



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

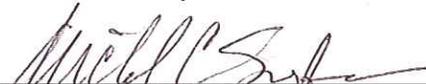


West Mountain Wildlife Management Area Long Range Management Plan



Ferdinand, Brunswick, and Maidstone, Vermont

Prepared in collaboration with the Kingdom Heritage Lands partners
The Nature Conservancy: Vermont Chapter
Vermont Housing and Conservation Board
Vermont Land Trust
U.S. Fish and Wildlife Service
Plum Creek Timber Company

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Last, but perhaps most important, we acknowledge those individuals and organizations who took the time to attend informational meetings, read the plan, and make comments about the plan and planning process.

Thank you.

Mission Statements

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."

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.

Departments

Vermont Department of Environmental Conservation

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

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

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.

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EXECUTIVE SUMMARY

West Mountain Wildlife Management Area Long-Range Management Plan Update

Project Background

Sixteen years ago, Vermont began perhaps the most ambitious conservation project in its history.

In 1998, Champion International sold 132,000 acres of land in northeastern Vermont. Through a complex partnership, these lands were divided into three parcels. The most ecologically significant areas became public lands, while the largest areas continued as private working forest:

- The State of Vermont acquired 22,000 acres for the West Mountain Wildlife Management Area (WMA).
- The US Fish and Wildlife Service acquired 26,000 acres for the Silvio O. Conte National Wildlife Refuge.
- Essex Timber Company acquired 84,000 acres for working forestry, with easements protecting certain natural resources and guaranteeing perpetual public access. This land was subsequently purchased by the Plum Creek Timber Company.

The most important part of this project has been its focus on complementary management across the three ownerships to achieve three equally important goals: Working forests, ecological protection, and public access.

Sixteen years after acquisition, calling these parcels “the former Champion lands” does little to recognize their unique and historical values for the people of Vermont. As a result, this document will refer to these lands as the Kingdom Heritage Lands.

The Planning Process

The Vermont Agency of Natural Resources (ANR) uses management plans to administer its land, and relies heavily on public involvement in planning.

The original planning process for the Kingdom Heritage Lands was unprecedented—after more than 35 public meetings, participation from the Vermont Legislature, and hundreds of written comments, ANR and its legal partners for these lands produced two guiding plans in 2002, a Long Range Management Plan for the West Mountain Wildlife Management Area and a Public Access Plan to manage the public access easement on the Private Timberlands.

In 2013 and 2014, ANR began the process to update these plans by soliciting input from user groups, local residents, and organizations. While numerous legal constraints and directives determine much of the management direction for these properties, this plan update was created by integrating this legal framework with comments from the public, the goals for these ownerships, updated scientific assessments, and a decade of management experience with these lands.

Long-Range Management Plan Update

The primary purposes of the West Mountain WMA are ecological protection and dispersed public access.

ANR's experience managing this land over the last decade has been very positive, largely, due to the thoroughness of the original management plan.

Public comment on updates to the management plan included the importance of the remote character of these lands and the public access opportunities they provide. People also expressed both desires to maintain intensive recreational uses (like snowmobiling and biking) and concerns over their effects on wildlife, desires for increased active management for game species, and a range of opinions about planned road closures in the Core Area.

This updated management plan follows the original plan closely, by

- Prescribing new wildlife habitat management activities for a variety of game and non-game species.
- Maintaining the original vision of a passively managed Core Area on the WMA to complement widespread active management on the Private Timberlands and public lands.
- Emphasizing dispersed pedestrian access across the ownership (for uses like hunting, fishing, bushwhacking, photography, and berry-picking).
- Maintaining intensive uses in designated corridors and sites, presently including:
 - Snowmobile (30 miles), equestrian (25 miles), and biking corridors (70 miles)
 - Two designated camping areas and one ADA-compliant moose viewing platform

In addition, it describes some new natural resources management strategies, including

- Management for Endangered Canada lynx and American marten.
- Prompt control of an increasing number of nonnative invasive plants.
- Replacing culverts which impair water quality, flood resilience, and fish passage.
- Adapting to impacts from a changing climate.

Finally, it describes new strategies to maintain and increase public access in the West Mountain WMA area, while also honoring the ecological vision of a roadless Core Area, including:

- Permanently maintaining all main roads on the WMA.
- Maintaining all roads used for leased camps and VAST trails during their use.
- Opening the single previously gated road on the WMA.
- Finalizing agreements with Plum Creek and another neighboring landowner to increase public access to roads around the WMA.
- Constructing a bridge over Paul Stream to increase public access to the Core Area and allow increased active management on the WMA.
- Maintaining closed roads as footpaths to increase pedestrian access to the Core Area.

Overall, this updated plan hopes to guide a second decade as successful as the first for the West Mountain WMA—providing public access and ecological protection, and ensuring public voices are heard in the process of crafting management decisions.

I. INTRODUCTION

This is an update of the original (2002) long-range management plan for the West Mountain Wildlife Management Area (West Mountain WMA), which consists of approximately 22,500 acres located in Essex County, Vermont. This parcel¹ was acquired by the State of Vermont in 1999 as part of the complex transaction to acquire a total of approximately 132,000 acres in the northeastern part of the state, formerly owned by Champion International, Inc. (Champion). Champion, and the St. Regis Paper Company before it, managed these lands for an array of forest products, with an emphasis on spruce-fir pulp wood for the manufacture of paper.

Sixteen years after acquisition, calling these parcels “the former Champion lands” does little to recognize their unique and historical values for the people of Vermont. As a result, this document will refer to these lands as the Kingdom Heritage Lands

Long-range management plans are created every ten to twenty years for lands owned and managed by the Vermont Agency of Natural Resources (ANR). The management focus and appropriate uses for every parcel reflect a variety of factors, including Agency and Departmental missions; legal constraints; existing natural, cultural, and recreational resources; past and current human uses; and public input. The process of creating plans is often complex, involving the gathering of a great deal of information, ANR inter-departmental analysis and review, and input from citizens and organizations.

The process which created the original (2002) management plan for West Mountain WMA was more extensive and balanced than any other in the State’s history. Given this, and the very positive experience ANR has had managing under the original plan, this update aims to preserve as much of the original plan as possible, while refining and adding information and strategies where appropriate.

The lands, waters, and wetlands included within the West Mountain WMA are ecologically rich. The area consists of varied terrain from numerous types of lowland swamps, bogs and fens, to mountain ridges. The area is mostly northern hardwood forest, but also includes considerable acreage of lowland spruce-fir forest and wetlands. It includes at least 21 natural communities statewide significance, 47 rare or uncommon plants species (including six listed as endangered or threatened by Vermont statute), and 37 animal Species of Greatest Conservation Need (including eight listed as Endangered or Threatened by Vermont statute).

The value of the area is enhanced because it is part of a large, undeveloped forested landscape that includes approximately 200,000 acres of land either owned by the public, or protected from development by easements. In addition, it is part of a much larger, generally forested region including Vermont’s Northeast Kingdom and Northern New England.

The area has a rich logging history and has been extensively used by hunters, trappers, anglers, snowmobilers, wildlife viewers, berry pickers, and other users over the years. Because of its

¹ The West Mountain WMA actually consists of four parcels separated by the VETCO power line fee ownership, and other private holdings.

rugged, undeveloped, and remote character, the area provides unique opportunities for recreational activities that benefit from such a setting.

In light of the area's biological diversity and historic uses, as well as the legal requirements resulting from the acquisition of these lands from Champion, two types of wildlife management are practiced in the West Mountain WMA. A portion of the property is actively and sustainably managed for game and non-game wildlife, and a portion of the property is passively managed to benefit natural ecosystem functions and plants and animals that prefer the conditions of unmanaged stands. This passively managed area also provides an ecological reserve where natural processes can be observed and scientifically studied and a benchmark against which conditions on actively managed portions of the landscape, both in the immediate area and in the broader landscape of Northern New England, can be compared.

In brief, the highlights of this updated Plan are:

- ANR will continue to manage the West Mountain WMA, with The Department of Fish and Wildlife (DFW) undertaking primary management responsibility.
- Public access for a wide range of activities is guaranteed on the WMA in perpetuity. Long-standing dispersed uses of these lands such as hunting, fishing, trapping, bushwhacking, and photography will continue on the entire property, including the Core Area. Other established uses including snowmobiling, horseback riding, bicycling, hiking (on trails), and motor vehicle access will continue to be managed in designated Corridors.
- The wild character of these lands, considered essential to their importance, will continue.
- The Active Management Area (approximately 10,000 acres) will continue to be managed through various techniques, including timber harvesting to provide habitat for selected game and non-game wildlife.
- The Core Area (approximately 12,500 acres, that include the most unique landscape features and natural communities found on the Kingdom Heritage Lands) will continue to be managed passively. Here, natural processes are allowed to shape the landscape and its biological communities with minimal human intervention. Logging is prohibited. This management is a long term strategy to benefit a variety of plants and animals, provide unique recreational opportunities, and serve as a control area for scientific study. Few such areas exist in Vermont or the northeastern United States, and none of this size exists on state-owned lands anywhere in Vermont.

The process of developing this Plan has been complex, involving the gathering of a great deal of information; discussion and negotiation among ANR, VHCB, Plum Creek, and other parties involved in the acquisition of the Kingdom Heritage Lands; and extensive input from interested citizens and organizations. The original (2002) planning process involved more than 35 meetings to solicit ideas and comments from the public, and the 2014 Plan update involved four additional public meetings, numerous stakeholder group meetings, and extended public comment periods.

This Plan is in substantial conformance with local and regional plans and regulations, including the Northeast Vermont Development Association “Regional Plan for the Northeast Kingdom” (2006), the Local Development Plan for Unorganized Towns and Gores of Essex County (2011), the Town Plan for Maidstone (2007), and the Municipal Development Plan for Brunswick (1995).

No plan for ANR lands is permanent. This updated plan will be in effect for ten years, and then it will be reviewed and updated again. However, even before that time, parts of the plan may be amended if it becomes apparent that improvement is needed, or conditions change. Section VII provides more specifics on the process for amending the plan. In general, the process of amending the plan will include opportunities for public comment and a public discussion of the issues involved.

II. DESCRIPTION OF THE PLANNING DOCUMENT

The remainder of this plan for the West Mountain WMA consists of the following sections:

Section III provides the context for planning for the West Mountain WMA. It includes a summary of the transaction that led to the acquisition of this property, and its principal implications for future management; a summary of the broader regional context within which the Kingdom Heritage Lands are situated, with respect to both ecological and recreational values; a summary of public input; a summary of goals and objectives for the Kingdom Heritage Lands as a whole; a discussion of how management of the West Mountain WMA fits within the broader context of the rest of the Kingdom Heritage Lands and the surrounding region; and the rationale for establishing the complementary Core Area and Active Management Area.

Section IV includes a description of the property that makes up the West Mountain WMA. It includes a brief history of land use, and an overview of the important natural, cultural and recreational resources, including, an overview of geology, soils, aquatic ecosystems, existing vegetation, natural communities, wildlife, roads, cultural features, and recreational resources. It also includes information on levels of recreational use.

Section V provides a summary of public involvement. This summary describes the input that was received both through written comments and public meetings held during the planning process. This public input covered issues that should be addressed in the plan, reactions to preliminary materials developed to inform and guide it, and ultimately, comments on the draft version of it.

Section VI specifies management direction, strategies and actions that will be implemented over time. This section includes goals and objectives for the management of the West Mountain WMA as a whole and details specific management policies that apply to the entire parcel.

Section VII describes the general process that will be followed for review and amendment of the Plan. This includes both regular review on the 10-year cycle specified by the Vermont Legislature, and the possibility of amendment within the 10-year plan period if circumstances warrant such action.

Section VIII (Appendices) includes a summary of key legal and policy factors that affect future management of the West Mountain WMA and the rest of the Kingdom Heritage Lands; a reference list of legal documents that are relevant to this planning process; a list of supplemental studies and references developed to inform and guide the plan; a summary of data sources used in preparing maps for the Plan; a summary of public involvement from the original (2002) planning process; and a summary of comments made by the public on the updated Draft Plan and how this revised version addresses those comments.

III. CONTEXT IN PLANNING FOR THE West Mountain WMA

In planning for the future management of the West Mountain Wildlife Management Area, a number of important factors were considered, including: legal constraints on management resulting from the land transaction that created the WMA; the ecological and recreational values of the Kingdom Heritage Lands when considered in the broader context of the surrounding region; economic considerations related to the acquisition of these lands and their future management; the views and opinions of the public; the management direction, including goals and objectives, that has been formulated for the Kingdom Heritage Lands as a whole; and how the public ownership and management of the West Mountain WMA fits within the broader context of the rest of the Kingdom Heritage Lands and the surrounding region.

A. BACKGROUND ON THE ACQUISITION OF THE KINGDOM HERITAGE LANDS AND RESULTING IMPLICATIONS FOR FUTURE MANAGEMENT AND PLANNING

1. Acquisition History

The acquisition of the so-called “Kingdom Heritage Lands” and the creation of the West Mountain Wildlife Management Area resulted from one of the most complicated land deals in Vermont history. The specifics of how the property was transferred to the current owners are relevant to management because in some cases the provisions of the transfer mandate certain types of management or constrain management in other ways.

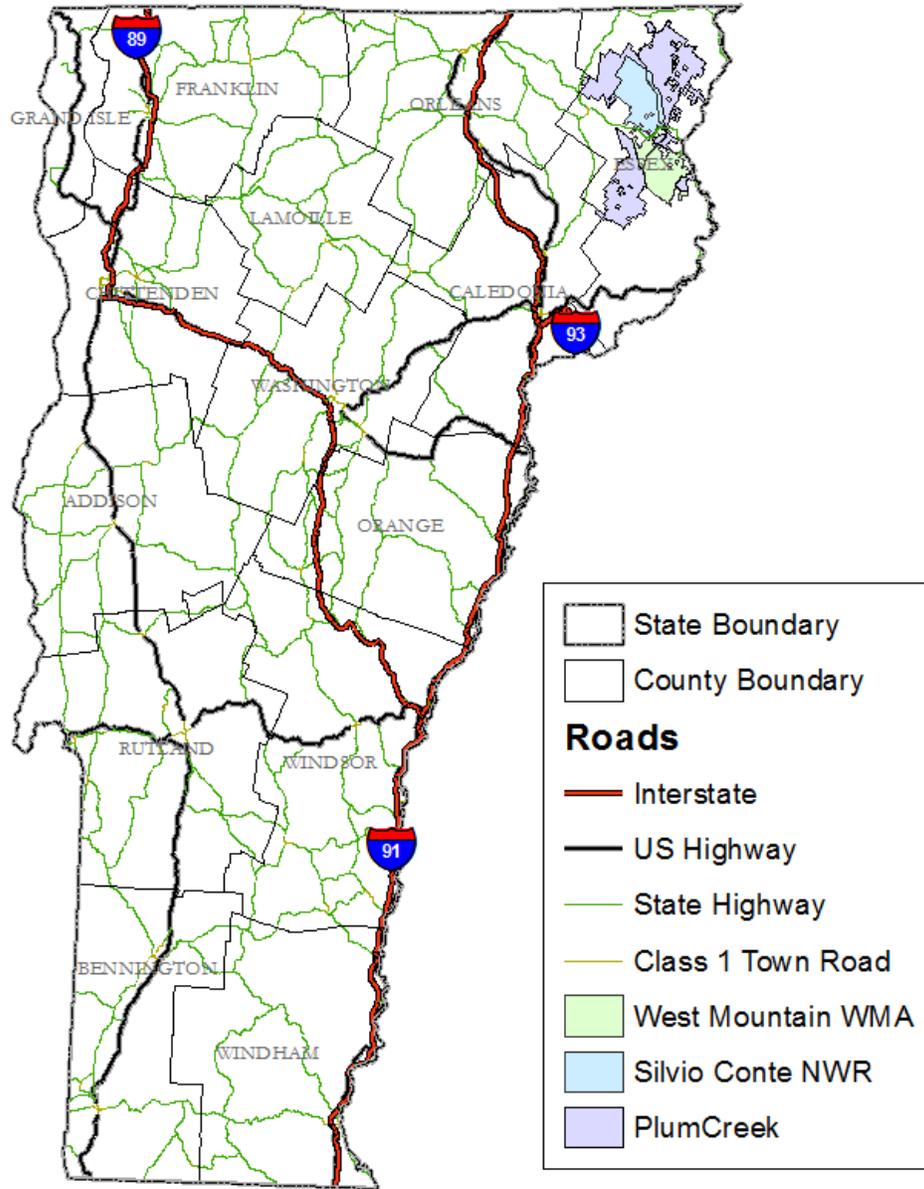
On October 8, 1997, Champion International Inc. announced its intention to sell approximately 132,000 acres in northeastern Vermont. (See Figure 1) Champion, and the St. Regis Paper Company before it, had owned these lands for decades, and during the last 20 years of ownership had harvested much of the merchantable spruce, fir, and hardwoods on the property.

On December 9, 1998, The Conservation Fund (TCF) of Arlington, Virginia announced that it had signed a contract to purchase Champion’s Vermont holdings, along with an additional 144,000 acres in New York and 18,000 acres in New Hampshire—a total of roughly 294,000 acres in the three states. The overall purchase price was \$72.25 million; the price for the Vermont lands was \$26,535,000.

TCF did not intend to retain long-term ownership of the Vermont lands, but instead worked in partnership with the Vermont Land Trust (VLT), the Vermont Agency of Natural Resources, the Vermont Housing and Conservation Board, the Vermont Chapter of The Nature Conservancy (TNC), and the U.S. Fish and Wildlife Service (USFWS) to create a new model for the protection and management of large acreages in the “Northern Forest” of the northeastern United States – one that would combine large- and small-scale conservation objectives with sustainable forest management and a continuation of the tradition of public access.

Figure 1: Location of the Kingdom Heritage Lands in Vermont

Location of the Kingdom Heritage Lands



Created by Doug Morin
Vermont Fish & Wildlife Department
April 2014



For planning purposes only. Not survey accurate.



A central part of this model was to divide the Kingdom Heritage Lands into separate but complementary ownerships on the basis of ecological values and basic management purposes: areas with the greatest ecological significance would be publicly owned and protected, with timber harvesting precluded on substantial acreages to allow natural processes like forest succession to occur unimpeded; and the most productive timber lands, with fewer special ecological values, would be kept in private ownership with a requirement that they be managed for long-term sustainable forestry. Public access for a variety of historical uses and other activities would be guaranteed on the entirety of the property.

When the possibility of acquiring the Kingdom Heritage Lands had first arisen, the Vermont Agency of Natural Resources requested that TNC lead a process to identify the most ecologically significant portions of those lands. ANR, TNC, TCF and the other partners in the acquisition used the results of that analysis to determine which parts of the overall property should be publicly owned either by the State of Vermont or the federal government, and which should remain under private ownership as a “working forest.” Ultimately, the ANR acquired more than 22,000 acres of land south of Route 105 that now comprise the West Mountain WMA, and the USFWS acquired 26,000 acres encompassing much of the Nulhegan Basin north of Route 105 as part of the Silvio O. Conte National Fish and Wildlife Refuge (See Figure 2).

The State lands are subject to, and must be managed in accordance with, an easement addressing both conservation and public access issues that was granted by ANR at the time the property was acquired from Champion. TNC and VHCB are co-holders of this easement (hereinafter referred to as the “State Lands Easement”).²

The federal lands are not subject to easements, but rather will be managed in accordance with federal laws, regulations, and policies governing the USFWS, the National Wildlife Refuge System, and the Conte Refuge.

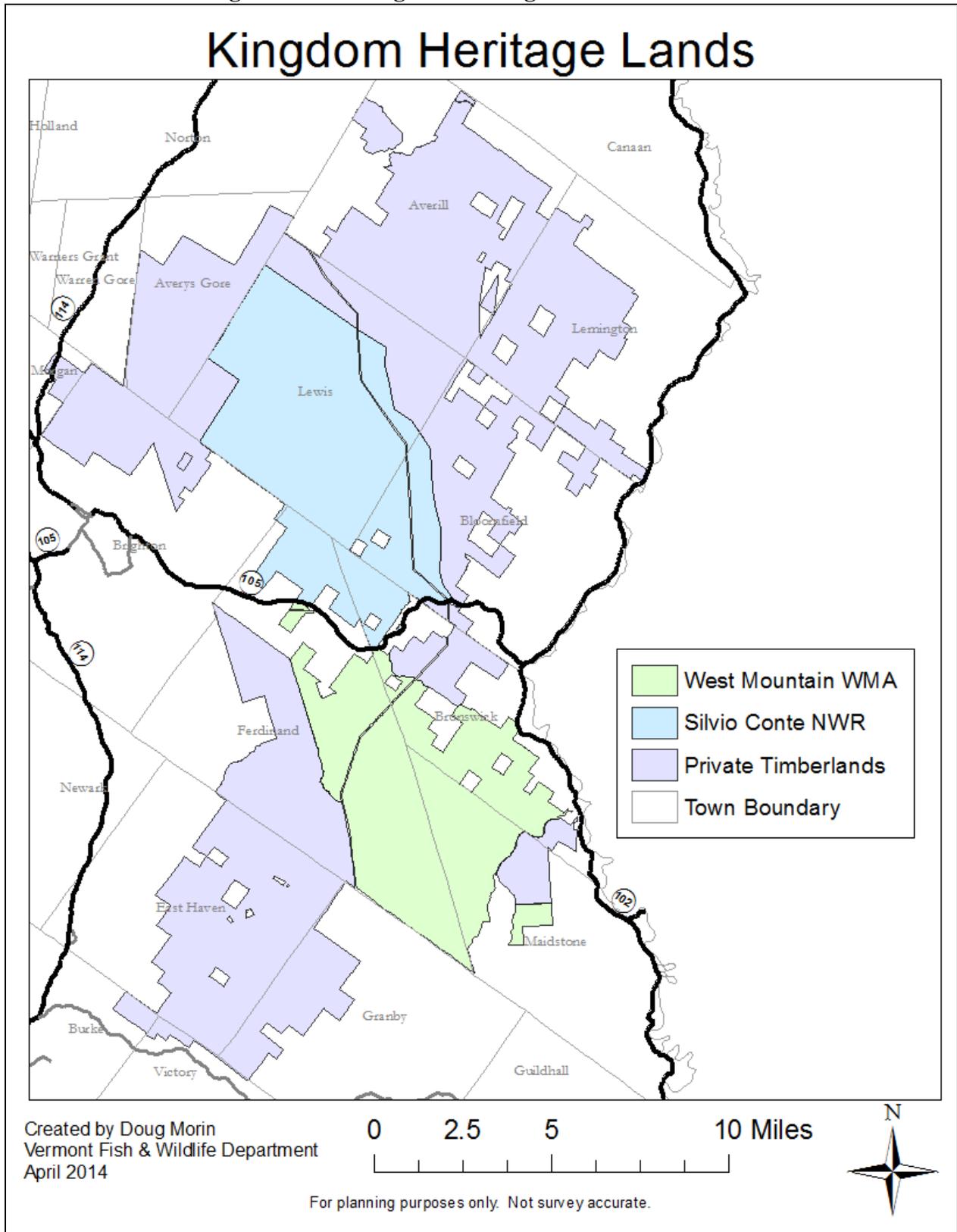
The Conservation Fund protected the remaining approximately 84,000 acres (hereafter referred to as the “Private Timberlands”) with permanent conservation and public access easements to ensure, in perpetuity, that forest products will be harvested in an ecologically sustainable manner and the public will continue to enjoy access for compatible recreational pursuits. TCF then put those lands on the market encumbered by the Public Access and Conservation Easements. After a competitive bidding process, the Private Timberlands were sold to the Essex Timber Company, LLC (Essex), a private corporation based in Massachusetts.³ The Vermont Land Trust and VHCB are co-holders of the Conservation Easement on the Private Timberlands, while the ANR and VHCB are co-holders of the Public Access Easement.⁴

² Pursuant to a “Stewardship Memorandum of Understanding” (MOU) co-signed by ANR, VHCB, VLT, and TNC at the completion of the acquisition on August 6, 1999, VHCB delegated some day-to-day stewardship responsibilities for the State Lands Easement to TNC. However, VHCB remains a full and active partner, and retains review and approval authority for various matters covered in the Easement and the MOU.

³ Essex Timber Company subsequently acquired an additional 1,228 acres of inholdings. These additional holdings are not subject to the easements covering the lands acquired from The Conservation Fund.

⁴ In accordance with the Stewardship MOU, VHCB delegated some day-to-day stewardship responsibilities for the Conservation Easement on the Private Timberlands to VLT and for the Public Access Easement to ANR. However, VHCB remains a full and active partner, and retains review and approval authority for various matters covered in the Easement and the MOU.

Figure 2: The Kingdom Heritage Lands in Vermont



The Conservation Fund and VLT were able to complete the \$26.5 million purchase by pulling together funding from a wide range of sources. In addition to the purchases by Essex (\$7.5 million) and the USFWS (\$6.5 million), funding to acquire the lands now included in the West Mountain WMA and the easements on the Private Timberlands came from several sources, including the Freeman Foundation (\$4 million), the Richard King Mellon Foundation (\$4.5 million), the State of Vermont (\$4.5 million), the North American Wetlands Conservation Act (\$1 million), and numerous smaller foundation grants and individual contributions. State funding was used to acquire the Conservation Easement and the Public Access Easement on the Private Timberlands. The lands now included in the West Mountain WMA were acquired with funding from the Mellon Foundation and the North American Wetlands Conservation Act.⁵

Since the original acquisition, some additional changes in ownership have occurred. The Private Timberlands were sold by Essex to the Plum Creek Timber Company (Plum Creek) in 2008. Also, two inholdings in West Mountain WMA were added to the WMA through donation and purchase with Forest Legacy Program funds.

2. Management Implications Resulting from the Acquisition

Many parties contributed not only money, but also ideas and energy to this complex transaction. These participants sought to ensure that the public values their organizations represent would be reflected in planning and future management of these lands through the easements that are now permanently attached to the West Mountain WMA and the Private Timberlands. Beyond the requirements of the easements, agency mandates to which the ANR and the USFWS must adhere have important implications for future management, and Plum Creek has its own objectives as a for-profit corporation. In addition, the Vermont Legislature mandated certain requirements for future management, including guaranteeing "Use of land for traditional and lawful recreational use, including boating, fishing, trapping, snowmobiling, snowshoeing, skiing, bird watching, hiking, biking, hunting, including training and using hunting dogs, equestrian uses, and other currently allowed forms of traditional recreational uses" (as articulated in the 1999 Budget Adjustment Act).⁶ And Governor Dean issued an executive order (#12-02) relating to the Kingdom Heritage Lands.

⁵ A total of \$28 million was raised for the acquisition. Of this, \$26.5 million was paid to Champion International. Most of the balance covered acquisition, holding and disposition costs, including appraisals, timber inventories, mapping, title reports, attorney fees, interest, stewardship and staff expenses; the remainder was placed in a fund for future forest land conservation in Vermont.

⁶ A point of confusion arose during the planning process stems from what recreational uses were guaranteed in the Budget Adjustment Act. The passage quoted from the Act guarantees a more inclusive range of uses than some members of the public consider as "traditional uses." Specifically, many members of the public consider "traditional uses" to include hunting, fishing, trapping, bushwhacking (dispersed cross-country walking, skiing, and snowshoeing—i.e., not on trails) and snowmobiling, and do not view biking, equestrian uses, and hiking on trails as traditional. (In fact, biking and equestrian uses were not officially allowed by Champion on these lands but apparently did occur.) To minimize any further confusion, in this document the term "historic uses" denotes those uses that were allowed historically on these lands by Champion, including both long-standing historic uses such as fishing, hunting, trapping and bushwhacking, as well as snowmobiling, which is a more recent historic use. Therefore, the term historic uses is used in this document where it is understood that commenters clearly meant to convey hunting, fishing, trapping, bushwhacking, and snowmobiling as opposed to the broader list of "traditional" "lawful" uses identified by the Legislature.

In very general terms, the principal implications of the acquisition of these lands from Champion and their subsequent conveyance to the current owners are as follows:

a. State Lands (West Mountain Wildlife Management Area):

- The State Lands Easement mandates the protection of ecological values and the fostering of compatible pedestrian recreational use and utilization, including hunting, fishing and trapping, as the primary purposes of public ownership and management of the property.
- On some parts of the WMA, active forest and wildlife management will be conducted for the particular benefit of priority game and non-game species.
- The remainder of the WMA will be passively managed as an ecological Core Area or “Special Treatment Area”, as required by the Easement. In this area, natural processes such as forest succession will be allowed to shape the land and its natural communities with minimal human interference.
- Dispersed pedestrian uses (*e.g.*, walking, snowshoeing, cross-country skiing, hunting, fishing, trapping, boating, swimming, wildlife observation) are permitted under the Easement. Intensive and concentrated uses, including motorized, mechanized and equestrian activities, may occur only on approved recreation corridors.
- The North American Wetlands Conservation Act Grant Agreement requires the protection of 5,600 acres of wetlands and associated uplands within the West Mountain WMA that include important black duck production areas and that provide other significant benefits to waterfowl and other migratory birds (including several priority species and numerous rare and endangered species). The Grant also requires providing opportunities on that acreage for “open public recreation, including hunting, fishing, hiking, canoeing and birding.”
- Executive Order (#12-02) by Governor Howard Dean states that the WMA shall allow “. . .perpetual public access for traditional recreational uses, including boating, fishing, trapping, snowshoeing, skiing, bird watching, hiking, and hunting (including training and using hunting dogs). . .”
- Executive Order (#12-02) further states that road access shall be maintained within two statute miles of any point in the WMA.

b. Private Timberlands (Plum Creek Timber Company):

- The Conservation Easement requires that these lands be managed for ecologically sustainable timber production consistent with a set of specified timber management standards. These include the requirement that after an initial 40-year period of forest recovery, the Landowner must harvest at least half of the net annual growth of trees on the property.

- Certain ecologically sensitive areas that are identified in the Conservation Easement as “Special Treatment Areas” (such as deer wintering areas, small patches of “*old growth*” forest, and certain water bodies and wetlands) will be given special protection.⁷
- Dispersed pedestrian uses (*e.g.*, walking, snowshoeing, cross-country skiing, hunting, fishing, trapping, boating, swimming, wildlife observation) are permitted under the Public Access Easement. Intensive and concentrated uses, including motorized, mechanized and equestrian activities, may occur only on approved recreation corridors. For each approved corridor, an organization or individual must be identified that will serve as “Corridor Manager” and assume responsibility for management of the corridor.
- The Landowner retains the right to temporarily exclude the public from areas where active forestry operations are underway, in accordance with the Public Access Easement.

c. Federal Lands (Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge):

- As part of the National Wildlife Refuge System, the federal lands will be managed for fish, wildlife, and plant species and their habitats. Priority species will include migratory birds, endangered species, and native and migratory fish.
- With respect to public access and recreation, priority will be given to wildlife-dependent uses including hunting, fishing, wildlife observation, photography, environmental education, and interpretation. All public uses must be determined to be appropriate and compatible with the Refuge purposes and the mission of the USFWS and the National Wildlife Refuge System.

Additional information on the constraints on future use and management of the Kingdom Heritage Lands resulting from their acquisition and new ownership is presented in Appendix A: Summary of Easements and Other Important Legal and Policy Factors Affecting Future Use of the Kingdom Heritage Lands.

3. Planning Implications Resulting from the Acquisition

Along with its contribution of funding toward the acquisition of the Kingdom Heritage Lands, the Vermont Legislature mandated that a comprehensive management plan for the West

⁷ The term “Special Treatment Area” (STA) is used in both the State Lands Easement covering the West Mountain WMA and the Conservation Easement covering the Private Timberlands that are now owned by the Plum Creek Timber Company, but with different meaning and management implications. For the West Mountain WMA, the term is synonymous with the term “Core Area” that is used throughout the rest of this document, and refers to that part of the state lands in which natural processes will shape the landscape and its natural communities to the greatest extent possible. For the Private Timberlands, the term refers to specific ecologically sensitive areas identified in the Conservation Easement that are subject to special management provisions (*e.g.*, no-cut buffers around identified water bodies and wetlands; harvesting restrictions in deer wintering areas).

Mountain WMA be developed and updated every 10 years with involvement from Vermont residents and municipalities. In addition, the Public Access Easement for the Private Timberlands mandates the preparation of an updated Long-Term Public Access Plan for those 84,000 acres every 10 years.

To guide the process of updating the original Plans, the six organizations that own or hold easements on portions of the Kingdom Heritage Lands—the Vermont Agency of Natural Resources, the U.S. Fish and Wildlife Service, the Plum Creek Timber Company, the Vermont Land Trust, the Vermont Housing and Conservation Board, and The Nature Conservancy’s Vermont Chapter—convened a series of “Partner” meetings throughout 2013 and 2014. In the spirit of collaboration that characterized the acquisition effort, the Partner group operates by consensus.⁸

Significant public involvement has been a foundation of developing these Plans since the original acquisition of these lands. The specific steps taken to obtain public input and the substance of that input are summarized in Section V of this Plan.

B. SUMMARY OF THE REGIONAL ECOLOGICAL CONTEXT

1. General Context

The Kingdom Heritage Lands are located in the “Northeast Kingdom” of Vermont, a region that contains one of the State’s most extensive areas of relatively remote and wild lands.⁹ These lands include a substantial portion of the Nulhegan Basin, an extensive area of northern lowland forest and wetlands ringed by hills and mountains of moderate elevation and drained by the Nulhegan River. Bordering the Nulhegan Basin to the south, they include the Paul Stream and Wheeler Stream watersheds, which comprise a diverse landscape including wetlands and ponds, interspersed with low mountains and hills.

The Kingdom Heritage Lands have long been recognized as an interesting part of the rich diversity of landscapes and natural communities within Vermont. These lands include the only large ecosystem in Vermont with characteristics related to the boreal forest of Canada. Geologically and ecologically, these lands are more related to New Hampshire and western Maine than to the Green Mountains, and are a unique landscape of geologic features and glacial landforms.

2. Resource Significance

⁸ In the event of irresolvable disagreements related to management and use of the three properties, decisions will be made by those parties with legal responsibilities for each parcel—i.e., ANR in collaboration with TNC and VHCB for the West Mountain WMA; The Private Timberland owner (currently Plum Creek), VLT, and VHCB for forest management and conservation issues on the Private Timberlands; ANR, VHCB, and Plum Creek for public access issues on the Private Timberlands; and USFWS for the Nulhegan Basin Division of the Conte Refuge.

⁹ The Green Mountains comprise the other notable area in this regard.

The Kingdom Heritage Lands have numerous ecological resources and values that are significant at the state and regional (northern New England) levels. These lands are significant in two major respects:

Concentration of High Value Resources:

These lands possess a concentration of unusual and high value natural resources, including:

- a rare ecological system in Vermont with boreal affinities—a large lowland basin dominated by spruce-fir forest (the largest lowland spruce-fir forest in Vermont) with a variety of forested and open wetland types;
- a large number of rare and/or state-significant natural communities, including at least 21 on West Mountain WMA and an additional 25 on the Conte Refuge;
- two occurrences of upland old-growth forest, plus a number of smaller wetland forests that may be considered old-growth;
- a number of pond-wetland complexes with very high ecological integrity and natural communities of statewide significance (including all eleven pond-wetland complexes in the West Mountain WMA);
- eight ponds which are Vermont Natural Heritage Sites, based on the presence of rare species (seven in the West Mountain WMA);
- miles of high-quality stream ecosystems, notably the Nulhegan River, which has recently been identified as a river of statewide significance because it, and its surrounding lands, are in exceptionally good ecological condition for a river of its size, and Paul Stream, which is recognized as an outstanding example of its type statewide, serving as a reference point against which the water quality of similar streams is compared.
- A population of state-threatened Eastern pearlshell mussel in the Nulhegan River;
- The only confirmed reproductive group of Canada Lynx (Federally listed as Threatened) in Vermont in more than 100 years.
- 47 rare and uncommon plant species, 6 of which are protected by the Vermont Endangered Species Law;
- State and regionally significant breeding habitat for numerous bird species, including songbirds, woodpeckers, raptors, waterfowl and grouse, including Vermont's only known breeding population of the rare spruce grouse;
- the State's largest deer wintering area.

Surrounding Forested Lands:

These lands are part of a vast area of relatively undeveloped forest that stretches from northern New York to eastern Canada, the so-called “Northern Forest Lands.” The Northern Forest is the largest continuous expanse of relatively uninterrupted forest in the eastern United States. This extensive regional forest contains a range of forest age-classes, from early successional to, in a few isolated locations, mature forest, but it is by and large young forest, less than 100 years old. It provides important habitat for the large mammals native to the extensive northeastern deciduous, coniferous and mixed forests. These include black bear, bobcat, American marten, deer, and moose. In addition, the expanse of undeveloped forest in northern Vermont and New Hampshire comprise one of the most important geographic areas in the northeastern United States for bird species of regional conservation concern, as identified by Partners in Flight.¹⁰

Within this larger landscape setting, the Kingdom Heritage Lands link together other publicly conserved lands, (*e.g.*, state forests, parks, wildlife management areas, municipal forests, and lands protected by Forest Legacy easements), into a nearly contiguous block of over 200,000 acres (see Figure 3). Aside from the Green Mountain National Forest, this is the largest block of land in Vermont that is protected from development. Contiguous, largely forested tracts like this provide important habitat for the sustenance and movement of wide-ranging species, such as moose, bear, lynx, and potentially cougar and wolf, were they ever to return to Vermont.

Further, the Kingdom Heritage Lands provide a forested link between the northern Green Mountains, and the North Country of New Hampshire (Coos County). As an example of the ecological importance of this linkage, in the relatively recent past (since the 1960s), moose were able to repopulate the northern area of Vermont from the forested regions of northern New Hampshire through the Northeastern Highlands of Vermont.

