

State of Vermont
Agency of Natural Resources
Department of Fish & Wildlife
Department of Forests, Parks and Recreation

Long Range Management Plan DENSMORE HILL WILDLIFE MANAGEMENT AREA



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**Long Range Management Plan
Densmore Hill WMA
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I. INTRODUCTION

Overview of Wildlife Management Areas Vermont Agency of Natural Resources

On behalf of the State of Vermont and the Agency of Natural Resources, the Department of Fish and Wildlife manages state-owned Wildlife Management Areas (WMAs) for a variety of purposes, ranging from the protection of important natural resources to public uses of the land in appropriate places.

Management and Administration of Wildlife Management Areas

The Department of Fish and Wildlife administers and manages Wildlife Management Areas 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 as 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 a 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 have been the predominate sources of funding for the management of state Wildlife Management Areas.



Natural Resources include, but are not limited to: the land, air, and waters of the State of Vermont and those fish, wildlife, plants, other life forms, habitats, natural communities, and ecosystems within biophysical regions of Vermont.

Public Uses on Wildlife Management Areas include wildlife dependent activities, not limited to: hunting, fishing, trapping, hiking, wildlife viewing, research, and education.

Outcome of Long Range Management Plans

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)

The Agency has a mandate to serve as the principal land steward for properties owned or managed by its three departments—Environmental Conservation; Fish and Wildlife; and Forests, Parks, and Recreation.

The development of long range management plans (LRMP) for state lands represents a key step in providing responsible stewardship of these valued public assets. Each LRMP identifies areas where different uses are to be allowed and describes how these uses will be managed to ensure protection of natural resources. The following management considerations further both Agency and Department missions and are evaluated during the development of long range management plans for all ANR lands:

Biological Diversity, Abundance, and Distribution: Wildlife Management Area lands are managed to maintain, restore, and control the variety (or diversity), number (or abundance),

and distribution of plants, fish and wildlife, and other life forms within natural habitats, communities, ecosystems, and biophysical regions.

WMAs are managed to restore, maintain, and control the abundance of certain species of plants, fish and wildlife, and other life forms within bounds that prevent damage or loss of resource value that can result from: high or “over” abundance; low abundance or extirpation of species or genetic stocks; and frequent and/or large fluctuations in abundance through time.

Ecosystem Health: Management of Agency lands to control diversity, abundance, and distribution of plants, animals, and other life forms considers ecosystem functions, health, and integrity.

Legal Constraints: Agency lands are managed in accordance with the purposes for which they were acquired. Many Agency lands were purchased with federal funds that require management for specific purposes. These legal requirements are followed during planning, management, and public use of Agency lands.

Principles of Natural Resource Management: The procedure for making management decisions on Agency lands includes comprehensive survey and assessment of natural resources, and determination of management objectives, evaluation to determine appropriate actions and determination and implementation of various management practices. This procedure is repeated periodically in response to natural resource conditions and uses through time.

Principles of Wildlife Management: Wildlife management activities are directed toward managing the diversity, abundance, and distribution of plants, animals, and other life forms. These activities are designed either to sustain or alter physical, chemical, and/or biological conditions to create, protect, or enhance specific habitat types. Species, habitats, and ecosystems where there is special conservation or public concern, are targeted for management.

Recreational Uses and Needs: Wildlife Management Area lands 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. Recreational uses that have been conducted on the properties prior to Department ownership may be allowed to continue if they do not degrade the habitat or natural resources.

Wildlife Habitat Management: Management practices are used to ensure that trees, shrubs, and other plants are established, promulgated or controlled to establish and maintain the diversity, abundance, distribution, and seral successional patterns characteristic of a healthy forest ecosystem. Wildlife Management Area lands are managed to provide for various habitat requirements for selected species. 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 go back into the management of Wildlife Management Areas. Wetland habitats may be manipulated through a variety of techniques for selected wetland water regimes or for various moist soil management regimes.

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 policies, plans, and regulations. In developing long range plans, the Agency considers interests outlined in local, regional, and state plans, including town plans, regional plans, watershed plans, and species recovery and management plans. The Agency works to resolve conflicts between plans as may be appropriate or necessary.

Historical/Cultural and Scenic Values: Agency 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.

Best Management Practices: A variety of Best or Acceptable Management Practices are applied to state lands. Agency lands are intended to serve as exemplary stewardship models for the public and private sectors of Vermont. Whenever possible, Best Management Practices are made visible and understandable to educate the public concerning their use and benefits.

Regional Availability of Resources and Activities: Department of Fish and Wildlife Wildlife Management Areas are managed for wildlife habitat values and to provide wildlife dependent activities (e.g. regulated hunting, fishing, trapping, wildlife viewing). The Agency works to ensure that additional uses and activities the public might desire (e.g. additional recreation, historical or cultural activities) are made available on a regional basis.

Mission Statements Which Have Guided the Development of This Plan

Vermont Agency of Natural Resources

The mission of the Agency of Natural Resources is "to protect, sustain, and enhance Vermont's natural resources, for the benefit of this and future generations." (Agency Strategic Plan, 2001-2005)

Four agency goals address the following:

- To promote the sustainable use of Vermont's natural resources;
- To protect and improve the health of Vermont's people and ecosystems;
- To promote sustainable outdoor recreation; and
- To operate efficiently and effectively to fulfill our mission.

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.

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.

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

A. Purpose for Ownership

Wildlife management areas are managed by the Vermont Department of Fish & Wildlife for improved wildlife habitat, timber production, and 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.

Management Goals for Densmore Hill WMA are to:

- Protect and enhance wildlife habitat through management of all seral stages, creation of early successional growth, improvement of deer wintering areas, and protection of unique habitat.
- Provide sustainable, periodic timber harvesting 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 access.

B. General Information and Base Maps

Densmore Hill Wildlife Management Area (WMA) consists of a 252-acre parcel located entirely within the town of Hartland, in Windsor County, Vermont. The terrain is hilly with an elevation ranging from 1249 feet to 1524 feet above sea level. Unlike many WMAs in Windham and Windsor County, the State controls all rights and resources on the land. The entire parcel is located within the Southern Vermont Piedmont biophysical region.

- Area Base Map
- Biophysical Region Core Forest¹ and Locator Map

C. Natural Resources Highlights

Densmore Hill WMA has numerous characteristics that provide excellent wildlife habitat. The WMA has productive soils; diverse terrain; abundant hophornbeam on drier ridges; scattered apple, red oak, and aspen trees and streams, seeps, and wetlands. There are also scattered large old dying trees useful to insects which provide a food source for birds, mammals, and amphibians. The tree species mix is typical of a northern hardwood site (sugar maple, white birch, beech, and white ash) in this biophysical region. White pine in former pastures is somewhat common and provide additional plant diversity.

¹ Core Forest is defined by the Vermont Biodiversity Project as forest land at least 100 meters from developed areas, agricultural openings, and roads. The Core Forest map was generated using GIS systems by the UVM Spatial Analysis Lab.

[Base Map]

[Biophysical Map]

D. Land Use History/Historic Resources Highlights

According to a study completed by the University of Vermont's Consulting Archeology Program, there is little likelihood that pre-historic sites exist on the WMA due to the steepness of the land and lack of major water features. In this region, early agriculture and settlement began in the late 1700s to early 1800s. At least two farms were located along two town roads which abutted or crossed what is now Densmore Hill WMA. Most of the land would have been suitable for pasture, and a smaller portion for cropland. It appears nearly all 252 acres were cleared as stonewalls on the property are abundant. Today there are two sites with farmstead foundations (house and barn), and one more recent cellar hole. The farms appear to have been abandoned in the early 1930s. The more recent house burned in the late 1960s.

Some vegetative management practices have occurred in the last 20 years. The main access road was constructed in 1984 for the purposes of accessing a timber sale which created regeneration in two acre patches to enhance grouse and whitetail deer habitat. In addition, apple trees have been freed of competition through the felling of small trees growing over them. The major impediment to more substantive management in the past has been a lack of good truck access and a lack of markets for the poor quality trees that would typically be harvested in habitat improvement projects for game species. In 2004, one mile of access road was reopened and upgraded to access a timber sale scheduled in the previous plan and to facilitate future management in general. In addition, markets for poor quality trees in this area have improved dramatically in the last decade. The improved access and improved markets should allow for more active habitat management of the WMA.

E. Recreation Resources Highlights

The main access road built in 1986 and improved in 2004 provides both management and recreational access to the interior of the parcel. A class 3 town road (T.H. No. 48 Morley Road) borders the property. The nearby Woodstock area is noted for its equestrian activities, and horseback riders use many of the rural roads in this area including the WMA access. Hunting of turkey, grouse, and deer, bird watching, trapping in the wetlands along Morley Road, cross-country skiing, snowshoeing, and hiking comprise most of the other recreational uses.

F. Timber Resources Highlights

Densmore Hill WMA is almost completely forested with even-aged stands. Northern hardwood species including sugar maple, white ash, white birch, beech, and hophornbeam account for most of the trees on the parcel. Soil productivity over much of this parcel is good, and the soils are well drained. These are important characteristics for tree growth. White pine, hemlock, and other conifer trees make up only 10% of the tree composition and are typically found in small stands or groups of 1 to 4 acres. Groups of aspen trees are scattered throughout the parcel.

G. Acquisition History and Legal Constraints

The Nature Conservancy (TNC) acquired this property in 1976 from Elizabeth and William Peabody and in 1977 subsequently transferred the title to the Vermont Agency of Natural Resources, Department of Fish & Wildlife.

