coniferous tree. Softwood trees belong to the botanical group gymnospermae, including balsam fir, red spruce, and hemlock.

Stand improvement. An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven-aged stands.

Stewardship. Caring for land and associated resources with consideration to future generations.

Sustainability. The production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.

Sustained yield. The yield that a forest can produce continuously at a given intensity of management.

Thinning. Removing some of the trees in a dense immature stand primarily to improve the growth rate and form of the remaining trees and enhance forest health.

Threatened species. A species listed on the state or Federal threatened species list. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Timber lands. Properties that are managed primarily for the maximum production of forest products.

Timber Stand Improvement. Activities conducted in young stands of timber to improve growth rate and form of the remaining trees.

Traditional uses. Those uses of the forest that have characterized the general area in the recent past and present, including an integrated mix of timber and forest products harvesting, outdoor recreation, and recreation camps or residences.

Uneven-aged (All-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Watershed. The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

Weeding (cleaning). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Wilderness. Areas having pristine and natural characteristics, typically roadless and often with some limits on uses. (This is not the federal definition of wilderness.)

Wildlife habitat. Lands supplying a critical habitat need for any species of wildlife, especially that which requires specific treatment and is of limited acreage.

Working forest. Land primarily used for forestry purposes but also available for recreation, usually where both managed land and land not presently being managed is present.

Working landscape. A landscape dominated by land used for agricultural and/or forestry purposes.

Appendix P: Right of First Refusal

RIGHT OF FIRST REFUSAL

Know all people by these presents that the undersigned, CERSOSIMO LUMBER COMPANY, INC., a Vermont corporation of Brattleboro, Vermont, on behalf of themselves and their heirs and assigns forever (hereinafter "Grantors"), in consideration of One Dollar and other good and valuable consideration, the receipt of which is hereby acknowledged, does hereby remise, release, give, grant and convey to the VERMONT DEPARTMENT OF FISH & WILDLIFE, State of Vermont, and its successors and assigns forever (hereinafter "Grantee"), a **Right of First Refusal**, which Right shall be of perpetual duration, and subject to the conditions set forth below, to purchase certain real property (hereinafter the "Property"), together with all rights, easements, and appurtenances thereto, belonging to Grantors and situated in the Town of Vernon, Windham County, State of Vermont, conveyed to Grantors by Warranty Deeds from: 1) Scott K. Goodwin dated March 18, 2003, recorded in Book 86, pages 613-614, Town of Vernon land records, and 2) Nelson H. Jenkins dated March 13, 2003, recorded in Book 86, pages 611-612, Town of Vernon land records, which is more particularly described as follows:

> Parcel 1: Being the same premises described in a deed from Sarah J. Dickinson to Philip F. Whitmore and Herbert H. Bixby, dated July 26, 1924, and recorded in the Town Clerk's Office, Vernon, Vermont, Book 14, Page 278, to which deed and the references therein contained, reference is hereby made for a more particular description.
>
> Parcel 2: Being the same premises described in a deed from Amy B. Smith to the said Philip F. Whitmore and Herbert H. Bixby, dated October 10, 1923, and recorded in the Town Clerk's office, Vernon, Vermont, Book 14, Page 494, to which deed and the references therein contained, reference is hereby made for a more particular description.
>
> Reference may be made to the above described deeds and record, and to the deeds and records referred to therein for a more complete and particular description.

The conditions of this **Right of First Refusal** shall be such that whenever Grantors receive a bona fide written offer from a person or persons to purchase the Property, Grantors shall deliver to Grantee in person or by certified mail, return receipt requested, a duplicate of said written offer, together with such other instruments as may be required to show the bona fides of the offer. Grantee may elect to purchase the Property within two (2) months on terms and conditions not less favorable to Grantors than those contained in said bona fide written offer. Notice of Grantee's election to exercise this **Right of First Refusal** and purchase the property shall be delivered to Grantors in person or by certified mail, return receipt requested within 60 days of receipt of Grantors bona fide written offer. Grantors shall convey good, clear, record and marketable title by Vermont warranty deed with closing to occur within 12 months from the date of Grantors' receipt of Grantee's notice of election. If the Grantee does not elect to exercise this **Right of First Refusal** as aforesaid, Grantor may accept the offer as written and, at the request of the Grantor, Grantee shall execute and deliver to Grantors a document in recordable form which memorializes Grantee's election not to exercise this **Right of First Refusal**.

Grantors represent to Grantee that they are not aware of any hazardous waste having been dumped or placed on the Property or any environmental or material defect of or on the property. Upon election to exercise this **Right of First Refusal**, Grantors agree that Grantee may, at its own expense, perform any and all tests and/or inspections and assessments of the property necessary to confirm this representation and inform itself of the condition of the property. In the event Grantee discovers that hazardous wastes have been dumped or placed on the Property, or that material defects unacceptable to the Grantee exist, Grantee may terminate its agreement to purchase the Property without further obligation to Grantors.

This **Right of First Refusal** shall apply to all sales and conveyances of the Property, including any sale or conveyance of any interest in the Property, for consideration, including any conveyance by, or conveyance of any interest in, a corporation, partnership or other holding entity.

IN WITNESS WHEREOF, we set our hands this 25th day of June, 2008.

In The Presence Of:

Witness

CERSOSIMO LUMBER COMPANY, INC.

By: Jeffrey G. Morse, Vice President and duly authorized agent

STATE OF VERMONT
Windham COUNTY, ss.

At Brattleboro, this 25th day of June, 2008, Jeffrey G. Morse duly authorized agent of the CERSOSIMO LUMBER COMPANY, INC., personally appeared and acknowledged this instrument, by him sealed and subscribed, to be his free act and deed and the duly authorized deed of the CERSOSIMO LUMBER COMPANY, INC.

Before me,

Notary Public Melissa S. Snow
My commission expires: 2/10/2011

Accepted:

VERMONT DEPARTMENT OF
FISH &WILDLIFE

6/30/2008
Date

By:
Its Duly Authorized Agent

Witness

STATE OF VERMONT
Washington COUNTY, ss.

At Waterbury, this 30th day of June, 2008, Wayne Laroche duly authorized agent of the Vermont Fish & Wildlife Department personally appeared and acknowledged this instrument, by him subscribed, to be his free act and deed and the duly authorized deed of the Vermont Fish & Wildlife Department.

Before me,

Notary Public
My commission expires: 2/10/2011

TOWN CLERK'S OFFICE
RECEIVED FOR RECORD
JULY 08 A.D. 2008 .
AT 08 O'CLOCK 27 MINUTES A.M.
AND RECORDED IN:
BOOK 104 PAGE (S) 408- 409 OF
THE VERNON LAND RECORDS.
ATTEST:
ASSISTANT TOWN CLERK