The special value of this large block of protected lands lies in its largely un-fragmented nature. In a large-scale forested landscape where natural communities, with their native flora and fauna, are less broken up by the wide roads and cleared lands associated with development or agriculture, natural ecological processes retain more influence, and species that benefit from interior forest conditions find favorable habitat. In such areas there is less exposure to exotic plants and animals, which have the potential to greatly alter natural ecosystem patterns and processes. For example, in fragmented ecosystems, many songbirds suffer high levels of nest parasitism by brown-headed cowbirds, which leads to population declines. Also, roads and roadside ditches are known to be corridors along which nonnative invasive species can quickly spread. In simple terms, less fragmentation means more habitat available for most of the species native to the Northern Forest.

3. A Unique Opportunity

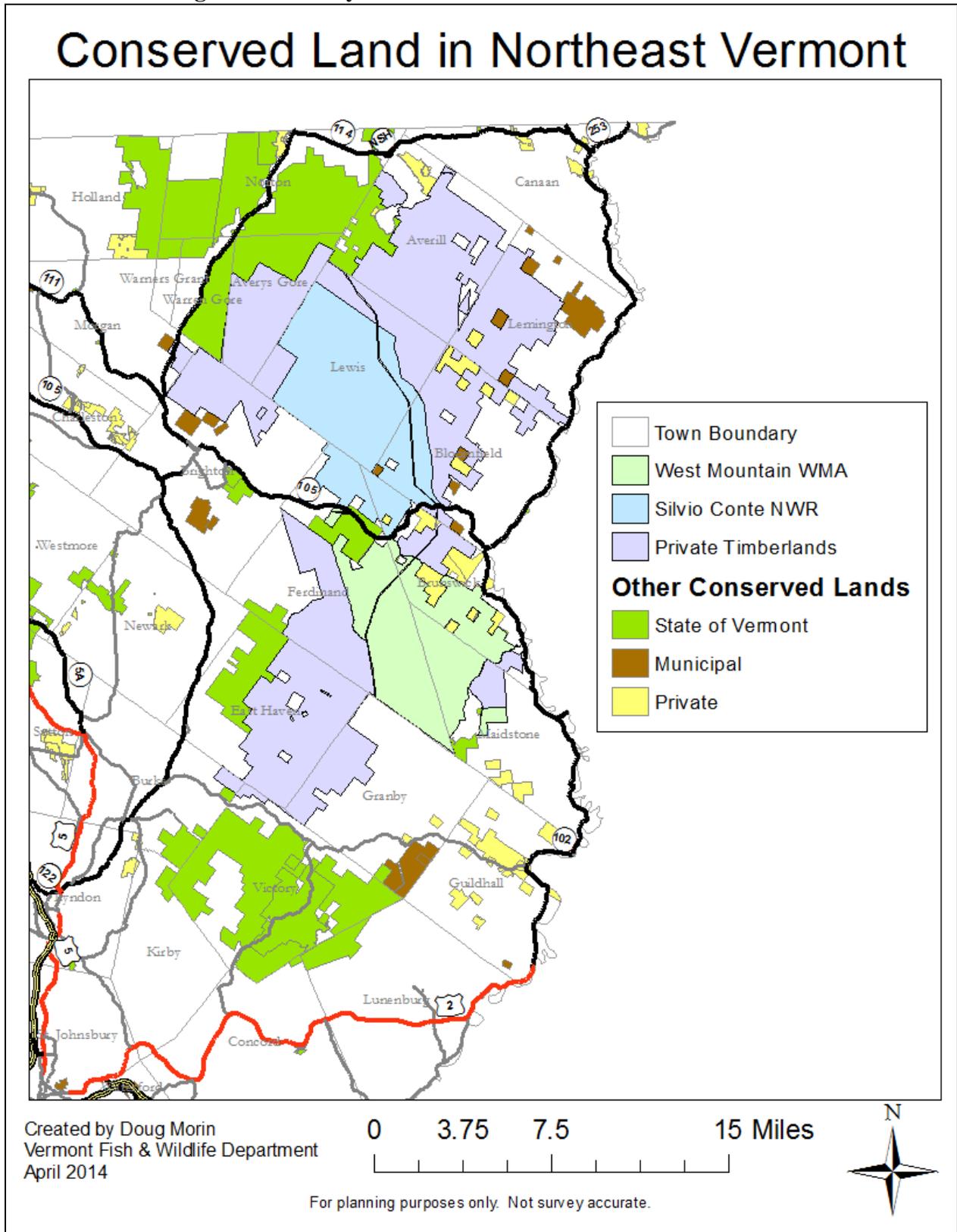
¹⁰ Partners in Flight (PIF) is a coalition of over 300 partners from federal and state agencies, conservation groups, foundations, academia, and forest products companies working together on bird conservation across the continental United States.

Because of their large size, geographic position within a larger collection of conservation lands, and high natural resource values, the Kingdom Heritage Lands provide unusual opportunities for management of conservation lands at the landscape level. Additionally they provide a unique opportunity to passively manage a portion of the lands as an ecological core, an area where natural processes, rather than more active habitat management, will create a natural forest and wetland landscape. In the Core Area, a variety of natural community types, in a broad elevation range, will function under a regime of natural ecological processes, including natural disturbances, that will create a mosaic of vegetation types and ages and will provide habitat diversity from which many species will benefit.

The management of this large and ecologically important area will be advantageous for the whole Northern Forest. Species that benefit from large tracts of un-fragmented forest, from marten to neotropical migratory songbirds, will likely be able to maintain populations large enough to repopulate other less intact ecosystems in the surrounding areas. Furthermore, processes that help maintain ecosystems, and that shape the evolutionary forces to which all species continuously respond, will be able to operate at the large scales that they require for proper functioning.

Although there are large State forests in northern Vermont, no other State owned parcel possesses the size or physiography sufficient to permit a well-buffered ecological Core Area that includes such a wide diversity of natural communities and elevations, from mountain summit to valley bottom. The ecological core is surrounded by lands actively managed for timber, wildlife and public recreation, and together, the Core and those actively managed lands, will provide a diversity of resources and opportunities that society values. For the State of Vermont, this represents a big step toward the landscape-level management of conservation lands that scientists and policy-makers from around the globe have been promoting in recent decades.

Figure 3: Publicly Conserved Lands in Northeast Vermont



C. SUMMARY OF THE REGIONAL RECREATIONAL CONTEXT

To make the best use of the resources on the Kingdom Heritage Lands, it is important to understand both the availability and demand for recreational opportunities in the surrounding region, and the opportunities the Kingdom Heritage Lands can provide that are found in few other places in Vermont. This provides an understanding of the special niche these lands may fill in the spectrum of recreational opportunities available in Vermont.

1. Key Aspects

Three aspects of these lands are particularly important to consider in planning for future uses and management:

Size of Protected Area: These lands, together with other surrounding state or public interest lands, form the largest block of public interest lands in Vermont other than the Green Mountain National Forest.¹¹

Backcountry Character: This is one of the most sparsely populated and least developed areas in Vermont, with a remote, rugged, “backcountry” character that is uncommon in the state.

Accessibility: Despite this seeming remoteness, this area is highly accessible to a large population via Interstates 91 and 93. Millions of people live within a day’s drive of the Kingdom Heritage Lands, including residents of Montreal, Boston, New York, and—Vermont’s fastest growing area—Chittenden County

2. Regional Supply of Recreational Opportunities

Public Interest Lands: Vermont has nearly 900,000 acres¹² of public interest lands, including over 400,000 acres in Federal lands. There are approximately 255,000 acres of public interest lands in the Northeast Kingdom. The Kingdom Heritage Lands comprise more than half of these (132,000 acres).

Hunting and Trapping: The Northeast Kingdom is Vermont’s premier wildlife region in many ways. The Northeast Kingdom offers both some of the largest populations and best access to moose, grouse, bear, woodcock, snowshoe hare, and other game species.

Fishing: There are over 3,800 miles of fishable trout streams in Vermont. The Northeast Kingdom is Vermont’s top region for trout and salmon. On the Kingdom Heritage Lands, the North Branch of the Nulhegan River and the Moose River above Victory are both listed as “best bets” for brook trout (Fish Vermont, VT Fish and Wildlife Dept.).

¹¹ Throughout this document, the term “public interest lands” is used to describe both lands owned in fee by federal, state or local government, and privately held lands upon which an easement has been placed that guarantees public access.

¹² This represents about 15% of the land area in Vermont (total land area of 9,249 square miles or 5.9 million acres).

There are 295 lakes and ponds in Vermont; over 80 of these are in the Northeast Kingdom, which account for two-thirds of the acreage of lakes and ponds in the State excluding Lake Champlain. Seven out of 13 walk-in only trout ponds in the state are located in the Northeast Kingdom, 4 being on the Kingdom Heritage Lands. Altogether, there are 13 lakes and ponds on the Kingdom Heritage Lands.

Snowmobiling: There are over 6,000 miles of snowmobile trails in Vermont; over 2,000 of these are in the Northeast Kingdom. Island Pond is the snowmobiling capital of Vermont. Trails from this area connect to trails in New Hampshire (and then to Maine) and Canada.

In accordance with this plan, VAST has been approved as snowmobile trail Corridor Manager for the Kingdom Heritage Lands, and manages that use on up to 150 miles of existing roads and trails on West Mountain WMA, the Private Timberlands, and USFWS Conte Refuge.¹⁴

Cross-country Skiing: There are over 1,000 cross-country ski trails in the State of Vermont offered at more than 150 sites. Chittenden, Lamoille, and Caledonia counties have the most cross-country skiing centers. In northern Vermont there are 13 major commercial cross-country ski centers with roughly 975 miles of groomed trails; 5 of these centers, including 345 miles of trails, are in the Northeast Kingdom. There are no established cross-country ski trails on the Kingdom Heritage Lands.

In northern New Hampshire there are hundreds of additional miles of cross-country ski trails available in 5 state parks, close to 500 miles of groomed trails at commercial ski resorts, and 225 miles of packed (not groomed) trails in the White Mountain National Forest.

Hiking: Vermont has thousands of miles of trails available to hikers. (There is no complete inventory of trails in the state.) There are approximately 700 miles of hiking trails within the Green Mountain National Forest in southern and central Vermont alone, including portions of the Long Trail and the Appalachian Trail. There are limited hiking trails in the Northeast Kingdom (less than 50 miles), located primarily in State Forests and Parks.

In New Hampshire, the White Mountain National Forest includes over 1,200 miles of trails, and over 60 peaks with elevations of 4,000 feet or more, the highest mountains in the Northeast. The Cohos Trail Association has been working to establish a new long-distance trail through New Hampshire's North Country, beginning in the White Mountains near Crawford Notch, and extending 150 miles to the Canadian border.

In accordance with this plan, Green Mountain Club, has been developing trails on the Private Timberlands, as hiking trail Corridor Manager for the Kingdom Heritage Lands. GMC has constructed 6 miles of trails to Bluff, Middle, and Gore Mountains, with approved plans for an additional 6 miles.

¹⁴ Under the terms of the agreement for the acquisition of the Kingdom Heritage Lands and Public Access Easement on the Private Timberlands, a maximum of 150 miles of the snowmobile trail network on these lands is to be open for use in any given year.

Horseback Riding: Horseback riding on public lands in most of Vermont is restricted to designated roads and trails. State Forest Highways are open for horseback riding, and some trails in the Green Mountain National Forest are also available, although these are limited.

Horseback riding is allowed on all trails and gated roads in the White Mountain National Forest (WMNF) except the Appalachian Trail.

In accordance with this plan, the Vermont Horse Council (VHC) has been approved as equestrian trail Corridor Manager for the Kingdom Heritage Lands, and manages equestrian use on about 25 miles of existing roads on West Mountain WMA, the Private Timberlands, and the nearby Victory WMA and State Forest.

Mountain Biking: In Vermont, mountain biking is allowed on State Forests roads, designed trails on State Forests and Wildlife Management Areas, and parts of the Green Mountain National Forest. Commercial four season resorts and ski centers are the primary providers of trails developed for mountain biking. In northern Vermont there are multiple commercial mountain biking centers offering over 100 miles of single-track trails.

In northern New Hampshire mountain biking is allowed on most trails in the White Mountain National Forest, excluding the Appalachian Trail and trails in the Wilderness areas. In addition, there are a number of ski resorts that have developed mountain bike trails, as well as several state park facilities with trails.

Roads as Trails: There is a considerable network of dirt roads and over 1500 miles of class 4 roads (unmaintained public rights of way) available for horseback riding and mountain biking in Vermont. In northern Vermont, there are 600 miles of these class 4 roads (375 miles in the Northeast Kingdom).

3. Existing Recreational Demand in Vermont and Northern New Hampshire¹⁵

Information on existing levels of public participation in various recreational activities in Vermont and northern New Hampshire is presented below. Note that recent trends are not necessarily indicative of future levels of participation for certain activities.

Hunting: As of 2012, about 11% of Vermonters hunted (about 64,000 people). Nationally, and in New England, the number of hunters has been declining at least since the 1970's. From 2001 to 2011, the number of Vermont residents hunting declined by 5%. Vermont also draws almost 10,000 nonresident hunters each year to the state. At the same time there has been an increasing number of specialty hunting licenses (deer-archery; muzzleloader, and turkey), both for residents and non-residents. These specialty licenses do not represent additional hunters, but rather additional types of hunting.

¹⁵ This subsection summarizes existing recreational demand data for the broad region of Vermont and northern New Hampshire. For more specific information on current recreational use of the Kingdom Heritage Lands, see Section IV.E. Levels of Recreational Use.

Fishing: As of 2012, approximately 13% of Vermont residents fished (about 80,000 people). Fishing license sales, like hunting license sales, have also been declining in Vermont. The state brings in about 35,000 additional nonresident anglers each year, though the National Survey of Fishing, Hunting, and Wildlife Associated Recreation estimates residents accounted for the majority of fishing days in Vermont. About half of the total fishing effort by both residents and non-residents statewide is for trout or salmon.

Trapping: The number of licensed trappers also has been declining in the Northeast over recent decades. Trapping increased in Vermont during the 1970's and reached a peak in 1980 when 3,090 licenses were issued. Since 1995 the number has typically ranged between 400 and 500 licenses per year, but has recently been increasing—and exceeded 700 in 2012.

Snowmobiling: Snowmobiling participation peaked in Vermont in the early 2000s, and has declined significantly since, but remains a large part of the state's winter recreation. Membership in the Vermont Association of Snow Travelers (VAST) increased from near 20,000 in the mid-1990s, to above 45,000 in 2003, only to drop again to near 24,000 in 2012. Almost a third of VAST memberships are from out-of-state. VAST membership is required in order to use the majority of trails in Vermont.

Cross-country skiing: Interest and participation in various types of cross-country skiing remains strong throughout the region. The 2011 Outdoor Recreation Demand Survey conducted by UVM found that nearly 12% of Vermonters participate in cross-country skiing. The highest levels of participation are at private ski areas that offer a variety of amenities, sometimes including lodging. At the same time, cross-country/back-country skiing is increasing in wilderness or remote areas in Vermont and New Hampshire, both on trails that are packed but not otherwise groomed and in locations without established trails. The magnitude of this demand is not known.

Hiking: Hiking is one of the nation's most popular outdoor activities, with 35 million participants each year. Hiking is also growing in popularity in the area: the White Mountain National Forest and Green Mountain National Forest both have seen increased use over recent decades. In the 2011 Outdoor Recreation Demand survey, hiking was the activity preferred by the most Vermonters: one in six rated it as their favorite outdoor recreation activity.

Mountain Biking: Mountain biking is a growing sport in the region. There has been a steadily increasing demand in mountain biking user-days in the White Mountain National Forest (where mountain biking is allowed on most trails) since the 1980's. About 20% of Vermonters take part in bicycling of some kind. In Vermont, however, limited opportunities for off-road biking and preferences for certain trail types (varied single track) lead most mountain biking to occur on private lands with trail systems developed specially for such use.

Horseback Riding: About 3% of Vermonters take part in horseback riding. Vermont, however, is a popular state for horseback riding, attracting equestrian enthusiasts from the Northeast region to ride the many back roads and trails in Vermont.

Wildlife Observation: Approximately 370,000 Vermont residents, or 60% of the state's population, participated in wildlife observation activities in 2011. About 100,000 residents and 80,000 nonresidents spent time wildlife watching on special trips away from home.

4. Special Recreational Opportunities of the Kingdom Heritage Lands

Recreational opportunities available on the Kingdom Heritage Lands that are unusual in the spectrum of opportunities available in Vermont as a whole include:

- Hunting in a remote backcountry setting.
- Fishing in a remote stream or pond.
- Wildlife observation with excellent opportunities for seeing a diversity of species, including those that utilize large undeveloped areas.
- Snowmobiling in an expansive backcountry region.
- Cross-country walking, snowshoeing, and/or skiing in a remote setting (bushwhacking).

D. ECONOMIC AND SOCIAL CONSIDERATIONS

The economic and social impacts associated with the Kingdom Heritage Lands Project have been an important consideration in planning for the future of these lands from the outset of negotiations for their purchase. Historically, the region has been subject to a “boom and bust” cycle that has corresponded to extensive harvesting when timber has matured. Most recently this cycle played itself out during the late 1980s and early 1990s when the land was heavily logged. In addition, numerous global forces have caused companies to sell large tracts of land throughout the northeastern United States. On many of these parcels, public access and the associated economic benefits from expenditures by hunters, anglers, and other recreation users have been put at risk.

Negotiations over the future of the Kingdom Heritage Lands during the acquisition process were concerned with both continuing the role these lands have played as a contributor to the local, regional and State economies, continuing the tradition of public access to and recreation on these lands, and protecting the lands' significant ecological resources. Further, the parties involved in the land transaction understood that these concerns were interrelated, as the contributions the Kingdom Heritage Lands made to the region's economy included not only supplying wood and jobs for the region's forest products industry, but also attracting recreationists who contribute to the region's economy.

This project hopes not only to continue these values but also enhance them by:

- Ensuring that 84,000 acres of the Kingdom Heritage Lands would forever be managed for quality sawlogs on a sustainable yield basis;

- Ensuring protection of the lands extraordinary natural resources to safeguard the area's ecological value and its attraction for recreationists; and
- Ensuring perpetual public access to the Kingdom Heritage Lands for hunting, fishing, trapping, and other compatible uses.

When the Vermont Legislature considered funding the Kingdom Heritage Lands project, discussion centered not only on the timber resource and related economic activity, but also on the significant roles the lands play in providing a site for a variety of recreational pursuits, including such activities as hunting, snowmobiling and wildlife observation. Obtaining perpetual access to the Kingdom Heritage Lands was seen as a critical measure if local traditions were to be maintained and the region's travel and tourism industry was going to thrive. With the land base secure, associated economic development could occur to the extent that it is compatible with individual and community desires.

Following the purchase of the property and in conjunction with the planning process for the Kingdom Heritage Lands, a number of discussions were convened regarding possible community and economic impacts associated with management of these lands. Four formal meetings on the topic included personnel from the Departments of Economic Development and Forests, Parks and Recreation, people involved in economic development at the regional level, academics with relevant expertise, and representatives from many of the most directly affected communities. economic issues were discussed during several other open public meetings that were held during the planning process.

Wood will continue to be harvested from the actively managed portions of the WMA and the Conte Refuge lands to benefit wildlife habitat, and the 84,000 acres of the Private Timberlands will be managed primarily for high value sawlogs. This benefits the local economy by producing a more even and reliable flow of timber from the land (and a more stable economy), and creating more value from sawlogs compared to the historical focus on pulpwood.

Any potential losses to the local economy from the loss in timber production in the Core Area of the West Mountain WMA may be largely, if not entirely, offset by enhanced yields and values from timber harvests on the Private Timberlands, and the enhancement of the region's tourism and recreation sector. Recreationists are be attracted to the area for the opportunities for wildlife observation, natural history study, and backcountry activities created by the diversity of management approaches on the Kingdom Heritage Lands, including:

- an ecological Core Area in the WMA,
- Special Treatment Areas on all three parcels of the Kingdom Heritage Lands,
- active wildlife management areas in the West Mountain WMA and Conte Refuge lands,
- a working forest on the Private Timberlands with public access for a variety of compatible recreational activities, and favorable habitat conditions for game species resulting from timber harvesting.

The private aspects of the “camp culture” that has been a traditional part of this area will be phased out over a period of decades on the West Mountain WMA and on the federal lands as the private camp leases expire. However, camp leases on the Private Timberlands are continuing (at the discretion of the owner) as in the past, and some camps on the West Mountain WMA may be retained for public use. In addition, ANR believes that providing for permanent protection and guaranteed public access to and use of 132,000 acres of lands will maintain and enhance other cultural and social values important to a broader public of users, including local residents and others that have traditionally used these lands for backcountry recreation.

A principal public value resulting from the changing ownership and management of the Kingdom Heritage Lands is the 12,500-acre Core Area on the West Mountain WMA. This ecological Core Area will re-establish an aspect of the landscape that was, until the last few decades, an essential part of the character of the north country of Vermont: an area which is largely inaccessible except by foot or canoe. The Core Area enables Vermonters as well as others experiences in a setting with, perhaps, fewer other users—all within a forest with characteristics determined by the forces of nature. Due to the size of the Core Area, the experience of remoteness is relatively unique on a statewide level. Along with providing the types of recreational experiences normally available on State wildlife management areas, preserving opportunities to hunt, hike and otherwise enjoy the region’s “natural” forests and wetlands is also an important objective of the ANR, and is consistent with Vermont’s traditional outdoor heritage.

Establishing a Core Area that provides remote recreation opportunities in an environment with little human intrusion has not only significant recreational, but also social values. Having the opportunity to hunt, hike, and camp in a Core Area allows people to experience and better understand their relationship with nature, and to gain a valuable perspective on the ever-changing landscape that they live in. Another social value of having a Core Area is that it provides important educational opportunities. Visitors to the Core Area are able to observe the physical characteristics of naturally functioning forests and wetlands, and to contrast those with other areas close by that are managed primarily for wildlife or as working forests. Research performed in the area may inform Vermonters about the ecology of the area, and visiting the area may enhance people’s understanding and perspective of our natural environment. These social values are available to all Vermonters as well as visitors from distant areas.

The Active Management Areas of the Kingdom Heritage Lands provides other cultural and social benefits. In particular, the actively managed portions of the State and Federal holdings within the Kingdom Heritage Lands, provide permanently guaranteed opportunities for multi-generational hunting, wildlife observation, and other backcountry activities in an area which is relatively easily accessible, rich with wildlife species selected for habitat enhancements, as well as opportunities to observe active wildlife management techniques. Also, the public access guaranteed on the Private Timberlands affords easily accessed opportunities to observe sustainable forestry operations, and opportunities to explore a vast undeveloped area by road, snowmobile trail, or bushwhacking. In short, there are significant social and cultural benefits from a diverse set of opportunities to enjoy the outdoors through a variety of activities, while gaining an appreciation of a range of land management approaches aimed at optimizing economic, recreational, and natural resource values in an extensive, undeveloped landscape.

E. SUMMARY OF PUBLIC INVOLVEMENT

Public involvement has been a fundamental part of management planning on West Mountain WMA and public access planning on the Private Timberlands.

The public process leading to the original 2002 Plans included 35 public meetings, workshops, and comment sessions; multiple requests for written comments (yielding more than 550 letters, emails, and postcards); the inclusion of many interest groups; and a devoted website to inform the public about the process and ways to be involved. This level of public involvement was, and remains, unprecedented for any project in which ANR has been involved.

The 2014 Plan updates involved a process similar to the original. In 2013, the Kingdom Heritage Lands Partners began meeting regularly to guide the update process. Scoping took place in individual meetings with local municipalities and numerous stakeholder groups, and with two public meetings in June 2013. About 100 members of the public attended these public meetings in Brighton and Lyndon, and a 60-day open comment period following the public meetings garnered 40 letters and emails. A website was maintained to provide documents and update the public on the process.

Details on the public process and the content of public comments may be found in Section V.

F. MANAGEMENT DIRECTION FOR THE KINGDOM HERITAGE LANDS AS A WHOLE

Another important factor considered in planning for the future management of the West Mountain WMA and public access on the Private Timberlands is the broader management direction that was formulated for the Kingdom Heritage Lands as a whole. The management of these parcels should remain consistent with, and contribute to, the achievement of the broader management direction. Much of the overarching management direction was developed before the conveyance of the land from Champion by the public and non-profit partners who collaborated on the acquisition (*i.e.*, ANR, VHCB, VLT, TNC, USFWS, and The Conservation Fund), and this vision has been enriched by the public planning processes and ongoing collaborations of the partners.

1. Overall Vision

Since early in the acquisition effort, the broad vision for the future of the Kingdom Heritage Lands has been the following (not in any particular order):

- Keep the area undeveloped;
- Produce a sustained flow of high-value timber;
- Exemplify environmentally sensitive forestry;

- Protect and enhance habitats for a diversity of native species;
- Protect environmentally sensitive areas;
- Conserve large, regionally significant northern forest ecosystems for their inherent value and as a place to study and observe the workings of ecosystems;
- Protect ecosystem function and natural ecological processes;
- Continue sustainable utilization of wildlife resources through hunting, fishing and trapping;
- Continue the tradition of open public access and compatible recreational use of the land;
- Continue the important role these lands have played in the culture and economy of the region.

This broad vision is to be accomplished through different but complementary management and use of the three ownerships that make up the Kingdom Heritage Lands. On the portion of the property now owned by Plum Creek (nearly 2/3 of the overall area), timber production through sustainable forestry and compatible public recreation are the dominant uses, with certain wildlife habitat benefits as ancillary values. West Mountain WMA, which represents approximately 1/6 of the overall area, is managed for a combination of ecosystem protection, traditional wildlife habitat management, and compatible public use, with timber management ancillary to those other purposes. The Conte Refuge, which covers the remaining 1/6 of the overall area also is managed for wildlife, ecological values and compatible public recreation.

2. Overall Theme for Management

The following statement incorporates the broad vision outlined above and the important background considerations described earlier in this document into a single unifying theme for management of the Kingdom Heritage Lands:

Manage the Kingdom Heritage Lands as a rugged, remote, and ecologically sustainable landscape, with diverse and complementary forms of land management designed to preserve and enhance environmental, social, and economic values, by providing for the production of forest products, conservation of rare and exemplary natural features and ecological processes at both a large and small scale, habitat for target wildlife species, and maintenance of the special opportunities for public use and recreation provided by this large, undeveloped landscape and primitive setting. This will require that the mix and relative dominance of management and uses will vary both among the three ownerships and within a single property.

3. Goals and Objectives for the Management of All Three Parcels

Within the broad bounds of the overall vision and management theme stated above, the following goals and objectives provide more specific direction for the management of the Kingdom Heritage Lands as a whole. Both the goals and objectives identify ends to be achieved through management, but the goals are more general, while the objectives are more explicit and measurable.

a. Management Goals:

- 1) *Enhance and restore natural resource conditions (e.g., develop a structurally diverse and productive forest, restore in-stream habitats and riparian buffers, and enhance wildlife habitats) and improve the stewardship of natural resources in the future.*
- 2) *Protect native biodiversity at the site, ecosystem, and landscape levels.*
- 3) *Rebuild, diversify, and stabilize the contribution these lands make to the local and regional economy.*
- 4) *Provide opportunities for continuation of the public uses that have taken place historically on these lands (e.g., hunting, fishing, trapping, and other dispersed pedestrian uses) and for other compatible recreational activities.*
- 5) *Maintain the area's predominantly undeveloped, rugged, and remote character and the contribution it, the wildest part of the region's landscape, makes to local communities and the rural lifestyle of its residents.*

b. Management Objectives:

- 1) *Protect or restore rare species and rare or exemplary natural communities*
- 2) *Protect and enhance wildlife habitats and provide both active and passive wildlife habitat management, as appropriate for designated target species, which addresses local, regional and national needs.*

Wildlife habitat management will occur on all three parcels, but wildlife habitat benefits on the Private Timberlands will be ancillary to timber production. On the Conte Refuge and the West Mountain WMA, active wildlife management activities (including forest management) will be undertaken specifically to improve conditions for target species.

- 3) *Provide a large ecological Core Area or areas on the public lands where natural processes are allowed to proceed with minimal human management and which will provide a benchmark over time for comparison with more intensively managed landscapes.*
- 4) *Protect and restore aquatic ecosystems.*

The terms of the easements for the Private Timberlands and West Mountain WMA call for measures such as riparian buffers aimed at protecting and, over time, restoring aquatic ecosystems. While not mandated by easements, the U.S. Fish and Wildlife Service will undertake such efforts on the Conte Refuge lands as well. Other more active restoration efforts also may be appropriate.

- 5) *Manage forest lands for a variety of benefits, including a sustainable flow of forest products and high-quality habitat for target wildlife species.*

Note that not every stand will be managed for all uses. Most timber harvesting activity will take place on the Private Timberlands, where sustainable production of forest products is a primary objective (as called for in the Conservation Easement on that property). Timber harvesting for wildlife management purposes will take place both on the Conte Refuge and on the West Mountain WMA.

- 6) *Protect the predominantly wild, undeveloped, rugged character of the Kingdom Heritage Lands, with a minimum of developed recreational infrastructure*
- 7) *Continue compatible dispersed pedestrian utilization of the lands and their resources for such activities as hunting, fishing, snowshoeing, wildlife observation, and trapping in a “big woods” northern Vermont setting.*
- 8) *Provide for other forms of public use and recreation (e.g., trail-oriented activities such as snowmobiling and hiking) as compatible with the easements and agency policies and mission.*

G. MANAGEMENT OF THE WEST MOUNTAIN WMA IN THE CONTEXT OF MANAGEMENT OF THE OTHER PORTIONS OF THE KINGDOM HERITAGE LANDS AND BROADER REGION

The West Mountain WMA and, indeed, all of the Kingdom Heritage Lands, are part of a vast, heavily forested landscape that extends from northeastern Vermont, across northern New Hampshire and into Maine. When viewed from a larger scale this ‘Great Northern Forest’ extends into the Adirondacks of New York, although continuity with this adjacent heavily forested area is interrupted somewhat by the less heavily forested and more developed Champlain Valley.

This forested region was the domain of large, industrial forestland ownerships for two centuries, but it also has included some large public holdings, most notably the White Mountain National Forest and Adirondack Park. In recent decades, additional large public lands have been purchased, along with public access and/or conservation easements over thousands of acres of private lands.

Although the majority of New England was deforested and converted to agricultural land use by European colonists and their descendants, the ‘Northern Forest’ has seen comparatively little land use conversion through the centuries. It has always been a heavily forested region, where timber harvesting activities followed cycles of cutting, regrowth and maturation of trees. Wildlife populations in turn responded to either abundance or scarcity of preferred habitat, but were also heavily affected by changing laws and human attitudes. For example, there were no laws regulating the harvest of deer and moose until the latter part of the nineteenth century, and ospreys and peregrine falcons were unable to recover until pesticides such as DDT were outlawed.

The Kingdom Heritage Lands continue today as part of this vast northern forest region. Land use on the majority of the more than 132,000 acres, including a portion of the West Mountain WMA, will continue much as it has for the past 200 years. The Kingdom Heritage Lands and the surrounding region are managed to provide a variety of forest products (including sawlogs, pulpwood), venison, berries, fur, endangered species habitats, and a host of deep woods recreational opportunities. In short, habitat conditions will, in general, remain similar to what they have been over the past several decades. This is especially true for the Private Timberlands, where sustained production of quality forest products is a primary ownership and management goal. Although there limited or no logging activity in some buffer areas and Special Treatment Areas on the Private Timberlands, the vast majority of these lands will be logged at regular intervals.

The US Fish and Wildlife Service is writing a legally-mandated Comprehensive Conservation Plan (CCP) for the Silvio Conte Refuge that will go out for public review in early-mid 2014. The CCP will lay out strategies to address land conservation, habitat management, public recreational opportunities, environmental education, and partnership efforts. Subsequent to the CCP, the Service will also prepare a more detailed Habitat Management Plan. A range of active and passive forest management is anticipated as means of achieving the habitat objectives of the focal wildlife species.

Relative to past timber management practices, one of the greatest changes in management has been the establishment of the 12,500 acre Core Area on West Mountain WMA. Over time, forest development in this area, will have a variety of effects on different wildlife species. Species which prefer older forests, with an abundance of dead and downed material, deep forest litter, and big trees, and those that are more apt to be impacted by roads and trails, will generally find more favorable habitat conditions in the Core Area. Other species which thrive in newly cut areas and younger forest growth, and which might be more tolerant of roads and trails, may find more valuable habitats outside of the Core Area. These effects are further described in Section VI.B.4.

Outside of this Core Area, the continuation of active forest management on these and surrounding lands is actually counter to the prevailing trend throughout much of the northeast. As suburban sprawl continues, forests once owned by farmers and other larger landowners are being carved into smaller, residential units. The new owners generally do not make their living from the land they live on, and are much less inclined to harvest timber on a regular basis, if at all. Consequently, forests in the Northeast are in general growing older, and the area in seedling - sapling sized forests, important to many species of wildlife, is declining.

H. RATIONALE FOR ESTABLISHING AND MANAGING A CORE AREA

This section differentiates between the Active Management Area and the ecological Core Area, explains the rationale for differentiating between these two areas, and articulates how management of the two portions of the WMA complement one another.

1. Purposes of Wildlife Management Areas

a. Wildlife Management Areas in General

In addition to the West Mountain WMA, The Vermont Fish and Wildlife Department owns and manages 89 wildlife management areas (WMAs) totaling over 133,000 acres. The majority of these WMAs were acquired in the 1960's and 70's using Fish and Wildlife Department funds and matching Federal monies. The two principal sources of federal monies used were the Federal Aid in Wildlife Restoration Act (also known as the Pittman-Robertson Act or P-R) and the Land and Water Conservation Fund Act (LWCF). Parcels acquired with the assistance of these Acts have detailed conservation and/or recreation purposes that must be met. Many WMAs acquired with P-R funds were purchased to "*provide big game and upland game restoration and public hunting*", whereas LWCF funds generally require the land to be managed for a variety of outdoor recreational activities including boating, hiking, snowmobiling, cross-country skiing, hunting and fishing. The Department's Strategic Plan includes the goal of "*Provide(ing) a diversity of quality fish and wildlife-based activities...*", and states that a desired outcome of management is to "*Provide a diversity of wildlife harvest opportunities...*". This goal and outcome are well served by WMAs managed for the purposes outlined in the Pittman-Robertson and Land and Water Conservation Fund Acts.

Wildlife Management Areas acquired within the last decade have continued to utilize P-R and LWCF funding sources; however, major funding also has come through other sources such as the Vermont Housing and Conservation Board and non-governmental organizations. Purposes of these more recent acquisitions often include language addressing the preservation and enhancement of ecological values and forest and wetland systems.

In addition to the purposes required to be served by the Federal Acts and wishes of other funders, the Department has its own WMA management goals. For example, another goal of the Department's strategic plan which is particularly relevant to management of WMAs is to "*Conserve, enhance and restore the ecological integrity of Vermont's natural and habitats and the ecological processes that sustain them.*" Even though the acquisition purpose for many WMAs may not speak directly to this goal, these lands can often contribute to the desired outcomes: "*Conserve, enhance and restore habitats, natural plant and animal communities, and ecosystem integrity to maintain wildlife and ecological values...*" and "*Conserve and restore Vermont's fish, wildlife, and plant species to maintain ecosystem integrity...*" Still other Department goals include providing areas for a variety of fish and wildlife-based activities (hunting, fishing, trapping, wildlife viewing); habitat restoration, protection and enhancement; and conservation of rare species and natural communities. Finally, Wildlife Management Areas may also provide sites for education, research, as well as demonstration areas for "*State of the Art*" land management.

Achieving the Department's diverse goals on each WMA requires thoughtful evaluation of the natural resource values present on each parcel, and balancing competing demands in light of resource capabilities and values. Thorough ecological assessments are undertaken to identify the natural resources (*e.g.*, wetlands, significant natural communities, deer wintering areas) that may warrant special management consideration such as buffers, set asides, or special forest management prescriptions to maintain wildlife populations or the natural diversity of fish and

wildlife species. Other less sensitive portions of WMAs provide opportunities to create specific habitat conditions, primarily through forest management and timber harvesting. Forest management in Active Management Areas is directed at benefiting selected wildlife species (*e.g.*, game or furbearers, species popular for viewing, and species with declining populations). Such strategies can also provide a sustainable supply of forest products for the local and regional forest products manufacturing facilities. As a result, users of Wildlife Management Areas can often experience a range of habitat conditions and outdoor recreation opportunities, and encounter a variety of fish and wildlife species, on any given visit.

Long range management plans for WMAs customarily consider current and future conditions on adjacent lands, with the goal of supplementing and enhancing fish and wildlife habitat conditions by filling gaps in local and regional habitat availability. However, consistent with the purposes outlined above, this must be done without sacrificing a wildlife management area's purpose of conserving a variety of fish and wildlife species and natural communities, as well as providing a diverse set of fish and wildlife-based activities.

b. West Mountain WMA

The primary purposes of the West Mountain WMA acquisition include the conservation and protection of biological diversity, natural communities, and ecological processes, as well as providing opportunities for compatible public recreation, including but not limited to wildlife-based activities such as hunting, wildlife viewing, fishing, and trapping. Secondary purposes are to manage more intensive public uses (*e.g.*, snowmobiling) by defining recreational corridors, conduct sustainable management and utilization of wildlife resources, conduct sustainable management of forest resources and protect the remote and undeveloped character of the property. As explained more fully in the State Lands Easement and in this Management Plan, the West Mountain WMA attempts to meet these goals through the use of two distinct management approaches, an Active Management Area and a passively managed Core Area.

The evaluation of resources and balancing of resource protection, management, and public use at West Mountain WMA presents challenges not unlike those faced when making management decisions on many other WMAs. However, the Management Plan for West Mountain WMA must address an additional challenge not faced in the planning for typical WMAs. Certain recreational uses that are not normally priority uses on wildlife management areas (*e.g.*, snowmobiling, mountain biking, and equestrian use), must be incorporated in the Plan for the West Mountain Wildlife Management Area due to legislative mandates. Further, these additional uses must be managed in a manner that minimizes their impacts on both the natural resources of the property and fish and wildlife-based recreational experiences.