The original Peabody deed restricts snowmobile activity on the property with exception of the Old County Road, also known as the Cady Brook Road. Other than typical road and utility line rights, there are no other easements on the property.

H. Relationship to the Region

Relationship to the Regional Context and Other Planning Efforts

The region in which the WMA is located is served by the Two Rivers-Ottawaquechee Regional Commission. Management of the WMA is consistent with goals of both the town and region.

The 2002 Hartland, Vermont Town Plan contains the following goals and management recommendations for scenic and natural resources, including forest lands, wildlife habitat, ridgelines, hilltops, hillsides, and natural and fragile areas:

- Protection of resources through State acquisition of land;
- Use of Best Management Practices for forestry; and
- Providing workshops about wildlife, emphasizing preserving the town's wildlife habitats.

The 2003 Regional Plan of the Two Rivers-Ottawaquechee Regional Commission contains the following goals for wildlife resources:

- Maintain or enhance natural diversity and populations of wildlife species in proper balance; and
- Allow sport and subsistence hunting at ecologically-sound levels so that species will continue to succeed.

The WMA's general proximity to other conserved lands indicates its value to wildlife in the region. As depicted on page 18, the WMA is in close proximity to seven parcels with permanent conservation easements and the Hartland Town Forest.

I. 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 will require consultation with both the appropriate town(s) and Two Rivers-Ottawquechee Planning Commission.

Cooperative conservation efforts with land trusts and landowners could add to a strong local base of conserved lands surrounding the WMA. The experience of the State has been that development of parcels adjoining WMAs leads to conflicts with management and pressures of non-wildlife related recreational use of the property. A common conflict is between hunting on WMAs and nearby homes and non-hunting users of the property. Conservation of adjacent lands limiting residential and commercial development creates opportunities for complementary management and far fewer conflicts between users of state lands and owners of adjacent lands.

III. PUBLIC INPUT

The public involvement process for Densmore Hill WMA began in 2006 when the Stewardship Team notified the town selectboard and the regional planning commission that the planning process was underway. In the spring of 2007, the draft Long Range Management Plan was placed on the Lands Section's website for public viewing.

On June 7, 2007 an advertised public input meeting to discuss all aspects of the management on the WMA was held at the Hartland Town Office in Hartland, Vermont. The district staff presented a draft plan for the WMA allowing a 30-day public comment period following. People were encouraged to respond by postcard, letter, or by email directly to the website established for this purpose.

After the 30-day public comment period, the comments were reviewed and analyzed by the Springfield Regional Stewardship Team.

Overall, comments made by the public supported the draft plan presented with the exception of the lack of old growth resources on the parcel. This suggestion was not incorporated due to the small size of the parcel and the inclusion of a number of areas in the management plan that call for all-aged management and large diameter trees.

Public support was high for continued conservation easement development of lands surrounding the WMA by those attending.

IV. RESOURCE ANALYSES

A. Ecological and Wildlife Habitat

An inventory and assessment of the biological features of Densmore Hill WMA was conducted. Existing databases and documents were reviewed to synthesize what was previously known of the wildlife habitats, ecology, soils, and other natural resources of the WMA. Spatial databases associated with Geographic Information Systems (GIS) were used extensively. Field work was conducted to support this existing information. A description of the natural communities identified on the WMA is found in Appendix I of this plan.

The ANR long range management plan format lays out a procedure for the ecological assessment of state lands. One of the goals of state lands management is conservation of the plants, animals, and other organisms native to this region. Recognizing that land managers cannot inventory all groups of organisms found on a parcel of state land, the inventory focuses on communities of organisms, commonly known as natural communities. Natural communities are described chiefly by their plant diversity and structure, as plants are more easily inventoried than animals. It is widely recognized that with knowledge of the natural communities present on a parcel of land, appropriate management will conserve examples of all the species that inhabit those communities, even if we do not track the individual species. For example, if we maintain healthy examples of northern hardwood forest, we expect that we are protecting black-throated blue warblers, which nest in the understory of these forests. For some species, however, we must inventory and monitor individual populations or habitats critical to their survival. For example, it is not enough to know that bobcats inhabit northern hardwood forests; to conserve them, we must also conserve the ledge outcrops they use for breeding and winter cover. This model of natural resource management is referred to as the “coarse filter/fine filter” method of inventory and management.

Densmore Hill WMA is located in the Southern Vermont Piedmont biophysical region. This is an area of relatively low elevations and mild climate. Like many landscapes in this region, the bedrock at the WMA is a mineral rich limestone of the Waits River geologic formation. Soils are mostly rocky, silty loams derived from glacial till, and some are considered excellent for agriculture and forest productivity. Much evidence of past tillage and pasturing of these soils is present.

The parcel is drained by small headwater streams, principally Cady Brook, that carry water to the Connecticut River. Seeps and springs are common, and there is a wetland along the brook.

Eight types of natural communities were identified and mapped at Densmore Hill WMA. Most of the parcel (238 acres) features forested upland communities common throughout the state. Northern hardwood forest occupies 118 acres of the parcel. This community has sugar maple, white ash, American beech, and yellow birch in the canopy. Characteristic herbs on the site are club mosses, wood ferns, early yellow violet, and wild oats. The community is variable at the WMA, due to site conditions and land use history. Rich northern hardwood forest is found where soils have a higher pH, more water, and mineral enrichment. Red oak, white ash, sugar maple, and basswood are the most common trees. Many herbs characteristic of “rich” sites were found, including blue cohosh, wild ginger, herb Robert, blue-stemmed goldenrod, and plantain-leaved sedge. On drier sites, red oak-northern hardwood forest was found. This oak is a prominent part

of the canopy in a small area, and hophornbeam is present with the other hardwoods. Herbs identified include wild licorice, blue-stemmed goldenrod, and white whorled aster. Hemlock forest and hemlock-northern hardwood forest were also mapped. These communities are distinguished primarily by the degree to which eastern hemlock shares the tree canopy with hardwoods. Very few herbs are present in the deep shade of continuous hemlock canopy; in hemlock-hardwood forests at the WMA, herbs include partridge berry, beech drops, and pipsissewa. The forests on this parcel are habitat for many species of wildlife.

Two wetland communities were identified. Five seeps were found where groundwater reaches the surface and creates saturated, mucky soils. Tree cover is low; herbs are numerous and include golden saxifrage, marsh bedstraw, spotted touch-me-not, sedges, and a variety of ferns. There is a beaver wetland along Cady Brook. Vegetation is variable here because the beavers regularly create new impoundments and abandon older ones. Both wetland communities function as habitat for wildlife at Densmore Hill WMA.

No rare, threatened, or endangered plants or animals were found in the inventory. Exotic or non-native plants are abundant, and some are a threat to natural resources at the WMA. A list of the scientific and common names of plants named in the text is found on page 67.

Bear – The WMA is used occasionally by bears that are foraging or wandering. Bears are not known to reproduce in this area. Bears feeding here would concentrate on fruit from scattered oak, cherry and apple trees, wetlands, and areas of jack-in-the-pulpit and wild leeks in the central portion of the parcel. Some bear sign was seen at the time of the field inventory in 2000.

Deer – Deer are found on the parcel but because the majority of the forest is older, it is not ideal habitat. Timber harvesting is recommended to create more young growth in appropriate areas. The release of apple trees from competing vegetation will improve habitat for all game species including deer. A stand of hemlock, stand 3 on the west side, provides deer cover in moderate winters. The main gated access road passes through the bottom of this area.

Turkey – This WMA provides excellent habitat for turkey which prefers mature hardwood stands of mast-producing trees such as beech, oak, hickory, cherry, hophornbeam, sugar maple, and white ash. These species: sugar maple, white ash, hophornbeam, and red oak comprise approximately 65% of the trees in the main canopy. Sugar maple, white ash, and beech make up the majority of this mast component. Black cherry and red oak are present in smaller numbers. Hophornbeam is relatively common particularly in drier soils. Ferns and sedges, other winter food sources, are common along the wetlands and streams.

[Natural Communities Map]

Grouse (Partridge) – This WMA currently only provides fair habitat for grouse, a species which is 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. Most aspen on this parcel are mature to overmature. White birch makes up 19% of the main crown canopy though most are in decline due to their advance age for the species. Grouse habitat components present on this WMA consist of the following:

- Several aspen clones large enough to regenerate.
- Seven acres of hardwood regeneration (1984) in three patches.
- Two areas stocked with healthy apple trees. Numerous, apple trees scattered throughout the parcel, but generally suppressed.
- Red oak and hophornbeam stands.
- Coniferous cover for roosting, particularly in winter.

Wetland and Water Features – Approximately one acre of open water and beaver wetland and three acres of seeps provide breeding habitat for birds and amphibians. Year round and ephemeral streams flow 1900 feet across the property providing habitat for a number of species. The larger wetland on the west side along Morley Road is utilized by furbearers including beaver and otter and by ‘dabbling ducks’ such as mallards, blacks, and wood ducks. Ample food for beavers exists in the young growth along the eastern side of the wetland though with time this food source may be depleted.

Amphibians and Reptiles – There has not been a formal study of herpetological species conducted on this property. There is no evidence that any rare, threatened, or endangered amphibian or reptile species are found on the WMA.

Forest Interior Birds – A *Forest Breeding Bird* inventory was conducted in 2003 for the purpose of documenting forest interior breeding bird species. Point counts were conducted in 15 different areas in four different forest types. A total of 36 species were documented. Birds documented were fairly typical of hardwood and mixed forest in the Southern Vermont Piedmont bio-physical region. The most diverse population was found in the Northern Hardwood natural community type. Ovenbirds and red-eyed vireos were the most numerous species documented. No rare or endangered bird species were documented. Waterfowl, raptors, and owls were not surveyed.