2. Reasons for Establishing a Core Area

a. General Background on the Need for Core Areas

The concept of establishing ecological reserves or core areas to provide long-term protection of native species, natural communities, and ecosystems has a long history and is now a matter of widespread scientific agreement. Although the concept has been around since the 1800s, it was

brought to the forefront most forcefully through the work on island biogeography by MacArthur and Wilson (1963, 1967). Ecological reserves or core areas have since become a cornerstone of the applied science, conservation biology. In a world of ever more fragmented landscapes, ecological disruptions, and imperiled species, ecological reserves act as biological oases, maintaining critical treasuries of past, present, and future biological diversity.

The establishment of the Core Area at West Mountain WMA is consistent with the Vermont Fish and Wildlife Department's mission, "*conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont.*" Although there is considerable practical knowledge on how to maintain healthy populations of many well-known species of fish and wildlife, there are many more species for which there is very limited information. A widely accepted tool for conserving all species is a concept referred to as the coarse filter approach. This approach recognizes that we have not identified all species of plants and animals, especially understudied groups like fungi, bryophytes, and invertebrates. In addition to these unknown species, developing individual long-term protection plans for the thousands of species that have been identified and classified is not practical. The coarse-filter approach hypothesizes that by conserving multiple, viable examples of all natural community types, distributed throughout their geographic range and representing their full variability and natural scale of occurrence, as well as by providing for maintenance of the ecological processes which sustain them, the majority of known and unknown species will be conserved.

An overarching reason for establishing ecological reserves is that they are areas where the forces of nature determine the characteristics of the ecosystem. Ecosystems functioning under the influences of natural ecological processes (nutrient cycling, energy flow, natural disturbance, succession, competition, stream flow, lake stratification, and many others) have been the basis for the development, adaptation, and evolution of life on earth. Although actively managed lands clearly provide many benefits to people and particular species of plants and animals, Core Areas provide the setting in which many species can evolve in response to long-term environmental change rather than in response to human alteration of natural systems. Clearly, adaptation and evolution occur over very long time periods and over wide geographic ranges, so large, sustainably managed landscapes are also critical.

Ecological reserves allow the full complement of species native to mature terrestrial and aquatic ecosystems to become established and persist. Species of concern include some soil microorganisms, aquatic macroinvertebrates, lichens, fish, birds, mammals, and likely even species that are not yet known or described. Large contiguous areas with minimal human disturbance may be necessary for some sensitive mammals and birds. Some microhabitats develop as a result of natural disturbance events occurring over long periods of time. Wind throw of individual trees creates the pit-and-mound topography of upland forests and the hummocks and wet hollows of swamps – microhabitats important for many herbs, bryophytes, other plants and insects. Similar microhabitats may develop in high-quality aquatic communities. In addition, reserves managed primarily for biological integrity and unimpeded functioning of ecological processes are more likely to be resilient to the invasion of exotic species. Most of the exotic species that currently threaten the integrity of Vermont natural communities are spread in association with mechanized land disturbance (such as road building) or by accidental and purposeful introduction to aquatic systems.

Ecological reserves also allow forests to develop the characteristics of biologically mature ecosystems. Old forests differ from early and mid-successional stands not only in the age of the trees, but also in species composition and structure. For example, there is considerable evidence from early land survey records that the relative abundance of tree species in Vermont forests has changed since pre-settlement times. In particular, American beech, red spruce, and hemlock were more abundant in our pre-settlement forests, and sugar maple was less abundant. Clearly, the goal should not be to manage reserves for any predetermined species composition, but instead, allow reserves to provide the setting in which species composition can be determined by centuries of functioning ecological processes.

Natural communities are not static – they are dynamic as a result of shifting species distributions and population sizes affected by long-term changes in the environment, especially climate. Paleoecological studies have documented the dramatic changes in our region's biota since the retreat of the glaciers 13,500 years ago – from open tundra, to cool spruce forests, to warmer oak and pine forests, to the current northern hardwood forests. Large reserves imbedded in a reasonably intact forest matrix will allow for these types of species shifts and recolonization to occur within the range of physical environmental conditions captured by the reserves. Reserves are needed to allow for landscape scale shifts in species distribution and abundance, since much of the current landscape is highly developed or fragmented by roads, dams, and other features that can impede movement and migration of plant and animal species.

Matrix natural communities are those that dominate the landscape and form the background in which other smaller scale communities occur. Matrix communities have broad ecological tolerances, and occur across a wide range of soil and bedrock types, slopes, aspects, and landscape positions. Regional scale processes such as climate typically determine their range and distribution. Northern hardwood forest is an example of a matrix forest type. Establishment of core areas that include examples of matrix communities at a size at least two times larger than any likely natural disturbance event is the preferred technique for conserving these community types over the long term and providing the opportunity for the species composition to shift over time in response to changing environmental conditions.

Related to these intrinsic values of intact, functioning ecosystems is the value of establishing reserves because they provide ecological baselines to benefit human understanding of nature and our impacts to it. Human activities have altered almost every part of Vermont and the Earth, with alterations varying in degree from extreme to very minor. Ecological reserves are areas where human influences are or will be minimal. Reserves serve as benchmarks where we can detect and measure subtle or dramatic changes in the structure and composition of natural communities over time in response to environmental change. These benchmarks also make it possible for us to compare ecosystems that are experiencing modern human alteration with those that are relatively free of those effects. This is critical in order for us to understand many types of human effects on natural communities and larger landscape ecosystems. Consequently, the education and research values of ecological reserves are great.

b. Why Establish a Core Area on West Mountain WMA

The Northeastern Highlands is one of Vermont's eight biophysical regions. It is characterized by its cool climate, long annual period of snow cover, granitic and weakly calcareous metamorphic bedrock, abundant glacial features such as eskers and kames, dominance of spruce-fir and northern hardwood forests with abundant wetlands, and generally sparse human settlement. These characteristics are all well represented in the West Mountain area. The forests, wetlands, and aquatic systems in the vicinity of West Mountain are considered of statewide and regional significance. As described in detail in Section IV of this plan, the significance of the West Mountain WMA is based on the:

- concentration of uncommon, rare, threatened, and endangered species;
- concentration of uncommon, rare, and State significant examples of natural communities;
- concentration of lakes and ponds, many of which are highly ranked for their wild character or presence of rare species;
- many miles of high quality streams.

The selection of this area for the establishment of an ecological reserve or Core Area is based on the above features, as well as the following characteristics:

- it provides a good representation of the physical environmental conditions present in the Northeastern Highlands biophysical region, including bedrock types, surficial deposits, elevation, slope, and aspect; and
- the presence of two matrix natural communities (northern hardwood forest and red spruce-northern hardwood forest) that are of sufficient size to absorb unimpeded natural disturbance events without significant losses in the various components of the community, and that will, over time, develop into benchmark examples of their types.
- the West Mountain area combines all of the above resource values with being one of few large blocks of land with minimal fragmentation in the Northeastern Highlands biophysical region. The other relatively unfragmented blocks in the biophysical region are the Nulhegan and Victory Basins, both of which have quite different characteristics than the West Mountain area.

IV. PARCEL DESCRIPTION

This section of the plan provides a description of the natural, cultural and recreational resources present on the West Mountain WMA . Detailed information, far too long to be included in this plan, exists on many aspects of the resources of the West Mountain WMA. For example, resource inventories were conducted during the summer of 2000 on the following topics: natural communities; vascular plants; amphibians and reptiles; small mammals; breeding land birds; fish and aquatic macro invertebrates; insects; migratory waterfowl, marsh birds, and wading birds; pre-settlement forest composition; historic and archaeological resources; and recreational resources. In addition, other information has been collected on the resources of this area independent of the original planning process. For a list of these materials and how they may be obtained, see Appendices F and G.

A. OVERVIEW DESCRIPTION OF THE PROPERTY

History: The West Mountain WMA consists of approximately 22,000 acres located in Essex County, Vermont. This parcel was acquired as part of the complex land transaction to acquire the 132,000 acres of land formerly owned by Champion Paper Company. The forests on these lands have been altered by a long history of timber cutting, dating back to the early 1800's. The first period of heavy cutting began in the Paul Stream and Nulhegan watersheds at the turn of the 20th century, after pine had been depleted in other areas of New England and spruce had become the replacement for saw logs. By this time, the lumber business and ownership of timberlands had consolidated, and logs were being transported in huge drives down the Connecticut River to industrial lumber mills. After the large sawlogs were cut in the early 1900's, industrial pulp and paper companies purchased these lands primarily for the remaining stock of spruce fir pulpwood for the manufacture of paper - first the Stone & Webster Company (1912), followed St. Regis Paper Company (1927), and then Champion Paper Company (1984). After harvesting most of the economic timber stock, Champion sold these lands (1999) through a complicated transaction involving a partnership of public and private funds.

Landscape and Natural Features: The West Mountain WMA lands are dominated by three major features: in the center of the parcel, West Mountain rises to a modest elevation of 2,733 feet above sea level; to the north and east the land drains into a series of small ponds in the Wheeler Stream drainage, while to the west and south Paul Stream drains an area dominated by Ferdinand bog. These two stream drainages, which are tributaries of the Connecticut River, contain what is thought to be the greatest concentration of glacial ice-contact deposits in Vermont. The result is a highly varied terrain containing kames, kame moraines, eskers, and kettles surrounding the resistant granite of West Mountain. Notch Pond Mountain, part of the Nulhegan Basin's mountainous rim to the north of West Mountain, separates the Wheeler Stream and Paul Stream drainages from the Nulhegan River. The mountains and high hills on the West Mountain WMA are strongly dominated by northern hardwood forests, while the stream drainages are dominated by red spruce northern hardwood forest or lowland spruce fir forests, and a variety of wetlands and ponds. The wetlands are predominantly northern white cedar swamps, spruce fir-tamarack swamps, and alder-beaver meadow complexes. The ponds are small and shallow, with tannic (tea-colored) water.

The diversity of terrain and natural communities on the West Mountain WMA produces a rich biological system. As intended in the division of the Kingdom Heritage Lands, the public lands, comprised of the West Mountain WMA and the Conte Refuge lands, include the areas with the most ecological interest or sensitivity. The lands to be included in the West Mountain WMA were selected in part due to a number of sites known to be among the best examples in Vermont of various types of wetland and pond complexes. These wetland and lowland natural community complexes typically also harbor substantial numbers of rare, threatened, and endangered plants and animals. The areas identified as having high ecological significance include:

- Ferdinand Bog (a large, diverse wetland complex of statewide significance that includes an unusual type of poor fen, alluvial forest and shrublands, and northern white cedar swamp, and rare plant and animal species),
- Dennis Pond (a pond/poor fen-wetland complex of statewide and regional significance that is home to a number of rare plant species),
- Mud Pond (an undisturbed poor fen wetland-pond complex with rare plant species),
- West Mountain Pond (a shallow, tannic pond and a mature northern white cedar swamp with rare plant habitat), and
- South America Pond (an undeveloped dystrophic pond with rare plants).

Other significant natural features of the WMA include the largely un-fragmented examples of northern hardwood forest and red spruce northern hardwood forest. Although the quality of most of the forest is currently low due to past heavy logging, with 54% in the pole timber size class (4.6" to 10.5" diameter at breast height) and more than 20% in relatively open stands (less than 40% crown closure), their size, landscape context, and (eventually) quality make them forests of state and regional significance (from a natural community perspective). There are also a few areas of mature forests including some small but good quality examples of lowland spruce fir forest; black spruce swamp; northern white cedar swamp; a red spruce hardwood boulder-slope forest; a paper birch-red spruce forest on the steep north slope of Notch Pond Mountain; and an area of high elevation northern hardwood seepage forest on West Mountain.

In the summer of 2000, ecologists and scientists conducted a variety of detailed inventories of the flora and fauna of the West Mountain WMA. The results of these studies are summarized in the following sections (see Appendix E for a list of these studies).

Roads: Although logging roads and trails have been part of the landscape since the 1800's, they were limited in extent, functioning as a support network in the transport of logs via Paul Stream until 1938 when the Paul Stream Truck Trail was built. Further, until the advent of skidders, use of horses to yard timber limited where and how roads were built. In the 1950's and 1960's, as the transition to skidders and truck transport was completed, a new effort was initiated to increase the logging road network.

Existing gravel logging roads and trails are shown in Figure 4. There are currently 73 miles of roads in the West Mountain WMA. Approximately half are Class A roads; that is, gravel, all-purpose roads with permanent drainage structures, for continuous use except in the winter and spring mud seasons, when they are closed. The other half are Class B roads, less durable gravel

roads that typically dead-end at log landings and may or may not be open to public motor vehicle travel.

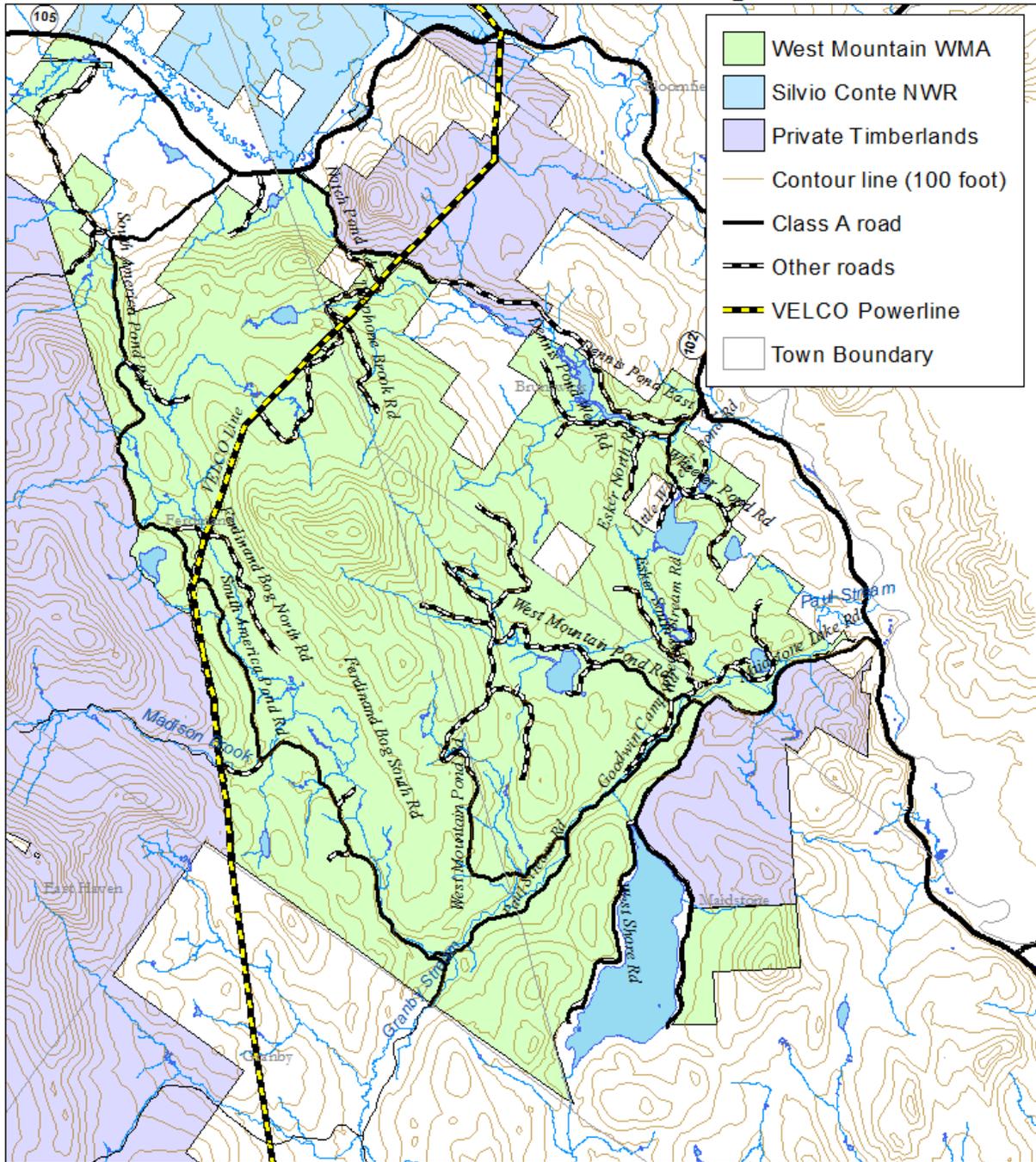
Cultural Features: Although there are only a few remnants and artifacts remaining, at various times in its history, these lands included dams used for log driving, a grist mill and sawmill located on Paul Stream, and a large logging camp near Ferdinand Bog on Paul Stream. In addition, a major long distance travel route, known as the Magog Road, passed through the area near Dennis Pond. It connected Montreal with ports on the Kennebec River and Atlantic coast in Maine. Parts of this road are still in existence.

Private Camp Leases: There are 64 leased lots with private camps on the West Mountain WMA lands. The camp leases are to be phased out over the coming century, consistent with the 1999 Budget Adjustment Act, the State Lands Easement, and Act 215 section 347 of the 2006 Acts and Resolves of the Vermont Legislature.

Recreational Resources: Existing recreational resources include 22,000 acres of backcountry lands accessed for a variety of activities by more than 70 miles of drivable gravel roads; approximately 30 miles of snowmobile trails; 25 miles of equestrian corridors on roads; a moose viewing platform; two campsites; eleven small ponds ranging in size from under 10 acres to 69 acres; Paul Stream and its tributaries; and Dennis Pond Stream.

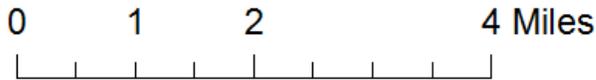
Figure 4: West Mountain Wildlife Management Area Base Map

West Mountain Wildlife Management Area



- West Mountain WMA
- Silvio Conte NWR
- Private Timberlands
- Contour line (100 foot)
- Class A road
- Other roads
- VELCO Powerline
- Town Boundary

Created by Doug Morin
 Vermont Fish & Wildlife Department
 April 2014



For planning purposes only. Not survey accurate.

B. BRIEF HISTORY OF LAND USE

Human occupation of the region predates Euroamerican settlement by several thousand years. Paleo-Indian occupation of lands around the Nulhegan Basin's northern rim and in North Stratford, New Hampshire, opposite the mouth of the Nulhegan on the Connecticut River, may date back to 10,000+ B.P. (Before Present) There are few known sites in the area; however, the Paleo-Indian site in Colebrook (27-C0-38) and the Early Woodland site in Canaan, Vermont (VT-ES-2), among others, suggest that there is much more to learn about the Native American occupation of the headwaters of the Connecticut River. Concentration of Native American sites and density of occupation steadily increases as one descends along the Connecticut River, until one reaches the principal Late Woodland period settlements in the vicinity of present-day Haverhill, New Hampshire and Newbury, Vermont.

The Nulhegan River was part of a long distance water and overland transportation route used by Native Americans, connecting settlements on the Androscoggin and Kennebec rivers and coastal Maine, settlements on the upper Connecticut River, and the settlements on the St. Francis and St. Lawrence rivers in Canada. The Nulhegan section of this long distance travel route lies at approximately the halfway point between the St. Lawrence and Maine settlements. The West Mountain Wildlife Management Area is located at a junction along the east-west trail that intersects with the Connecticut River, a north-south route.

A segment of an early Euroamerican overland route, the Magog Road, which passes through a portion of the West Mountain WMA in Brunswick, possibly followed the route of an existing portage trail used by Native Americans on their east-west passage through the Nulhegan section of the long distance travel route.

Years of intermittent yet continuous warfare with and among Native Americans made much of northern New England, including the West Mountain area, inhospitable to English settlement during much of the eighteenth century. The fur trade that developed with Euroamerican occupation changed the Native American cultures and increased conflicts among tribes; and disease introduced by Euro-Americans wiped out 90% of the native populations. Eventually, the Native American population withdrew from the area, and Euroamerican settlements were established following the American Revolution.

The history of the last 200 years has had three dominant phases. The first phase (A.D.1780-1850) is generally considered an agricultural age exemplified by the subsistence farm and small-scale craft industries. Logging, the dominant activity in the uplands and swamps, was a component of this integrated farm and lumber manufacturing economy. During this phase, in the last decade of the eighteenth century, Brunswick, Maidstone and Ferdinand were settled. This period is best identified by the construction of the Cargill grist and sawmill (Figure 12) on lower Paul Stream in Brunswick in 1800, the first recorded industry in the West Mountain Management area. Typical of this early phase, this enterprise established a unique symbiosis between agriculture, and logging and lumbering, a union that was to form the backbone of the local economy as well as that of the rest of the northern New England rural economy. Also during this early phase, the Brunswick segment of the Magog Road (Figure 12), which follows along Wheeler and Dennis Pond Streams through the pass between Notch Pond Mountain and North Notch Mountain, was

surveyed by Timothy Hinman in 1793 and utilized as a long-distance stage and freight route ultimately connecting Montreal with Portland (an ice-free port on the Atlantic). Several families (1820-21) attempted to settle along this stretch of the Magog Road in Brunswick. The exact location of the settlement is not known. Other sawmills were constructed in the immediate area, and the curative properties of Brunswick Springs may also have been a factor in the early settlement of Brunswick and Maidstone.

The second phase of local Euroamerican history (A.D.1850-1900) is characterized by increasingly intensified wood harvesting, and the consolidation of timber interests into the hands of a few large companies. It represents the onset of the “industrialization” of the forests. Two important technological introductions - the railroad and large-scale wood manufacturing were instrumental in these developments. Agriculture continued through this period but was heavily influenced by the demands of the forest industry as well as by the incentives introduced by rail transportation. Three mills have been identified as belonging to this period in the Paul Stream-Maidstone Lake area. Brown's Mill, the Beattie Mill, and the Norris/Merrill Mill (Figure 12) were relatively large-scale in operation and were constructed as a result of the Grand Trunk Railroad opening the area up to commerce and manufacturing. Several mills in the Nulhegan Basin were also built as a result of the railroad. It is probable that some of the businesses on the Nulhegan milled wood drawn from the West Mountain area during this period.

The third phase of historical development (1900-1990s) in the West Mountain Management area is characterized by a final phase of land consolidation, large-scale harvesting and the elimination of the large wood manufacturing mills throughout the Nulhegan District. George Van Dyke and the Connecticut Valley Lumber Company (CVL) dominated the woods industry in the upper Connecticut River drainage. Control of the timber reserves in this vast area was accompanied by a decision to drive all softwood saw logs to mills well down the Connecticut. While the practice of booming logs, building dams and driving logs on the Nulhegan River and Paul Stream were of nineteenth century origin, the scale of operation assumed by the CVL under Van Dyke's management marked the industrialization of the northern woodlands. This industrialization eliminated the softwood saw-log from the area's inventory, but harvesting of smaller logs and hardwoods became economic as a result of chemical and mechanical innovations of the pulp and paper industry, developed by a succession of companies including, the Brown, St Regis, Champion, and International Paper companies.

C. DESCRIPTION OF LANDSCAPE, NATURAL COMMUNITIES, AND BIOTA

The landscape of West Mountain WMA features a single relatively high mountain in generally mid-elevation, moderately sloping to level terrain in which there is a network of ponds and streams. Practically in the center of the WMA is West Mountain itself, a 2,733-foot granite mountain. The granitic mountain land is one of four major landforms in the WMA. Schist-phyllite-quartzite mountain land is a second major landform. Notch Pond Mountain, elevation 2,068 feet, is a prominent feature of the schist-phyllite-quartzite mountain land. Paul Stream and the numerous ponds of the Wheeler Stream drainage are prominent features in another of the major landforms, a mid-elevation (980 to 1,500 feet) glaciofluvial landscape of kames, kettles, eskers and sands deposited in the shallows of an ice-dammed lake. The fourth major landform—

the Nulhegan Basin—comprises a small part of the WMA in the far north and is part of an extensive basin to the north and west which includes the Wenlock WMA, and Nulhegan Basin Division of the Conte National Fish and Wildlife Refuge.

West Mountain WMA is in the Northeastern Highlands Biophysical Region of Vermont, a region characterized by a shorter growing season and colder winter temperatures than most of the state (aside from the highest areas in the Green Mountains). It is also an area in which mountains are scattered across the landscape, rather than being oriented into ranges. Geologically, the WMA is representative of the biophysical region, in that it includes a relatively high, isolated mountain and two of the major bedrock types of the region—granite, and metamorphic schist-phyllite-quartzite. Nevertheless, the high concentration of glaciofluvial landforms in the area is unique in the State. From a natural community¹⁶ perspective, the WMA includes substantial acreage of both of the predominant natural community types of the biophysical region—northern hardwood forest and red spruce hardwood forest. The WMA also includes lesser amounts of a third natural community type common in the biophysical region—lowland spruce fir forest. For more general information on the biophysical regions of Vermont, and to compare the Northeastern Highlands with the seven other regions, refer to *Wetland, Woodland, Wildland* (Thompson and Sorenson, 2000).

The entirety of the WMA is within the Connecticut River drainage; the bulk of the land lies in either the Paul Stream or Dennis Pond Brook/Wheeler Stream watershed. Because of the varied topography in the area, the land ranges from nearly level in most of the wetlands, to extremely steeply sloping on both mountainsides and the shorter slopes of the kames and eskers. As in the whole of the Northeastern Highlands Biophysical Region, mountains are not strongly aligned in any direction; thus slopes with all aspects are present in the WMA.

More detailed information on the landscape, natural communities and biota of the WMA is available in a series of reports prepared for the planning effort for the Kingdom Heritage Lands. These reports cover natural communities and rare vascular plants; reptiles and amphibians; small mammals; breeding birds; insects, (butterflies, dragonflies, and damselflies); fish and macroinvertebrate communities; waterfowl broods and marsh birds; presettlement vegetation; and natural ecological processes (see Appendix E for a list of these studies).

1. Bedrock Geology

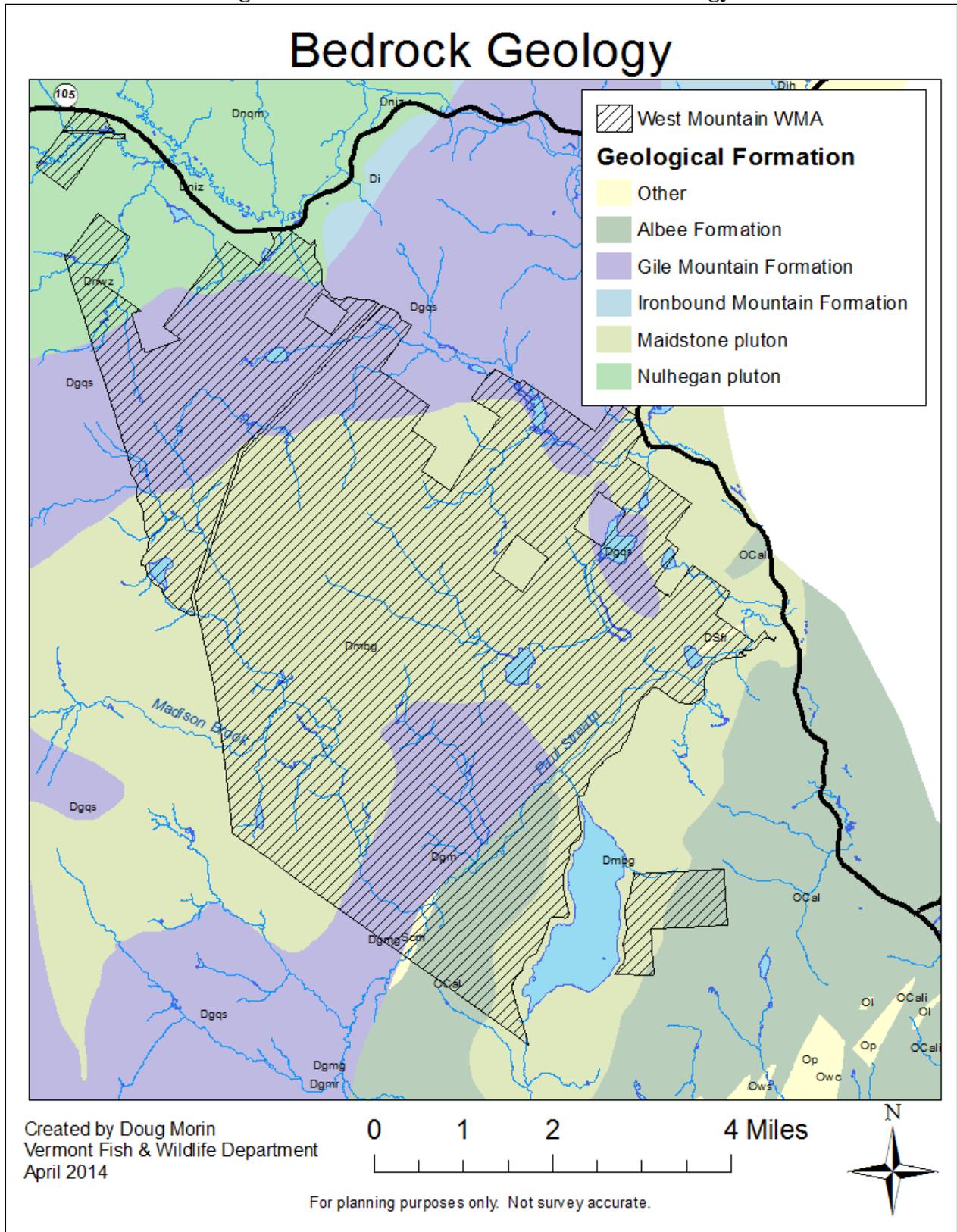
The West Mountain WMA is composed of three bedrock types (Figure 5)—granite of the Maidstone pluton; phyllite, schist and quartzite of the Gile Mountain formation; and quartzite, slate and phyllite of the Albee formation. The former two are of Devonian age, while the latter originated approximately 100 million years earlier in the Ordovician Period. Within the Gile Mountain formation, which occurs north and south of plutonic West Mountain, are Notch Pond Mountain, Notch Pond, Mud and Dennis Ponds, and Wheeler Pond. These are some of the botanically more diverse pieces of the landscape. Nevertheless, although the Gile Mountain formation does include beds of calcareous mica schist and crystalline limestone in some

¹⁶ A natural community is an interacting assemblage of organisms, their physical environment, and the natural processes that affect them (Thompson and Sorenson, 2000).

locations, no substantially calcareous areas, as judged by vegetation and natural communities, are known to occur in the WMA.

The Gile Mountain and Albee formations, and the granite of the Maidstone Pluton are three of the four major bedrock types that occur in the Northeastern Highlands; the fourth (not present on the WMA) is the Waits River formation, which in general exhibits greater mineral nutrient richness. Hence, the WMA does not include the natural communities or flora that are characteristic of the most nutrient-enriched ecosystems of the biophysical region. However, it does represent a characteristic geologic and topographic cross-section of the region, and the variety of natural communities, plants and animals that are common to the more acidic, nutrient poor lands in the Northeastern Highlands.

Figure 5: West Mountain WMA Bedrock Geology



2. Soils and Surficial Geology

The character of West Mountain WMA, particularly of the mid- and lower-elevation land, is to a large extent dependant upon the surficial geologic deposits¹⁷ resulting from glaciation. West Mountain WMA includes, perhaps, the greatest concentration of glacial ice-contact features in the State. The terrain east of a curved line from Mud Pond to West Mountain Pond and southwesterly to Ferdinand Bog is predominantly an ice-contact landscape. Ice-contact deposits, and washed till¹⁸, are formed in late-glacial environments in which a melting¹⁹ glacier leaves large ice blocks on the landscape. When glacial meltwaters subsequently deposit sand, gravel, cobbles and boulders around an ice block classic kames are formed; when meltwaters deposit sand, gravel, cobbles, and boulders in and under the ice block, eskers are formed. When the ice blocks melt, depressions of various sizes are left in the landscape. Many of the ponds, as well as Ferdinand Bog, appear to sit in ice-block depressions. Appearing as low, winding ridges, well-formed eskers occur in the valleys of Paul and Wheeler streams, and can also be seen scattered throughout the wetlands associated with Dennis, Mud and West Mountain ponds.

The upland soils of the ice-contact features are primarily spodosols, an order of soils characteristic of humid, cold climates and coarse, acidic parent materials. Spodosols are typical of a majority of the uplands of the Northeastern Highlands and the Green Mountains biophysical regions; they characteristically have a soil layer that has accumulated iron, aluminum and organic matter below a much paler layer from which these have been leached. The spodosol soils on the eskers, kames and washed tills of the WMA generally support red spruce hardwood and lowland spruce fir natural communities.

The WMA includes several boulder lag deposits—on the east side of Ferdinand Bog, south of Dennis Pond, west of West Mountain Pond, and north of Little Wheeler Pond. These boulder accumulations likely represent rock from the mountains that was plucked and deposited by ice. Glacial and ice-block meltwaters probably washed away the sand, gravel, cobbles and finer particles that were deposited with the boulders. The sloping bouldery soils are well drained and plants need to reach beneath the boulders to root in the soil. More level boulder-lag soils in the WMA are wetter, and the trees on them are shallowly rooted. These soils are likely classified as inceptisols, which have less profile development than spodosols; there are neither soil layers that have been substantially leached of minerals nor that have substantial accumulations of minerals or organic matter. Moist lowland spruce fir forests, or in rare instances, hemlock forests, frequent the bouldery soils.

Small ice-dammed lakes are often associated with glacial retreat in narrow valleys, just as the large post-glacial lakes in the Connecticut River and Lake Champlain valleys were associated with glaciers damming outlets that later became functional. A small ice-dammed lake apparently existed in the Paul Stream valley approximately from Browns Mill south to Granby Stream. The

¹⁷ Surficial geologic deposits are the material in which soils form.

¹⁸ Till is unsorted material of mixed sizes—from clay to boulders—that is carried and then deposited by a glacier. Washed till has had some of the finer materials washed away by meltwaters.

¹⁹ Melting glaciers are called ablating or ablational; they are losing ice faster than they are accumulating new ice. They are also sometimes referred to as retreating.

narrow band of shoreline deposits of the lake have somewhat excessively drained, sandy spodosol soils that support red spruce hardwood natural communities.

The surficial deposits of the mountain slopes are dominated by fine-loamy to coarse-loamy tills.²⁰ These unsorted deposits of sand, silt, clay and larger rock are typical of the Vermont mountain and hill landscape. Well-drained to moderately well-drained spodosols are dominant in these tills; moister or seepier pockets may have inceptisols. Northern hardwood forest, of numerous variants, is typical of the sloping tills. Montane spruce fir and montane yellow birch-red spruce forests typically occupy these soils where they are shallower to bedrock or at higher elevations.

An unusual landform—a high, wet-mesic²¹ flat—occurs between West Mountain and Notch Pond. The surficial deposit on the flat is likely basal till; the very seepy groundwater hydrology in association with the level to gently sloping terrain adds physical and natural community diversity to the mountain land. Moist variants of red (and black) spruce hardwood forest, lowland spruce fir forest, and northern hardwood forest occur on the wet and seepy soils of the high flat.

Among the surficial deposits of lesser extent are peat deposits. Peat deposits have been forming in many of the pond and wetland basins since glacial retreat. Shallow peat deposits also occur in some of the lowland conifer forests. The peats are organic soils, or histosols, that develop in permanently saturated conditions and contain a high percentage of dead plant (organic) material in various states of decomposition. The coniferous swamp forests and open peatlands are the natural communities that occur on the peat soils. Another type of histosol is muck soil. Mucks form when there is greater decomposition of organic material, generally due to greater availability of oxygen. Alder swamp and shallow emergent marsh are two natural communities of the muck soils.

Along parts of the streams in the WMA are deposits of recent sandy and silty alluvium. On these parent materials are entisols, younger soils that show little profile development at all. Floodplain soils are inundated in spring and can be quite droughty later in the summer. On these sites, floodplain forest and alluvial shrubland natural communities are common. On older alluvium, inceptisols and spodosols often develop; northern hardwood or red spruce hardwood communities frequently occur on these older or less frequently inundated floodplains.

Because of rather extreme differences in soil texture and groundwater hydrology in adjacent or nearby landforms, there often occur striking and abrupt changes from dry uplands to wet lowlands and wetlands. Soil drainage in the WMA ranges from excessively drained on the coarser, ice-contact landforms (*i.e.* eskers) to very poorly drained in the peat-filled basins. The mountain slopes are predominantly well drained; exceptions are groundwater seepage areas, which are characteristically moderately well to somewhat poorly drained, and shallow-to-bedrock soils, which are typically somewhat excessively to excessively drained. Soil drainage in the ice-contact landscape is more spatially variable, with close association of excessively drained

²⁰ Most of the mountain deposits are ablation till. In general, the ablation till either tumbles out of or off of the ice or is washed out a short distance. In contrast, basal till is deposited beneath a glacier and is commonly densely compacted by the pressure of the ice, and gives rise to less well drained soils.

²¹ Mesic refers to neither excessively wet nor excessively dry; it is a mid-range in a general moisture gradient.

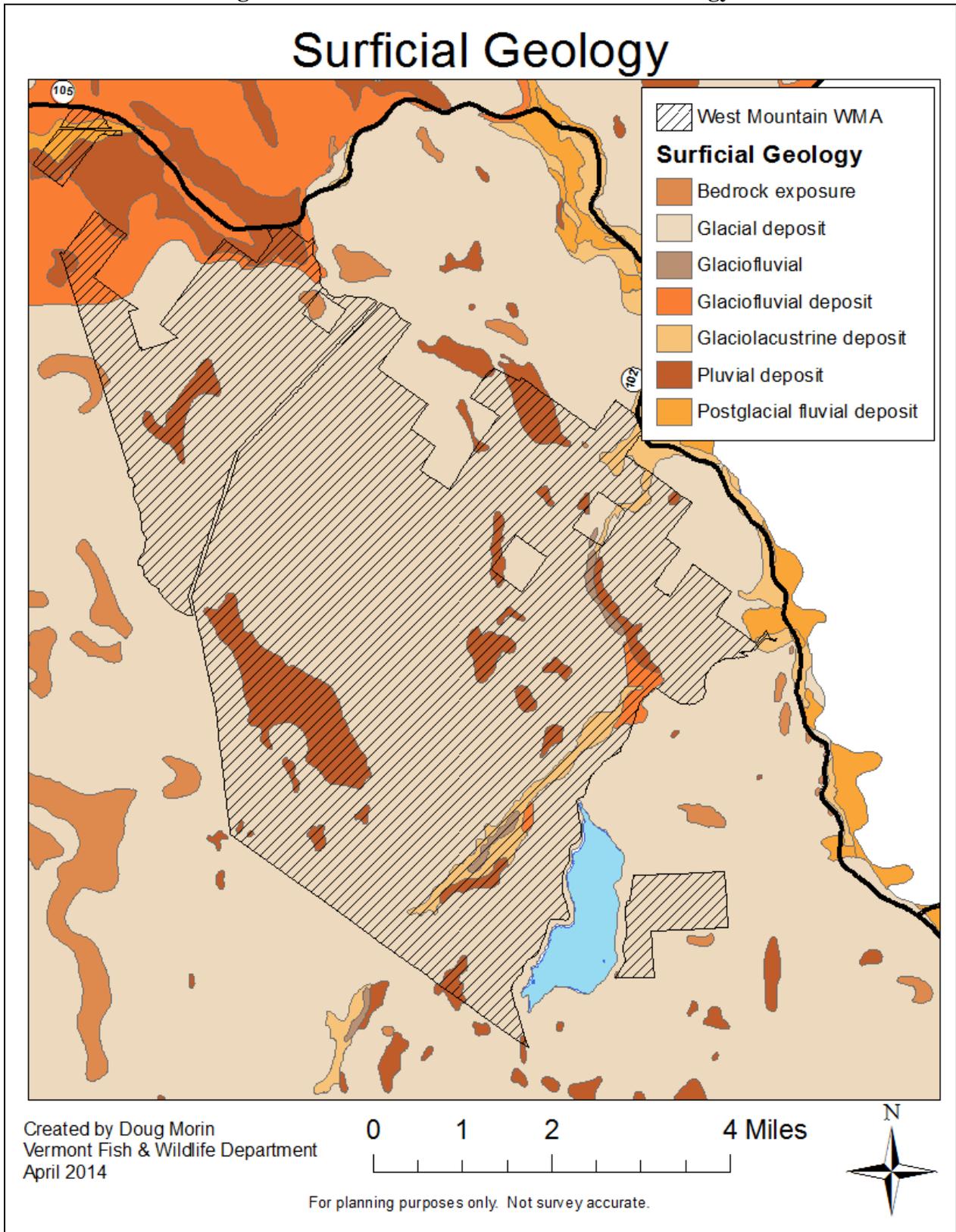
features and very poorly drained basins being common. The general terrain in the ice-contact zone is, however, well drained to moderately well drained; more discrete areas and landforms tend toward the extremes at both ends of the gradient.

Because of the climate and the differences among soils derived from kames and eskers versus those that developed in till, the soils of the West Mountain-Nulhegan Basin landscape, may be unique in the region. Soil scientists from Vermont and northern New Hampshire who have briefly visited the area agree that some of these soils are unlike soils they are familiar with from other parts of northern New England. More detailed work on soils, and on the hydrology and surficial geology that are so important to the formation of soils, will give greater understanding to the commonalities and uniqueness of the West Mountain WMA soils and those that exist in other parts of the region.

Soils, topography, and hydrology are very important to the understanding of both ecological relations among plants and animals and interactions among physical factors and natural disturbance patterns. The diversity of landforms, soils and geology at West Mountain provide a complex landscape in which there are many different habitats in a variety of spatial arrangements available to the fauna and flora of the area. Conservation of, and connectivity²² among, all the diverse parts of the landscape are essential to achieving the most natural state of ecological functioning in the WMA.

²² Connectivity refers to connections between and among different “pieces and parts” of a landscape. For some organisms, connectivity can be broken by barriers as little as a trail that compacts or erodes soil or removes soil litter.

Figure 6: West Mountain WMA Surficial Geology



3. Aquatic Ecosystems

The West Mountain Wildlife Management Area is part of the upper Connecticut River drainage basin. Drainage to the Connecticut River is via three watersheds: Paul Stream, Dennis Stream and to a very minor extent, namely its extreme northwestern portion, the Nulhegan River. Much of the Paul Stream main stem courses through West Mountain WMA, as does the entire Wheeler Stream, a major sub-watershed of Dennis Stream.

a. Lakes and Ponds

West Mountain WMA has a high concentration of ponds compared to most regions of Vermont (Figure 7). Eleven ponds occur in or partly within the WMA²³. A listing of these ponds along with physical characteristics, type, and rankings in the Vermont Lake Protection Classification System (DEC) is provided in Table 5 (in section IV.D.4. Recreational Resources and Facilities). To date 286 out of a total of 295 lakes and ponds 20 acres or greater in surface area have been assessed and classified by DEC.

West Mountain WMA encloses eight major ponds and a ninth pond straddles the WMA boundary. The ponds and physical and hydrologic information about them are listed in Table 5. All ponds but Dennis appear to be of natural origin and for the most part have outlets that have not been modified or raised. The ponds are morphologically quite diverse. They range in size from small (<10 acres) to large (70 acres). Their drainage areas vary from virtual headwaters (less than 150 acres) to substantial (over 8 square miles). Four are at an elevation of roughly 1000'. Three are situated over 1500'. Maximum depths range from 3' to 35'.

The West Mountain WMA ponds are generally small and shallow with tannic (tea-colored) waters and pH ranging from slightly acidic to around neutral. Ponds with these characteristics are typed as dystrophic (pond type is determined by macrophyte assemblages and physical characteristics (Warren, 1998)). All the ponds except Tuttle have one or more camps. Compared to most lakes and ponds, however, the relatively sparse shoreline camp development along many of the ponds gives the WMA ponds high "wilderness-like" rankings. Only 42 out of the 286 assessed lakes in Vermont have "wilderness-like" rankings of 8, 9, or 10. "Wilderness Like" means that there is some evidence of human activity, but activities and structures are inconspicuous enough that the pond still retains a wilderness-type feel. Dennis, Notch and South America Ponds have "wilderness like" rankings of 8. These three ponds lie within the Core Area that is established under this Management Plan. Given the management regime currently designated for that area, it will be possible for these ponds to move into the remote "wilderness" category over time. Currently, there are only ten wilderness lakes in Vermont. The other ponds located in the Core Area (West Mountain, Wheeler, Tuttle, and Buxton) are currently not "wilderness like" based on the Lake Protection Classification System criteria, but they have the potential to become "wilderness like" or "wilderness" ponds in the future. The smaller ponds, which have not been assessed by DEC but have been evaluated by ecologists during natural community mapping and rare plant inventory, appear to also meet the "wilderness-like" classification criteria.

²³ Except that Mud Pond, which is part of the Dennis Pond/Mud Pond system, is located on an inholding owned by TNC.

Several of the ponds (Dennis, West Mountain, and South America) have unusual scenic or natural features, such as bouldered shores or unique aquatic vegetation, and have high rankings (9, 7, and 7) in this category. Only 70 lakes statewide have rankings of 7 or better in this category and Dennis Pond is only one of 25 with a ranking greater than or equal to 9. In the category of Rare, Threatened, or Endangered Species, five of the West Mountain WMA ponds (Dennis, Wheeler, Notch, Paul Stream and West Mountain) ranked highly. While ranked largely on the basis of rare flowering plants (macrophytes), this category might also include pond-associated animals, such as common loon and osprey. With five rare plants, Wheeler Pond stands out as one of the most botanically significant ponds in Vermont. Wheeler Pond is one of four lake (including Lake Champlain) that have this high a number of rare, threatened, and endangered species. It received the highest rank of 10, one of only 22 lakes/ponds in the state with that rank. Furthermore, Notch and South America ponds received a ranking of 9 for rare species. Only 68 lakes/ponds statewide received a rank or 9 or 10 in this category.

The DEC Lakes and Ponds section recently completed an evaluation of lakes that incorporated the wilderness, scenic, and biological diversity information discussed above as well as water quality data. The purpose of this “Best Lakes” analysis was to highlight the uniqueness of Vermont lakes that exhibited high-quality characteristics across several categories. Three main categories were developed – water quality, biological diversity, and unusual or scenic natural features – that allow lakes to be scored and ranked in each category. The scores may also be combined into an overall composite score which incorporates all three categories.

Several ponds in the West Mountain WMA scored near the top of all Vermont Lakes. Dennis, South America and West Mountain Ponds are all ranked in the top 5% of the nearly 550 Vermont lakes ranked for Water Quality, Biological Diversity and Unusual or Scenic Natural Features. These ponds were scored highest for biological diversity, as they harbor rare species, diverse communities of aquatic plants, and unique habitat types in relatively unaltered conditions. These three lakes scored highly for their scenic qualities as well, and the wilderness-like character of Dennis and South America ponds also contributed to their high rankings. Notch, Paul Stream and Wheeler Ponds were ranked in the next highest category of Vermont Lakes, ending up in the top 20% of ranked lakes in Vermont. Although not ranked as high for wilderness-like or scenic characteristics, these ponds scored highly for overall water quality, rare species, biological diversity, and unique habitat types.

Other ponds in the West Mountain WMA did not rank as highly when compared to all Vermont lakes, but do show indications of good biological diversity. Little Wheeler, Mud, and Tuttle all have characteristics that suggest healthy biological communities and quality aquatic habitat.

Maidstone Lake, although not contained within West Mountain WMA, has most of its shoreland adjacent to WMA land. Furthermore, a large portion of the lakes watershed exists inside West Mountain WMA. Maidstone Lake has shown a slightly increasing trend in its phosphorus concentrations over the past several years. As an extremely low-nutrient lake like Maidstone, even a small increase in nutrient levels is cause for concern. Maidstone ranks in

the 23rd percentile of all Vermont ranked lakes, with scores for biological diversity and scenic features. Despite low nutrient levels and very clear water, it does not score well for water quality because of intensive shoreland development. Reducing erosion in the watershed and improving shoreland vegetation management strategies should be priorities for the protection of Maidstone Lake.

b. Streams

West Mountain WMA features significant portions of three stream drainages flowing into the Connecticut River. The largest is Paul Stream, a 28,096 acre watershed approximately two-fifths of which lies within the WMA. A significant part of the balance of this watershed is owned by Essex Timber Company. The Dennis Pond Brook/Wheeler Stream watershed is approximately 10,880 acres. About three-quarters of this watershed is within the WMA and most of the remainder is owned by Plum Creek. The small Tuttle Pond watershed flows into the Connecticut River between the mouths of Wheeler and Paul streams; it is mapped by the State of Vermont as part of the Dennis Pond Brook/Wheeler Stream watershed.

The relatively small watersheds of the WMA support streams ranging from mountain headwater types to moderately-sized high and low gradient types with variable substrates. They can be generally characterized as softwater streams with pH around neutral. It is notable that these watersheds, although used for industrial timber production for a century or more, lack a history of human habitation, industrial development and agriculture. Biological inventories reveal the general health of their waters. The results of the 2000 fish and macroinvertebrate sampling study are summarized below (see Appendix E, Langdon and Fiske, 2000).

The fish and macroinvertebrates found in running waters of West Mountain WMA were shown to be in good to excellent condition. Based on sampling during year 2000 at 10 sites in the Paul Stream and Dennis Pond drainages and more recent sampling done in 2009, species composition and abundance data were used to evaluate biological integrity of different sites along the streams. The data were also used to classify reaches of streams according to fish and macroinvertebrate assemblages.

Twenty species were collected from the two watersheds, including 3 non-native species (Refer to Tables 3 and 4, Langdon and Fiske, 2000). The species assemblage also includes migratory Atlantic salmon, formerly native to Paul Stream and throughout the Connecticut River drainage.. Salmon are currently present only in their juvenile, pre-migratory life stages, following annual releases of unfed fry from White River National Fish Hatchery, as part of the multi-state/federal interagency Connecticut River Atlantic Salmon Restoration Program. No State or Federally listed species, or State rare species, were recorded for these watersheds. Two species, the finescale dace (*Phoxinus neogaeus*) and the burbot (*Lota lota*), and one natural hybrid, finescale x redbelly dace (*Phoxinus neogaeus* x *P. eos*), are considered uncommon in Vermont.

Five fish assemblage types are represented in the West Mountain WMA watersheds. Developed in 1998 by the Aquatic Classification Workgroup, fish assemblage types are one way to classify the aquatic communities of Vermont. The fish assemblage types were

amended as a result the survey work done in 2000. The five assemblage types in West Mountain WMA are: Brook trout (Type 1), Brook trout - Slimy sculpin (Type 2), Blacknose dace - Slimy sculpin (Type 3), Blacknose dace - Creek chub (Type 4b), and White sucker - Bluntnose minnow (Type 5). These represent stream types ranging from cold, headwater streams to moderate-sized coldwater streams or rivers. Substantial lengths of Paul Stream, Wheeler Stream, and Notch Pond Brook were mapped as a newly described type, 4b, which represents a low gradient, soft-bottomed stream type.

Seven of eleven sampling sites were evaluated using Index of Biological Integrity classifications. Scores ranged from “good” to “excellent.” Where calculated, the streams met the State Water Quality Standard Biocriteria for fish assemblages of Class B waters.

Based on seven sampling sites, a total of 147 macroinvertebrate taxa were identified in streams of West Mountain WMA (Refer to Appendix E, Langdon and Fiske, 2001). While some snails and freshwater clams occurred, aquatic insects were the most prevalent taxonomic group. All native, the taxa found represent the diversity of common species one might expect to collect from a variety of stream types in late summer. The only uncommon species discovered was a beetle, *Microcyllloepus pusillus*, found in Dennis Pond Stream.

Based on macroinvertebrate assemblages, reaches of streams in West Mountain WMA were classified into six common aquatic community types following the Aquatic Classification Workgroup system: Cold Headwater Acidic Mountain Stream (Type 1), Cold Headwater Mountain Stream (Type 2), Moderately-sized Mountain Stream (Type 3), Small Headwater Marsh Stream (Type 5), Medium-sized Mid-reach Meandering Stream (Type 6), and Lake/Marsh Outlet Stream (Type 9). Using Vermont Biocriteria for wadeable streams, 8 of the 9 stream reaches were assessed for their health, or integrity. Seven of the nine were rated “excellent,” while one rated “very good.” The low-gradient reach of Paul Stream could not be evaluated using these criteria, but was thought to be in good condition.

The stream and pond ecosystems of West Mountain WMA are, from a statewide perspective, in excellent condition. The WMA includes a number of highly ranked dystrophic ponds, most of which have rare aquatic plant populations. In addition, the WMA contains substantial lengths of good to excellent quality streams of a wide variety of fish and macroinvertebrate natural community assemblage types.

Culverts, allowing roads to cross over streams, on West Mountain WMA, however, are typically undersized and often prevent aquatic organism passage. An assessment of all culverts on “blue-lined” streams in the WMA in 2013 showed that all culverts were smaller than optimal, with a low of 14% of bankfull width to a high of 79%. Undersized culverts may have chronic effects on streams, in addition to increasing the chance of catastrophic failures of the structure and/or roadbed. This assessment also showed that all 31 culverts presented some barrier to aquatic organism passage, with 20 culverts blocking all fish, even adult salmonids.

c. Fish

Paul Stream, Granby Stream and their many tributaries support populations of wild brook trout, documented by VTFW sampling over the past decades through autumn 2013. Other species found include slimy sculpins, burbot, long- and blacknose dace, white and longnose suckers, creek chubs and common shiners. Paul Stream, Granby Stream and Madison Brook are stocked with catchable-size yearling brook trout to enhance fishing opportunity. Rainbow trout drifting out of Maidstone Lake are occasionally caught in Paul Stream as well. Rainbow trout and brown trout from the Connecticut River migrate into Paul Stream and spawn in its lower reaches.

Paul Stream historically was a spawning and nursery stream for Atlantic salmon, extirpated from the Connecticut River two centuries ago by dam-building, pollution, and habitat destruction. It has been playing a role in the multi-state and federal Connecticut River Atlantic Salmon Restoration Program. From 1997 through 2013 salmon fry were stocked annually throughout available nursery habitat from the outlet of Ferdinand Bog downstream to the Connecticut River, the juveniles spending two years in Paul Stream before migrating at roughly 6 inches in length to the Atlantic Ocean. Good survival and growth documented each fall by DFW monitoring demonstrated the suitability of Paul Stream as Atlantic salmon production habitat. The current iteration of the restoration effort is ending due the withdrawal of critical support from the U.S. Fish and Wildlife Service. Following the final stocking of fry in spring 2013, juveniles will be present through spring 2016. Although active management for salmon will end, habitat for salmon will be protected to preserve potential for resumption of future restoration efforts.

DFW conducted surveys of fish at West Mountain WMA ponds in year 2000. Additional survey work has been carried out by staff from 2010 to 2013, mainly to better characterize brook trout populations and to evaluate brook trout stocking by the recapture of marked fish. A total of 12 common fish species, one to six species per pond, were collected in the ponds. At least seven of the 12 species are known to be present in West Mountain Pond, the pond in which the highest number was captured. Brook trout, the only cool- to cold-water species, was recorded at Notch, South America, Unknown, and West Mountain ponds. All the remaining species sampled were warm-water species, or species tolerant of a wide range of water temperatures. All except one species (bluntnose minnow) are native to the Connecticut River drainage. The fish communities found in these ponds fit into the “dystrophic” or “high-elevation” lakes categories as defined by The Aquatic Classification Workgroup (1998), though classification of natural fish assemblages is confounded by unauthorized introductions.

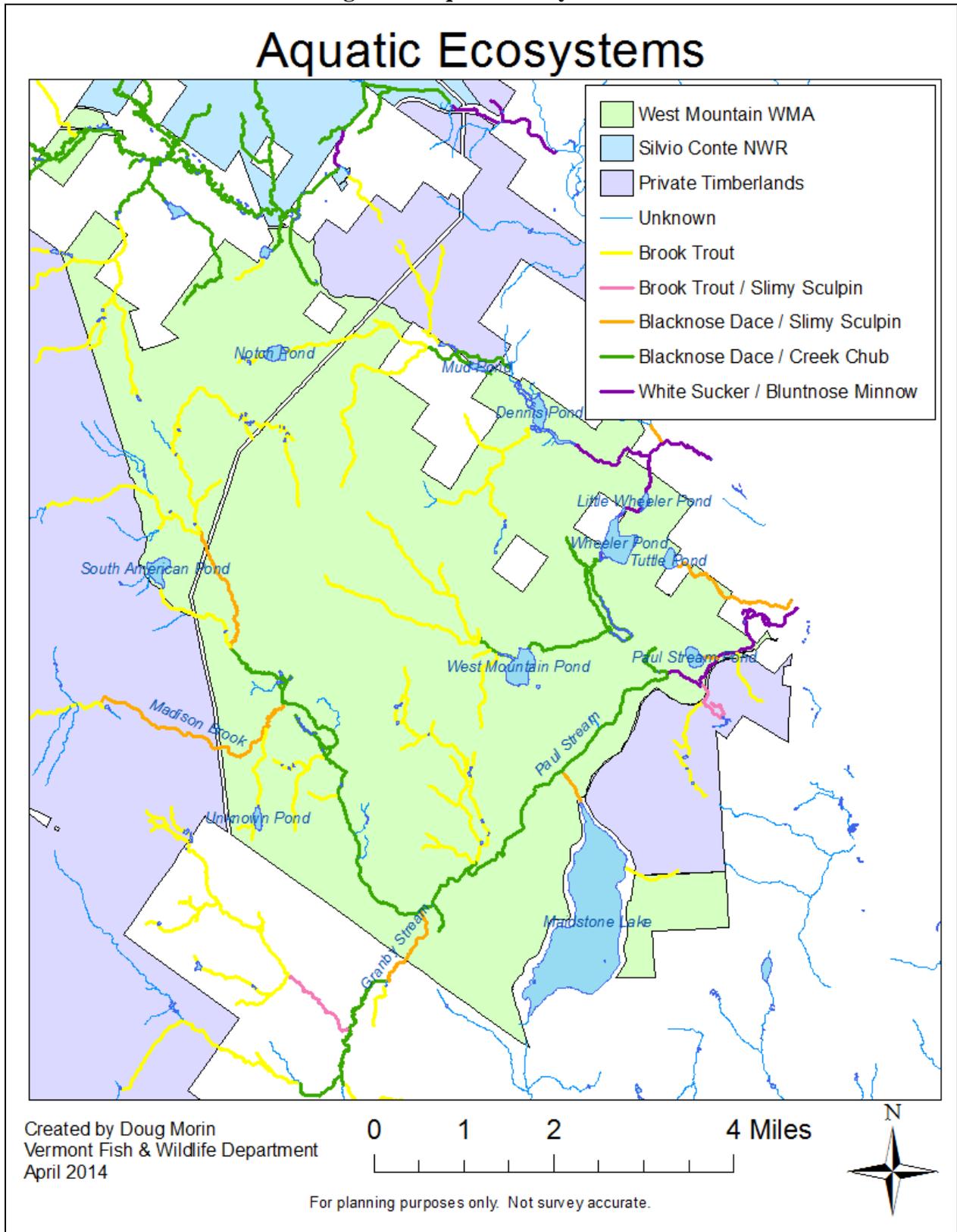
West Mountain Pond, South America Pond, Notch Pond, and Unknown Pond are managed for coldwater species, principally brook trout, and support angling. South America, Notch and Unknown ponds are stocked annually with fingerlings brook trout each autumn. Recent sampling has confirmed the survival and growth of the stocked fingerlings, and indicated a low abundance or absence of wild brook trout. West Mountain Pond is not stocked. Recent sampling there finds a substantial population of adult brook trout, apparently the result of natural reproduction in the pond or its tributaries. In the case of all four ponds the population status is adequate to furnish the opportunity for good brook trout angling in a remote setting.

Dennis, Wheeler, Paul Stream, Tuttle and Little Wheeler ponds contain warmwater fish populations dominated by yellow perch, chain pickerel and brown bullheads.

All ponds are being monitored periodically and the focus of their fisheries management may shift over time.

The fishery resources of Maidstone Lake are not treated in West Mountain WMA planning – it is not enclosed by West Mountain WMA and the management of its fishery resources and related recreation do not fall under the jurisdiction of West Mountain WMA.

Figure 7: Aquatic Ecosystems



4. Forest Ecosystems

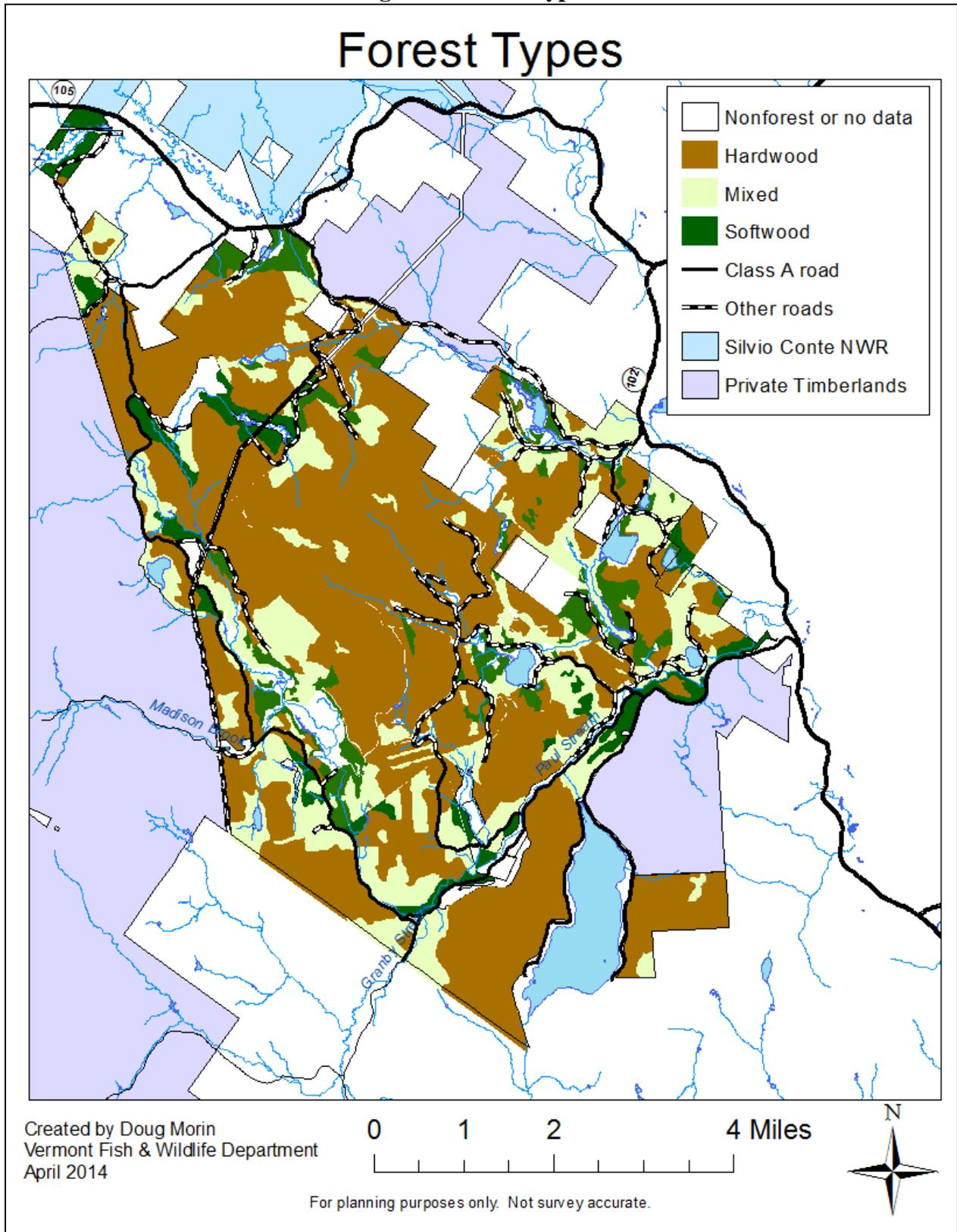
The Kingdom Heritage Lands are situated within the Northeast Kingdom which has strong connections to the working landscape. Many of the communities within the region have ties to the forest products industry and the Kingdom Heritage Lands have played an integral role in that history. There is evidence of early lumber industry scattered across the property with old log driving dams in the Nulhegan River and Paul Stream, remnants of sawmills along Paul Stream and Granby Stream and several leased camps that were formerly part of logging camps.

This history has influenced the composition of the forest of the region and the Kingdom Heritage Lands. Many of the forest stands on West Mountain WMA are in a condition that warrants either time for healing or regeneration. Past management has been more intensive in the lower elevations resulting in younger forest stands and more single tree management on the surrounding mountain slopes. The mountainous slopes were likely treated with a diameter limit harvest where trees above 8-10" inches in diameter at breast height (DBH) were harvested resulting in a forest with primarily suppressed, less competitive, trees in the overstory.

Based on the natural community data that was developed for the original management plan and subsequently updated for this plan revision, 8% of the entire WMA is of a wetland type, 51% of a hardwood type, 16% of a softwood type, 24% of a mixed wood type and 1% is open water. Using the forest inventory that was completed for the Active Management Area as a sample of the entire WMA the forest is currently 54% in a large pole/ small sawlog size class, 20% in mature sawlog, 11% early succession habitat, 10% saplings and 5% either wetlands or open water. This may be somewhat misleading because the forest inventory data only includes measurements for overstory trees, so the average diameters for two aged stands may be over estimated.

Comparing the natural community data and the forest inventory data collected since state ownership, the forest types in the WMA appear to be similar to what would be expected for the area. There are some locations where the species composition has been altered due to plantings and harvesting of targeted species but this is the exception. The species mix within stands may be different, but the broad forest types remain unchanged.

Figure 8: Forest Types



a. Forest Age and Size in Context

Historical estimates of forest disturbance and presettlement conditions indicate the natural range of “early successional” (variously defined as up to 10 or 20 years old, or up to about 1 inch dbh) forest was likely about 1-3% of the total forest area for hardwoods and 3-7% for softwoods, while the majority of forests were likely over 150 years old. The mechanisms and patterns of disturbances, however, are now dominated by humans, with timber harvesting creating more early successional habitat than historically prevailed in the northeast. Despite this, numerous species of wildlife that rely on early successional habitat are declining throughout their ranges.

In northeastern Vermont, early successional habitat might now cover approximately 10-20% of the landscape, and planned timber harvesting on the Private Timberlands increase this number greatly in coming decades. USFS FIA and ANR Heavy Cut data both indicate levels of early successional habitat near or above 10% of the landscape. More locally, the 86,000 acre Plum Creek Timberlands have about 14% in the seedling class (0-20 years/<1”DBH), 11% in sapling/pole (20-40 years/ 1-8.9” softwoods and 1-11.9” hardwoods dbh), 64% in sawtimber (40-60 years/ at least half of trees >9dbf softwood or >12 hardwood), and 7% large sawtimber (60-100 years, at least half of all trees >20 softwoods and 24” hardwood). Based on their management plan, however, Plum Creek projects after 20 years of management the new forest age-distribution will be: 42% 0-20 years, 20% 21-40 years, 10% 41-60 years, and 31% 61-100 years.

b. Forest Health Assessment

1) Current forest health conditions in the WMA:

The current forest health conditions within the WMA are good. Despite wide-scale infestation of Beech Bark Disease, beech continues to act as a co-dominant species within much of the upland hardwood forests. The diversity within the forest types and tree species within the WMA add to the resilient nature of this forest. Wind disturbance continues to be the most wide-scale natural disturbance type within the area, however, despite high intensity the magnitude of these disturbance is relatively low, with usually less than 5 acres impacted at a time. These small- to medium-scale disturbances create a mosaic patchwork of age classes throughout the forest, similar to the impact of past and present forest management, helping to diversify the age class within the forest which in turn adds to the resiliency of the forest. These small scale wind events are more prevalent in the softwood stands within the WMA but as trees mature within the Core Area wind will play a bigger role in diversifying the structure of the forest.

Despite the resilience of the forests, numerous pests, pathogens, and invasive species threaten the WMA. In reviewing the Vermont Forest Insect & Disease Conditions reports from 1981 – 2004 , there is a history of decline and mortality affecting several species, i.e. larch, red spruce, fir, birch and other hardwoods including maple most often associated with environmental factors, i.e. drought; open winters (winter injury of red spruce), wet sites and periodic outbreaks of defoliators, i.e. larch casebearer, birch

skeletonizer and leaf miners, or leaf diseases, i.e. anthracnose or a combination of symptoms accumulating over several years. As weather patterns continue to change with a changing climate, the history of dieback and decline will likely continue or worsen in the years to come.

Pests and Pathogens

Spruce budworm

Historic trends show that the spruce budworm (*Choristoneura fumiferana*) populations follow cyclic patterns. The last major outbreak in Vermont occurred from 1975 to 1985, when winds from the north transported the spruce budworm southward into northeastern Vermont (Parker et al. 1989). Recent data from monitoring traps through Essex, Orleans, Chittenden and Caledonia counties show a decline in spruce budworm populations over the last three years and significant defoliation from spruce budworm is not expected in 2013. However, close evaluation of historic population trends show that another population explosion is likely in the next decade, and recent population growth in Quebec suggests cause for concern. As such, in 2009 the state of Vermont re-initiated the spruce budworm monitoring which was discontinued in 2004. Monitoring of spruce budworm populations will continue, and this information will be used to inform management decisions in mature fir dominated softwood stands spruce-fir stands, which are most impacted by a significant spruce budworm outbreak.

Hemlock wooly adelgid

In 2012 hemlock wooly adelgid was detected in seven new towns in Vermont, bringing the total number of towns with positive identifications up to 13 towns in southern Vermont. This non-native invasive pest is a potential concern to the WMA, especially in the areas within around the wetlands of Dennis Pond and to the east and north of Wheeler Pond. These stands have a relatively high concentration of eastern hemlock compared to most of the softwood forests of the region. Their proximity to the Connecticut River and a warming climate make the threat from this pest a concern.

Emerald ash borer (EAB) and Asian longhorned beetle (ALB)

Of greatest concern to the upland forests throughout the WMA are the expansion of two non-native pests, the emerald ash borer (*Agrilus planipennis*) and the Asian longhorned beetle (*Anoplophora glabripennis*). In 1996 the Asian longhorned beetle was first identified in Brooklyn and Long Island, NY, and efforts to monitor the spread of this pest into Vermont began in earnest. Emerald ash borer was first introduced to the United States in 2002 in the southeastern Michigan, and spread of this pest has occurred at a rapid pace throughout much of the eastern United States.

Both of these species target hardwood trees, which compose a large portion of the WMA landscape. Neither of these pests have been detected within a 100 mile radius of the WMA, and no specific management adjustments in anticipation of ALB or EAB are recommended. Following a detection of any non-native invasive pest within the WMA, forest managers will work with relevant agencies to develop and engage in an adaptive management strategies to respond to the potential threat of the specific pest.

Beech Bark Disease

Beech Bark Disease arrived to Nova Scotia around 1920, and in the United States by 1929. Today nearly all beech trees within the WMA show scars from this disease, which has resulted in a shift in the role of beech trees within the northern hardwood forests of the WMA from a co-dominant canopy tree to a dominant understory tree with few large individuals. Of notable consequence from this complex is that prior to dying back the final response of large beech stems is to release many “suckers” from its root system, creating a dense understory of beech saplings that are clones of the parent tree. The relationship between the decline of beech in the overstory and the increase of beech in the understory illustrates just how far reaching the impact of an individual pest can be. Management of beech stands will emphasize the retention of trees that demonstrate some level of resistance to the disease.

Browse Sensitivity

From 2003 to 2012 FPR and the Essex and subsequently Plum Creek Timber Companies collaborated to monitor the effects of moose browsing on forest regeneration with a series of exclosures on West Mountain WMA and the Private Timberlands. This study concluded that moose browse was severely altering the development of regenerating forests in the area. In 2013, DFW and FPR staff evaluated the development of the regeneration harvests conducted on West Mountain WMA since the state took ownership of the WMA. Staff concluded that moose had prevented most regenerating trees from developing normally and were maintaining the stands in shrubby, low forms despite some ages exceeding a decade. This assessment, however, also concluded that some individual trees and small groups have successfully grown out of the browse zone in most harvests, and that very recent treatments showed less severe damage than older treatments—possibly due to the significantly smaller moose population in the area in recent years. While browse has clearly had dramatic effects on the forest over the last decade, it is now believed the moose population is at a level that will allow more successful forest regeneration. As such, early successional forest management will continue during this planning interval, and browse effects will be monitored. The level of forest management activities will be responsive to increased browsing activities on the WMA.

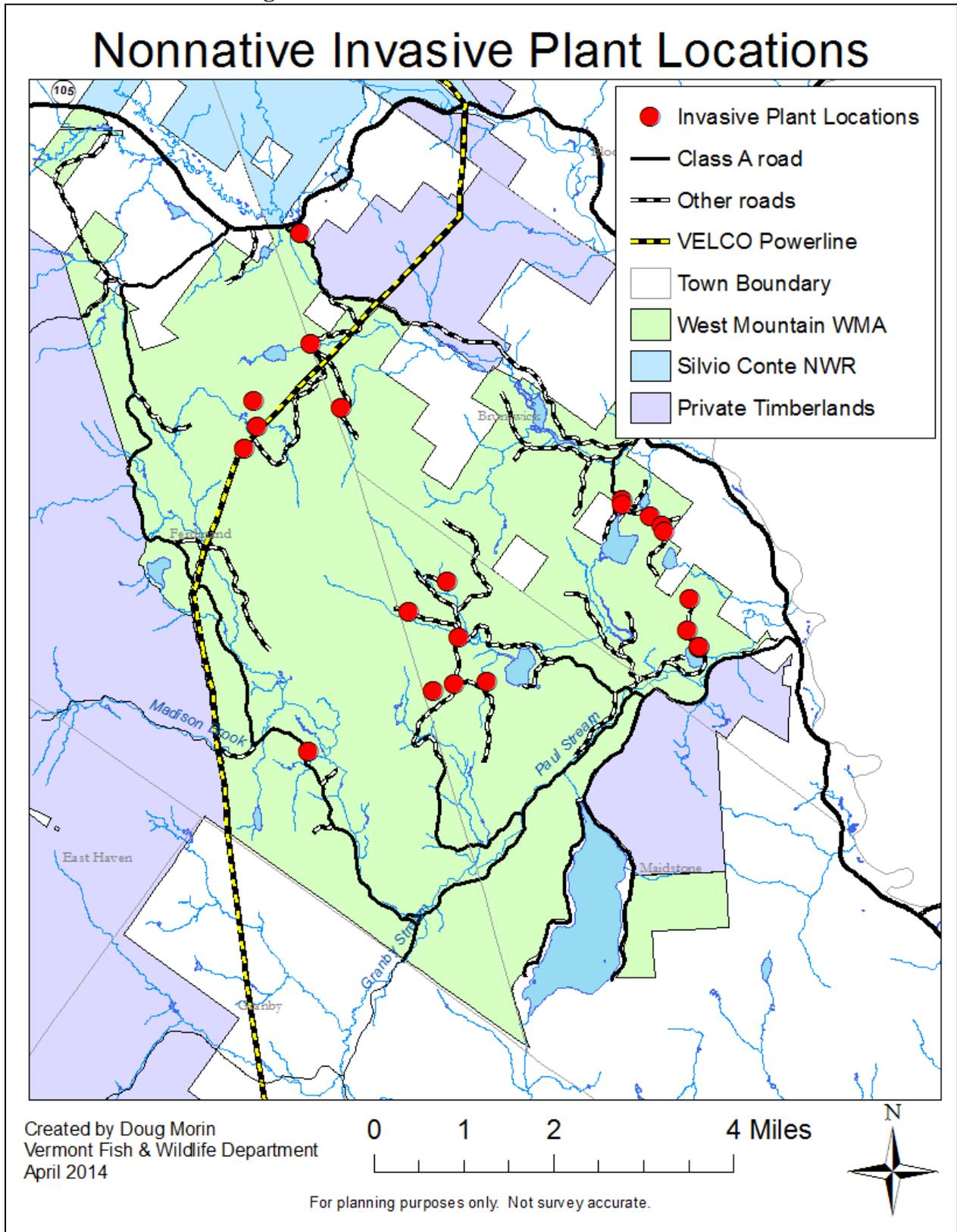
Nonnative Invasive Plants

Unlike many other areas in the state of Vermont, the impact of nonnative invasive species is currently low within the WMA. This is in part due to the isolation of this area and the land use history which has maintained a relatively intact forest.