[Wildlife Resources Map]

Other Quality of Habitat Concerns

Non-native Species – Invasive exotic species can pose a threat to biodiversity and natural community health by displacing native plants and animals with large numbers of a few aggressive and dominant non-native species.

No exotic species of plants or animals are known to be causing significant impacts on the WMA at this time. However, barberry, buckthorn, and, in particular, honeysuckle are present on the property and may spread within the current planning period.

Several exotic woody plant species such as glossy buckthorn and honeysuckle are invasive elsewhere in Windham and Windsor Counties and have outcompeted native vegetation in the forest understory in unmanaged and managed forests. Management practices should be implemented so as to limit the spread of these plants.

Core Forest – Densmore Hill WMA is located within a rural region somewhat fragmented by residential development and agriculture. Core forest analysis identifies the local landscape as moderately to highly fragmented. Aerial photos, GIS maps, and local tax maps demonstrate that the landscape surrounding the WMA is comprised of moderately-sized rural parcels of forests, fields, and homesteads. Parcel sizes are typically from 25 to 200 acres in size and forests dominate. Forest management activities in the region are common. In 2005 10,944 acres in Hartland and 14,151 acres in Woodstock were enrolled in the Forestry and Agricultural programs of the Current Use program. Most of the Current Use acreage is forestland, which reflects the land use in the surrounding landscape.

Wildlife Movement Corridors – No regionally significant corridors are found in this area. However, the WMA sits at the center of seven permanently conserved parcels and a number of parcels in the Current Use program. This offers a potentially significant local landscape for wildlife habitat and wildlife movement. If several additional parcels could be conserved, a fairly large area of forest for this region would be linked. The following map of conserved lands demonstrates the landscape and the gaps of unconserved lands within it.

[Map of Conserved Parcels around WMA]

B. Historic Resources

- 1) **Pre-Contact Assessment** – No potential pre-historic sites were identified during the “Archaeological Pre-Contact Site Sensitivity Analysis”, conducted by the Consulting Archaeology Program of the University of Vermont. There is little likelihood that pre-historic sites exist on the WMA due to a lack of flat land, major water features or historic travel routes. Field review by staff confirms the site conditions that resulted in a low probability of settlement by Native Americans in this area.
- 2) **European Settlement Period and Recent History**– This information was gathered from deeds at the Hartland Town Clerk’s office, Beers Atlas, and state lands files.

The first European to settle on some of the land now known as Densmore Hill WMA appears to have been Isaac Cobb who purchased 29 acres in 1816. He added 88 acres through two additional purchases in 1832 and 1834. Isaac Cobb died in 1843. The ‘Cobb Place’ then passed through Cobb’s will to Abigail Weed and others. In 1849 the property was sold again to Abigail Mackenzie where it remained until the heirs sold it in 1900 to Daniel and Frank Cady.

Another person known to have settled on the WMA lands was Sullivan Cady who purchased 140 acres from Alvin Dutton in 1845. This property then passed onto Daniel and Frank Cady through Probate Court in 1878. The two Cadys went on to buy the Cobb place and also the so-called Kendall Farm. It appears at least one of the Cadys lived on the property until 1936 when the estate of Frank Cady sold the property. It is likely that this was also the approximate date when agricultural activities ceased. The next owner, Merton Lewis, died four years later at which time his widow sold it to A. Robinson McEwen in 1940.

The McEwens built a new house near the Cady cellar hole. This house burned in 1957, and the McEwens were both killed in the fire. The property went to three heirs through Probate Court and was eventually sold to William and Elizabeth Peabody who, in turn, sold it to The Nature Conservancy in 1976. The Nature Conservancy transferred the title to the Vermont Department of Fish & Wildlife in 1977.

Historical remains of the homesteads here are better than average with intact walls and foundations and at least one dug well. A number of exotic plants are associated with these former homesteads including former apple orchards.

The old road adjacent to Cady Brook was referred to as the County Road and originally was a stage road connecting Windsor to Woodstock. This is now a legal trail and is currently gated at both ends by the Town of Hartland. Vandalism has been an ongoing occurrence with these gates. This road is reported to have been repaired in 2002 for equestrian activities connected with the Pan American games, though today it is eroded and infrequently maintained.

Some stonewalls on this property match the existing property lines. However, in other places they appear to be interior walls associated with past farming and grazing. There are an estimated four miles of stonewalls on the WMA.

[Historic Resources Map]

C. Recreational Assessment

The recreational use and setting can be characterized as “semi-developed natural” with an easement restricting motorized use. Use tends to be low-impact and dispersed with limited interaction with others. The recreational setting is a predominately natural appearing environment and is managed with minimum on site restrictions. Motorized use is not permitted.

There are currently no formal parking areas at the WMA. However, there is room for limited parking adjacent to the kiosk. This pull-off is scheduled for maintenance in 2006/2007 to remove hazard trees and re-gravel.

The main access road off Morley Road provides access for foot travel into the interior of the parcel and is used for horseback riding, hunting, snowshoeing, cross-country skiing, and bird watching. The beaver pond is occasionally used for trapping and bait fishing. Horseback riding is typically not allowed on WMAs but an exception was made on this parcel for use of the main access road to facilitate the acceptance of the initial transfer from the Nature Conservancy to the Agency of Natural Resources.

Old County Road does not provide decent access to the parcel due to erosion from runoff, the steep slopes above the road and a stream running along the road. Local civic groups have done trail work in the past on the old County Road and installed gates but the road remains in poor condition. As it is a town road, the State will not repair or maintain it. The top (west) portion of this road could see flooding by beavers in the near future.

The Woodstock area is a prominent region for recreational horse activities. The Green Mountain Horse Association has scheduled events throughout the summer and fall. Morley Road and the Old County Road are both used almost daily by horseback riders through the summer and fall months.

Illegal uses, such as all-terrain vehicle travel and trash dumping, are uncommon on the WMA.

The parcel deed restricts snowmobile activities on the WMA to the Old County Road. A very well used snowmobile trail crosses Morley Road north of The WMA. Periodically, ANR is approached by the local snowmobile club to grant permission for a new snowmobile trail on the WMA. The Nature Conservancy has determined that the former owners’ intent was that the parcel be free of all motorized recreation into perpetuity, including ATVs, snowmobiles, and dirt bikes. They are not willing to amend the deed to allow a new snowmobile trail. In addition, due to terrain limitations, there is no route for snowmobiles through the parcel that would not impact the deer wintering area.

D. Timber Resource Assessment

History of Vegetation and Habitat Management

Densmore Hill WMA has a long history of farm and forest management as evidenced by stonewalls, cellar holes, woods roads, orchards, planted stands of Norway spruce, and log landing sites. As is common for this area, forests have reclaimed agricultural land on the entire parcel and, due to excellent soils, trees are well stocked throughout. Northern Hardwood forest in the young pole to mature sawtimber class is dominant. Woody vegetation in the 1 to 20 year old age class is limited.

In 1977 following State acquisition, a truck road was constructed to gain access to the parcel because access was limited by a steep face along the road frontage with the town road. This road was built for log trucks of that time, which were shorter than those used today. Seven acres of patch clearcuts were completed in a high quality timber stand to create young growth for game species, primarily grouse and deer. These clearcuts resulted in regeneration of excellent stands of diverse young hardwood. A small vehicle pull-off was constructed at the bottom of the access road and a gate installed to prevent damage to the access road.

Since the 1980s, timber sales were not completed due to a lack of markets for the type of wood that was scheduled for harvest and the incompatibility of the access road with modern log trucks. In 2004 a grant from The Ruffed Grouse Society allowed for reconstruction of the road to accommodate timber harvests. Staff cleared the road of brush and a contractor was hired to cut and fill sharp corners to accommodate tractor trailers. The road reconstruction, improved markets for low-grade timber, and increased size of the trees allowed for a resumption of management. In 2005 a timber sale of 36 acres comprised of patch clearcuts and thinning was marked and sold for cutting in 2006.

Current Status of Resources and Dominant Forest Types

With generally excellent soils, forest stands tend to be fully to overstocked with high quality trees. Portions are fairly steep and in one area too steep to harvest trees. A lack of thinning or natural dieback has led to high densities that are limiting growth and regeneration. Dominant species include sugar maple, white ash, paper birch, white pine, and aspen. Less common but important wildlife species include red oak, hemlock, basswood, and butternut. In areas where soils are droughty (ridge tops and south and west-facing slopes), hophornbeam and beech are common. Timber quality is excellent on the WMA. In mature stands there are typically 3,000-4,000 board feet per acre of hardwood for a total volume of approximately half a million board feet. Regeneration is variable with beech common on drier sites and white ash and sugar maple on more moist or fertile sites. In all cases, regeneration is generally suppressed by the dense overstory. Forest health is generally good though most butternut are dying due to butternut canker, a common and lethal disease affecting butternut throughout its range.

DENSMORE HILL WILDLIFE MANAGEMENT AREA
STAND COMPOSITION FOR 252 ACRES NORTHERN HARDWOOD

Species	Percent
Sugar Maple	39.4
White Birch	13.5
Beech	11.6
White Ash	10.92
Hemlock	6.0
Yellow Birch	5.1
White Pine	4.1
Hophornbeam	3.3
Aspen	2.1
Other Hardwood	2.6

Forest Roads

Access is excellent, and a well-established interior road network exists along with several excellent log landing sites. A plan to extend the truck road through to the east side of the property was not completed. However, this should not limit management on this relatively small parcel. In several sections, existing woods roads pass through historic homestead sites.