Despite this, six species of nonnative invasive plants have been identified on the WMA:

- common reed (*Phragmites australis*) (17 occurrences)
- honeysuckle (*Lonicera spp.*) (2 occurrences)
- glossy buckthorn (*Frangula spp.* and *Rhamnus spp.*) (1 occurrence)
- Asiatic bittersweet (*Celastrus orbiculatus*) (1 occurrence)
- coltsfoot (*Tussilago farfara*) (throughout the region primarily in disturbed sites)

Figure 9: Nonnative Invasive Plant Locations



And, numerous others are known to occur in nearby areas, including:

- Japanese knotweed (*Fallopia japonica*)
- autumn olive (*Elaeagnus umbellata*)
- purple loosestrife (*Lythrum salicaria*)

Such nonnative invasive plants pose a threat to native forests of the WMA. These plants may outcompete native species, decreasing the diversity of native species and reducing the regeneration of native forest trees. They may also have a range of impacts on wildlife species and ecosystem function.

Of those known on the WMA, common reed occurs in the largest numbers and presents the greatest threat to local ecosystems. Populations of common reed have been identified within the WMA by ANR staff. Populations are usually less than ¼ acre in size and are being managed and effectively eradicated using localized application of herbicides, which is ongoing.

All of these populations have been established in areas where heavy equipment has operated in roadside ditches or in areas of recent timber harvesting. In response to these introductions all timber harvest and road work contracts include a clause that all machinery must be free of dirt and plant materials to minimize the potential for additional introductions onto the WMA. In addition, the presence of non-native invasive species will be monitored by ANR staff, and specific eradication and/or control plans will be implemented for all populations identified. Many of the strategies in place for the Core Area will help to reduce the odds of nonnative invasive species gaining footholds: for example, soil disturbance will be minimized by closing roads over time and limiting forest management practices.

The currently low levels and impact of nonnative invasive plants at West Mountain WMA add significantly to its ecological importance.

5. Natural Communities

The Agency of Natural Resources uses the “coarse filter/ fine filter” approach to the ecological inventory and assessment of state lands (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000). Widely employed as a management tool on state, federal, and private lands (see for example: Leslie et al. 1996; Committee of Scientists 1999; Stein et al. 2000; USFS 2000, 2004), it is an aid to land managers who seek to protect most or all of the species that naturally occur on their lands, but who lack the resources to make exhaustive inventories of all taxonomic groups. Because many groups of organisms are cryptic or poorly understood (e.g., fungi and soil invertebrates), it is not practical to make lists of all of them (Anderson et al. 1999; Willis and Whittaker 2002). 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 (NCASI 2004). Natural communities are thus a coarse filter for “catching” the majority of an area’s native organisms. Because conservation of habitats (in the form of natural communities) will not protect all species, we also employ a “fine filter” to catch the remaining species that are known to require very specific conditions for their growth, reproduction, wintering, etc. Examples of organisms benefiting from the fine filter inventories described below include breeding birds, deer on their wintering areas, and rare plants.

The coarse filter assessment begins by describing landscape and climatic factors that characterize the West Mountain WMA, such as bedrock geology and water resources. It then details the 28 distinct natural community types documented and mapped during inventories of West Mountain WMA. This is followed by a fine filter assessment describing rare species, invasive plants, and wildlife habitats found here.

The information presented here is in part adapted from the report “Natural Communities and Rare Vascular Plants of West Mountain Wildlife Management Area and Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge, Essex, Vermont: Mapping, Description, and Ecological Management Recommendations” (Lapin and Engstrom 2002).

a. Coarse Filter Assessment

Much of the standard Coarse Filter Assessment has been covered in greater detail in this document already. Some topics (biophysical region and climate, topography, bedrock geology, surficial geology, soils, and hydrology) are important to this assessment, but are redundant with previous sections, and so their descriptions have been omitted here.

b. Natural and Human Disturbance

Natural disturbance process, such as wind, fire, and flooding, continually shape landscapes and define their natural communities. As is typical of Vermont’s forested natural communities, the most frequent upland disturbances at West Mountain WMA are small-scale events, such as individual tree death and canopy gap dynamics. Wind and ice storm damage are probably the most common large-scale disturbances. In contrast, naturally-occurring fires appear not to have been a frequent disturbance prior to European settlement, though there are well-documented fires of human origin that occurred in the 20th century (Lapin and Engstrom 2002). West Mountain WMA does not have the large stands of spruce-fir forest found in more northern settings, thus insect defoliation outbreaks such as spruce-budworm are likely not an important disturbance regime in the WMA. Browsing by deer and moose can have significant impacts on forest regeneration patterns, and high moose populations during the past decade resulted in observable browse impacts in parts of the WMA. Moose populations have declined over the past several years, and browsing impacts appear to have moderated.

Wetland natural communities are also influenced by changes in hydrology. In particular, beaver activity is a common wetland disturbance in West Mountain WMA. The cycle of beaver flooding and abandonment contributes important habitat diversity to the landscape. Other hydrologic disturbances include flood and drought.

Land use history also shapes the present-day distribution and condition of natural communities. At West Mountain WMA, the long history of timber harvesting has resulted in changes to forest age and structure, species composition, and natural hydrological patterns.

c. Natural Communities

A natural community is an assemblage of biological organisms, their physical environment (e.g., geology, hydrology, climate, natural disturbance regime, etc.), and the interactions between them (Thompson and Sorenson 2000). More than a simple collection of species, a natural community is characterized by complex webs of mutualism, predation, and other forms of interaction. The 89 natural community types described in Vermont repeat across the landscape in patches (or “polygons”) of various sizes. These patches (or groups of patches in close proximity to each other) are referred to as natural community occurrences, and are to be distinguished from broad descriptions of community types. Natural community occurrences vary greatly in their size. Matrix communities, such as Northern Hardwood Forests, occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. Large patch communities, such as Spruce-Fir-Tamarack Swamps, typically occur at scales of 10-100 acres. Small patch communities such as Poor Fens or Boreal Outcrops are usually less than 10 acres in size, and owe their existence to highly localized site and disturbance characteristics.

Natural communities in West Mountain WMA have been identified through a combination of aerial photograph interpretation and field surveys. Lapin and Engstrom (2002) prepared an initial, detailed natural community map based on extensive field work and provided a detailed description of their mapping methods. There has been no systematic attempt to review or update the initial map; however, revisions and improvements have been incorporated over time as a result of additional field observations, the availability of high-resolution aerial orthophotos, and refinements to the natural community classification and ranking system. Because some natural communities occur at very small scales (e.g., less than ¼ acre), this mapping effort is probably still 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 in West Mountain WMA; instead, it should be treated as an ongoing effort to describe and understand the natural communities in this area. Land managers and members of the public should be aware that additional examples of small patch natural communities (e.g., vernal pools and seeps) probably occur on the management unit. As subsequent inventories and site visits are conducted, this map will continue to be improved.

d. Natural Communities of West Mountain WMA

Sixty-five occurrences of 28 natural community types have been identified and mapped in West Mountain WMA (see Table 1). A total of 524 natural community polygons were mapped. Some broad patterns emerge from the natural community map. The mountain terrain, including West Mountain, Notch Pond Mountain and the high hills west of Maidstone Lake, is strongly dominated by Northern Hardwood Forest. This community is highly variable in soils and plant species composition and/or abundance; most variation is due to seepiness, rockiness, parent material geochemistry, and elevation. The highest elevations of West Mountain and its sub-summits are Montane Yellow Birch-Red Spruce

Forest with a small acreage of Montane Spruce-Fir Forest. The ice-contact terrain is dominated by Red Spruce-Northern Hardwood Forest (lacking sugar maple) and Lowland Spruce-Fir Forest (both well-drained and wet-mesic types). There are many wetland natural communities in the ice-contact area. They are predominantly Northern White Cedar Swamps (both minerotrophic and boreal acidic types), Spruce-Fir-Tamarack Swamp, Alder Swamps and beaver-influenced wetland complexes. The Nulhegan Basin portion of the WMA features areas of well-drained Lowland Spruce-Fir Forest and Black Spruce Swamp; among the smaller natural communities are Northern White Cedar Swamp and Intermediate Fen. Non-forested wetland natural communities cover a small portion of the WMA, but tend to be excellent examples of natural community types that are rare statewide. Among these are Poor Fen, River Cobble Shore, Alder Swamp, and beaver-influenced wetland complexes.

e. Natural Communities of Statewide Significance

Natural community occurrences are assigned a quality rank, a statement of their overall ecological value which helps guide management. An “A”-ranked occurrence is of high quality relative to others of its type in the state, while a D-ranked example is of comparatively low quality. Quality ranks are objectively assigned on the basis of three factors: occurrence size, current condition, and landscape context. The three factors vary in the degree to which they influence overall quality in different communities. 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 DFW which are available upon request. It is recommended that state-significant natural communities be afforded a higher level of protection than other areas of the management unit; however, state-significance in itself does not denote “no management.” Particularly for large upland natural communities like Northern Hardwood Forest, active management can be consistent with protection of state significant natural communities.

West Mountain WMA is a large parcel within an even larger area of undeveloped land. The remote and undeveloped character of the WMA and the surrounding landscape—the same character that attracts hunters, anglers, and wildlife enthusiasts to the WMA—contributes to an ecologically intact landscape, where species movements and other ecological processes can occur relatively unimpeded. In addition, many of the natural communities found on the WMA, while relatively common in Essex County, are uncommon or rare throughout Vermont. The combination of many uncommon natural communities and an ecologically intact landscape means that the majority of natural community examples within the WMA meet the criteria for state significance. Overall, there are state-significant examples of 21 of the 28 natural community types mapped at West Mountain WMA. While these are distributed throughout the WMA, what follows are descriptions of particular sites and their associated significant natural communities.

Wetland and lowland areas have not only have significant natural communities but also substantial lists of rare, threatened and endangered plants and animals as well. These sites include:

- The Dennis Pond Basin, which also includes Mud Pond, is one of the most significant and interesting natural areas in Vermont. Very high-quality Poor Fens are the dominant natural communities at the site.
- Wheeler Ponds Basin is another wetland and aquatic complex with numerous significant natural communities, including Intermediate Fen, Sweet Gale Shoreline Swamp, Black Spruce Swamp, and Alder Swamp.
- West Mountain Pond Basin is dominated by a high-quality Northern White Cedar Swamp.
- Ferdinand Bog is a large wetland/lowland complex that features the largest open wetland in the Kingdom Heritage Lands; among the many high-quality natural communities are Poor Fen, Northern White Cedar Swamp, Black Spruce Woodland Bog, Northern Conifer Floodplain Forest, and Alluvial Shrub Swamp.
- Buxton Pond Lowland is the piece of the Nulhegan Basin that is within the bounds of the WMA; the major natural communities on the flat are fine examples of Lowland Spruce-Fir Forest and Black Spruce Swamp.

The most notable upland forest is the 12,000-acre Northern Hardwood Forest that spans the WMA. This is a very large occurrence within a highly-connected, ecologically intact landscape. This forest has a long history of timber harvest while much of the forest is relatively young and in only moderate ecological condition, it has the potential to recover over time, and eventually develop characteristics of a mature forest. For all these reasons, it is considered to be state-significant.

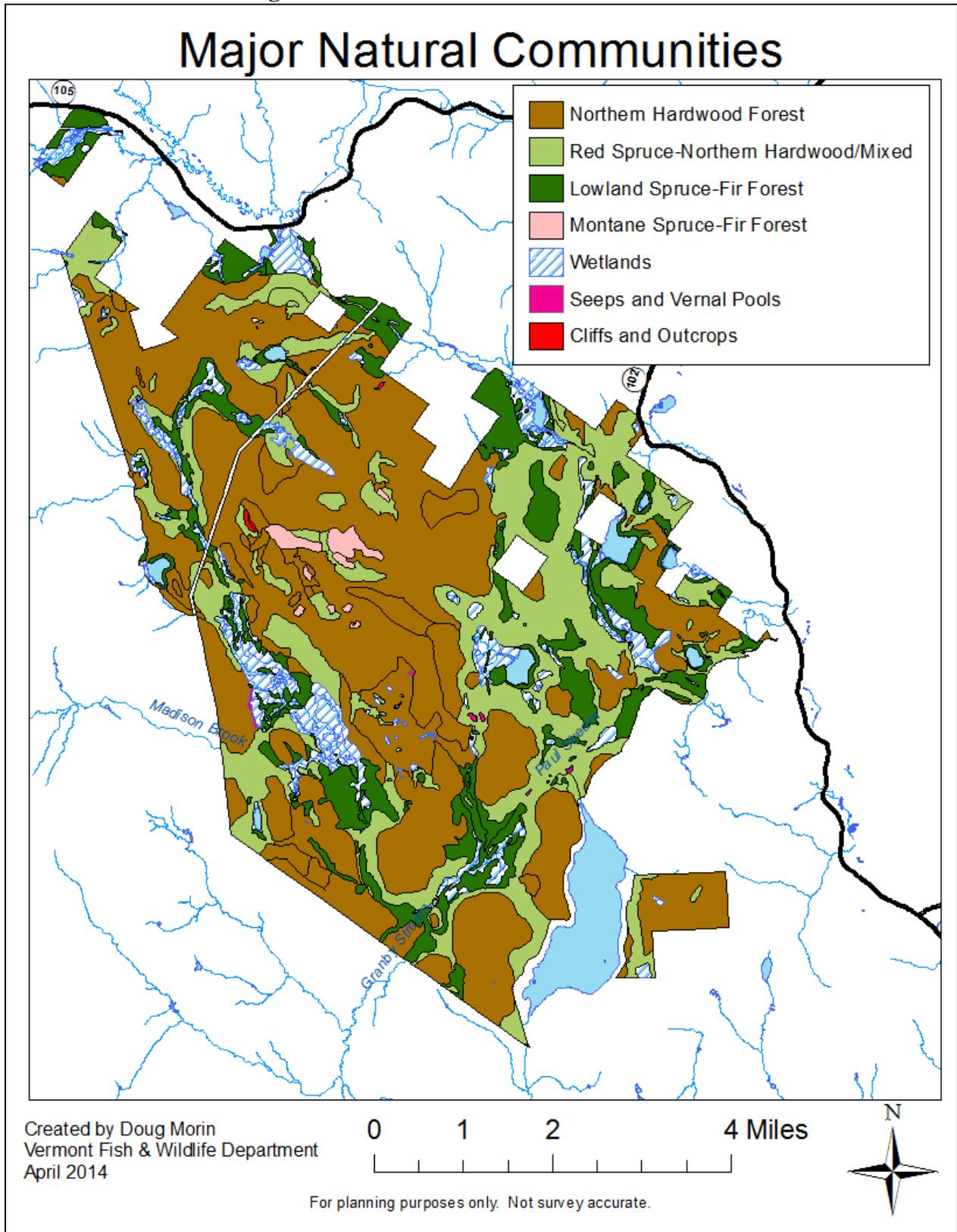
A list of all natural communities mapped at West Mountain WMA, along with their rarity and significance, is presented in Table 1 below.

Table 1: Natural Communities of West Mountain WMA

	Natural Community	Acres	Vermont Distribution	Example of Statewide Significance ?
Wetlands	Alder Swamp	113	very common	Yes
	Alluvial Shrub Swamp	346	uncommon	Yes
	Beaver Wetland	154	very common	<i>n/a</i>
	Black Spruce Swamp	169	rare	Yes
	Black Spruce Woodland Bog	4	rare	Yes
	Dwarf Shrub Bog	6	rare	Yes
	Hemlock-Balsam Fir-Black Ash Seepage Swamp	69	uncommon	Yes
	Intermediate Fen	3	rare	Yes
	Northern Conifer Floodplain Forest	57	rare	Yes

	Northern White Cedar Swamp	495	uncommon	Yes
	“Peaty Sand Pondshore”	<1	<i>n/a</i>	<i>n/a</i>
	Poor Fen	200	rare	Yes
	Red Spruce-Cinnamon Fern Swamp	6	uncommon	
	River Cobble Shore	2	rare	Yes
	Sedge Meadow	7	common	
	Seep	24	common	
	Shallow Emergent Marsh	8	common	
	Spruce-Fir-Tamarack Swamp	351	uncommon	Yes
	Sweet Gale Shoreline Swamp	27	uncommon	Yes
	Vernal Pool	1	uncommon	Yes
<i>Uplands</i>	Boreal Acidic Cliff	2	common	
	Boreal Talus Woodland	30	uncommon	Yes
	Hemlock Forest	77	common	Yes
	Hemlock-Northern Hardwood Forest	39	common	
	Lowland Spruce-Fir Forest	3,557	uncommon	Yes
	Montane Spruce-Fir Forest	181	uncommon	Yes
	Montane Yellow Birch-Red Spruce Forest	355	uncommon	Yes
	Northern Hardwood Forest	12,322	very common	Yes
	Red Spruce-Heath Rocky Ridge Forest	8	uncommon	
	Red Spruce-Northern Hardwood Forest	5,312	common	Yes
	Temperate Acidic Outcrop	<1	common	
For more information on these and other natural communities, see <i>Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont</i> , by Elizabeth Thompson and Eric Sorenson.				

Figure 10: Terrestrial Natural Communities



Fine Filter Assessment: Plants

The rare and uncommon species flora of the WMA is impressive. Thirty species of rare or very rare plants have been located within West Mountain WMA, as well as an additional ten species of uncommon plants. Of the rare/very species, one is listed as “endangered” and another five are listed as “threatened” by Vermont state endangered species statute (10 V.S.A. 123). The occurrence of these legally protected plants on the WMA is thus very important on a statewide basis.

Of the forty rare and uncommon plant species, all but two are associated with wetland, riparian, or aquatic habitats. Many of these species are adapted to the very particular conditions found in some natural communities, such as Poor Fens, Dwarf Shrub Bogs, Seeps, or Northern White Cedar Swamps. Protecting the hydrological and ecological integrity of these natural communities is essential to maintaining the long-term viability of their associated plant populations. In particular, activities that alter the natural flow of water into or out of wetlands have the potential to negatively impact rare and uncommon plants. Other potential threats include the spread of invasive species, or substantial flooding of wetland complexes by beaver activity.

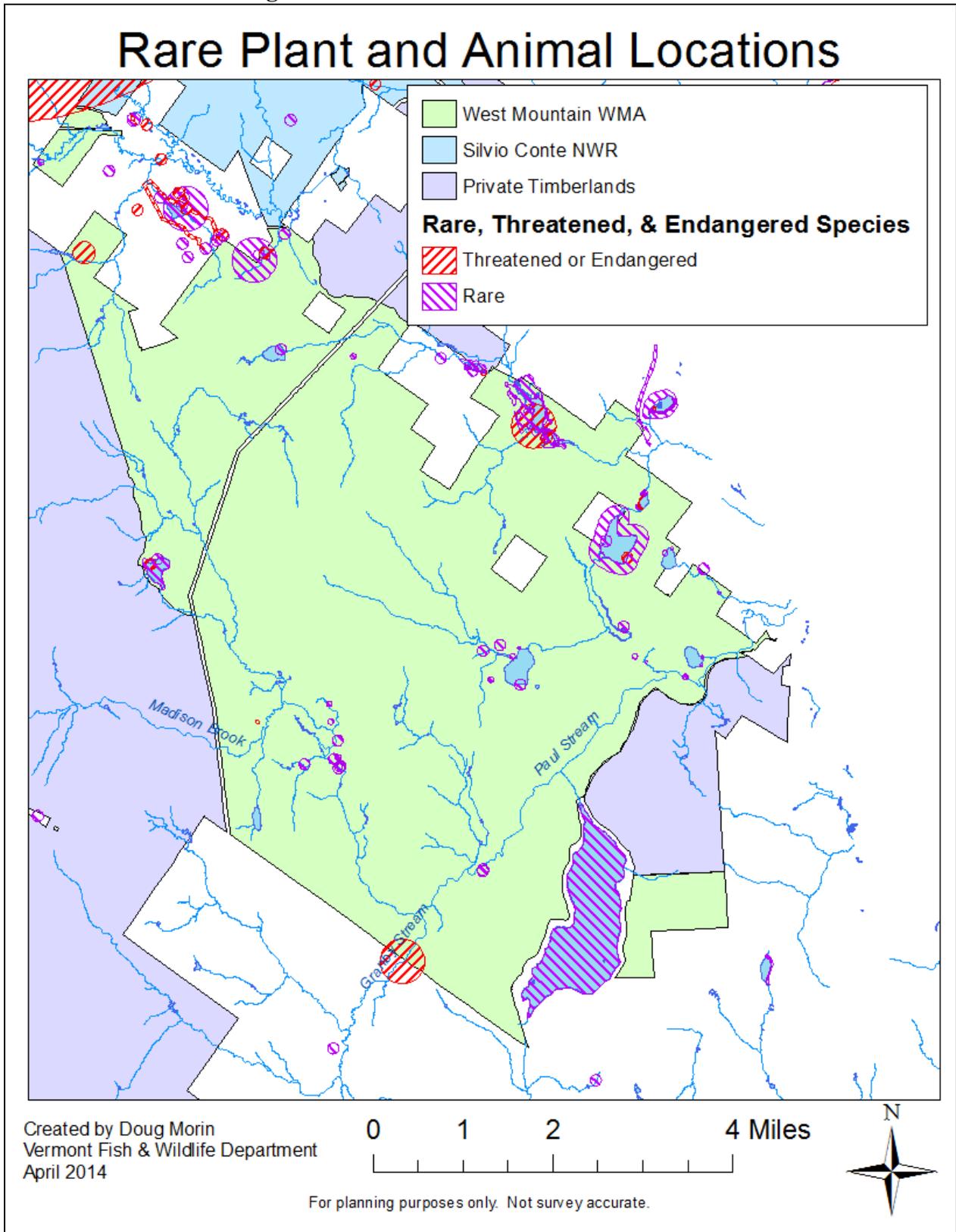
Table 2: Rare, Threatened, and Endangered Plants of West Mountain WMA

Scientific Name	Common Name	State Status*		State Listing
<i>Calamagrostis pickeringii</i>	Pickering's Reed Grass	S1	Very Rare	Endangered
<i>Cretageous oaksiana</i>	Oake's Hawthorne	S1	Very Rare	
<i>Eleocharis flavescens</i> <i>var. olivacea</i>	Olive Spikerush	S1	Very Rare	
<i>Eleocharis robbinsii</i>	Robbins' Spikerush	S1	Very Rare	
<i>Eriophorum tenellum</i>	Rough Cottongrass	S1	Very Rare	
<i>Isoetes tuckermanii</i>	Tuckerman's Quillwort	S1	Very Rare	
<i>Najas gracillima</i>	Slender Naiad	S1	Very Rare	
<i>Stellaria alsine</i>	Trailing Stitchwort	S1	Very Rare	
<i>Utricularia resupinata</i>	Northeastern Bladderwort	S1	Very Rare	Threatened
<i>Xyris montana</i>	Northern Yellow-Eyed-Grass	S1	Very Rare	Threatened
<i>Carex exilis</i>	Bog Sedge	S2	Rare	
<i>Carex lenticularis</i>	Shore Sedge	S2	Rare	
<i>Cladium mariscoides</i>	Bog-rush	S2	Rare	

<i>Eleocharis quinqueflora</i>	Few-Flowered Spikerush	S2	Rare	Threatened
<i>Galium kamtschaticum</i>	Boreal Bedstraw	S2	Rare	
<i>Littorella americana</i>	American Shoreweed	S2	Rare	
<i>Myriophyllum farwellii</i>	Farwell's Water-milfoil	S2	Rare	
<i>Najas guadalupensis</i>	Guadalupe Naiad	S2	Rare	
<i>Oclemena nemoralis</i>	Bog Aster	S2	Rare	
<i>Petasites frigidus var. palmatus</i>	Northern Sweet-Coltsfoot	S2	Rare	Threatened
<i>Platanthera blephariglottis</i>	White-Fringed Orchis	S2	Rare	
<i>Potamogeton bicupulatus</i>	Snail-Seed Pondweed	S2	Rare	
<i>Rosa nitida</i>	Shining Rose	S2	Rare	
<i>Scheuchzeria palustris</i>	Pod-Grass	S2	Rare	Threatened
<i>Scorpidium scorpioides</i>	A Moss	S2	Rare	
<i>Splachnum ampullaceum</i>	Moose Dung Moss	S2	Rare	
<i>Carex cryptolepis</i>	Northeastern Sedge	S2 S3	Rare to Uncommon	
<i>Carex michauxiana</i>	Michaux's Sedge	S2 S3	Rare to Uncommon	
<i>Muhlenbergia uniflora</i>	Fall Dropseed Muhly	S2 S3	Rare to Uncommon	
<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot	S2 S3	Rare to Uncommon	
<i>Calopogon tuberosus</i>	Tuberous Grass-Pink	S3	Uncommon	
<i>Cirsium muticum</i>	Swamp Thistle	S3	Uncommon	
<i>Elymus weigandii</i>	Wild-rye	S3	Uncommon	
<i>Galium boreale</i>	Northern Bedstraw	S3	Uncommon	
<i>Poa saltuensis ssp. saltuensis</i>	Drooping Bluegrass	S3	Uncommon	
<i>Pogonia ophioglossoides</i>	Rose Pogonia	S3	Uncommon	
<i>Utricularia geminiscapa</i>	Hidden Bladderwort	S3	Uncommon	

<i>Utricularia gibba</i>	Humped Bladderwort	S3	Uncommon
<i>Utricularia purpurea</i>	Purple Bladderwort	S3	Uncommon
<i>Sparganium fluctuans</i>	Water Bur-reed	S3 ?	Possibly Uncommon
<p>*for a full explanation of these rarity ranks, visit the Vermont Natural Heritage Information Project website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm</p>			

Figure 11: Rare Plant and Animal Locations



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6. Wildlife

Many species of wildlife are found in the large and diverse habitats contained in West Mountain WMA. The greatest value of this area for wildlife comes from its function as a centerpiece of the region's remote, extensively forested landscape.

a. Habitats

1) *Habitat in the Surrounding Landscape*

Like much of northernmost New England, West Mountain WMA has been heavily logged over the last two centuries, but has remained largely free from agriculture and development. Today, West Mountain WMA lies in the heart of the most forested county in one of the most forested states in the US. The legacy of logging is still apparent on West Mountain WMA as it is throughout the region. The majority (70%) of the forest in Essex County is 40-80 years old, while about 9% of the forest is younger than 20 years and less than one percent is older than 100 years.

The habitats found in this region are predominantly young forests composed of hardwood, mixed, and softwood stands as well as extensive areas of wetlands. The forests of Essex County are approximately 74% hardwood, 15% spruce-fir, and 10% aspen-beech. The history of logging in the region has created a forest dominated by medium-sized trees (35% large, 51% medium, 13% small, <1% nonstocked). The area, however, does support many examples of wetlands including softwood swamps and bogs, which are unusual in Vermont.

2) *Habitat in West Mountain WMA*

West Mountain WMA is a prime example of the habitats of this region. The landcover of the WMA is predominantly young to middle aged forest (with 54% in the pole/small sawtimber class alone) with extensive wetlands and open water (about 10% of the total area).

The position of the WMA in the northeast part of Vermont also gives it boreal features that are uncommon in the state. In the heart of the Northeast Highlands biophysical region, this is the coldest part of the state, and has the shortest growing season. As a result, black spruce, red spruce, balsam fir and other boreal plants are more common here than elsewhere in the

state, and especially common in extensive lowland areas and wetland complexes. The WMA shares this trend, with about one third of the vegetation cover in coniferous or mixed wood.

Uncommon habitats on the WMA include grasslands, meadows, shrub fields, very young forests, old forests, and developed areas. Grasslands do not occur on the WMA. Shrub fields currently occur on about 50 acres of the WMA in the form of old log landings and 160 acres of the VELCO powerline inholding. Very young forests (0-10 years old) occur on 116 acres of the WMA as a result of timber harvesting and habitat management conducted by ANR. Older forest stands (over 100 years) cover very little area on the WMA, perhaps less than 10 acres. The WMA is one of the least developed places within the region, with 64 hunting camps, a few small gravel pits and parking areas, and 73 miles of roads.

3) *Habitat Connectivity*

West Mountain WMA has excellent habitat connectivity. Wildlife species are largely unimpeded in their movements, and there are few barriers that limit long-term dispersal of plants and animals across the landscape. The WMA lies at the heart of the second largest forest block in the state—117,000 acres bounded by Routes 105, 102, 114, and the Granby Road. The largest habitat block in the state is the 154,000 acre forest centered on the Nulhegan Basin just to the north of West Mountain WMA. Vermont Route 105, however, separates these two blocks, and results in numerous vehicle collisions with moose, deer, bear, and other species. At a larger scale, wildlife movement in the region is likely the most difficult between the large forests of northeastern Vermont and northern New Hampshire, a pathway that is hampered by more significant human development and agriculture, highly travelled roads, and the Connecticut River. Despite these barriers, landscape-level analysis (Anderson et al. 2012) indicates that the West Mountain WMA is within an area suitable to diffuse species movements as part of a broad corridor extending from the Green Mountains in Vermont north and east to the Gaspé peninsula in Quebec.

4) *Important Habitats*

Deer Wintering Areas

The West Mountain WMA provides a large area of potential deer wintering habitat in its softwood forests. West Mountain WMA contains 5376 acres of deer wintering area, mostly in the lowlands near the Wheeler Ponds, Paul Stream, and Ferdinand Bog. In addition, the largest deer wintering area in the region occurs just outside of West Mountain WMA: more than 17,000 acres of softwood forest extend from the Wenlock WMA north through the Silvio Conte NWR in the Nulhegan Basin.

Beech Mast Production Areas

West Mountain WMA contains a large amount of American beech a key hard mast species. While too far north for other hard mast species like oak and hickory, numerous stands exist throughout the WMA with a high proportion of American beech and widespread evidence of bear use. The Core Area has not been surveyed for mast stands, but mast stands are known to occur dispersed across the Active Management Area where they cover many hundreds of acres.

Vernal Pools

West Mountain WMA contains seven identified vernal pools. Vernal pools are small (usually less than ¼ acre), seasonal wetlands that provide critical breeding habitat for reptiles and amphibians.

Snags and Woody Material

Dead trees and wood are important habitat elements for many species, including woodpeckers and cavity nesting birds, ruffed grouse, reptiles and amphibians, American marten, and snowshoe hare. While West Mountain WMA's young forests have begun to generate dead wood through natural forest development, the legacy of industrial timber harvesting on the WMA has left few snags (standing dead trees) and little downed dead wood, especially of large diameter, compared to older and less-intensively harvested forests.

b. Wildlife

As a result of these habitat patterns, wildlife species that rely on forests for some or all of their needs are most common on the WMA (e.g., fisher, bear, ruffed grouse, and scarlet tanager). The WMA supports numerous species that use early-successional habitats for at least part of their annual food or cover needs, including moose, bobcat, snowshoe hare, American woodcock, and ruffed grouse. Many of the species the WMA hosts are common to boreal forests, but uncommon in Vermont (e.g., gray jay, American marten, and mink frog). Also common are many species that rely on wetlands (e.g., otters, beaver, dragonflies, and numerous birds). Finally, due to the relatively low level of human infrastructure, species associated with human development (such as starlings and house sparrows) are less common than in many other parts of the state.

1) Large Mammals

Some of the State's highest densities of moose are found in and around West Mountain WMA, and moose population management has been very active over the last decade. In 2000, the moose density in the region was near four per square mile—so high that moose-vehicle collisions were too common and moose browse was impacting forest regeneration, causing habitat degradation for the moose and other animals, and difficulties for the timber industry. In response, the Vermont Fish & Wildlife Department increased moose hunting permits in Wildlife Management Unit E, leading to very high harvest levels: from 2000 to 2012, 2745 moose were harvested in WMU E. Since 2000, hunters have harvested more than 6 moose each year from West Mountain WMA. Moose densities are now near their target of 1.75 moose per square mile in WMU E, but have dipped below their target in the southern part of the WMU ("E2"), to about 1 moose per square mile. In addition, the moose herd's future may be severely impacted by growing threats from warming weather and winter ticks, which may be causing substantial population declines in many northern states.

Deer densities, on the other hand, are some of the lowest in the State, and have changed little since 2000. Currently, WMU E is estimated to have a density of about 5 deer per square mile, and in 2012, hunters harvested 208 deer from WMU E, the lowest harvest per square mile in the state.

These low deer numbers in this region are likely due in part to severe wintering conditions. Although deer have generally benefited from timber harvesting in the hardwood stands, some

of the critical deer wintering areas located in the lowland softwood forests have been periodically degraded by overharvesting. For example, a sizable deer wintering area surrounding Ferdinand Bog was heavily cut in the 1980's, and likely led to lower deer numbers in a localized area.

Nonetheless, the more difficult hunting conditions at West Mountain WMA lead to an older age structure of the herd, and some hunters and photographers in search of a deer with larger antlers and body size are attracted to the region for this very reason.

Bear thrive in the extensive forests of northeastern Vermont. The large wetlands and mast stands throughout the forest provide important food sources for bears, and the remoteness of the region allows these notoriously shy animals to largely avoid human contact. Hunters harvested 40 bear from WMU E in 2012—a relatively high harvest for the state.

2) *Furbearers*

Many furbearers likely thrive in the forests and interspersed small openings and wetlands of West Mountain WMA.

Across WMU E, yearly harvests since 1990 have averaged: 418 mink, 535 raccoon, 4265 muskrat, 129 skunk, 241 coyote, 192 red fox, 38 grey fox, 251 fisher, 18 bobcat, 930 beaver, and 541 nuisance beaver. 2012 harvests were below average for mink (307), raccoon (418), muskrat (3130), red fox (97), otter (79), and beaver (615); but above average for skunk (160), grey fox (69), and bobcat (34). Coyote (259) and fisher (248) harvests were nearly average.

Total harvests since 1984 in West Mountain WMA's host towns (Ferdinand, Brunswick, and Maidstone) have reached 51 fisher, 18 otter, and 33 bobcat. Two-thirds of these animals have been harvested from the town of Ferdinand.

In addition, two State Endangered furbearers are now known in the West Mountain WMA area:

American Marten were extirpated from Vermont as part of range-wide declines from over exploitation and habitat loss that occurred throughout in the 19th century. Recently, however, reforestation and natural reestablishment have brought the marten back to many parts of its former range, and it is now considered to occur throughout northeastern Vermont, including across West Mountain WMA.

Canada Lynx (Federally Threatened) recently returned to northeastern Vermont. Lynx sightings have been confirmed in the Victory Basin Wildlife Management Unit and the Nulhegan Basin. And reproduction is believed to be occurring in the Nulhegan Basin. These two habitat blocks are also considered the best quality habitats for lynx in Vermont. While West Mountain WMA itself is not ideal lynx habitat, it connects these two areas, and as a result, may play a key role in the persistence of this species in Vermont, providing connectivity and peripheral habitats for lynx coming to and from Victory and the Nulhegan.

3) *Small Mammals*

In a survey of small mammals conducted for this plan, Kilpatrick (2001) documented 17 species of small mammals at West Mountain Wildlife Management Area; however population densities were very low (see Appendix E). The most abundant species captured was red-backed vole (*Clethrionomys gapperi*), the second most abundant was woodland jumping mouse (*Napaeozapus insignis*), and the third most abundant was deer mouse (*Peromyscus maniculatus*). All of these species occurred in a variety of both upland and wetland natural community types.

Only one rare species, rock vole (*Microtus chrotorrhinus*) was observed. Four boulder slopes were sampled, and rock vole was only captured on the bouldery north slope of Notch Pond Mountain. One species uncommon in Vermont, the northern long eared bat (*Myotis septentrionalis*) was captured on the WMA in the 2000 small mammal inventory.

Three species of shrews were recorded on the WMA. Masked shrew (*Sorex cinereus*), which occurs in a diversity of upland and wetland natural community types, but is notably absent from northern hardwood and red spruce-hardwood forests, was the most frequently captured shrew. Short-tailed shrew (*Blarina brevicauda*) has been in very low numbers in parts of Essex County since 1997; very few were captured in either upland or wetland natural community types. Smoky shrew (*Sorex fumeus*) was collected from one bouldery forest in the WMA.

Ten species of small rodents, plus beaver (*Castor canadensis*) and woodchuck (*Marmota monax*), are known to occur on the WMA. As mentioned above, red-backed vole, deer mouse and woodland jumping mouse were the most frequently trapped. Meadow jumping mouse (*Zapus hudsonius*) was common in wetland natural communities, whereas white-footed mouse (*Peromyscus leucopus*) and northern flying squirrel (*Glaucomys sabrinus*) were observed at only a single site each. Meadow vole (*Microtus pennsylvanicus*) was captured at a variety of sites, all of which Kilpatrick characterized as having open growth with low vegetation such as grasses, sedges, or herbaceous annuals. The other rodents trapped were red squirrel (*Tamiasciurus hudsonicus*), chipmunk (*Tamias striatus*) and the rare species, rock vole (*Microtus chrotorrhinus*).

One mole species, of the two known from Vermont, was observed. A single dead specimen of hairy-tailed mole (*Parascalops breweri*) was collected along the South America Pond Road, north of Ferdinand Bog. No surface ridges or other evidence of moles was observed on the WMA.

Bat sampling consisted of both mist-netting and acoustical survey. The latter yielded no definite species identifications, but did detect a high level of activity at Dennis Pond. Both northern long-eared bat (*Myotis septentrionalis*) and little brown bat (*M. lucifugus*) were netted on the WMA, both from the area east of Ferdinand Bog. These observations were the first in Essex County for both species. Two other mist net locations were unsuccessful.

Both short-tailed and long-tailed weasel (*Mustela erminea*, *M. frenata*, respectively) were trapped at West Mountain WMA. Short-tailed weasel were taken from both upland and

wetland forested natural communities; long-tailed weasel were observed at two bouldery sites.

Meso-mammals observed on the WMA were coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and snowshoe hare (*Lepus americanus*).

Kilpatrick notes that the following additional small mammal species may occur at West Mountain WMA: star-nosed mole (*Condylura cristata*) (recently observed along Webster Brook in Morgan, Essex County), pygmy shrew (*Sorex hoyi*) (difficult to capture by conventional methods), long-tailed shrew (*Sorex dispar*) (similar habitat requirements to rock vole), southern flying squirrel (*Glaucomys volans*) (known from Coos County, New Hampshire), southern bog lemming (*Synaptomys cooperi*) (known from elsewhere in Ferdinand), pine vole (*Microtus pinetorum*) (often occurs sympatrically with hairy-tailed mole), and a number of additional bat species.

4) Birds

The wide variety of upland and wetland habitats at West Mountain WMA allows a myriad of bird species to live, nest, and reproduce here, both year-round and as seasonally. The large acreage of coniferous forests and swamps, in conjunction with similar habitats on adjacent lands, allows several boreal bird species to live and even breed on this area. These species, which in Vermont are uncommon to rare outside of the Northeast Kingdom region, include the gray jay, black-backed woodpecker, boreal chickadee, rusty blackbird, and Tennessee, Cape May, Wilson's, and bay-breasted warblers. In addition, the State endangered spruce grouse breeds in the northern extremity of West Mountain WMA and has been seen elsewhere on the property. These qualities have been recognized by the Audubon Society, in their inclusion of West Mountain WMA as part of the largest Important Bird Area in the state (the Nulhegan Basin Important Bird Area).

The vast, unfragmented hardwood forest is attractive habitat to a number of bird species that need larger woodland tracts to breed successfully. These would include species such as the wood thrush, yellow-bellied sapsucker, red-eyed vireo, scarlet tanager, and black-and-white, Canada, and black-throated blue warblers.

The many ponds and beaver flowages are utilized by a number of water-dependent wildlife species. Both the endangered common loon and osprey regularly nest here, as do pied-billed grebes, black ducks, wood ducks and hooded mergansers. These wetland habitats are also important feeding sites for spotted sandpipers and great blue herons (as well as black bear, moose, otter and mink).

The WMA supports a diverse assemblage of primarily upland birds. Thirty-four species (36%) of the West Mountain WMA list are neotropical migrants. These represent roughly two-thirds of the neotropical migrants known from the Northern Forest region, or northern New England.

As part of the year 2000 biological inventory work of the WMA and Conte NFWR, Dan Lambert from the Vermont Institute of Natural Science conducted breeding bird surveys in

both management units (see Appendix E, Lambert, 2000). Based on data collected from 94 point count stations (39 in West Mountain WMA, 49 in the Nulhegan Basin Division of the Conte NFWR, and 6 in Wenlock WMA), he created a list of species, produced an index of relative abundance for species, associated species with specific natural community types, and documented rare species. Separate surveys for owls were made in early spring.

Ninety-four species were recorded as breeding birds in the WMA, out of a total of 103 species for both management units (Lambert, 2000, with the addition of gray jay from Lapin and Engstrom). Of the 94, seven species are listed as Special Concern (American black duck, black-backed woodpecker, boreal chickadee, common loon, gray jay, pied-billed grebe, and rusty blackbird), and twenty are Species of Greatest Conservation Need (Table 3).

State Endangered spruce grouse are known to occur commonly on the adjacent Wenlock WMA and regularly on at least the northern part of West Mountain WMA. West Mountain WMA provides an important potential link for dispersal and genetic exchange between the only two populations of spruce grouse in the state—the wild population at Wenlock WMA and an introduced population in Victory Basin WMA.

Lowland spruce-fir forest had the greatest number of bird species (31) as well as the highest number of conservation priority species of any community surveyed in West Mountain WMA. The lowland conifer forest complex (lowland spruce-fir forest as well as northern white cedar swamp, black spruce swamp and black spruce woodland bog) supported over half (52 species) of all species, including a majority of the conservation-priority species. Among the upland natural communities, red spruce-northern hardwood forest supported the greatest diversity of birds; alluvial shrub swamps displayed high diversity among the non-forested wetlands. Open peatlands (dwarf shrub bog, poor fen, and intermediate fen) and associated water bodies supported three species (Lincoln's sparrow, pied-billed grebe, and American bittern) not found in any other natural communities.

Barred, great horned, and saw-whet owls were the only owls recorded during the nocturnal owl survey. Boreal owl was sought using tape playbacks, but was not detected.

Turkey numbers in the area are relatively low, and hunters harvested 152 turkeys from WMU E in 2012, one of lowest harvests per square mile in the state. Populations, however, have grown noticeably over the past 12 years and turkeys are commonly seen on West Mountain WMA.

Ruffed grouse and woodcock likely found excellent habitat on West Mountain WMA over recent decades as the forest regenerated from widespread intensive timber harvesting. Much of the forest is now likely past prime condition for these birds, though natural areas of alder, dogwood, and other shrubs which naturally occur in wet areas do provide good quality habitat. No systematic survey of American woodcock or ruffed grouse has been conducted in the WMA and no information exists on the number harvested in this area.

5) *Waterfowl and Marsh Birds*

West Mountain WMA was surveyed for waterfowl and marsh bird production in June 2000 (see Appendix E, Longcore, 2000). This summary is from that survey with additional information from observations by Lapin and Lambert. The WMA was found to be an especially important breeding area for American black duck (*Anas rubripes*) and hooded merganser (*Lophodytes cucullatus*). Nearly every pond produced one or more broods of black duck, hooded merganser or wood duck (*Aix sponsa*). Broods were observed at Dennis Pond (2 black duck and 2 merganser broods), Ferdinand Bog (1 black duck brood), and beaver-flooded areas at “Paul Stream Esker” (1 black duck brood), and West Mountain Pond Cedar Swamp (1 brood each of black duck and merganser). Single broods of hooded merganser were observed at South America and Unknown ponds. Additionally, a female black duck at Paul Stream Pond appeared to be establishing a nest, and other small beaver wetlands are also likely nesting sites. Wood duck were somewhat less common on the WMA; broods were observed at Dennis, West Mountain and Wheeler ponds. Common loon nest at West Mountain and South America ponds, and a green-winged teal was seen at Wheeler Pond. Dennis Pond is also a nesting site for special-concern species pied-billed grebe (*Podilymbus podiceps*); an observation of the species was also made at Ferdinand Bog. Three permanent ponds on the WMA—Tuttle, Mud, and Buxton—were not included in the brood survey, but in 2001 a black duck brood was observed at Buxton Pond, and adults were seen at Tuttle Pond.

Dennis Pond was judged to be the best quality site for waterfowl and marsh birds. Marsh birds observed there were American bittern (*Botaurus lentiginosus*), great blue heron (*Area herodias*) and common snipe (*Gallinago gallinago*). Furthermore, a small great blue heron rookery (5 nests) is located in a white pine along the outlet of Mud Pond, a smaller pond in the Dennis Pond aquatic/wetland complex. American bittern was also observed at Ferdinand Bog.

6) *Amphibians and Reptiles*

Based on inventory work done by Jim Andrews of Middlebury College at West Mountain WMA and adjacent lands (see Appendix E, Andrews, 2000), 17 species of reptiles and amphibians are now known to occur in the WMA. Broken down by group, the species recorded include eight frogs and toads, six salamanders, two snakes and one turtle (Andrews, 2000).

The species found in the WMA represent common species, that are widespread in Vermont. A notable exception is the mink frog (*Rana septentrionalis*), whose distribution is primarily Canadian, but includes the northern third of Vermont. No State or Federally endangered species of reptiles and amphibians were found in the WMA. While positive evidence for breeding was obtained for only some frogs and salamanders, all species presumably breed in the WMA. A possible exception is the gray tree frog (*Hyla versicolor*), which might disperse into the WMA after breeding in areas along the Connecticut River.

Among salamanders, the spotted salamander (*Ambystoma maculata*) was noted most frequently while only single records were obtained for both northern dusky salamander (*Desmognathus fuscus*) and spring salamander (*Gyrinophilus porphyriticus*). Remarkably few eastern newt (*Notophthalmus viridescens*) were recorded given their ubiquity throughout

the rest of Vermont. American toad (*Bufo americanus*) and spring peeper (*Pseudacris crucifer*) were the most common frogs while there were only single observations for mink frog and gray tree frog. Painted turtle (*Chrysemys picta*) was the only turtle recorded in the WMA. It occurred at Big Wheeler and Dennis ponds. Of the snakes, the common garter (*Thamnophis sirtalis*) was recorded frequently while the redbelly (*Storeria occipitomaculata*) occurred only once.

All the amphibians except the red-backed salamander require water for breeding. Small stream margins, vernal pools, semi-permanent pools, beaver ponds and ponds are utilized by amphibians for breeding in the WMA. Many important communal breeding sites for amphibians were documented during the inventory (Andrews, 2000).

In the WMA, Dennis Pond and Little Wheeler Pond had the greatest numbers of reptiles and amphibians, each with six species. With five species, Big Wheeler Pond was the second most diverse site.

7) *Insects*

Selected taxonomic groups of invertebrates were surveyed by Miller (2001) as part of the year 2000 biological inventory work (see also Appendix E). Butterflies (*Lepidoptera: Papilionidae*), and damselflies and dragonflies (*Odonata: Zygoptera and Anisoptera*) were the focus groups. Additionally, very limited inventory work was done for macro-moths (*Lepidoptera*) and tiger beetles (*Coleoptera: Cicindelidae*). Inventory efforts for these groups were concentrated in wetlands chosen as representative of various natural communities, plus a few additional sites. Representative upland sites visited by other biologists were not inventoried.

Twenty-four species of butterflies were recorded for the WMA as compared with 34 species for both the WMA and Conte NFWR (Miller, 2001). No rare butterflies were found in the WMA, although Miller believes the two-spotted skipper (*Euphys bimacula*) qualifies as at least uncommon based on his field experience. Canadian tiger swallowtail (*Pterourus glaucus*) and members of the Celastrina complex (azures) were the most widely distributed species in the WMA.

Forty-two species of odonates (dragonflies and damselflies) were documented in the WMA, as compared with 55 species for both the WMA and Conte NFWR (Miller, 2001). An additional eight rare species of odonates have been documented by Frank Carle in work for The Department of Fish and Wildlife's Nongame and Natural Heritage Program (Carle 1994). The WMA odonate occurrences included 4 rare (S1-2) and 6 uncommon (S3) species (Table 3). The chalk-fronted corporal (*Ladona julia*) was the most widespread species encountered.

For butterflies, and to a lesser extent odonates, the numbers of species and individuals were low according to Miller; the drought of 1999 might have been responsible for the low numbers. Of the five major sites visited in the WMA, Dennis Pond had the greatest diversity (42 species) of butterflies and odonates while Ferdinand Bog had the second highest (33 species). Based on the results of his inventory work, Miller reported these two sites as

biodiversity “hotspots” in the management area. These represent bog, poor fen, shrub swamp and lowland woodland habitats.

Nineteen species of macro-moths, including three species of loopers and relatives (*Geometridae*), one tussock moth (*Lymantriidae*), and 15 owlet moths and relatives (*Noctuidae*), were documented from a single night of blacklight collecting at Dennis Pond (Miller, 2001). Approximately one-half of the moth specimens were hemlock looper (*Lamdina fiscellaria*), a forest pest species. The armyworm moth (*Pseudaletia unipuncta*) was another pest species recorded at the site. According to Miller, this represents a small fraction of the total diversity of macro-moths for the area, which may be as many as 400 species. In addition to the blacklighting data, Miller also found New England buckmoth (*Hemileuca lucina*) caterpillars at Dennis Pond. This is the first record for Essex County of a species that is perhaps rare to uncommon statewide.

Incidental inventory for tiger beetles (*Cicindelidae*) led to the discovery of two rare species in the WMA, at a site adjacent to Dennis Pond: *Cicindela longilabris* (S2) and *C. purpurea* (SU; Special Concern).

8) *Fish*

Fish are discussed in Section 4.C.3.

Fine Filter Assessment: Animals

The diversity of animals at West Mountain WMA makes it a uniquely rich and important place. West Mountain WMA contains at least forty-seven animal species of significant conservation concern (Table 3). Of these forty-seven, six species are listed as Threatened or Endangered under Vermont’s Endangered Species Law (Table 3), and ten species are listed as of Special Concern. Forty of the forty-seven species are recognized in Vermont’s Wildlife Action Plan as Species of Greatest Conservation Need (SGCN), and twenty-five of the forty-seven are classified as rare/imperiled in Vermont (S2) or very rare/critically imperiled in Vermont (S1).

Table 3: Species of Conservation Concern

<u>Common Name</u>	<u>Scientific Name</u>	<u>State Status</u>	<u>Global Status</u>	<u>State Listing</u>	<u>SGCN</u>
<i>Birds</i>					
American bittern	<i>Botaurus lentiginosus</i>	S3B, S3N	G4		SGCN
American black duck	<i>Anas rubripes</i>	S5N	G5	SC	SGCN
American three-toed woodpecker	<i>Picoides dorsalis</i>	S1	G5		
American woodcock	<i>Scolopax minor</i>	S5B	G5		SGCN
Bay-breasted warbler	<i>Dendroica castenea</i>	S2B	G5		SGCN
Black-backed woodpecker	<i>Picoides arcticus</i>	S2	G5	SC	SGCN
Blackpoll warbler	<i>Setophaga striata</i>	S4, S5B	G5		SGCN
Black-throated blue warbler	<i>Setophaga caerulescens</i>	S5B	G5		SGCN
Boreal chickadee	<i>Parus hudsonicus</i>	S2	G5	SC	
Canada warbler	<i>Cardellina canadensis</i>	S5B	G5		SGCN

Common loon	<i>Gavia immer</i>	S3B	G5	SC	SGCN
Gray jay	<i>Perisoreus Canadensis</i>	S2	G5	SC	SGCN
Great blue heron	<i>Area herodias</i>	S3, S4B	G5		SGCN
Great horned owl	<i>Bubo virginianus</i>	S3	G5		
Northern goshawk	<i>Accipiter gentilis</i>	S2B, S3N	G5		SGCN
Northern saw-whet owl	<i>Aegolius acadicus</i>	S3B, S3N	G5		
Olive-sided flycatcher	<i>Contopus cooperi</i>	S4B	G4		SGCN
Osprey	<i>Pandion haliaetus</i>	S3B	G5		SGCN
Pied-billed grebe	<i>Podilymbus podiceps</i>	S2, S3B	G5	SC	SGCN
Ring-necked duck	<i>Aythya collaris</i>	S1B	G5		
Rusty blackbird	<i>Euphagus carolinus</i>	S3B	G4	SC	SGCN
Spruce grouse	<i>Falciennis canadensis</i>	S1	G5	E	SGCN
Turkey vulture	<i>Cathartes aura</i>	S3, S4B	G5		
Veery	<i>Catharus fuscescens</i>	S5B	G5		SGCN
White-winged crossbill	<i>Loxia leucoptera</i>	S3N	G5		
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	S3B	G5		
Reptiles and Amphibians					
Mink frog	<i>Rana septentrionalis</i>	S3	G5		
Ringneck snake	<i>Diadophis punctatus</i>	S3	G5		
Spotted salamander	<i>Ambystoma maculatum</i>	S5	G5		SGCN
Wood turtle	<i>Clemmys insculpta</i>	S3	G4		
Mammals					
American marten	<i>Martes americana</i>	S1	G5	E	SGCN
American water shrew	<i>Sorex palustris</i>	S3	G5		SGCN
Canada lynx	<i>Lynx canadensis</i>	S1	G5	E	SGCN
Little brown bat	<i>Myotis lucifugus</i>	S1	G3	E	SGCN
Long-tailed weasel	<i>Mustela frenata</i>	S3, S4	G5		SGCN
Northern long-eared bat	<i>Myotis septentrionalis</i>	S1	G1G3	E	SGCN
Rock vole	<i>Microtus chrotorrhinus</i>	S2	G4	SC	SGCN
Fish					
Atlantic salmon	<i>Salmo salar</i>	S4	G5		SGCN
Brook trout	<i>Salvelinus fontinalis</i>	S5	G5		SGCN
Burbot	<i>Lota lota</i>	S3, S4	G5		
Finescale dace	<i>Phoxinus neogaeus</i>	S3	G5		
Mussels					
Eastern pearlshell	<i>Margaritifera margaritifera</i>	S2	G4	T	SGCN
Triangle floater	<i>Alasmidonta undulata</i>	S3	G4		
Insects					
Black meadowhawk	<i>Sympetrum danae</i>	S1, S2	G5		SGCN
Boreal long-lipped tiger beetle	<i>Cicindela longilabris</i>	S2	G5		SGCN
Brown elfin	<i>Callophrys augustinus</i>	S3	G5		
Cow Path tiger beetle	<i>Cicindela purpurea</i>	SU	G5	SC	

Ebony boghaunter	<i>Williamsoni fletcheri</i>	S1S2	G4	SGCN
Harlequin darter	<i>Gomphaeschna furcillata</i>	S2S3	G5	SGCN
Jutta arctic	<i>Oeneis jutta</i>	S1	G5	SGCN
Kennedy's emerald	<i>Somatochlora kennedyi</i>	S1S2	G5	
Lake emerald	<i>Stomatochlora cingulata</i>	S1, S2	G5	
Maine Snaketail	<i>Ophiogomphus mainensis</i>	S3	G4	SGCN
Moustached clubtail	<i>Gomphus adelphus</i>	S3	G4	
Ocellated emerald	<i>Somatochlora minor</i>	S2	G5	
Pink-edged sulphur	<i>Colias interior</i>	S3	G5	
Ringed emerald	<i>Stomatochlora albicincta</i>	S1	G5	
Saffron-winged meadowhawk	<i>Sympetrum costiferum</i>	S3	G5	
Ski-tailed emerald	<i>Stomatochlora elongata</i>	S3	G5	SGCN
Two-spotted skipper	<i>Euphyes bimacula</i>	S1,S2	G5	SGCN
Uhler's sundragon	<i>Helocordulia uhleri</i>	S3, S4	G5	
Zebra clubtail	<i>Stylurus scudderi</i>	S3, S4	G4	SGCN

State Status / Global Status:

- 1 = very rare or critically imperiled
- 2 = rare or imperiled
- 3 = uncommon or vulnerable
- 4 = common to uncommon or apparently secure
- 5 = common or secure
- U = unrankable, due to lack of information
- B = Breeding status

State Listing

- SC = Special Concern
- T = Threatened
- E = Endangered

SGCN = Species of Greatest Conservation Need

The forty-seven species of concern are associated with a variety of habitats. Some rely on early-successional forest (e.g., American woodcock), others rely on late-successional forest (e.g., American marten), others still rely on non-forest features like wetlands (e.g., American black duck) and talus slopes (e.g., rock vole). Notably, many of the rare species for Vermont are associated with boreal communities, and are found more commonly to the north (e.g., Canada lynx, Canada warbler, gray jay, and rusty blackbird), so the protection or enhancement of conifer, bog, and other boreal habitats is of concern. In addition, many species are associated with open water or wetlands (e.g., most dragonflies, American bittern, rusty blackbird), so the protection or enhancement of these features is of prime importance.

**Table 4: Threatened and Endangered Animals of West Mountain
WMA**

Common Name	VT Rank*	U.S. Rank*	Legal Status*
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Northern long-eared bat (<i>Myotis septentrionalis</i>)	Very rare (S1)	Very rare—uncommon (N1N3)	Endangered (VT)
<p><u>Habitat:</u> Northern long-eared bats forage in and around the forest canopy, and specialize in interior forests with low edge-to-interior ratios and the complex structure and high wood volume typical of old growth. They use large trees (greater than 16 inches diameter, by one study) for daytime roosts, and caves for hibernation.</p> <p><u>Threats:</u> Northern long-eared bats have undergone severe population declines recently as a result of a “white-nose syndrome” fungal disease.</p> <p><u>Management Opportunities:</u> Creating or maintaining an adequate supply of dead and dying trees, especially large trees, complex forest structure, and extensively forested areas.</p>			
Little brown bat (<i>Myotis lucifugus</i>)	Very rare (S1)	Uncommon (N3)	Endangered (VT)
<p><u>Habitat:</u> Little brown bats are active over water, where they drink and eat flying insects. They use buildings and tree cavities for roosts and caves for hibernation.</p> <p><u>Threats:</u> Formerly abundant throughout New England, little brown bats have undergone severe population declines recently as a result of a “white-nose syndrome” fungal disease.</p> <p><u>Management Opportunities:</u> Maintaining an adequate supply of dead and dying trees for roost sites, and maintaining stream, pond, and wetland buffers for travel and access to aquatic insects.</p>			
Canada lynx (<i>Lynx canadensis</i>)	Very rare (S1)	Common—uncommon (N4)	Endangered (VT), Threatened (US)
<p><u>Habitat:</u> Lynx rely on snowshoe hare as the staple of their diet, so they are strongly associated with coniferous and deciduous forests with dense understories, especially sapling/small pole-sized coniferous forests that support high hare densities. They thrive in northern climates, where deep snow allows them to outcompete bobcats and coyotes. They also make use of swamps, bogs, and rocky areas, and create dens in rocky openings, large tree cavities, or fallen trees.</p> <p><u>Threats:</u> Lynx declined historically from overexploitation and habitat loss, and have only in the last few years been confirmed in Vermont. Competition from coyote, fisher, and bobcat may decrease lynx success. Mortality from incidental trapping is a threat in some locations outside Vermont. Finally, climate change may pose a threat to this species, which is at the southern extent of its range.</p> <p><u>Management Opportunities:</u> Creating or maintaining mature forested areas juxtaposed with regenerating conifer or mixed forest. Creating or maintaining large diameter snags and woody material. Managing snowshoe hare populations to provide sufficient prey base.</p>			
American marten (<i>Martes Americana</i>)	Very rare (S1)	Common (N5)	Endangered (VT)
<p><u>Habitat:</u> Marten are opportunistic carnivores, and forage in trees and forest understories. They are associated with dense forest, especially softwood, and prefer mature, undisturbed forests with</p>			

complex structure, but may use forests as young as 30 years. They rely on large cavities in trees for resting and denning, and extensively use coarse woody material and its associated subnivean tunnels for finding prey in winter.

Threats: Incidental mortality through trapping may be a problem in some locations, and a small number of marten have been taken in this way in WMU E recently. In addition, plowed roads in winter may allow competitor species such as coyotes increased access to marten habitat. Also, climate change may pose a threat to this species, which is at the southern extent of its range.

Management Opportunities: Creating or maintaining extensive areas of mature forest with complex structure, including large diameter live and dead trees. Limiting young forest to a minority of the forested landscape. Monitoring and managing trapping mortality.

Spruce grouse (<i>Falcapennis Canadensis</i>)	Very rare (S1)	Common (N5)	Endangered (VT)
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Habitat: Spruce grouse prefer dense lowland softwood forests with low branches, understory berries, and small openings.

Threats: Their declines have been driven by a loss of softwood habitat, particularly their preferred dense, young stands. Additional mortality may come from accidental take, by hunters seeking ruffed grouse. Finally, climate change may pose a threat to this species, which is at the southern extent of its range.

Management Opportunities: Creating or maintaining young softwood stands with low branches and dense understory vegetation.

Eastern pearlshell mussel (<i>Margaritifera margaritifera</i>)	Rare (S2)	Common—uncommon (N4)	Threatened (VT)
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Habitat: Eastern pearlshells are a freshwater mussel that typically live in the bottoms of fast-moving, cold, clean streams and rivers. They require trout or salmon species as hosts for part of their life-cycle.

Threats: They can live over 150 years and reach a size of six inches. Eastern pearlshells are threatened by over-collection, pollution, and habitat alteration from the draining, damming, and channelizing of waterbodies in addition to bridge building and road stabilization.

Management Opportunities: Protect clear, cool waters and riparian areas. Design road maintenance and crossing structures to limit impacts on eastern pearlshells.

* For a full explanation of these ranks, read “Explanation of Legal Status and Information ranks” from the Vermont Natural Heritage website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm

9) Summary of Findings for Wildlife

As a result of both the original and current management planning processes, extensive inventories and assessments of wildlife have been completed on West Mountain WMA. Inventories of amphibians and reptiles, butterflies and dragonflies, birds, small mammals, fish and stream macroinvertebrates have revealed a wide array of species that are endangered, threatened, rare, or uncommon in Vermont. Some important species and habitat relationships discovered include:

- The largely unfragmented expanses of forest between the Nulhegan and Victory Basins are essential for the persistence of two Endangered mammals, the American marten and Canada lynx.
- The lowland spruce-fir forest complex (which includes also black spruce swamps, cedar swamps, and spruce-fir-tamarack swamps) and the red spruce-hardwood forests are of particular importance in the conservation of many species of conservation concern, including American marten, Canada lynx and spruce grouse.
- Large, open wetlands such as the fens and shrub swamps at Dennis Pond and Ferdinand Bog are especially important areas for odonates and butterflies, mink frog and perhaps southern bog lemming, and birds including rusty blackbird and waterfowl. They are also important moose feeding areas and thermal refugia.
- Cool, clear stream conditions are important for Endangered eastern pearlshells.
- Large trees and woody material are important features for endangered bats, American marten, black bear, woodpeckers, and other species.
- Areas of dense young forest are important for spruce grouse, ruffed grouse, chestnut-sided warbler, Canada lynx, and other species.
- Permanent ponds and beaver ponds provide important habitat for black duck, pied-billed grebe, osprey, and other species.
- New beaver ponds and vernal pools are important communal breeding areas for amphibians.
- Boulder slopes with mature forest are important for rock vole.

The natural community diversity of the WMA, including extensive northern hardwood and red spruce-hardwood forests, beaver complexes and two unique open wetlands, provides excellent habitat for a wide variety of nongame species. More inventory in these same groups as well as other animal groups is likely to highlight an even greater array of species present.

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D. DESCRIPTION OF ARCHAEOLOGIC, HISTORIC AND RECREATION FEATURES AND INFRASTRUCTURE

1. Existing Roads

Internal access on the West Mountain Wildlife Management area is provided by a 73 mile network of roads (Figure 12). The road density on the WMA is currently 1.92 miles of road per square mile of land. For management purposes, roads on the West Mountain WMA are classified into three classes based largely on function and road condition:

Class A - Major Access Road - Gravel, all-purpose roads, generally open to public vehicular use,²⁴ and suitable for frequent or continuous use except during winter and spring mud seasons when closures are required. Drainage structures are permanent and road surfaces consist of aggregate fill.

Class B – Minor Access Road – Roads that typically dead end at log landings, may or may not have aggregate surfacing or drainage structures, and may or may not be open for public vehicular travel.³⁴

Class C - Unimproved Road/Winter Road – Roads that have little or no aggregate surface and which have non-permanent drainage structures. Outside of the Core Area, these roads are only suitable to be used for management activities that involve the use of motor vehicles during winter/frozen ground conditions. These roads are not open to public use by motor vehicles, and will not be maintained for travel by the public.

This Plan deals only with roads open for public vehicular travel. Further, this Plan deals only with improvement, management, maintenance and closure issues associated with roads, as no new roads for public vehicular use or relocation of roads already open to public traffic are contemplated at this time.

The WMA contains or adjoins eight Class A Roads (about 35 miles; excluding Vermont Routes 105 and 102). These include the Maidstone Lake Road, Paul Stream Road, West Mountain Pond Road, South America Pond Road, Notch Pond Road, VELCO Access road, and the Dennis Pond Road. Most of these roads were built as main haul roads for the removal of timber. Since State acquisition, many of these have received significant maintenance work. The Paul Stream, South America Pond, and West Mountain Pond Roads have been re-surfaced, ditched, and graded for more efficient maintenance and improved public access.

The Maidstone Lake Road begins from VT Rte 102, about 5 miles south of the Village of Bloomfield. From its departure at Rte 102, the road travels south westerly along Paul Stream, passing the Paul Stream Road turnoff at 2.21 miles. At 3.5 miles the road forks to the east and west sides of Maidstone Lake, with the east fork continuing as the major access road and ending at the Maidstone State Park. The Maidstone Lake Road was built in the 1930's by the Civilian

²⁴ Public vehicular use of roads on the West Mountain WMA is allowed if a road is designated as a Motor Vehicle Corridor. See Section VI.E.3. and Figure 12 for a description of those corridors.

Conservation Corp as a main access road to the State Park. The road is in excellent condition and is used frequently by both State Park users as well as camp owners on Maidstone Lake. The Maidstone Lake Road became a Class III Town Highway, at the request of the Town of Maidstone, in 2011, and a public easement on the West Shore Road (the fork off Maidstone Lake Road to the west of the lake) was similarly transferred to the Town of Maidstone, in 2013.

The Paul Stream Road provides access to the southern edge of the West Mountain WMA and connects through to the South America Pond Road and public roads in Granby. It departs the Maidstone Lake Road at mile 2.21 (Brown's Mills) and travels south westerly along the south side of Paul Stream. The road travels a distance of 3.78 miles, passing the outlet of Maidstone Lake at 1.34 miles and the "*Bullthroat*" Dam site at 2 miles, before forking at the junction of Granby Stream and Paul Stream. The left fork of the Paul Stream Road continues southwestly, leaving the WMA at the Granby Town Line (mile 4.3), and provides access through the LIADSA Timber Lands to Granby Town Highway 1. The right fork of the Paul Stream Road swings northwestly, just beyond the Granby Stream Bridge, and continues along Paul Stream 3.27 miles, passing Ferdinand Bog at mile 2.1, before ending at the junction with the South America Pond Road and the Madison Brook Road

Another Class A Road, the West Mountain Pond Road, provides access to the portion of the Wildlife Management Area around West Mountain Pond. It leaves the Paul Stream Road and forks to the left after crossing the bridge on Paul Stream at Brown's Mills. This well-graveled road travels 1.1 miles northwestly from Brown's Mills before forking to the north and south of West Mountain Pond. The south fork serves as access to several camp lease sites on the pond. The north branch ends as a Class A Road at mile 2.06. From mile 2.06, the road travels west another ½ mile where it comes to an intersection. North of this intersection is a network of roads leading up various West Mountain Pond headwater streams. To the south of this intersection, a small bridge (not suitable for heavy trucks) crosses a tributary to the pond and the road loops south and swings east 3.96 miles ending at the Bullthroat Dam site. No bridge over Paul Stream currently exists at this site, preventing access to the Paul Stream Road.

The Dennis Pond Road leaves VT Rte 102 1.82 miles south of the Village of Bloomfield and provides access to Dennis Pond, Wheeler Pond, Little Wheeler Pond, and Tuttle Pond. From its departure on VT RT 102, the road travels southwestly 0.3 miles where it meets the Dennis Pond East Side Road (also known as the Magog Road), from here the road swings left and continues another ¼ mile to a fork with the Dennis Pond West Side Road (right fork). The Dennis Pond West Side road crosses Dennis Pond Brook and runs northwestly a distance of 1 mile before ending as a Class A road. The left fork crosses Dennis Pond Brook and continues another 0.6 miles to its end as a Class A road at the bridge at the outlet of Wheeler Pond. At this point the road splits with a spur road accessing Little Wheeler Pond to the north and another spur road leading south towards Tuttle Pond.

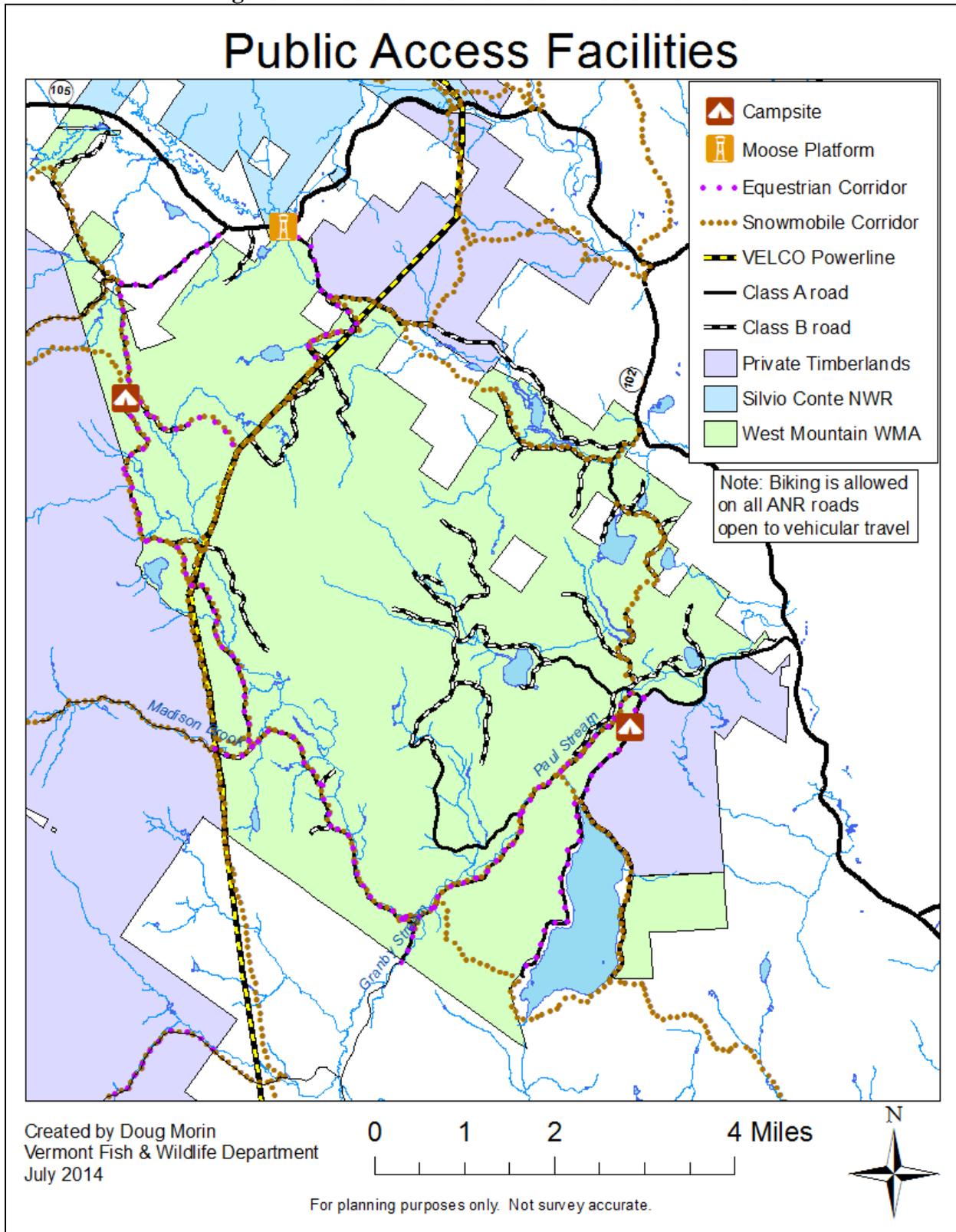
The Notch Pond Road, is a major access road to the north end of the West Mountain WMA and roads connecting south. It leaves VT RT 105 6.15 miles west from the Village of Bloomfield and 9.82 miles east of the Village of Island Pond. This road travels south 1.03 miles to where it forks. The left fork leads east 1 mile along the historical Magog Road to its end as a Class A road. The right fork of the Notch Pond Road travels south 1.1 miles from the fork to its junction with the

trail leading into Notch Pond. The Notch Pond Road ends at mile 2.36 at its junction with the VELCO Access Road.

Although the VELCO Access Road is not part of the West Mountain Wildlife Management Area, because VELCO owns the transmission line corridor in fee, the portion of the road between Notch Pond and South America Pond serves as an important link between these two areas. The portion of this road that travels underneath the transmission lines for a distance of 2.7 miles contiguous with the West Mountain WMA lands, is a Class A road, and provides access along the northern slope of West Mountain.

The lands in the northwestern portion of the WMA are accessed through the Wenlock Wildlife Management Area via the South America Pond Road. The South America Pond Road leaves VT RT 105 9.2 miles east from the Village of Island Pond and 6.95 miles west of the Village of Bloomfield. This road travels south 1.57 miles through the Wenlock WMA to the West Mountain WMA. At mile 1.4, the road forks. The right fork provides access to the southern portion of the Wenlock WMA and the Private Timberlands lands along the northern slope of Seneca Mountain. The South America Pond Road bears left at the fork and continues south, dropping into the Paul Stream Watershed at mile 3.0, and traveling along the lower eastern slopes of Seneca Mountain. At mile 4.7 the trail leading into South America Pond departs to the right. The road continues south, passing under the VELCO power line at mile 5.5, and ending at mile 7.5 at the junction with the Paul Stream Road and the Madison Brook Road.

Figure 12: Roads and Other Public Access Facilities



2. Cultural Features

a. Native American Sites

As described in section IV.B. above, the history of the area includes use of the Nulhegan region by Native Americans perhaps dating back 10,000 years. The Nulhegan River was part of a long distance travel route used by Native Americans connecting the St. Lawrence and St. Francis rivers with locations in the Androscoggin, Kennebec, and Penobscot river drainages in Maine, and the Atlantic coast. However, while Native American sites along the lower portion of the Connecticut River are well documented, there is little evidence on record regarding their habitation or activity in the Nulhegan region. Brunswick Springs, in the Dennis and Wheeler Stream drainage near their confluence with the Connecticut River (just beyond the West Mountain WMA boundary), was apparently an important site for Native Americans for medicinal and spiritual purposes; and a number of sites near Island Pond have produced artifacts. Maidstone Lake is the site of another find.