Product forest soils, good access, healthy trees, and high volumes should enable successful habitat and vegetation management.

Soil Productivity Guidelines

Forest site classes are used in this plan to express potential for forest productivity and for vegetative management (Figure 12). Forest site classes were developed to reflect the relative degree to which trees grow on a particular soil type. Site classification for Densmore Hill is based on the Windsor 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.

The relative values can be used for broad planning purposes. However, on-site investigations are recommended to assess variations in site conditions and slope variations especially in the E slope which range from 35% to 60%. A thru E subscripts represent percent slope and are defined as:

A	less than 3%
B	3 to 8%
C	8 to 15%
D	15 to 35%
E	35 to 60%

As a general rule, commercial harvesting operations, as known in the Northeast, can easily be accomplished on slopes up to 35%. Additional care and planning are required on slopes between 35% and 50%. Slopes of 60% and over are often considered inoperable.

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 harvest intervals on the WMA.

BROAD FOREST TYPE ENTRY INTERVAL IN YEARS		
Forest Site Class	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.

[Soils Productivity Map]

E. Legal Constraints

The Nature Conservancy of Vermont (TNC) deeded the property to the State of Vermont in 1977. Regarding snowmachine travel, the deed states:

“...the use of snowmachines on the granted premises shall be restricted to an existing trail which crosses the granted premises starting from a point on Town Highway #48, said point situated 960 feet more or less, northerly along said highway from the point where said highway crosses the southerly boundary of the granted premises, and extending southeasterly through the granted premises to a point of exit.”

Recent inquiries to allow a snowmobile trail through The WMA solicited the following response from TNC:

“...The original donor intent at Densmore Hill WMA was to restrict snowmachine travel to a clearly defined corridor. We must uphold any use restrictions that we place upon a property whether it is through deed restrictions or conservation easements.

The Nature Conservancy of Vermont will not request that the State of Vermont Fish & Wildlife Department amend the deed of their Densmore Hill WMA or rewrite their current management plan in order to allow for the creation of a new snowmobile travel corridor through the property. We do not support such an amendment to the deed or management plan...”

F. Water Resources Assessment

Densmore Hill WMA is in the headwater source of Cady Brook which is a small high gradient stream aquatic community with a drainage area of approximately one square mile at the confluence of the two small drainages within the WMA.

There has been no sampling of fisheries found within Cady Brook and the beaver pond along Morley Road. Fisheries staff believe the beaver pond is too warm in summer to support brook trout and too shallow in winter to support warmwater game fish such as bass. Fisheries are likely to be temperature tolerant nongame species such as creek chub, golden shiner, common shiner, and long nose dace. Cady Brook is believed to support a small population of wild brook trout.

G. Deer Browsing Assessment

Forest Browsing Site Condition – A browse assessment was conducted during February of 2006 using the rating system “*Browsing Site Conditions for Managed Northern Hardwoods*” that was designed cooperatively by biologists and foresters with the Woodland Owners Association, the Vermont Department of Forests, Parks and Recreation, and the Vermont Fish & Wildlife Department.

The most common tall woody species of saplings encountered were beech. Very few were browsed and over large areas no browsing was noted on this species. White pine saplings were not numerous but where found were mostly unbrowsed although a few branches and terminals had been eaten. The more preferred browse species of hemlock, red oak, and white ash were almost entirely absent as tall woody saplings although they are a component of the overstory and were recorded as seedlings in the 2002 Forex inventory for this WMA. Sugar maple saplings were not as common as would be expected in a healthy northern hardwood forest and, when encountered, showed signs of browsing and appeared to have their heights impaired relative to other unpalatable species. All browsing appeared to have been done by deer as there was no sign noted of either moose or snowshoe hare.

Short woody species were limited primarily to beech and other unpalatable species. Some *Rubus* sp. occurred in the old patch cuts but was of low density. All *Rubus* stems showed signs of browsing.

This WMA appears to have had intensive (heavy) browsing by deer within the past ten years as the unpalatable plant species show an increase in density while others occur in poor form in understory stems more than one foot in height. This is interesting as very little fresh and recent sign of deer was encountered and the softwood cover on the WMA was not being used as a wintering area. Very little browse appears to be available and subsequently there is currently little use by deer. The deer utilizing the area, although below herd objective for the past five to six years, are having an impact on forest succession by maintaining the cover in an overbrowsed condition. Deer numbers were probably too high for forest health during the 1990s and the forest was overbrowsed at that time. The commercial timber harvest and patch cuts scheduled for the WMA should improve conditions for the deer as well as for overall forest health.

V. 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 the WMA is based on a thorough understanding of the resources identified and the application of the over-arching lands management standards presented in the introduction section of the plan. The resources include natural communities, plants, and wildlife as well as habitat, recreation, historic, timber, and water resources. The 11 lands management standards or principles include enhancing and maintaining wildlife habitat, biodiversity, appropriate recreational uses and involving the public, as well as implanting 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 are 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.

[Land Use Classification Map]

Management Objectives for the WMA

- 1) Create age class and habitat diversity within the parcel by utilizing two different styles of management, even and uneven aged.
 - a. Focus even-aged management on the western portion of the parcel where early successional species are more common to provide and maintain early successional habitat for grouse and deer. Provide up to 10% of the parcel in early successional habitat this planning period.
 - b. Focus all-aged management on the eastern side of the parcel where northern hardwood species are more common. Where appropriate, occasional patch clearcuts of up to three acres will be conducted in this area to meet early successional goals.
- 2) Protect and enhance important wildlife habitats and features.
 - a. Promote the growth of mast-producing trees, particularly in the enriched stand, hophornbeam areas, and apple orchards.
 - b. Manage riparian areas and borders 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 water bodies. Augment district guidelines in the enriched cove by increasing buffer width to incorporate steep, erodable, and potentially unstable banks above the stream. Manage travel corridors between seeps to maintain or improve conditions for amphibians.
 - c. Retain dense hemlock stands for deer winter cover.
 - d. Create additional early successional habitat adjacent to the wetland to generate an additional food supply for beaver.
 - e. Retain large, old trees for dens, snags, and dead and down material.
 - f. Minimize the spread of exotic shrub species through appropriate management activities.
 - g. Convert log landings into wildlife openings through seeding and annual mowing.
- 3) Develop and improve appropriate non-motorized recreation opportunities for wildlife-based activities including hunting, fishing, trapping, and wildlife viewing while maintaining and protecting infrastructure and historic sites.
 - a. Facilitate use of access roads by the public that are compatible with wildlife habitat and conservation by upgrading the access road to accommodate management and providing foot access into the parcel for users. Any upgrades should avoid sensitive sites, such as cultural and historic districts, and wetlands. Limit road construction into the west side of the parcel to limit illegal use such as ATVs and discourage the spread of exotic plants and animals.

- b. Maintain main access road with annual late summer mowing and ditching, graveling and grading as needed.
- c. Improve safety and visibility of public access.
- d. Re-route existing harvest network, where needed, to protect historic sites. Follow agency guidelines closely in the two historic areas to protect historic resources.

A. **Highly Sensitive Management**

There are no areas classified as Highly Sensitive.

B. **Special Management** (59 acres)

- 2.0) **Steep Slopes: 32 acres** – A portion of the WMA on the southern end is excessively steep and is likely inoperable with current harvesting systems. The forest cover is primarily white birch, aspen, and hardhack with an understory composed primarily of hardhack and beech seedlings and saplings. Given the steep slope, the potential for erosion and the presence of Cady Brook at the base of the slope, no harvest activity is planned for this area.

Densmore Hill Important Wildlife Habitats

- 2.2a) **Orchard: 5 acres** – Small groups of abandoned or wild apple trees can be found in two locations – one adjacent to the old Sullivan-Cady homestead, which has been treated in recent years, and one at the far northeast corner of the WMA where trees are few in number and in decline, but could be restored to health and provide an excellent wildlife food source. One of the primary uses of the WMA, hunting, will benefit from restoring production of wild apple trees as well as nongame species.

Management Actions:

- Apple trees in both areas will continue to be released from overstory competition by felling trees overtopping or growing up through the crowns of the apple trees. Given the proximity to a historic site (2.2e), competing trees will need to be felled away from historic structures. Stems will be protected from beaver feeding by the installation of wire fence protectors.
- 2.2b) **Deer Wintering Area: 5 acres** – A small stand of hemlock is found on a west-facing slope above Morley Road. The stand is primarily hemlock on shallow soils with other species such as oak, beech, and sugar maple in low numbers. Though small in acreage, it is an important area of coniferous cover on this parcel which is primarily deciduous.

The main forest access road passes along the bottom of the stand which could have some impact to deer wintering use. However, due to easement restrictions, requests to use this road as a snowmachine trail in winter have been denied mitigating the potential disruption to wintering deer.

While management to improve vigor of hemlock is often recommended, on this site, where hemlock trees are shallow rooted and not resilient to stress, cutting is not recommended as it could easily lead to dieback and/or blowdown of remaining hemlock.

Management Actions:

- Limit winter use for recreation to passive forms such as snowshoeing/skiing.
- Per deed and objective, snowmobiling is not allowed in the deer wintering area.
- New hiking trails or access roads through the deer wintering area will not be allowed. Temporary skid trails will be allowed.

- 2.2c) Wetlands: 4 acres – An active beaver wetland is located along Morley Road. This is utilized by a host of furbearers, birds, and amphibians. For now, ample food for beavers exists in the young growth along the eastern side of the wetland.

For a time, this wetland should be self-regulating through a cycle of beaver feeding and stump sprouting. However, with an increase in non-native honeysuckle outcompeting the hardwood regeneration this pattern could be disrupted.

It is likely that trees in the adjacent historic site will be felled by beavers, and it is possible that parts of that site will be temporarily flooded. There is no practical way to prevent this. Beaver activity may eventually affect the Class IV road known as “Old County Road” or Cady Brook Road as well. Apple trees near the wetland will likely need to be protected from beavers.

There is an abandoned chain link fence within and around the wetland that should be removed where feasible. It has been a source of complaints from neighbors who find it unsightly. In addition, it could pose a safety risk to people accessing the wetlands.

Management Actions:

- Maintain baffle in dam to protect Morley Road.
- Remove galvanized fence for aesthetic and safety reasons.
- Protect apple tree stems with fencing.
- Install a beaver protection device in culvert under Old County Road.
- Minimize growth and fruit production of invasive exotic plants through mechanical and chemical control.

- 2.2d) Seeps (Wetland Habitats): 3 acres

A series of five seeps totaling 3 acres are located in the central valley of the WMA. The quality of several seeps is high while several are quite close to the truck road, and 1987 patch cuts resulting in a lower quality rating. A description of the seep and seep vegetation can be found in the ecological assessment (Appendix I). These seeps are important locally due to the prevalence of dry ground in the area.

The amphibian and reptile species on The WMA will be best conserved through the dual approach of conserving wetlands and seeps and managing buffers, as well as maintaining forested corridors that provide for movement of amphibians among existing breeding sites.

Management Actions:

- Seeps will be protected by maintaining shade and undisturbed soil within 100 feet of seeps and within corridors between seeps wherever feasible.

HISTORICAL DISTRICT

2.2e) Historical Homestead Site: 10 acres – Cobb Place and Sullivan – Cady Place

There are two historical areas containing cellar holes, stonewalls, and other signs of previous homesteads on the WMA. Both are exceptional examples with no evidence of disturbance to the historical features. The Sullivan-Cady site is believed to be the source of several exotic invasive shrubs on the property. There is a potential conflict between maintaining historic plants at a historic site and negative impacts to local habitat and ecology due to their spread from the homestead sites.

Management Actions:

- Protect from damage by adhering to Agency protocols for protecting archeological and cultural sites.
- The use of metal detectors and removal of stone or artifacts is prohibited by state law.
- Trails or woods roads will not be constructed within the site unless there are no alternatives. If they are necessary, they will be constructed to minimize disturbance and the proportion of the site impacted.
- Tree removal will be conducted only to protect the site, reduce hazards to the public, release apple trees for wildlife, and to control the spread of exotic plants.
- Continue to provide opportunities for diverse non-motorized recreational pursuits that are compatible with the resources. This includes hunting, fishing, trapping, cross-country skiing, hiking and snowshoeing.

C. General Forest Management Area (193 acres)

- 3.0a) The majority of this 164 acre area is comprised of hardwood stands of medium ages. Sugar maple trees are the most common. Sizes range from small diameter to large diameter trees depending on age, stand history, and soil productivity. The largest trees are scattered, declining sugar maple which were likely sugarbush trees in the 1800s. Large mast trees such as oak, ash, and hardhack are less common but retention of these species will be important to wildlife objectives. Small stands of white pine and Norway spruce are also present but do not provide winter cover for deer. A small area of large overmature hemlock is present on steep slopes in stand 10 near Cady Brook.

Tree growth and stocking varies by site. Dense stands of vigorous trees are found on the better soils. On shallow drier ground on ridge tops, trees are often less numerous, shorter and less vigorous.

Stands that were more recently pasture are where aspen, white birch, and white pine are typically found. These areas offer the best opportunity for even-aged management.

Because openings are an opportunity for invasive exotic shrub establishment, continue monitoring and control of exotic plant species.

Stands to the west with northern hardwood composition are well suited to uneven-aged management due to fertile soils, a diversity of tree sizes and existing hardwood regeneration.

Three previous patch clearcuts are found within the central portion of the parcel. Completed approximately 20 years ago, they were very successful. Today, they have dense stocking of hardwood saplings. Common species are sugar maple, ash, aspen, white birch, black cherry, pin cherry, and yellow birch. Occasional oak are present as well. They are a focus of activity by certain wildlife species such as deer, turkey, grouse, fox, coyote, and various rodents.

Mature aspen trees often grow in clumps of trees connected by root systems and originating from common rootstocks. Because the trees are genetically identical, they are called 'clones' or 'clonal'. Scattered throughout this area are a number of small pockets of mature to overmature aspen clones. Not all have been located or mapped at present. Aspen trees typically have a life span of 60-80 years. These trees are beyond that age as evidenced by decay in the stems and declining crowns. These clones are occasionally located within protection zones for streams and seeps, wetlands, historical sites, and within excessively steep slopes.

Management Actions:

- Manage the northern hardwoods east of the central drainage emphasizing an unevenaged silvicultural system to maintain and improve tree health and stand structure. Maintain a continuous canopy cover and a sustainable flow of timber products. Stands will be treated on a 15-year cutting cycle.
- Even-aged management will be used in early successional stands (aspen-white birch) west of the central drainage to maintain the vegetative diversity in the unit and to provide habitat for species requiring openings, edge, and young growth. Patches of aspen will be clearcut to generate dense aspen sprouts utilized by wildlife including deer and grouse.
- Manage white pine and Norway spruce inclusions using an evenaged silvicultural system. Thinnings should be done every 10 to 15 years to maintain growth rates and establish hardwood regeneration. Establish white pine regeneration amongst hardwood saplings for forest and habitat diversity. Retain scattered mature white pine to serve as future snags and as a seed source.

- Aspen clones within protection areas will not be harvested. This will avoid risk of damage to protected areas and provide some mature aspen trees for the short term.
 - Aspen trees within a short distance from the beaver wetland will be left as a food source for beavers.
 - Remove honeysuckle shrubs to limit seed source adjacent to scheduled harvest areas. Treat cut stumps with herbicides registered for use in wetlands.
 - Monitor early successional cuts for successful regeneration and invasive exotic shrubs. Control exotic shrubs as necessary.
 - Improve the growth and productivity of mast-producing trees as a wildlife food source.
 - Maintain den and snag trees throughout the unit for use by cavity-nesting birds and mammals and as a future source of large material on the forest floor.
 - Protect historic and cultural features from damage due to logging or road and trail building. Stonewalls, cellar holes, and other cultural artifacts in these areas will be protected according to ANR guidelines for protection of historic and cultural sites.
 - Protect water quality and aquatic ecosystems from degradation during logging and road or trail building by following state and district guidelines to protect water quality and manage riparian habitat.
 - Continue to provide opportunities for diverse non-motorized recreational pursuits that are compatible with the resources. This includes hunting, fishing, trapping, cross-country skiing, hiking, snowshoeing, and horseback riding.
 - Maintain the existing truck road system. Continue to gate the access road to control vehicle access and protect the roadbed.
 - Improve public safety and utility at the kiosk site by re-graveling and shaping the existing parking area and cutting dead trees and brush.
 - A small area of pole-sized sugar maple will be treated with pre-commercial TSI to release sugar maple for growth and food production.
- 3.0b) A 29 acre area of ‘cove forest’ (enriched northern hardwood) growing on rich, moist soils is found on the slopes above a small brook and adjacent to seeps in the center of the parcel. Banks above the stream, while productive, are highly unstable and erodable. Tree diversity here is greater than in other areas as is productivity and site sensitivity. Tree species include sugar maple, basswood, white ash, butternut, red oak, American beech, and yellow birch. Associated diversity of herbaceous plants and amphibians is expected to be higher here as

well. Wild turkeys use the area heavily to feed on insects and seeds. They prefer the relatively open understory here for foraging.

Management Actions:

- Cutting and machinery will be restricted from the steep slopes above the stream to a distance of 200 feet or 50 feet beyond the top of the banks, whichever is greater.
- Single tree selection with a higher residual density of trees will be practiced outside of the buffer with a goal of growing high value veneer trees with tight, even growth rings for specialty markets. Patch clearcuts will not occur in this area. Utilization of harvested trees will be intentionally limited to sawlogs to retain a high amount of coarse woody debris and organic matter.
- Turkeys prefer foraging where they have unlimited vision of their surroundings. Habitat for wild turkeys will be enhanced by limiting the amount of woody understory that is established. Higher densities of overstory trees and less development of midstory trees will also encourage success of the rich herbaceous layer found here which also benefits wild turkeys.
- Amphibian habitat will be enhanced by encouraging the development of coarse woody debris by leaving behind the lower grade portions (non-sawlogs) of harvested trees and by girdling rather than harvesting cull trees.
- Species of trees found in low numbers, such as red oak and butternut, will be retained as a source of wildlife mast (food).
- Seeps and associated riparian areas will be buffered according to district buffer considerations.

Water Resources: The management of Densmore Hill will, at minimum, maintain the quality of all the surface waters associated with the land. It is understood that agricultural and silvicultural activities that follow *Acceptable Agricultural Practices and Acceptable Management Practices* are presumed to comply with Vermont's Water Quality Standards.

Managers of ANR land holdings will cooperate with the ANR's Department of Environmental Conservation, Water Quality Division with their watershed planning initiatives for the Connecticut River and others as they are undertaken.

The watershed basin planning effort includes the determination of the water management type of all waters located with the basin(s). Through this process, the assignment water classification and water management type for all waters will take into consideration the existing water quality, the desired water quality, and whether or not the desired quality is attainable.