There are no known sites on the West Mountain WMA. However, the Cultural Resource Assessment conducted for this plan and the Nulhegan Basin Division of the Conte Refuge plan (Scharoun, Frank, Bartone, and Cowie, 2001, see Appendix E) states that “the study area contains a variety of landforms and settings that were likely attractive to Native Americans over their long tenure in the area.” The rich environments provided by the mix of wetlands, streams, ponds and mountains would suggest that this area may have been a trapping area, particularly given its location along a regionally significant long distance travel route. Further, a portage trail from the Nulhegan River passing through the notch between North Notch and Notch Mountains, following the Notch Pond and Dennis Pond streams to the Connecticut River, may have been part of the historic long distance travel route used by Native Americans. This route also passes in close proximity to Brunswick Springs.

It is important to be aware of the potential that the West Mountain WMA lands have for Native American artifacts or other evidence of their culture, occupation, and use of the area. To this end, the Cultural Resources Assessment presents “sensitivity” maps that highlight areas where specific procedures should be followed to avoid compromising any such potential sites with any future management actions.

b. Euro-American Historic Sites

Within the West Mountain WMA there are a number of confirmed sites with portions of structures remaining that are of historic interest, most associated with the industrial logging period (post 1900). A few earlier sites date to the 1700’s and 1800’s, the period of early settlement and a farming/lumbering economy. These are listed below and shown in Figure 13.

- Magog Road (VT-ES-34)
Pioneer Subsistence Period (1780-1850)
Early Commerce, Transportation

This extensive linear feature connected points in Canada (Montreal) to coastal Maine (Portland). Portions of this highly significant historic stage and freight road have been identified with the aid of old maps of the town of Brunswick. A small settlement (five families) was attempted on this road in 1820 -21, just off the West Mountain WMA in Brunswick. The settlement was abandoned because the land was not suited for agriculture.

- Browns Mill (VT-ES-17)
Logging and Lumbering Period (1850-1900)
Industrialization Period (post 1900)
Logging and Lumbering Context
Saw Mill, wood manufacturing, dam

This site is located on Paul Stream in Maidstone, at the bridge to the West Mountain Pond Road. Photographic evidence suggests a large mill complex was situated here in the early 1900's, on the former site of a mid 1800's mill. Iron rods and embedded eye bolts are among the features that identify this mill site. Landforms in the immediate area suggest the outlines of a mill pond and head-race. There are also portions of cribwork underneath and upstream of the present bridge, which are possibly remnants of the dam.

- D.H. &T.G. Beattie Mill (VT-ES-32)
Logging and Lumbering Period (1850-1900)
Logging and Lumbering Context, Possible Agriculture Context
Saw mill, wood manufacturing

The Beattie brothers established a mill on Paul Stream in 1859, located below Browns Mill, somewhere in the vicinity of Paul Stream Pond. Records show the mill closed in 1876.

- Beattie Farms
Logging and Lumbering Period
Logging and Lumbering Context, Agriculture Context
Farm

The Beattie brothers also operated two farms, a 600 acre farm in Maidstone (thought to have been located within the West Mountain WMA boundaries), and a 380 acre farm in Brunswick, possibly an early predecessor to the Whittaker Farm, located outside of the West Mountain WMA boundaries.

- Bullthroat Dam/Camp – Boom Anchor (VT-ES-18)
Industrialization Period (post 1900)
Logging and Lumbering Context
Logging Camp and Dam, and Logging Feature

This site is located in Maidstone along Paul Stream. Photographic documentation identifies this site as a Connecticut Valley Lumber (CVL) logging camp. Probable remnants of the dam exist beneath extensive modern disturbance. The boom anchor is a feature consisting of an eyebolt with an attached iron ring. The bolt has tentatively been associated with the dam at Bullthroat a short distance down stream.

- Ferdinand Camp (VT-ES-47)
Industrialization Period (post 1900)
Logging and Lumbering Context
Fire Warden Camp

A standing structure, ca. 1934, this fire warden's camp is located near the confluence of Granby and Paul Streams in the town of Ferdinand. The camp is in excellent condition, and is the only representative of its type in the Nulhegan and Paul Stream area. It is associated with the fire tower that was erected on West Mountain by the Vermont Timberland Owners Association, shown on a 1903 map of the Association's fire patrol system. The fire tower was later rebuilt by the CCC in the 1930's.

- Boom Anchor (VT-ES-48)
Industrialization Period (post 1900)
Logging and Lumbering Context
Logging Feature

This feature is located in the town of Ferdinand, near the outlet of Ferdinand Bog. It is an eyebolt embedded in boulder, and is tentatively listed as an anchor for a boom constructed behind the dam once located at the outlet. This boom anchor also marks the general area of a large logging camp, of which no discernible signs persist.

- Horse/Stock Barn (VT-ES-49)
Industrialization Period (post 1900)
Logging and Lumbering Context
Company Farm

Located in the upper Paul Stream drainage in the town of Ferdinand, this early 1900's structure represents the probable location of the winter logging camp of Lucian Dion, and is representative of a 'company farm.' The structure is in a state of collapse, but retains a considerable number of details useful in documenting functional aspects of the barn. As an agricultural site, the area in which the barn is located may also contain other evidence of farming/logging.

- Rock Shelter (VT-ES-37)
Industrialization Period (post 1900)
Possible Native American Period
Trapping Context

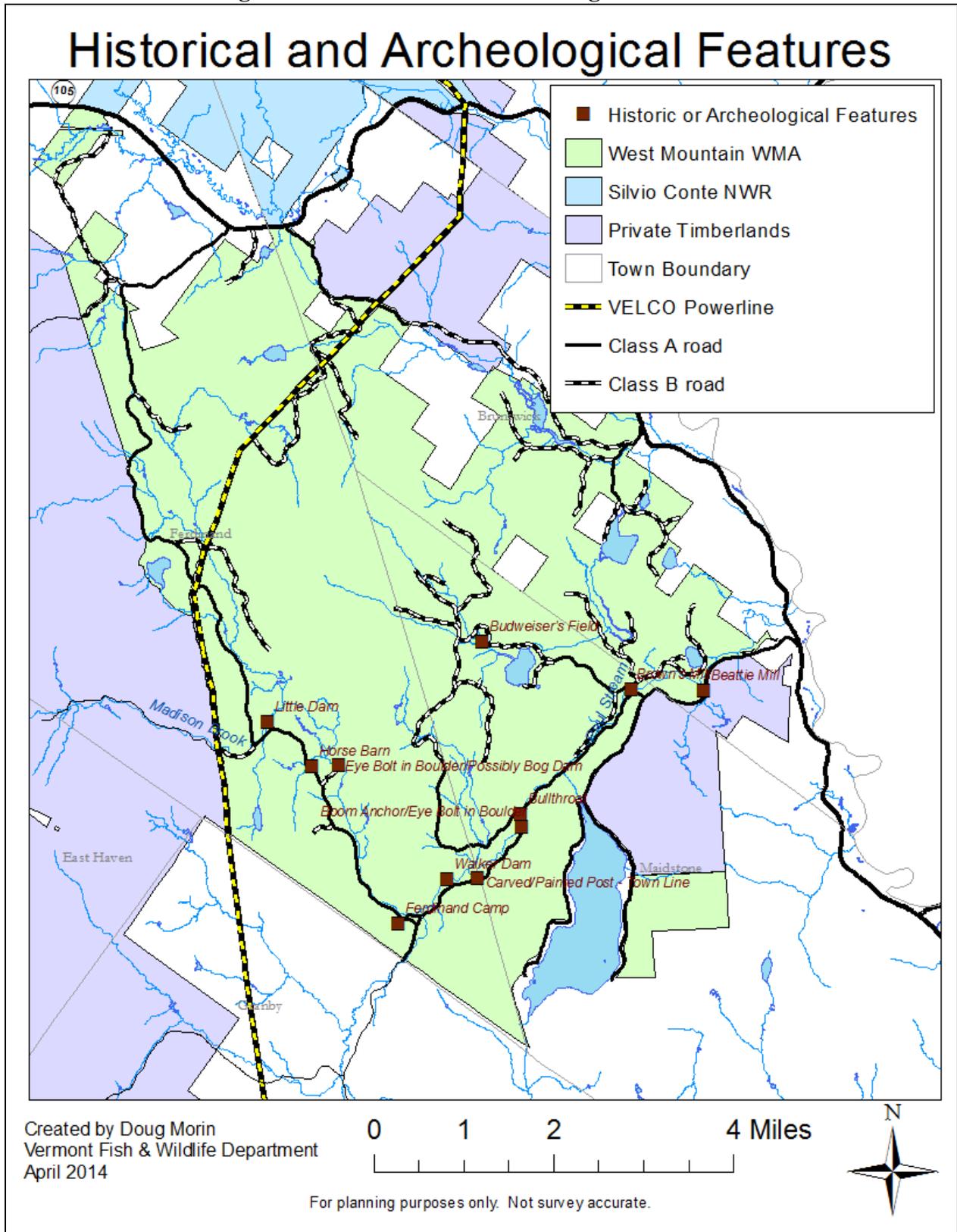
Located on Wheeler Stream in the town of Brunswick, this is a natural feature formed by glacial erratics and converted to a crude camp. The site, dated in the early 1900's, represents a camp of a local trapper. It may have been used also by Native Americans.

- Budweiser's Field
Industrialization Period (post 1900)
Logging and Lumbering Context
Logging Camp

Located in Maidstone, beyond the West Mountain Pond on the West Mountain Pond Road, this site contains the remains of a twentieth century logging camp.

The sites listed above are part of a system of enterprises that developed around the economic use of the forests in the Nulhegan and Paul Stream drainages beginning in the early 1800's. There are a number of other sites in close proximity to the West Mountain WMA that are part of this larger context, including the Hawkins and Stevens saw mill (1802-1814) on the south branch of Wheeler Stream; the Norris /Merrill Mill (ca. 1850), a saw mill and wood manufacturing shop at the outlet of Maidstone Lake; the Granby Bog Saw Mill on Granby Stream approximately one mile from the Granby/Maidstone line and boundary of the West Mountain WMA; and the Whittaker Farm located where the Magog Road intersects Route 102 in Brunswick, thought to have been used as an inn when the Magog Road was a principal long distance route and stagecoach road, later owned by the Beattie brothers as a farm and depot for their operations in the area, and later as the headquarters for the Connecticut Valley Lumber Company; and numerous other mills and dams on the Nulhegan River and its tributaries.

Figure 13: Historical and Archeological Features



3. Private Camp Leases

Camps have been in existence on the West Mountain WMA lands since at least 1911, when a map produced by the Connecticut Valley Lumber Company showed nine camps in the Paul Stream drainage above the confluence of Granby Stream and Paul Stream. Of the 73 camps on West Mountain WMA at acquisition, 64 remain privately-held, while ANR owns six, The Nature Conservancy owns two, and two structures were destroyed by fire.

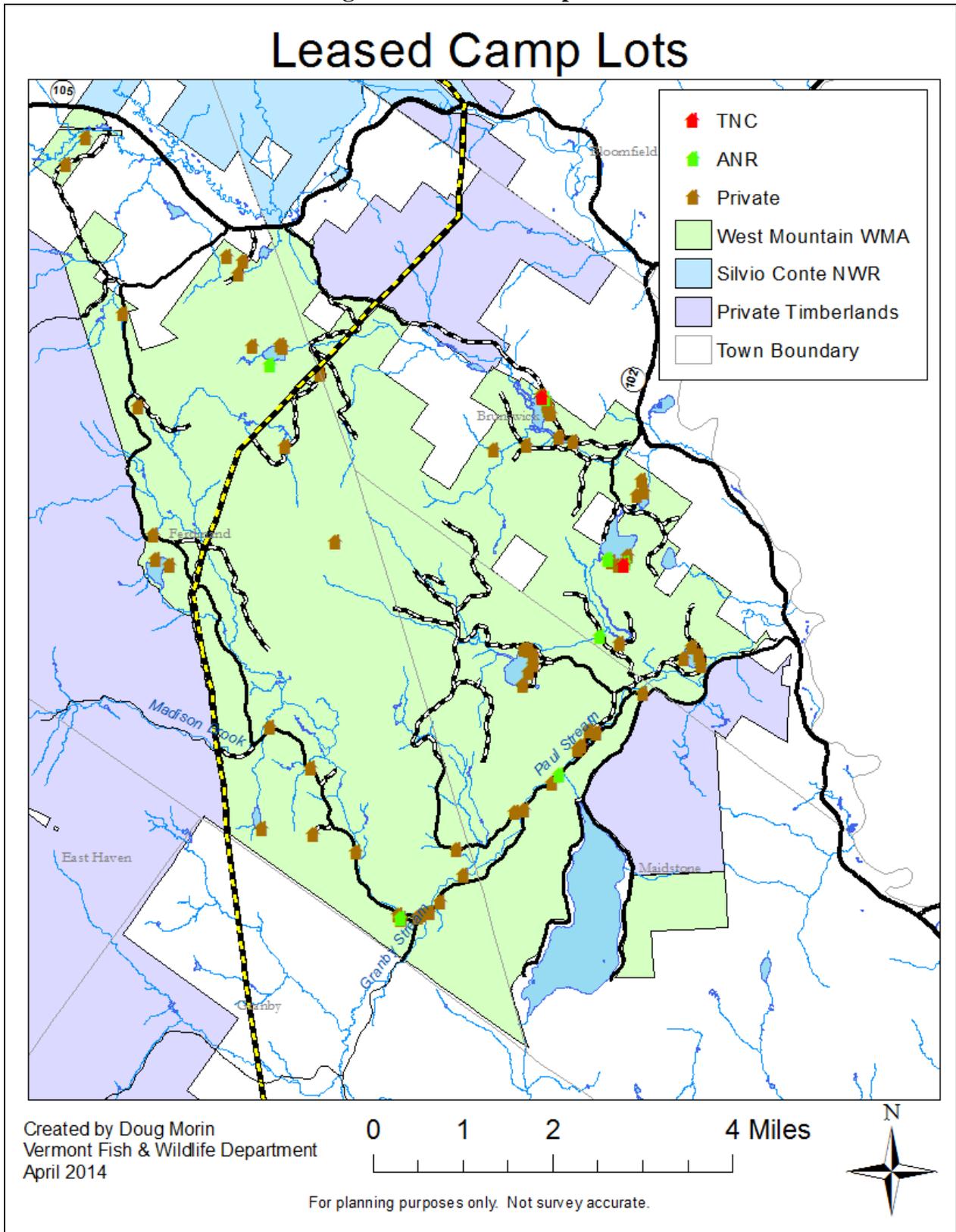
About half (33) of these are located on the 11 ponds in the WMA. They range in character from rustic single room hunting camps to fully developed seasonal residences. Most are accessible by two-wheel drive road, although a few (10) are water-access or walk-in only (greater than 1/3 mile from a road).

The camp leases will expire over time, and private use will cease, consistent with the provisions of the 1999 Budget Adjustment Act and the State Lands Easement, and ANR will eventually take ownership of all lots and abandoned structures. Despite this, lease terms are for the extent of the life of the leaseholder plus twenty years (but are converted to fixed terms if sold or assigned to new owners), and many leases are held by more than one person. Many will legally be entitled to continue the leases beyond the next 50 years. The management policies developed for the West Mountain WMA regarding access roads and fire management reflect the fact that these camps are and will continue to be part of the landscape for some time to come.²⁵

More details on privately leased camps is included in Section VI.F.7.

²⁵ See Section VI.F.7. for a discussion of management options for any camps that become state property.

Figure 14: Leased Camp Lots



4. Public Recreational Resources and Facilities

a. Recreational Resources

The primary recreational resources of the West Mountain WMA include:

- Ponds
- Rivers and Streams
- Wetlands
- Forests
- Fish and Wildlife, and
- Mountains

These resources are inseparable parts of an integrated system. For example, the forests and wetlands provide habitat for wildlife and clean water for surface waters and fish habitat.

As the most widespread feature of the landscape, the forests described previously provide the setting for most recreation.

The recreational resources of the West Mountain WMA are unusual for the State of Vermont because of the area's relatively remote, rugged and undeveloped character and, related to this, the relatively low levels of use that these resources receive (see Section IV.E for information on levels of use). The West Mountain WMA and the surrounding landscape are a piece of the North Woods, which is more prevalent in the Adirondacks and northern, eastern, and western Maine. The North Woods is a large forested area characterized by ecosystems dominated by northern hardwoods and spruce/fir forests, use for timber production, and low levels of development comprised largely of primitive camps on lakes. The North Woods character of the West Mountain Wildlife Management Area distinguishes its recreational resources and uses from other regions in Vermont.

The following tables summarize information on specific recreational resources found on the West Mountain WMA. These resources include eleven ponds, nine named streams and a small segment of the Nulhegan River, eight mountains and ridges, and numerous wetlands. Developed recreation facilities include snowmobile trails, equestrian trails, camp sites, a moose viewing platform and two information kiosks. There are also a number of informal trails and access points to the rivers and streams. The gravel roads within the WMA are also used for wildlife viewing, hunting, and foraging activities.

Many of the public access opportunities extend off of single ownerships within the Kingdom Heritage Lands. The Nulhegan River extends well outside of the Kingdom Heritage Lands area, and provides access as part of the Northern Forest Canoe Trail stretching from Old Forge, New York to Fort Kent, Maine. Equestrian trails and snowmobile trails cross West Mountain WMA,

the Private Timberlands, and numerous other public and private lands. Even the hiking trails on the Private Timberlands use private land in some areas.

Table 5: Ponds, Rivers and Streams on the West Mountain WMA Lands

Waterbody	Town	Size	Sport Fishery s=stocked, w=wild BKT= brook trout ATS=Atlantic salmon BNT=Brown Trout RBT=Rainbow Trout	Wilderness - Like Rating³	Access f=foot/ carry-in c=car top	Max. Depth (ft.)	Type
Ponds							
South America Pond	Ferdinand	30a.	cold/ s-BKT	8	c	4	dystrophic
Notch Pond	Ferdinand	21a.	cold/ s- BKT	8	f	26	dystrophic
Unknown Pond	Ferdinand	11a.	cold/ s-BKT	not assessed	f	14	dystrophic
Dennis Pond	Brunswick	33 a.	warm/ s-BKT	8	c	3	dystrophic
*Mud Pond	Brunswick	5 a.	warm	not assessed	f	NA	dystrophic
West Mtn. Pond	Maidstone	59a.	cold /s-BKT	0	c	12	dystrophic
Wheeler Pond	Brunswick	69a..	warm	0	c	35	dystrophic
Little Wheeler Pond	Brunswick	7a.	warm	not assessed	f	NA	dystrophic
Paul Stream Pond	Brunswick	21a.	warm/s-BKT	0	c	10	dystrophic
Tuttle Pond	Brunswick	16 a.	none	not assessed	f	NA	dystrophic
*Buxton Pond	Ferdinand	6a.	unknown	not assessed	f	NA	dystrophic
Rivers and Streams (Named only)							
Nulhegan River	Ferdinand	≅ 1 mi	s-BNT, s-ATS, w-BNT, w-BKT, w-RBT	NA	NA	NA	NA
Paul Stream	Ferdinand Brunswick	11 mi.	s- BKT, s-ATS, w-BKT	NA	NA	NA	NA
North Branch Paul Stream		1.5 mi.	w-BKT	NA	NA	NA	NA
Madison Brook	Ferdinand	≅ 1 mi	s- BKT, w-BKT	NA	NA	NA	NA
Granby Stream	Ferdinand	< 1mi	s- BKT, s-ATS, w-BKT	NA	NA	NA	NA
Stevens Brook	Ferdinand	≅ 1 mi	w- BKT	NA	NA	NA	NA
West Mtn. Brook	Ferdinand- Brunswick	≅4.5 mi	w-BKT	NA	NA	NA	NA
Telephone Brook	Ferdinand Brunswick	≅ 3 mi	w-BKT	NA	NA	NA	NA
Dennis Pond Stream	Brunswick	< 1mi	w- BNT	NA	NA	NA	NA
Wheeler Stream	Brunswick	≅ 2 mi	w-BNT	NA	NA	NA	NA
<p><u>Wilderness-like</u> is defined as having a wilderness character, but having a two-wheel drive access within 1/3 mile of the lake which may provide access to the lake, or having seasonal or year round-use structures, or having both of these characteristics. The maximum number of structures is an average of one per 1/3 mile of shoreline. Ratings range from 0 to 10 with 10 having the most wilderness characteristics.</p> <p>NA = not applicable or not available.</p> <p>* = ½ on a TNC inholding within the West Mountain WMA, and ½ on the Private Timberlands..</p>							

Table 6: Mountains and Ridges on the West Mountain WMA Lands

NAME	TOWN	ELEVATION	TRAIL	NOTES
West Mountain	Ferdinand	2,710	Yes to summit	Ledges on south side offer good views. Summit including old fire tower and cabin

				are privately owned.
Notch Pond Mountain	Ferdinand	2,000	No	Summit is forested – mostly spruce/fir.
Ridge to west of Notch Pond	Ferdinand	1,960	No, but skid trail goes through the saddle.	Summit is forested.
Ridge to west of Maidstone Lake	Maidstone, Ferdinand	1,790	No	Summit is forested.
Ridge east of Ferdinand Bog	Ferdinand	1,660	No, but old logging road goes part way up.	Summit is forested.
Hill east of Unknown Pond	Ferdinand	1,760	No but old logging road most of the way to summit.	Summit is forested.
Hill south of West Mountain Pond	Maidstone	1,600	No, gravel road goes within 1,000 ft of summit.	Summit is forested.
Stoneham Mountain	Maidstone	2,140	No	Summit is forested.

The recreational resources of the lands also include the wetlands present on the West Mountain WMA. Wetlands can offer important opportunities for nature study, wildlife observation, canoeing, and hunting; however, they are highly significant and sensitive resources which can be damaged by too much, or inappropriate, recreational use. Therefore, appropriately managing access to these areas, group activities, etc., is particularly important in achieving the goals and objectives for these lands.

Thus, the recreational resources of the West Mountain WMA are varied and represent unusual recreational opportunities for Vermont because of their relatively remote, rugged and undeveloped character, as well as their location within a large, undeveloped block of forest land.

b. Recreation Facilities

Previous owners of the West Mountain WMA, as paper companies interested in the area’s fiber resources, did not specifically develop recreation facilities for the general public. The policies of the previous owners contributed to the relatively undeveloped character of these lands today.

Previous landowners allowed certain recreational uses (largely hunting, fishing, trapping, and snowmobiling) but did not allow others (ATV use, camping, biking, and horseback riding). Use of the area over time has resulted in “informal” recreation sites. Examples of informal recreational sites include old skid roads used not only for access to camps, but also for hiking; and sites used to access the shores of lakes, ponds and streams.

Prior to State ownership, formal recreational facilities were largely limited to snowmobile trails. Since State acquisition, however, some additional formal recreational facilities have been added

including substantial mileages of designed corridors for biking and equestrian use, a moose viewing platform, and two campsites.

Table 7: Public Recreation Facilities on the West Mountain WMA²⁷

FACILITY	TOWN(S)	METRICS	DESCRIPTION AND USE
Snowmobile Trails	Brunswick Maidstone Ferdinand	About 30 miles	Designated roads and trails managed by VAST as snowmobile Corridor Manager.
Equestrian Corridors	Brunswick Maidstone Ferdinand	About 25 miles	Roads managed by VHC as equestrian Corridor Manager.
Biking Corridors	Brunswick Maidstone Ferdinand	About 70 miles	Roads managed by ANR as biking Corridor Manager.
Moose Viewing Platform	Brighton	One	ADA-accessible covered platform at Notch Pond Road and Route 105, overlooking moose wallows.
Designated Camp Sites	Maidstone Ferdinand	Two	Two open areas designated for camping off of South America Pond Road and Paul Stream Road, respectively.
Information Kiosks	Maidstone, Brunswick, Ferdinand	One kiosk at each location	Standard kiosk with information on area, management, and public uses. Located at Browns Mills, Dennis Pond entrance road, South America Pond Road at Route 105.

Other sites used informally by recreationists include the following:

- A trail up West Mountain, located in the town of Ferdinand and approximately two miles long, is a well-defined trail with modest grades and no significant views. The trail starts from a 4 wheel drive road (Road #76-00-0) east of the VELCO line at the site of a camp. The summit and fire tower are privately owned. This trail appears to be used largely to access the leased on the summit.
- A trail to Unknown Pond, located in the town of Ferdinand and approximately 5/8 of a mile long, a spur road (Road #77-50-1) off the South America Pond Road, is a well- defined trail with modest grades and some wet spots. It leads to the pond and camps thereon. The pond is scenic. Access to the pond itself is across a wetland. This trail appears to be used largely to access the camps on Unknown Pond.
- A trail to the south side of Notch Pond, located in the town of Ferdinand and approximately 5/8 of a mile long, is a well-defined trail that starts from a dirt road (Road #73-14-1) off the

²⁷ The location of trails may change from time to time based on other land management needs, *e.g.*, areas where timber is being harvested, etc.

VELCO line. The trail is wet in spots and appears to be used largely to access the camp in this location. The pond is scenic with views of Notch Mountain.

- Trail (old road #73-13-0) to the east side of Notch Pond, located in the town of Ferdinand and approximately 3/8 of a mile long, is a well-defined trail of modest grade that leads from the Notch Pond Road (Road #73-00-0) to the east shore of the pond and the site of three camps. This trail appears to be used largely to access the camps. The pond is scenic.
- A shoreline access at South America Pond, located in the town of Ferdinand. This site lies just off the 4WD road to South America Pond (Road #72-50-0). It is an informal site suitable for launching a canoe, kayak or car top boat. It is suitable for activities such as picnicking and shore fishing and provides good views of the pond which is quite scenic.
- A shoreline access at West Mountain Pond, located in the town of Maidstone, is a path from the West Mountain Pond Road (Road #79-00-0). This site is located just to the west of the outlet of West Mountain Pond. It is an informal site that has been maintained by private individuals for the purpose of launching canoes, and other small watercraft. The water is very shallow at this site and makes launching a boat difficult. It provides good views of the pond.
- A shoreline access at Dennis Pond, located in the town of Brunswick, is a path from the Dennis Pond Road (Road #75-12-0). This site lies just off the portion of road west of the outlet of Dennis Pond. It is an informal site over a boggy wet area to the shore of the outlet. It has been used for launching canoes, kayaks or car top boats. It provides good views to the north.
- A shoreline access at the outlet of Wheeler Pond, located in the town of Brunswick, is an area on the shoulder of the road that crosses the outlet of Wheeler Pond (Road #34-00-0). It is a rough, informal access site suitable for launching a canoe, kayak or car top boat. It provides access to Wheeler Pond through a narrow passage in the upstream end of the outlet. This site is not particularly scenic or well suited to other activities. Two other sites that appear to be used for boat access also exist on the private land that abuts Wheeler Pond.
- A shoreline access at Paul Stream Pond, located in the town of Brunswick, is a small shoreline area used to access the pond. This site lies just off the gravel road on the east side of Paul Stream Pond (Road #79-04-0). It is an informal site suitable for launching canoes, kayaks and car top boats. The shoreline at this site is attractive for sitting and picnicking. This site offers views of Paul Stream Pond.
- An access to Paul Stream below Ferdinand Bog, located in the town of Ferdinand, is a roadside site that provides access to the stream and up into the bog. This site lies on Paul Stream just south of Ferdinand Bog where the bridge on Road #77-60-0 crosses the stream. It is an informal site suitable for launching canoes, kayaks or a small car top boat. The site offers good views to the north. It also offers a footbridge to allow pedestrian access across the bog outlet, to the east of the bog.

The area also has many short, informal trails to streams and brooks, largely for fishing access. Thus, a variety of informal recreation sites exist on the West Mountain WMA as well as the formal network of snowmobile trails maintained by VAST.

The roads in the area, shown in Figure 12, are also used for recreational purposes although their primary purpose is to provide access for management activities. See Sections IV.D.1. and VI.E. for further information on roads.

E. LEVELS OF RECREATIONAL USE AND PROJECTED TRENDS

1. Current Uses and Levels of Use

a. Present Uses

Present uses on the West Mountain WMA lands include snowmobiling, hunting, training and hunting with dogs, fishing, trapping, bushwhacking, snowshoeing, cross-country skiing without groomed trails, walking/hiking, horseback riding, biking, foraging wild berries, collecting antlers, wildlife observation, and photography.

b. Overview

Overall, the level of use on the West Mountain WMA lands is light for most uses except snowmobiling and hunting. Furthermore, most use takes place within a relatively short distance from existing gravel access roads (estimated as approximately ½ mile). This was the overall conclusion resulting from a series of focus meetings aimed at specific user-groups, held during 2000, and is consistent with the experience of ANR land managers since that time. Present use was considered light enough to maintain a sense of remoteness.²⁸ The fall and winter hunting seasons were perceived to have a higher use than the spring and summer, and summer use was heavier than spring use. The highest daily use for the peak season (fall hunting) was estimated by participants to be in the high hundreds of users for the whole of the West Mountain WMA.

c. User Characteristics

A survey of recreational users was conducted for the Conte Refuge in 2000 and 2001. User characteristics as determined from the Conte Refuge survey provide an indication of user characteristics on other Kingdom Heritage Lands (since patterns of use on the Conte Refuge lands are expected to be similar to that on the Plum Creek lands and West Mountain WMA). On the Conte Refuge, the September through December period was dominated by hunting (over 90% of the respondents indicated they were at the Refuge for hunting during this period), and about half of the respondents were camp owners. All of the respondents during the winter season (January through March) indicated they participated in snowmobiling. Less than ten percent said

²⁸ Because use was considered to be light, planning efforts have not committed scarce resources to a detailed study to document the precise number and type of users of the West Mountain WMA.

they originated their snowmobile trip from a private camp. The most common vehicle was a truck with two occupants.

d. Fall Use

Based on data from motor vehicle counters, fall appears to be second only to winter in terms of visitation and use. Traffic counter data were collected at three points on the West Mountain WMA (on Notch Pond Road, Paul Stream Road, and South America Pond Road). The total vehicle count²⁹, as measured by these machines for the period including the last week in August through the first week in December, was 5,632. Additional use occurred on roads which were not monitored - the Granby Stream Road and the Dennis pond Road. Assuming that additional use via the Granby Road was approximately 50% to 75% of the level of use on the Paul Stream and South America Pond Roads, and that use on the Dennis Pond Road was roughly 25% of the use of the Notch Pond Road,³⁰ these two roads would add another 1,700 vehicles, for a total vehicle count of roughly 7,300. Assuming that one-third of the weekend users are camp owners who stayed an average of 1.5 days per visit, and assuming a vehicle occupancy of 2.5 persons for camp users and 2.0 for day users, use for the West Mountain WMA for the Fall in the year 2000 is conservatively estimated as roughly 17,000 user-days.

The pattern of use of the West Mountain WMA lands is similar to that observed on the Conte Refuge lands, with a higher level of use during weekends, and during the peak hunting season, October and November (based on patterns observed at the three roads monitored with traffic counters). For the period August 23, 2000 through December 7, 2000, the average daily vehicle counts on weekends were generally on the order of double the average daily vehicle counts on weekdays; and average daily counts on both weekdays and weekends increased by 50 to 100% during the months of October and November, compared to August and September. Approximately 35 percent of the estimated total Fall vehicle count for the West Mountain WMA occurred on the Paul Stream Road; 25 percent on the South America Pond Road, 19 percent on the Granby Stream Road, 17 percent on the Notch Pond Road, and 4 percent on the Dennis Pond Road.

e. Winter Use

Based on data from snowmobile counters, winter appears to be the time of heaviest visitation and use. To estimate the level of snowmobiling use, snowmobile counters were installed for the 2000-2001 season at five major trail locations. Use was monitored from the last week in December through the first week in April. For all stations combined, the heaviest use occurred in January and February (66%), and on weekends (50%). The total use is estimated to be in the range of 40,000 to 60,000 user-days for the entire area encompassed by the Kingdom Heritage Lands.³¹ Approximately 25% of the use was monitored at the two stations located south of the

²⁹ Vehicle count was estimated as half the total count, assuming that vehicles exited the lands using the same point of entry (tripping the counter twice), or exited at a point that had another counter (thus being counted twice).

³⁰ Based on estimates provided by Dave Willard and Matt Langlais, ANR.

³¹ Calculated as half the recorded snowmobile counts at the five stations (assuming that each counter was passed by a sled that had been previously counted once); and assuming that the five counter locations account for 50% to 75% of the total use.

Nulhegan River, at Wenlock Road and the Granby Stream Road. For both of these stations, the heaviest use occurred in January and February, and on weekends. Use was slightly heavier at the Granby Stream trail, which had a peak daily use of 200 sleds recorded on Sunday, January 28. The peak day use at the Wenlock trail was 135 sleds, which also occurred on a Sunday (February 18). The weekend daily average use for the entire season at Granby Stream was 75 sleds, compared to 65 sleds at the Wenlock trail. For comparison, the maximum daily number of sleds recorded at any of the five stations included in this monitoring effort was roughly 400 sleds at the Henshaw Road outside of Island Pond.

f. Spring/Summer Use

Traffic counter data were collected from May 17, 2001 through August 12, 2001 at three points on the West Mountain WMA (on Notch Pond Road, Paul Stream Road, and South America Pond Road). The total vehicle count,³² as measured by these machines for the spring/summer period, was 3,890. Additional use occurred on roads that were not monitored - the Granby Stream Road and the Dennis Pond Road. Assuming that additional use via the Granby Road was approximately 50% to 75% of the level of use on the Paul Stream and South America Pond Roads, and that use on the Dennis Pond Road was roughly 25% of the use of the Notch Pond Road,³³ these two roads would add another 1,200 vehicles, for a total vehicle count of roughly 5,000. Assuming that one-half of the weekend users are camp owners who stayed an average of 2 days per weekend visit, and assuming an average vehicle occupancy of 2.5 persons for camp users and 2.0 for day users, use for the West Mountain WMA for the spring/summer period in the year 2001 is estimated as roughly 14,000 user-days.

The pattern of use of the West Mountain WMA lands for the spring/summer period shows average daily vehicle counts on weekends to be 1.5 to 2 times the average daily vehicle counts on weekdays. Approximately 45 percent of the estimated total spring/ summer vehicle count for the West Mountain WMA occurred on the Paul Stream Road; 20 percent on the South America Pond Road, 20 percent on the Granby Stream Road, 11 percent on the Notch Pond Road, and 4 percent on the Dennis Pond Road.

F. MANAGEMENT OF WEST MOUNTAIN WMA SINCE 1998

Since 1998, ANR has managed the West Mountain WMA for conservation and public access, in accordance with the goals and objectives laid out in this document, and in a way that complements activities on the Private Timberlands and Conte Refuge. During this time ANR has also managed the Public Access Easement on the Private Timberlands, and coordinated closely with the other Kingdom Heritage Lands Partners.

1. Infrastructure and Access at West Mountain WMA

³² Vehicle count was estimated as half the total count, assuming that vehicles exited the lands using the same point of entry (tripping the counter twice), or exited at a point that had another counter (thus being counted twice).

³³ Based on estimates provided by Dave Willard and Matt Langlais, ANR.

Since taking ownership, ANR has conducted many activities to maintain and improve public access via roads across the WMA.

From 2000 through 2012, ANR spent \$342,000 on road and bridge maintenance on West Mountain WMA—an average of more than \$26,000 each year. Almost all of these funds have come from the payments of camp leaseholders. ANR has actively maintained more than 40 miles of roads in West Mountain WMA with grading, graveling, and brush-clearing, and has made substantial repairs to numerous roads following flood damage. ANR has only closed one road to vehicles (at the outlet south of Ferdinand Bog).

ANR has conducted extensive repairs on the bridges of West Mountain. Eight bridges have needed significant repairs due to flood damage or old age, while almost all of the 16 bridges on the WMA have required new decking. ANR also replaced the failing bridge over West Mountain Brook, with a new vehicle bridge to allow camp access until leases expire, and replaced the vehicle bridge to the closed road south of Ferdinand Bog with a pedestrian bridge.

ANR has managed access to and from its property by opening and closing gates in conjunction with neighboring landowners (primarily, the Conte Refuge, Plum Creek, and LIADSA).

Some changes have been made to roads and access in West Mountain WMA. The road south of Ferdinand Bog was closed and restored to a more natural state after it was damaged in a storm. This road was designated for closure, so ANR replaced the old vehicle bridge with a pedestrian bridge to allow continued foot traffic. ANR also relocated about a third of a mile of the entrance to Dennis Pond Road off of the private property it had been on and relocated the last quarter mile of the road to Notch Pond away from Notch Pond Brook, while maintaining access for leased camps. Access in the Brown's Mills area was changed by the addition of a gate nearer Maidstone Lake Road, to replace three interior gates that were a maintenance problem, and the parking area at Brown's Mills was moved to Maidstone Lake Road. ANR also maintains other gates to control access where roads enter West Mountain, including on Granby Brook Road, Madison Brook Road, Dennis Pond Road, South America Pond Road, and Notch Pond Road.

2. Recreational Infrastructure and Corridors

ANR has also implemented some changes and additions to recreational infrastructure and has managed large recreational corridor networks, to maintain or enhance the public's enjoyment of the WMA. ANR relocated about 3 miles of VAST trail (#98) from the Core Area west of Wheeler Pond to a trail to the east bordering the Transitional Management Area. ANR also replaced the vehicle bridge to the closed road south of Ferdinand Bog with a pedestrian bridge to allow continued access of that area. Two new types of infrastructure have also been added: ANR spent \$20,000 to build a handicapped-accessible moose viewing platform at the junction of Route 105 and Notch Pond Road, and built two campsites (one at the parking area off Maidstone Lake Road and one along Paul Stream Road, about a mile south of Wenlock WMA) with assistance from the Vermont Horse Council.