The goal for the water management type of waters below 2,500 feet that flow through ANR lands is to maintain a high quality ranking (potential B1). B1 waters are managed to maintain an almost natural condition showing minimal changes from reference conditions for aquatic macroinvertebrates and fish assemblages. Possible exceptions to B1 typing including the following:

- Where water level is fluctuated for ski area water withdrawal; and
- Situations where B1 water quality is otherwise unattainable.

IMPLEMENTATION SCHEDULE

Year	Actions/Purpose	Comments	Acreage	Responsible Parties	Outcomes
Annual	Monitoring for insect & disease*			Resource Protection	
Every 1 to 3 years	Mow roadsides of truck road, improve surface as needed			State Lands Stewardship Forester	Allow better access for non-commercial and commercial management activities.
Every 15 years	Re-blaze and paint boundaries	Last done in 2001		State Lands Forester I	Identify and maintain property lines. Prevent timber trespass.
2006-2007	Cut and treat honeysuckle on hillside above beaver pond	To limit spread of invasive plants into patch cuts. WHIP funding allocated in 06	6 +/-	State Lands Forester I	Control of exotic invasive plant.
Sale #1 – 2006 Sale #3 – 2021 (2 nd entry)	Regenerate aspen clones with patch clearcutting, release red oak and black cherry, white pine, hemlock, healthy beech, and other northern hardwood. Salvage white birch	Stands #1, 2 & 6	100+/-	State Lands Stewardship Forester Fish and Wildlife Biologist	Regeneration for grouse habitat, retain softwood cover and healthy mast producers. Buffer seeps and wetlands.
2007 2011 (re-treat)	Fencing of apple trees near beaver pond and apple tree release Apple tree release	Sullivan Cady Block thinned in 2004. Treat northwest section All areas	2 4	State Lands Forester I Fish and Wildlife Biologist	Restore apple trees to production and protect from beaver feeding.
2007	Remove galvanized fencing along and in beaver pond		n/a	State Lands Stewardship Forester	Improved public safety and aesthetics.
2007	Crop tree release of mast trees (red oak, black cherry, white ash)	Apply for WHIP funds Stand 7	7	State Lands Stewardship Forester	Improved wildlife habitat.
2008	Crop tree release in approximately 5 acres of young sugar maple	If possible, will be sold as firewood in 2006 timber sale Stand 5	5	State Lands Stewardship Forester	Release sugar maple/white ash for improved growth and mast production.
Sale #2 – 2011 Sale #4 – 2026 (2 nd entry)	Single tree and group selection in pine-hardwood. Favor best-formed trees. Release oak and apple trees. Occasional patch cuts up to 3 acres where early successional species are present	Stands #2 & #4 Stands #2, 4, 5 & 6	100+/-	State Lands Stewardship Forester Fish and Wildlife Biologist	

[Wildlife Habitat Management Map]

VI. MONITORING AND EVALUATION

During the life of the Long-Range Management Plan for Densmore Hill WMA, periodic monitoring will be conducted to insure that the resources are protected from fire, insect and disease, other natural disturbances, encroachments, or unforeseen problems that may occur within the wildlife management area. 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.

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 Densmore Hill WMA 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 Densmore Hill WMA 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**

The two historic districts on the property will be periodically evaluated by the district stewardship team to ensure that these sites remain protected and unharmed.

VII. APPENDIX

- A. Densmore Hill Topo Map
- B. Densmore Hill Orthophoto
- C. Chain of Title
- D. Public Input – Comments
- E. Authorization to Plan and Manage
- F. Summary of Some Policies and Guidelines
- G. Glossary
- H. Forest Stand Inventory Data and Forest Stand Map
- I. Ecological Assessment

APPENDIX A. Densmore More Hill Topo Map.

APPENDIX B. Densmore Hill Orthophoto.

APPENDIX C. Chain of Title

An approximate chain of title for Densmore Hill WMA

Grantee	Year	Book/Page	Grantor
S. Perkins	1816	8/22	Isaac Cobb
I. Kendall	1832	12/53	Isaac Cobb
J. Wilder	1834	12/60	Isaac Cobb
Cobb Estate	1843	15/140	Abigail G. Weed & others
Abigail G. Weed	1849	27/263	Abigail Weed
Heirs of Abigail MacKenzie	1900	35/265	Daniel & Frank Cody
<i>above represents 111 acre Cobb Place</i>			
Alvin Dutton	1845	14/290	Sullivan Cady (140 acres)
S. Cady Estate	1878	23/25	Daniel & Frank Cady
Cobb Place	1900	35/265	Daniel & Frank Cady
Kendall Farm	1900	35/265	Daniel & Frank Cady (88 acres)
Frank Cady Estate	1936		Merton Lewis
Flora Lewis (widow of Merton Lewis)	1940		A. Robinson & Francis McEwen
Richard & Dorothy Fowler		38/127	A. Robinson & Francis McEwen (64 acres)
McEwen Estate	1957	52/269-275	Margaret Finney & others
McEwen heirs		52/493-501	W. & Elizabeth Peabody
Peabody	1975		The Nature Conservancy
The Nature Conservancy	1977	53/31	State of Vermont Department of Fish & Wildlife (252 acres)

APPENDIX D. Public Input **Comments**

DENSMORE HILL WMA PUBLIC MEETING **Thursday, June 7, 2007** *Hartland Town Hall • Hartland, VT*

Comments

- Local uses – horses, biking, hiking, snowshoeing, skiing, and hunting.
- Interest in more trails or access for snowshoeing and skiing.
- Coverts? Should State cooperate with Coverts volunteers to secure additional lands around WMA? Participants felt Fish & Wildlife Department should do so.
- Yes, the State should be pursuing conservation easements on adjacent lands.
- Hartland Conservation Commission wants a map of conserved lands around WMA.
- Where do timber sale receipts go?
- This management plan leaves out old-age forest management.

APPENDIX E.

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 F.
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, Streamsidings 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, Streambanks 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, Streambanks 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 Board, 7/2/00.

Vermont Wetland Rules, Vermont Water Resources Board, 1/1/02

APPENDIX G.

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 H.

Forest Stand Information Management Unit: Densmore Hill WMA Forex Inventory Summary, 2002

Stand	Acres	MSD	BA/A* Total	Acc. BA/A**	Unacc. / BA/A**	Cull BA/A**	Tim- ber Type	Species % BA	Opera- bility
1	46	10.9	81	71	26	12	25	beech 26 sugar maple 22 hemlock 20	good
2	36	9.4	85	57	15	26	25	sugar maple 42 white ash 20	good
4	19	9.4	76	60	26	8	25	paper birch 51 sugar maple 15 white pine 11	good
5	38	7.2	83	81	25	10	25	sugar maple 76	fair
6	55	11.3	96	79	20	11	25	sugar maple 52 yellow birch/beech 30	fair
7	7	3.4	65	60	5	0	25	white ash 30 pin cherry 15 sugar maple 15	good
9	30	8.6	80	65	43	1	11	sugar maple 30 paper birch 25	non- commercial, steep
10	21	11.0	106	100	37	7	25	white ash 30 sugar maple 20	fair

* total basal area
dominant-codominant

** acceptable, unacceptable & cull, all canopy positions

Densmore Hill WMA Timber Volumes /Acre

Species	Stand								% BA
	1	2	4	5	6	7	9	10	
Eastern Hemlock	943		39	110	148		39	243	6.0
White Pine	312	478	201					48	4.1
Red Spruce	50								0.1
White Ash	105	734	164	216	253	215	273	634	10.2
American Beech	1196	183	121	163	852		429		11.6
White Birch	575	439	970	273	253	53	741	98	13.5
Yellow Birch					852	107	195	147	5.1
Red Maple	50	36					78		0.6
Sugar Maple	993	1504	283	2876	2898	161	888	438	39.4
Elm								48	0.1
Red Oak	211								0.8
Hardhack	156		39	53	253		195	147	3.3
Basswood		111							0.4
Black Cherry		72	53					48	0.6
Pin Cherry		36				23.1			0.09
Aspen		81	53				156	243	2.1
Totals	3,768	1,539	1,516	1,397	3,892	363	1,542	3,521	

[Forest Stand Map]

APPENDIX I.

ECOLOGICAL ASSESSMENT

Agency of Natural Resources land managers use the “coarse filter/fine filter” approach to conduct the ecological inventory and assessment of state lands. Widely recognized as an effective tool for inventorying and managing biological resources, 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 inventory them. Even if we could assemble such lists of 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. 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 the wintering areas, and rare plants.

The coarse filter assessment begins by describing landscape and climatic factors that characterize Densmore Hill WMA, such as bedrock geology and water resources. It then details the eight distinct natural community types documented and mapped during inventories of the state forest. This is followed by a fine filter assessment describing rare species and specialized habitat types found here. Along with other resource assessments, this ecological inventory was used to make many of the land management decisions documented in this plan.

1) Coarse Filter Assessment

Biophysical Region and Climate

Vermont can be divided into eight biophysical regions that share features of climate, topography, geology, human history, and natural communities. Densmore Hill WMA is located in the Southern Vermont Piedmont biophysical region, which encompasses the eastern margin of the state from Guilford and Vernon on the Massachusetts border as far north as Randolph, Tunbridge, and Strafford (with a narrow extension as far north as Barnet along the Connecticut River). This is an area of relatively low elevations and mild climate. Elevations average about 1000’ above sea level, with much lower elevation along the rivers, and a few spots above 2000’, such as Mount Ascutney. Annual precipitation is about 42”, a good deal more than that received by the Champlain Valley, but much drier than the upper elevations of the Green Mountains. Although many types of bedrock are found here, the majority of the biophysical region (including Densmore Hill WMA) features metamorphosed limestones. Soils are mostly derived from glacial tills, but glacial outwash silts, sands, and clays are abundant in valleys, many of them making prime agricultural soils.

Bedrock, Surficial Geology Soils

Bedrock at Densmore Hill WMA is of the Waits River formation. This formation is characterized by metamorphosed gray quartzose and micaceous crystalline limestone. Limestone is high in calcium carbonate, which weathers and breaks down easily. The addition of calcium and other positively charged ions to the soils and surface water contribute to the creation of ‘sweet’ or fertile soils. In areas with limy bedrock, groundwater seepage may greatly enrich soils and increase productivity.

At the end of the last ice age, melting glacial ice deposited a blanket of unsorted clay, silt, sand, and gravel over these rocks. This material, known as glacial till, forms the basis of nearly all the soils on the WMA. These soils are primarily of the Vershire, Dummerston, Glover, Teago, and Pomfret complexes. They are mainly sandy and silty loams, and tend to be very stony. Soil depth is usually at least 10”, and in many areas, is greater than 60”. These soils tend to be sloped, have low water tables, and be moderately well drained. The zone of nutrient-rich organic material near the surface is well developed, particularly at the base of slopes. These are generally productive forest soils. Approximately 20 acres are recognized as outstanding (designated “prime” and “statewide” by the Natural Resources Conservation Service) agricultural soils. These soils of highest productivity are found along Cady Brook and on the plateau near the height of land.

The beaver wetland along Cady Brook is the only area where soils are composed primarily of recently deposited organic material rather than glacial till. This deep, permanently saturated soil is known as Pondicherry and Wonsqueak Muck.

Soils on the WMA have a long history of human use. Much of the upper elevation areas were cleared for sheep pasturing in the 19th century. Pastures were cleared of many tons of rocks, which now form walls, sheep paddocks, and foundations in the woods. Some of the land along Cady Brook was probably tilled for row crops, or at least for small scale gardening around the homestead site.

Hydrology

Most of the waters of Densmore Hill WMA leave the parcel in the headwaters of Cady Brook, either through the main stem, which originates near the parking kiosk, or a secondary permanent stream that flows southeast out of the cove at the heart of the property. Cady Brook joins Lull Brook in Hartland, which soon ends at the Connecticut River. A small area of the parcel on the northeast side of Scott Hill sheds its water to Densmore Brook, which also flows into Lull Brook. A small area at the north end of the parcel drains north to Kedron Brook, which joins the Ottauquechee River at Woodstock Village. This water also joins the Connecticut River in Hartland.

At the headwaters of these streams are small springs and seeps. The assemblage of wetland vegetation that inhabits these important wildlife habitats is described below. The parcel features a single wetland, the series of beaver impoundments on the main stem of Cady Brook.

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. 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.

Thompson and Sorenson (2005) describe three general size categories for natural communities. Matrix communities occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. They are structured by landscape-level disturbance processes, such as periodic weather events and insect outbreaks. Northern hardwood forest is an example of a matrix community found at Densmore Hill WMA. Large patch communities typically occur at scales of 10-100 acres, and are structured by local bedrock, geological, and topographic factors. Rich northern hardwood forest is a characteristic large-patch natural community of the WMA. Small patch communities are usually less than 10 acres in size, and owe their existence to highly localized site and disturbance characteristics. Local hydrology and topography combine to produce seeps, a small patch community found here.

Eight occurrences of eight natural community types were identified and mapped at Densmore Hill WMA. A total of 15 natural community polygons and one open water polygon were mapped. Natural communities were identified through aerial photograph interpretation, systematic FOREX inventory (see timber assessment section), and field surveys. Field data were collected using a Trimble GeoExplorer II global positioning system (GPS) unit, clinometer, compass, binoculars, soil augur, Cornell pH kit, and a variety of reference manuals for identification of plants, animals, fungi, etc. Plant specimens were collected for identification in the lab. A Geographic Information System (GIS) map of natural communities was produced using ArcView software. 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 Densmore Hill WMA; instead, it should be treated as a first attempt at describing natural communities in this area. Land manager and members of the public should be aware that additional examples of small natural communities (e.g., vernal pools and seeps) probably occur on the WMA. As subsequent inventories and site visits are conducted, this map will be improved.

What follows is a description of all natural community types identified at Densmore Hill WMA. A quality rank (A through D) for each natural community occurrence is given. 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. An A-ranked occurrence is of high quality in comparison with other occurrences of its natural community in the state, while a D-ranked example is of comparatively low quality. 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. No state-significant natural communities were documented in this inventory. Detailed descriptions of Vermont's natural community types may be found in *Wetland, Woodland, Wildland: A Guide to Natural Communities of Vermont* (Thompson and Sorenson 2005). Additional information may also be found in the glossary (Appendix G).

Northern Hardwood Forest

Two polygons totaling 118 acres form a single occurrence of this common forest type on the parcel. Most of this area is found on moderately well-drained hillsides featuring rocky till soils. All of this forest was cleared for agriculture, and there is abundant sign of these activities, including stone walls and corrals. Vegetation in this community varies with aspect, stand age, land use history, and other factors. Typically, a canopy tree height is about 50', and canopy closure averages at 80-85%. Most common canopy trees are white pine, sugar maple, paper birch, and American beech. Less common in the canopy are red oak, white ash, quaking aspen, and big-tooth aspen. (For scientific names of plants, see list below). In some areas, a 35-40' subcanopy of American beech and hophornbeam is present. A moderately well-developed tall (10-20') shrub layer averages 35% cover, and features American beech, hophornbeam, red oak, and occasionally eastern hemlock. The short (3-8') shrub layer features saplings of the same trees, as well as Japanese barberry and striped maple. Characteristic herbs are club mosses, intermediate woodfern, marginal woodfern, early yellow violet, red raspberry, purple-flowering raspberry, bedstraw, Indian pipe, calico aster, blue-stemmed goldenrod, rattlesnake-plantain, Solomon's seal, wild oats, and normal sedge.

The hardwood forest around the unnamed 1,524' peak southwest of Scott Hill is dominated by large diameter sugar maples, some greater than 34" in diameter. Trees with cavities, large diameter snags, and rotting logs are more prevalent here. There is a sparse understory of sugar maple and hophornbeam saplings, and very little beech is present. The site contains more herbs characteristic of rich woods, including white baneberry and plantain-leaved sedge. It resembles an old sugar bush, and may have been managed as such.

The hardwood forest on steep facing slopes above Cady Brook has characteristics of a Dry Oak-Hickory-Hophornbeam Forest (see Thompson and Sorenson 2005), including a short tree canopy dominated by hophornbeam, more light penetration to the dry forest floor, and herbs such as Pennsylvania sedge in the understory. It is likely that in time, this stand will come to more closely resemble the typical northern hardwood forest described above.

The northern hardwood forest occurrence at Densmore Hill WMA has a "C" quality rank (Size=C; landscape condition=B/C; and current condition=B). In an ecological sense, the occurrence extends off of state land and is much larger; the quality rank would be "B" if ranking considered the privately owned portion of the occurrence.

Hemlock Forest

A five-acre Hemlock Forest was mapped near the northwest corner of the parcel. The slope is steep and faces west-northwest. Soils are rocky basal glacial tills of the Teago-Pomfret and Vershire-Dummerston complexes. A largely single-age canopy tree layer is 50-55' tall with more than 95% cover. Eastern hemlock accounts for nearly all of the canopy, although paper birch and American beech are scattered throughout the stand. Very few shrubs are present, and the forest floor is nearly absent of vegetation. Without management, the long-lived and shade tolerant hemlocks will continue to be the dominant plant in the forest, with hardwoods establishing only in treefall gaps. This forest grades into the surrounding Hemlock-Northern Hardwood Forest, where conditions are more favorable to establishment of hardwood trees. At five acres this is a relatively small Hemlock Forest. It has a "C" quality rank.

Hemlock-Northern Hardwood Forest

Eleven acres of this mixed forest type occur on the west- and northwest-facing slopes above Folding Hills Road. The rocky, well-drained soils have a sandy texture, and are derived from glacial tills. Canopy trees are 40-50' tall, with about 85% cover. Like the hemlock forest described above, this is primarily an even-aged forest. Scattered stumps are evidence of past thinning. Eastern hemlock accounts for about 25% of the forest canopy cover. American beech is the most common tree; other trees present include red spruce, white pine, red maple, paper birch, big-toothed aspen, and sugar maple. A sparse layer is occupied primarily by saplings of these tree species. Herbs are more abundant than in the adjacent hemlock forest. The most common species are club mosses, partridge berry, beech drops, common speedwell, and pipsissewa. Mosses are abundant in places. This is a small hemlock-northern hardwood forest relative to others in the area. It has a "C" quality rank.

Rich Northern Hardwood Forest

This 60-acre community accounts for some of the highest quality forest on the parcel. Two polygons of rich hardwood forest were mapped, one on steep northeast-facing slopes south of Cady Brook, the other in and around the cover in the center of the WMA. These two patches of forest are considered one ecological occurrence. Like other rich northern hardwood forests, this one features mineral rich, mesic soils, high levels of plant diversity, and tall, vigorous canopy trees. The layer of organic material in the upper soil horizon is a deep (i.e., 3-5") humus. The soil is enriched by a combination of factors, including weathering of calcium-rich bedrock outcrops, groundwater discharge, and downslope movement and accumulation of organic matter on the forest floor. The tree canopy is about 70' tall, with more than 75% cover. Most common trees are sugar maple, basswood, and white ash. Also present are yellow birch, red oak, and eastern hemlock. In places, a subcanopy of 50-60' tall trees is present; species composition of this vegetation layer is similar to that of the main canopy. The herb layer is well developed and diverse. Among the most common plants here are marginal woodfern, maidenhair fern, blue cohosh, wild ginger, white baneberry, herb robert, blue-stemmed goldenrod, white boneset, and plantain-leaved sedge. Mosses may be abundant, particularly on wet bedrock outcrops.

This community features the best site conditions for tree growth on the WMA. It includes some of the oldest, least disturbed forest. It also includes six acres of young thickets resulting from clearcutting around 1985. While these cuts created ideal habitat for many species of wildlife, they may have been negative impacts on other aspects of forest ecology. The rich northern

hardwood forest has a “C” quality rank, but would be ranked “B” without the fragmentation causing by this cutting.

Red Oak-Northern Hardwood Forest

One small (3.5 acre) area of this forest type was identified in the northwest corner of the parcel. Soils are dry, very rocky, and somewhat shallow, with bedrock outcrops common. A 3” organic horizon was observed; it is markedly drier than that sampled in the adjacent rich northern hardwood forest. Tree canopy is about 50’ tall, with less cover (no more than 70%) than the other hardwood forest types described here. Red oak is the most common tree; other species noted include sugar maple, white ash, American beech, and eastern hemlock. Hophornbeam is very common, but mostly in a subcanopy layer about 30-40’ tall. Red oak was the only tree observed in the very sparse tall (8-15’) shrub layer. Herbs observed include marginal woodfern, intermediate woodfern, wild licorice, blue-stemmed goldenrod, white whorled aster, and a sedge (probably Pennsylvania sedge). This forest has a relatively low (“C”) quality rank due to its small size.

Seep

Five seeps totaling three acres were mapped. Due to their close proximity and shared hydrology, they are considered a single ecological occurrence. These are small wetlands created by a near continuous influx of groundwater. The soils are mucky and saturated, with as much as 5” of organic material near the surface, and a gravelly silt loam below. Tree canopy cover is sparse, but some of the seeps are shaded by adjacent forest. Scattered trees in the seeps include basswood, white ash, yellow birch, slippery elm, and apple. A tall shrub layer (8-15’) is present in some of the seeps, and contains alternate-leaved dogwood, Morrow’s honeysuckle, and willow. Herbs may cover nearly 100% of the ground, particularly at the height of the growing season. Most common species include horsetail, rested fern, sensitive fern, ostrich fern, marsh fern, Christmas fern, golden saxifrage, marsh bedstraw, spotted touch-me-not, herb robert, asters, goldenrods, and sedges. Common nightshade, a weed, was present in several areas. These seeps produce green vegetation nearly all year long, and evidence of feeding by animals was observed in a late winter site visit. They may be a critical habitat feature for herbivores, especially near the end of winter.

These seeps appear to have been impacted by the timber harvest activities in the 1980s. Several are close to the truck road and patch cuts. Groundwater discharge appears to have been affected, and weeds were noted. This natural community is ranked “B/C”.

Beaver Wetland

A colony of beavers has dammed the main stem of Cady Brook along Folding Hills Road, creating a series of ponds and small wetlands. Like other beaver wetlands, this one contains a number of distinctive and transitional wetland natural community types. Because beavers come and go (e.g., wetlands are not depicted on the most recent United States Geological Survey topographic maps for the area), the wetlands associated with them are usually inventoried and described collectively under the general name “beaver wetland.” At Densmore Hill WMA, the beaver wetland most closely resembles shallow emergent marsh, shrub swamp, and cattail marsh (see Thompson and Sorenson 2005 for descriptions). Common shrubs here are red-osier dogwood, steplebush, and willows. Herbs noted include broad-leaved cattail, sensitive fern, joe-pye weed, and sedges. Several non-native weeds were observed in the wetland, including reed

canary grass and glossy buckthorn. Adjacent to the wetland is a thicket of hardwood samplings and stump sprouts resulting from the beavers' harvest of trees from that area. Beaver wetlands provide habitat for a variety of wildlife species, and while small, this one is an important contribution to the WMA in that respect.

Literature Cited

Thompson, E.H. and E.R. Sorenson. 2005. *Wetland, Woodland, Wildland. A guide to the natural communities of Vermont.* University Press of New England, Hanover, NH.

2) Fine Filter Assessment

Rare, Threatened, and Endangered Species

There are no known examples of rare, threatened, or endangered species on this parcel.

Exotic Species

Introduced plant species, some of them invasive, are established on the parcel. The most significant threat to native species and communities is posed by exotic shrubs, including glossy buckthorn, Morrow's honeysuckle, and Japanese barberry. The densest thickets of these plants are associated with the old foundation near the beaver wetland. They are also scattered elsewhere on the parcel. These shrubs have the potential to choke out native vegetation, especially after ground disturbance and opening of the forest canopy during timber harvest. For this reason, land managers should consider control measures both before and after timber sales. Another exotic plant of concern is goutweed, which was found in the kiosk parking area and along Cady Brook. This ornamental garden plant occurs in both its green- and variegated-leaf varieties at the WMA. The green variety is a noted invader of forest understories in Vermont, and can completely out-compete other vegetation. Land managers should consider eradicating goutweed during the life of this management plan. A third weed that might warrant eradication efforts is reed canary grass, found in the beaver wetland. This non-native plant can form dense clones and exclude all other wetland vegetation.

Other exotic plants found primarily in association with the old foundation are periwinkle and apple. Dandelions, burdock, and common speedwell are found in relatively undisturbed areas of the WMA, but do not seem to be causing problems for native vegetation. Many weedy plants were observed along the roads in the WMA, including mullein, ox-eye daisy, self-heal, St. John's wort, and smooth brome grass.

Plants Described in the Text

American beech	<i>Fagus grandifolia</i>	normal sedge	<i>Carex normalis</i>
apple	<i>Pyrus malus</i>	ostrich fern	<i>Matteuccia struthiopteris</i>
aster	<i>Aster</i> species	ox-eye daisy	<i>Chrysanthemum leucanthemum</i>
basswood	<i>Tilia americana</i>	paper birch	<i>Betula papyrifera</i>
bedstraw	<i>Galium</i> species	partridge berry	<i>Mitchella repens</i>
beech drops	<i>Epifagus virginiana</i>	Pennsylvania sedge	<i>Carex pensylvanica</i>
big-toothed aspen	<i>Populus grandidentata</i>	periwinkle	<i>Vinca minor</i>
blue cohosh	<i>Caulophyllum thalictroides</i>	pipsissewa	<i>Chimaphila umbellata</i>
blue-stemmed goldenrod	<i>Solidago caesia</i>	plantain-leaved sedge	<i>Carex plantaginea</i>
broad-leaved cattail	<i>Typha latifolia</i>	purple-flowering raspberry	<i>Rubus odorata</i>
burdock	<i>Arctium</i> species	quaking aspen	<i>Populus tremuloides</i>
calico aster	<i>Aster ptarmicoides</i>	red oak	<i>Quercus rubra</i>
Christmas fern	<i>Polystichum acrostichoides</i>	Red-osier dogwood	<i>Cornus stolonifera</i>
club moss	<i>Lycopodium</i> species	red raspberry	<i>Rubus idaeus</i>
common nightshade	<i>Solanum dulcamara</i>	reed canary grass	<i>Phalaris arundinacea</i>
common speedwell	<i>Veronica officinalis</i>	reed canary grass	<i>Phalaris arundinacea</i>
crested woodfern	<i>Dryopteris cristata</i>	sedge	<i>Carex</i> species
dandelion	<i>Taraxacum officinalis</i>	self-heal	<i>Prunella vulgaris</i>
rattlesnake-plantain	<i>Goodyera pubescens</i>	slippery elm	<i>Ulmus rubra</i>
early yellow violet	<i>Viola rotundifolia</i>	smooth brome	<i>Bromus inermis</i>
Eastern hemlock	<i>Tsuga canadensis</i>	Solomon's seal	<i>Polygonatum pubescens</i>
glossy buckthorn	<i>Rhamnus cathartica</i>	spotted touch-me-not	<i>Impatiens capensis</i>
golden saxifrage	<i>Chrysosplenium americanum</i>	St. John's wort	<i>Hypericum perforatum</i>
goldenrod	<i>Solidago</i> species	steplebush	<i>Spiraea tomentosa</i>
goutweed	<i>Aegopodium podagraria</i>	striped maple	<i>Acer pensylvanicum</i>
herb robert	<i>Geranium robertianum</i>	sugar maple	<i>Acer saccharum</i>
hophornbeam	<i>Ostrya virginiana</i>	white ash	<i>Fraxinus americana</i>
horsetail	<i>Equisetum</i> species	white baneberry	<i>Actaea alba</i>
Indian pipe	<i>Monotropa uniflora</i>	white boneset	<i>Eupatorium rugosum</i>
intermediate woodfern	<i>Dryopteris intermedia</i>	white pine	<i>Pinus strobus</i>
Japanese barberry	<i>Berberis thunbergii</i>	whorled aster	<i>Aster acuminatus</i>
joe-pye weed	<i>Eupatorium maculatum</i>	wild ginger	<i>Asarum canadense</i>
maidenhair fern	<i>Adiantum pedatum</i>	wild licorice	<i>Galium circaezans</i>
marginal woodfern	<i>Dryopteris marginalis</i>	wild oats	<i>Uvularia sessilifolia</i>
marsh bedstraw	<i>Galium palustre</i>	willow	<i>Salix</i> species
marsh fern	<i>Thelypteris palustris</i>	yellow birch	<i>Betula allegheniensis</i>
Morrow's honeysuckle	<i>Lonicera morrowii</i>		
mullein	<i>Verbascum thlaspi</i>		