ANR manages biking use on all roads open to vehicles on the WMA and also manages equestrian and snowmobile use in approved corridors with designated Corridor Managers.

Currently, ANR collaborates with the Vermont Horse Council (VHC) to provide 25 miles of roads on West Mountain WMA for the use of riders, and with the Vermont Association of Snow Travelers (VAST) to provide about 30 miles of corridors on West Mountain WMA.

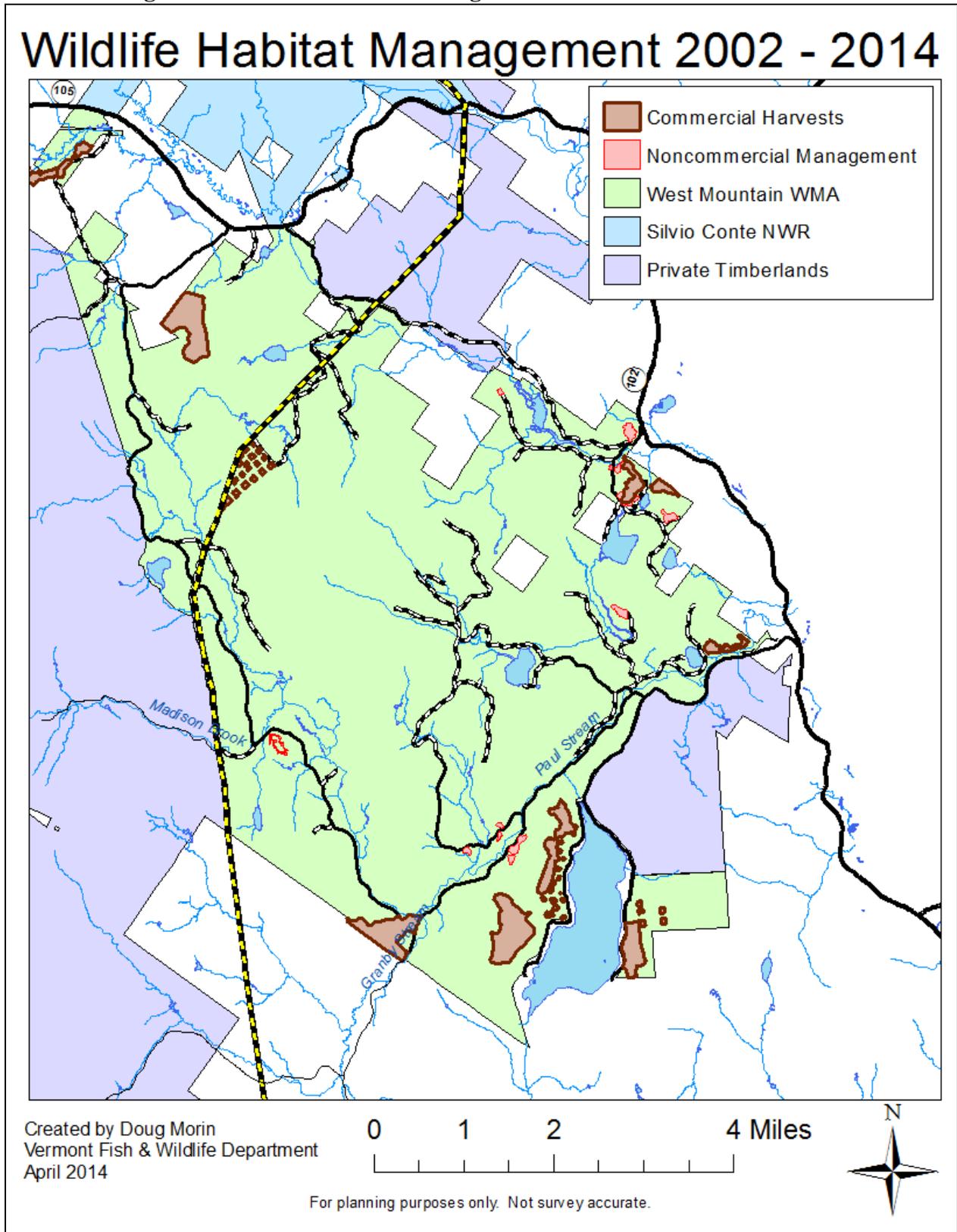
3. Habitat and Forest Management

ANR has conducted commercial timber harvests in nine different locations on the West Mountain WMA Active Management Area. These harvests covered 785 acres, including 116.5 acres of patch cuts (most 3 acres or smaller) and produced 642,000 board feet of sawtimber and 4,317 cords of low quality wood. These timber harvests were designed to accomplish a variety of management goals, including: to create early successional habitat for grouse and other species, to release mast-bearing trees, to improve deer wintering areas by balancing species and age-classes, to salvage trees damaged from an ice storm, and to improve the growth, health, and quality of trees.

A variety of noncommercial habitat improvements have also been conducted on West Mountain WMA. Sixty three acres of deer wintering areas have been thinned to improve their habitat quality. ANR staff has also maintained a historic opening of about 10 acres along Paul Stream Road with prescribed burning to provide herbaceous vegetation and promote blueberry growth, and created 6 acres of early successional habitat for Woodcock near the brook from Unknown Pond.

Since the start of active management in 2004, commercial and noncommercial treatments contributed a total of 124.5 acres of new early successional forest habitat on West Mountain WMA. This is below the level intended in the first West Mountain WMA plan, which would have harvested 470 to 860 acres over the same time period. The shortfall was a result of harvest levels that were unattainable on the ground due to topographical constraints and low timber quality, and newly planned forest management activities will take these factors into account. Such modest levels of even-aged management, however, are not viewed as of concern from a wildlife habitat perspective, given the widespread availability of early successional habitat in northeast Vermont.

Figure 15: Wildlife Habitat Management Activities from 2002 - 2014



ANR has also undertaken other projects to enhance the ecological integrity of West Mountain WMA. Staff have used targeted herbicide application to control and eliminate populations of nonnative invasive common reed (*Phragmites australis*) plants in 14 locations. Staff also physically removed single individuals of other nonnative invasive plants including buckthorn, honeysuckle. Also, ANR has been consistently improving the ability of aquatic organisms to pass through culverts, which often prevent their movement, by replacing failed culverts with bridges or improved culverts. Finally, ANR, in collaboration with the Northwoods Stewardship Center, has planted trees in an old gravel pit in the Core Area near West Mountain Pond, to accelerate its revegetation.

4. Hunting and Fishing

Moose management has been very active in the region of West Mountain WMA over the last decade. In 2000, the moose density in the region was near four per square mile—so high that moose-vehicle collisions were too common and moose browse was impacting forest regeneration, leading to negative consequences for the moose as well as other animals and the timber industry. In response, DFW increased moose hunting permits in Wildlife Management Unit E, leading to very high harvest levels: from 2000 to 2012, 2745 moose were harvested in WMU E, with 86 of those on West Mountain WMA (an average of more than 7 per year). Moose densities are now near 2 moose per square mile in the region (2.5 per square mile in WMU E1, north of Route 105, and 0.98 per square mile in WMU E2, south of Route 105 and including West Mountain WMA).

Deer density, in contrast, has changed little since 2000, remaining between 12 and 13 deer per square mile for northeastern Vermont (WMUs D1, D2, and E). The entire northeastern region is not the same, though: currently it is estimated that WMU D1 has the greatest density, with about 17 deer per square mile, while D2 has a lower density of about 12 deer per square mile, and E has the lowest density of near 5 deer per square mile.

ANR has also performed regular fish stocking in West Mountain WMA waters. Each spring, ANR stocks yearling brook trout in Paul Stream, Granby Stream and Madison Brook, on a put and take basis. Each autumn, ANR stocks fingerling brook trout in Notch, South America and Unknown ponds, for overwinter survival and utilization in the following season(s). West Mountain WMA has also provided nursery habitat for stocked Atlantic salmon fry in Paul Stream and Granby Stream, as part of Connecticut River salmon restoration efforts. Salmon stocking, however, will end for the foreseeable future in spring 2013 due to a lack of source fish. In neighboring Maidstone Lake ANR also stocks yearling rainbow trout each spring, for immediate and future utilization by anglers and ice fishermen.

5. Monitoring and Inventory

ANR has gathered new information on forest stands, invasive species, fish, moose browse, vernal pools, and leased camps. New forest inventories have been completed for the newly

acquired inholdings and the Transition Management Area.³⁵ Invasive *Phragmites* populations have been monitored for response to herbicide treatments. Aquatic sampling has included estimates of outmigrating Atlantic salmon, survivorship and reproduction of brook trout, and fish community inventories in streams feeding Ferdinand Bog and West Mountain Pond. ANR also conducted a study to test the effects of moose browse on forest regeneration on the Private Timberlands and West Mountain WMA, surveyed the Active Management Area of West Mountain WMA for vernal pools—important amphibian breeding habitats, and performed targeted surveys for black-backed woodpecker nests. Staff also assessed major stream crossing structures for geomorphic compatibility and aquatic organism passage. Finally, ANR has completed an inventory of all camp structures on West Mountain, collecting data on their facilities and condition.

6. Land Acquisition

Seven parcels adjoining West Mountain WMA and one road have changed ownership since 2000. The “triangle” inholdings that spanned Paul Stream near Maidstone Lake have been acquired by ANR with Forest Legacy Project funds, and another inholding near Wheeler Pond was gifted to the State. Two other inholdings and three adjoining parcels have been acquired by The Nature Conservancy. TNC and ANR are in discussion about conveying these lands to ANR. Finally, public highway right-of-way easements across the Maidstone Lake Road and the West Shore Road, which form the south east boundary of West Mountain WMA, were transferred to the town of Maidstone at their request, relieving the Agency of maintenance demands and allowing the town to be more responsive in meeting the desires of residents.

7. The Private Timberlands

Since 1998 ANR, Plum Creek (and Essex Timber Company, before them), and VLT have conducted a variety of activities on the Private Timberlands to maintain and increase public access, while the Private Timberlands have been successfully operated as working forests.

As part of its duties as manager of the Public Access Easement on the Private Timberlands, the Agency of Natural Resources has committed to helping maintain public vehicular access throughout the ownership. Currently, about 70 miles of roads are open for public access across the Private Timberlands. Pursuant to a Road Agreement required by the Public Access Easement, ANR shares the cost of maintaining these roads to ensure they remain open to the public; for example, as part of this agreement, ANR’s share of costs exceeds \$40,000 for maintenance in 2013.

ANR also coordinates with three recreation corridor managers using Plum Creek land: the Green Mountain Club, which has created 6 miles of hiking trails (and plans to create at least 6 miles more) to Bluff, Middle, and Gore Mountains in Avery’s Gore and Brighton, the Vermont Horse Council which has been approved to use 25 miles of roads on West Mountain and 10 miles on Plum Creek land, and VAST, which maintains up to 150 miles of trails across all three former

³⁵ The Transition Management Area is a 483 acre part of the Core Area north and east of Wheeler Pond. It will continue to receive targeted active management over the coming decade to accelerate the recovery of this deer wintering area from the impacts of historical management.

Champion properties, including about 30 miles on West Mountain and 100 miles on the Private Timberlands.

ANR and Plum Creek have recently also taken on other projects. For example, a partnership with Trout Unlimited, The Northwoods Stewardship Center, and the Vermont River Conservancy led to a new driftboat access area on the Connecticut River in Lemington. Also, the state Fisheries Division is partnering with Plum Creek and Trout Unlimited on a study on the effectiveness of aquatic debris addition on branches of the Nulhegan River to enhance habitat for trout and other species. Finally, Plum Creek has also provided increased access to portions of their land during moose season and for trout stocking in remote beaver ponds.

G. DELINEATION AND ROLES OF THE ACTIVE MANAGEMENT AND CORE AREAS

Perhaps the most significant accomplishment at West Mountain WMA since the beginning of State ownership has been the establishment and delineation of the Core Area and Active Management Area through the original plan's public process and successive management by ANR.

1. Delineation of the Active Management and Core Areas

The Active Management Area and the Core Area are shown in Figure 16. Figure 17 shows the Core Area in the context of the entire Kingdom Heritage Lands. The delineation of the Core Area and Active Management Area is consistent with, and responds to the requirements specified in section I.B. of the State Lands Easement for the West Mountain WMA. Specifically, section I.B.(a) requires the Management Plan to “*create and manage Special Treatment Area (s) on the Protected Property where the highest ecological values predominate...*” (addressed by the Core Area); and section I.B.(i) requires the Plan to “*identify opportunities for sustainable wildlife habitat and forest management activities...*” (addressed by the Active Management Area). The delineation of the Active Management and Core Areas was based on numerous ecological and practical considerations, including public comments. First, the differentiation between the Active Management Area and the ecological core was aimed at achieving an appropriate balance between these two types of management on the West Mountain WMA and thus maximizing the benefits to be achieved through complementary management of the two areas. The fundamental bases for delineating the actively managed and Core Areas were 1) maintaining the areas best suited for wildlife management in the Active Management Area; and 2) representing the following ecological components in the Core:

- the diversity of terrestrial and aquatic natural communities found on the West Mountain WMA;
- a majority of State significant natural communities;
- the matrix natural communities found on the WMA (*e.g.*, northern hardwood forests) at scales large enough to absorb natural disturbance processes;

- the range of physical features (*e.g.*, bedrock types, aspects, slopes, elevations) present on the WMA;
- habitat for species that will benefit from mature forest;
- an intact, unfragmented forest landscape at a large enough scale to allow natural processes to occur unimpeded and provide for the maintenance of large blocks of mature forest in the event of catastrophic disturbance; and
- buffers for natural communities and sensitive ecological areas.

Figure 16: Active Management and Core Area

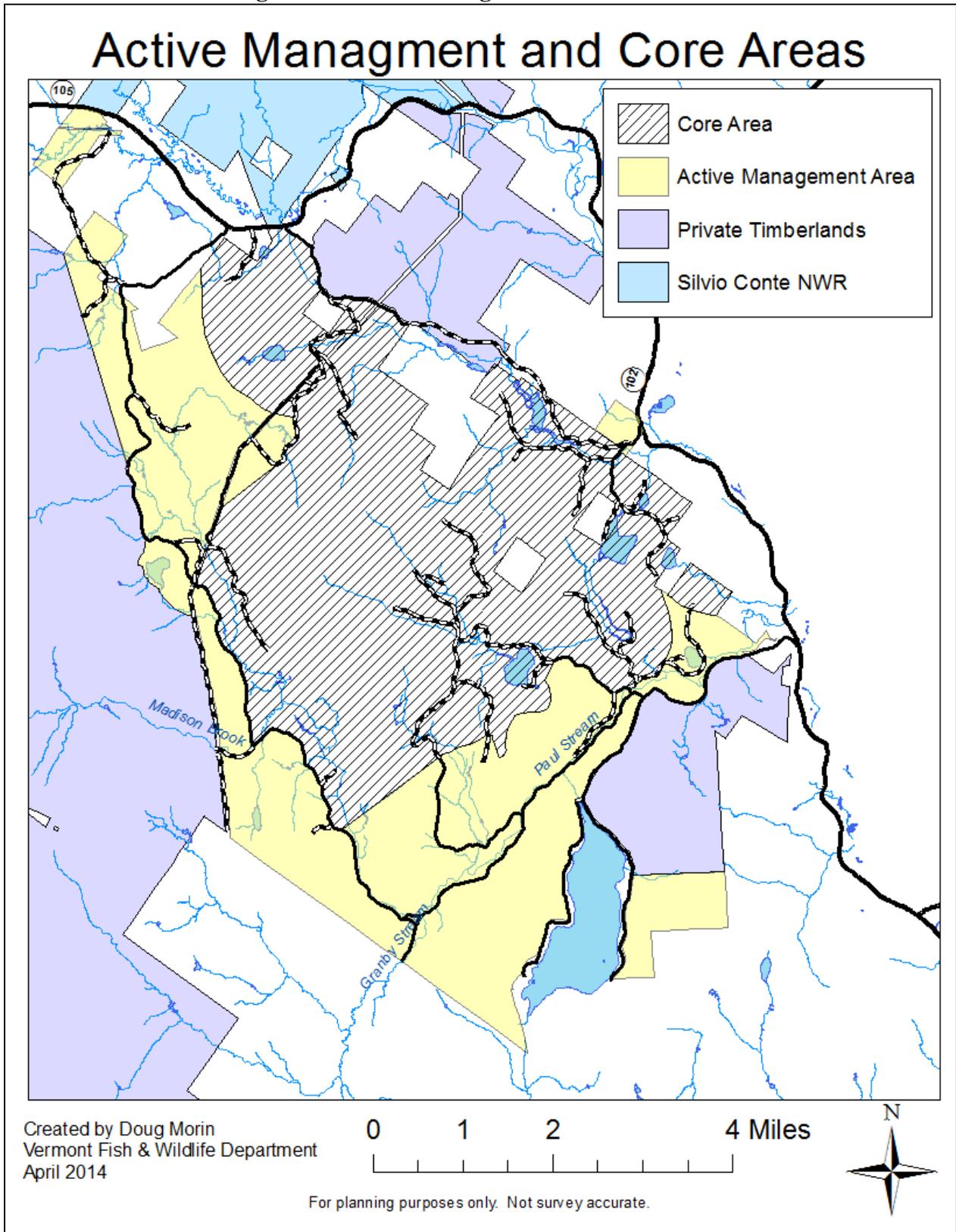
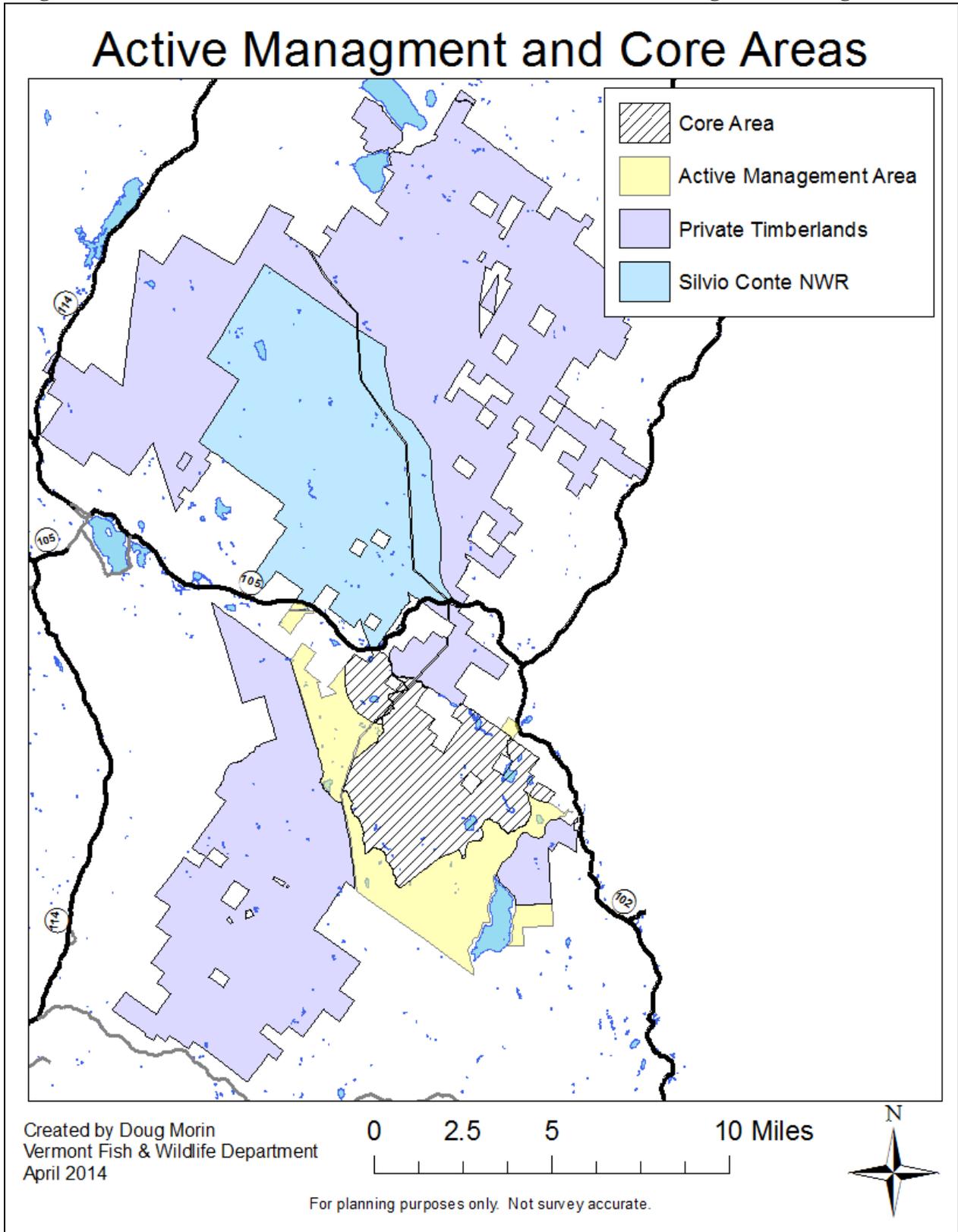


Figure 17: West Mountain WMA Core Area Within the Entire Kingdom Heritage Lands



The following explains how the size and location of the Core Area meet the delineation criteria.

- Of the 2,000 acres of (non-matrix) State significant natural communities on the West Mountain WMA, approximately 1,700 are within the Core Area. Essentially all high-integrity natural community complexes—sites where at least several State significant communities function together in a closely related system—are within the Core. Nearly all the highest ranked communities are within the Core. Those State significant natural communities on the Active Management Area are protected via designation as set aside protected areas where no active forest management occurs unless needed to maintain the natural community itself. These protected areas also include appropriate buffers.
- The Core represents the biophysical region well, within the limitations of the physical landscape of the WMA, as it includes several bedrock types, a variety of surficial geologic landforms characteristic of the Northeastern Highlands, and mountain summits over 2700 feet with contiguous land down, or nearly down, to two major rivers – the Nulhegan and Connecticut.
- The Core Area extends from the highest elevations on the WMA (West Mountain) nearly to the lowest point and includes all compass directions on the flanks of the highest mountain. Thus it captures all ecological differences present on the WMA due to elevation, slope and aspect.
- A complete watershed (Wheeler/West Mountain Pond), with an elevation range from mountaintop to lowland, is encompassed by the Core Area. This one watershed (excluding 100 acres outside the Core) captures a broad range of habitat types and includes a very large numbers of rare species. It is therefore nearly ideal as a benchmark area. The majority of Dennis/Mud pond watershed, including Notch Pond is located in the Core Area- portions of the watershed not in the Core Area are primarily located outside the West Mountain WMA boundary. The Ferdinand Bog watershed is partly in the Core Area and partly in the Active Management Area. Protective buffers along Paul Stream and South America Pond adequately protect the ecological values of these areas. Although South America Pond Road is located near the western side of the Ferdinand Bog wetland complex, it has been determined that this road is critical for access to the Active Management Area and that the upland buffer between the road and the wetland complex is adequate to minimize adverse effects on the wetland complex.
- The size of the Core Area allows for natural disturbances, while to the greatest extent practicable ensuring that at any given point in time substantial parts of the forest will be very old stands with mature forest conditions. Based on site-specific considerations of natural disturbance patterns, a determination was made that a minimum block of 5,000 acres was needed to ensure that, in the face of major disturbances, the whole suite of old-growth conditions would always be present somewhere within the Core. Although the 5,000-acre minimum is much less than some scientists argued is necessary to guarantee

mature conditions, there is good evidence that this particular area has been impacted by far fewer and less intense large-scale disturbances than many other parts of the northern hardwood region.

- The Core Area encompasses sufficient expanses of two matrix communities, northern hardwood and red spruce-northern hardwood forest, to enable these representatives to develop (over time) into benchmark examples of their type.
- The Core Area represents the WMA's three dominant forest types roughly proportionally to their occurrence on the larger landscape.
- The Core Area contains a very wide mix of habitats to meet life requirements of a broad array of wildlife species.
- The boundary of the Core Area has been located so that the Core itself includes adequate buffers for natural communities and sensitive ecological areas with the Core. Streams flowing into the Core from the Active Management Area and the Private Timberlands are also buffered.

The Core Area also includes the following site-specific ecological resources:

Dennis Pond: Dennis Pond has great ecological importance at the species, natural community, and regional levels. The Dennis Pond-Mud Pond wetland-aquatic complex contains some of the best examples of several natural community-types including: poor fen, dystrophic pond, peaty sand pond shore, dwarf shrub bog, deep peat alder swamp, and sedge meadow. The complex is one of the most significant and interesting natural areas in Vermont. It is habitat for a long list of rare and uncommon species, including at least 12 species of plants, 5 species of birds, 5 species of terrestrial invertebrates, and 1 aquatic mollusk. It hosts high numbers of species of butterflies, dragonflies, waterfowl, marsh birds, and amphibians. It is viewed as the best waterfowl and marsh bird habitat on the WMA.

Ferdinand Bog: Ferdinand Bog is the largest open wetland in all of the Kingdom Heritage Lands; the wetland complex includes the highest diversity of natural communities of any wetland on the WMA. It hosts rare species of plants and dragonflies .

West Mountain Pond: West Mountain Pond is the only complete watershed located on public land in the Kingdom Heritage Lands; the adjacent wetland has a variety of very dynamic natural communities and includes a high-quality example of a northern white cedar swamp with trees 120-150 years old.

Matrix Natural Communities: The Core Area contains two of the matrix-forming (*i.e.*, large landscape scale) natural communities found in northern Vermont. Further, it includes them at a large enough scale to ensure that they can withstand a major disturbance event. These matrix communities are northern hardwood forest and red spruce hardwood forests. Smaller examples of other matrix natural communities that occur at matrix scale in the Northeastern

Highlands also occur in the Core Area: montane spruce-fir forest; montane yellow birch-red spruce forest and lowland spruce-fir forest.

Wheeler Pond: This is the largest water body on the WMA and is considered to be one of the best examples of a dystrophic pond in Vermont. It has the highest concentration of rare plants (5) of any interior lake or pond in Vermont.

Little Wheeler Pond: Little Wheeler Pond includes two high-quality examples of natural communities not widely found on the Kingdom Heritage Lands: sweet gale shoreline swamp and intermediate fen. It contains the greatest diversity of mollusks of any pond in the WMA.

Notch Pond: Notch Pond, another excellent example of a dystrophic pond, contains rare aquatic species, and is part of the Dennis Pond watershed; the associated wetland includes a very mature northern white cedar swamp.

The Core Area was also designed to limit both its impacts on existing and potential uses and the need to close roads that provide public access to the WMA as a whole. More specifically, considerations related to use and access include:

- All the major access roads that serve as through roads are unchanged. Even though the Core Area includes land on both sides of one through road, a strip of actively managed land has been left to permit continued through access between South America Pond road and Notch Pond road. In many instances, existing roads were used as practical, identifiable boundaries for the Core.
- While many ponds are located within the Core Area, the boundaries have been designed to provide relatively easy walk-in access for recreational purposes on all ponds that currently have road access.
- The snowmobile network has been maintained.
- Deer winter range is distributed both within and outside of the Core Area, providing for a range of management strategies. In addition, portions of the deer wintering area within the Core is being managed during a transitional period to speed up the recovery of dense softwood vegetation that provides winter shelter.
- A great deal of the fishing activity within the WMA occurs on Paul Stream. The Core Area does not affect this activity in any way.

The Active Management Area includes the lands on the WMA outside of the Core Area. Management activities within this portion of the WMA are directed at maintaining the integrity of the Core Area and providing habitat conditions complementary to those in the Core Area, and which are favorable to a variety of species whose habitat preferences include both older and younger forest, and interior and edge. Sensitive habitats, habitats of rare plant and animal species, and State significant natural communities within the Active Management Area are

managed to maintain their important biological values. In the case of State significant natural communities, they are designated as protected areas with appropriate buffers

2. Complementary Roles of the Active Management Area and the Core Area

As stated earlier, each of the three separate ownerships that comprise the Kingdom Heritage Lands emphasizes a different set of objectives that, as a whole, are essential in achieving the overall goals for these lands. Also, as mentioned in Section III.H.1., the Vermont Fish and Wildlife Department operates under several complementary goals in managing wildlife management areas, conserving and enhancing wildlife habitat and providing a diversity of quality fish and wildlife-based activities.

a. Achieving the Conservation Mission

Conserving native fish, wildlife, and plant species is a difficult task for land managers. Because the full array of these species in Vermont includes an estimated 24,000 to 43,000 species, a diversity of management strategies are needed to achieve management goals.

First, individual target species or groups of species have been identified which benefiting from specific habitat features that require active management. These species and species groups include those that prefer early successional forest stands (*e.g.*, moose, deer, chestnut-sided warbler) as well as specific rare, threatened, and endangered species (*e.g.*, spruce grouse). For these species, management prescriptions to enhance habitat conditions through active forest management are reasonably well understood.

Second, within the Active Management Area, special habitats are being conserved and, if appropriate, actively managed, often for the benefit of target species. Examples of these habitats include deer wintering areas, mast stands, vernal pools, wetlands, lakes, and streams. In general, management actions either enhance certain habitat conditions (*i.e.*, cover or food) or provide buffers for the identified habitat or natural community (*e.g.*, streams, wetlands). Non-matrix State significant natural communities are protected and appropriately buffered.

Third, the needs of fish, wildlife, and plants species that benefit from natural forest conditions, or those for which there is insufficient knowledge regarding the impacts of active forest management on habitat conditions or populations, will be addressed by the maturing Core Area. These species generally are best conserved in natural communities and/or ecosystems/landscapes where natural processes are unaltered by management activities, be they recreation or active forest management. Examples of such species include certain soil microorganisms, aquatic macroinvertebrates, amphibians, certain birds, terrestrial invertebrates such as insects, plants such as lichens and mosses, as well as, in all likelihood, species that are not yet known or described. The Core Area is also designed to conserve high quality examples of the majority of natural community types occurring on the WMA. Serving the habitat needs of the full complement of species in Vermont requires diverse habitat conditions, and to further complicate the issue, the habitat requirements for most species are still unknown. Although we do not know the particulars of the ecology of many species, we

do know that all of Vermont's species find appropriate habitat in the various natural communities found within the State. Consequently, we can use natural community conservation as a means of conserving the habitat needs of many of Vermont's native species.

Together the Active Management Area and the Core Area provide the full spectrum of age classes for the matrix communities found on the West Mountain WMA (northern hardwoods, spruce-fir, and red spruce-hardwood forest). This mixture is spatially and temporally configured to meet the habitat needs of a diverse set of species. Forest management within the Active Management Area is implemented to complement the existing and future habitat conditions within the Core Area, while making certain that activities outside the Core do not impact the Core itself. Active management on the WMA is also be planned and executed mindful of conditions on the Private Timberlands, the Conte Refuge, and other nearby lands. Thus, within a Vermont context, the management perspective included in this plan encompasses an ecosystem and landscape perspective as well.

b. Providing Diverse Opportunities for Fish and Wildlife-Based Activities and Recreation

History demonstrates that unmanaged utilization and recreation can have significant impacts on fish and wildlife species and the quality of recreational experiences. This has led to the conclusion that many activities need to be managed to minimize their impacts on sensitive species and to ensure that the quality of recreational opportunities is not degraded.

Regarding these issues, recreation managers often recommend subdividing a parcel into various levels of human activity to meet the interests of all users and to minimize impacts to ecologically sensitive areas. Those portions of a parcel that are more accessible and less remote could provide for motorized activities, developed facilities (*e.g.*, campgrounds, shelters, or picnic areas) and the needs of users who wish to be close to a road. The more remote portions of a property can be managed for more dispersed activities, and for users seeking fewer contacts with other recreationists. Further, managing access to the most sensitive areas of a parcel can limit adverse impacts to the resources involved.

Opportunities to manage for such a wide diversity of fish and wildlife-based experiences are quite uncommon on wildlife management areas. Most of the parcels are much smaller and historic management activities typically stressed improving access (*i.e.*, roads) for users. A management strategy comprised of an Active Management Area and a Core Area enables the Department to manage West Mountain WMA creatively for a wider variety of uses and quality of experiences than is typically the case.

More specifically, fish and wildlife-based activities such as hunting, trapping, fishing, wildlife viewing, and wildlife photography can successfully occur on all portions of the parcel. However, the concept of an Active Management Area and a Core Area provide for a unique scenario where fish and wildlife-based users can find a greater variety of experiences based on their particular interest. For example, hunters choosing to pursue game in the Active Management Area will more likely find better access, other users, more hunters to move game, and, perhaps a greater supply of younger age class animals. On the other hand, hunters

within the Core Area may find fewer hunters and other users, more remote settings, and potentially larger, older animals.

V. PUBLIC INVOLVEMENT

Public input has been a key factor in developing this Plan. The development of the original (2002) Plan saw an unprecedented amount of effort invested in obtaining public input and number of individuals and organizations who participated. Details on the original public process and input can be found in Appendix C.

Generally, this original public process identified the unique value of the Kingdom Heritage Lands for conservation, public use, and local communities while expressing mixed feelings on a range of management strategies that would change some aspects of timber harvesting, road access, and private camp leases on some parts of the land. The public identified the unique value of these lands as an anchor of the remote, undeveloped, contiguous forests in Northeast Vermont. Many participants expressed the concern that the area not be overly developed, and that pedestrian uses of the land remain a primary focus of management. Many also expressed interest in maintaining snowmobiling across the lands and considering new uses including trail hiking, horseback riding, and mountain biking. Participants voiced a variety of concerns over the Core Area, including its perceived negative impact on game species and ease of hunting access and positive impact in state-wide conservation efforts and remote hunting opportunities. Comments also cited objections about the eventual elimination of privately-leased camps, as set forth by the Legislature. Many comments also highlighted a concern for maintaining timber production and how future use and management of the Kingdom Heritage Lands would affect local communities.

The 2013-2014 Plan update set out to use a similar, but less intensive, process to fine-tune the vision created in the extensive original public process. A summary of both the process and substance of this public involvement is presented below.

A. PUBLIC INVOLVEMENT PROCESS

1. Scoping Process

Scoping for the plan updates began in the spring of 2013.

a. Constituent Group Meetings

In April, 2013, the Agency of Natural Resources began reaching out to groups and organizations that have been involved in the Kingdom Heritage Lands over the last 13 years, including all interests represented on the former Citizen's Advisory Council. In May and June Agency representatives met with representatives of each of the following groups/organizations:

- The Town of Brunswick
- Unified Towns and Gores
- Vermont Assoc. of Snow Travelers
- Green Mountain Club
- Vermont Horse Council
- Audubon, Northeast Kingdom
- Vermont Forest Products Assoc.

- Vermont Natural Resources Council
- Sierra Club of Vermont
- Vermont Fish and Wildlife Conservation Group
- West Mountain Leaseholders
- Ruffed Grouse Society
- Vermont Sportsmen’s Federation
- Hunters, Anglers, and Trappers Association of Vermont
- Vermont Bear Hounds Assoc
- Vermont Traditions Coalition
- Champion Lands Leaseholders & Traditional Interests Association

These small meetings used the same basic format as the public meetings (discussed below): ANR staff giving background on the ownership and management of West Mountain WMA and the Private Timberlands Public Access Easement, followed by extended discussion based on stakeholders interests. Comments were recorded during these discussions for incorporation in planning efforts.

Twelve other groups did not respond to invitations for scoping meetings:

- Northeastern Vermont Development Assoc.
- Island Pond Chamber of Commerce
- Associated Industries of Vermont
- Vermont Woodlands Association
- Kingdom Trails Association
- Nulhegan Gateway Association
- *Towns*: Maidstone, East Haven, Granby, Bloomfield, Lemmington, Brighton

b. Public Meetings

In June, 2013, the Agency of Natural Resources hosted two public forums to discuss the plan updates (June 11 at Brighton Elementary School and June 13 at Lyndon State College). Ninety-six people signed-in between the two meetings, though more were in attendance based on head-counts. Following a presentation about the history of the ownership, legal restrictions, and management practices on the WMA and Private Timberlands, participants visited five tables with different themes, where they spoke with staff about their experiences on the land and recorded their comments.

c. Public Comment Period

The public was encouraged to provide written comments by mail or email, beginning in July and ending August 15, 2013. Forty comments were received during this time.

2. Draft Review Process

On April 9, 2014, ANR released the draft plan updates for public review.

a. Public Meetings

The Agency of Natural Resources hosted three public forums to discuss the draft plan updates (April 29 11 at Brighton Elementary School, April 30 at Montpelier Highschool, and May 5 at Lyndon State College). Sixty members of the public signed-in between the three meetings. Again, participants visited tables with different themes, where they spoke with ANR staff about their experiences on the land and thoughts about the draft plans, and staff recorded their comments.

b. Public Comment Period

The public was encouraged to provide written comments by mail or email, beginning on April 9, 2014 and ending on June 11, 2014. Twenty comments were received during this time.

B. PUBLIC COMMENTS

1. Scoping Comments

The essence of the themes that emerged from the 2013 scoping process were as follows.

Unique character: Many comments spoke to an underlying feeling that The Kingdom Heritage Lands have special value for Vermont because they are a large, contiguous, undeveloped, relatively remote area and because of their rugged, unrefined character.

Long Term Access Plan: The relatively small number of comments that focused on the LTAP tended to be quite specific, such as access to certain roads and gates, or locations of timber harvesting. Many of the other themes expressed, however, also apply broadly across the Kingdom Heritage Lands (e.g., the desire for a significant snowmobile network).

Public use and recreation: Broadly, public comments supported managing the land for a variety of uses. Numerous comments supported maintaining or increasing snowmobile, equestrian, hiking, mountain bike, and pedestrian uses of the property. A small number also asked that ATV connector trails also be considered. Concern was expressed, however, over the perceived incompatibility of mountain biking, snowmobiling, and ATV riding with wildlife and pedestrian use.

Forest and habitat management: Some comments desired a greater level of timber harvesting, to enhance habitat for game species, including grouse and deer. Others stated that harvesting should be based on holistic silviculture, rather than game species management. Still other comments stated that management on West Mountain WMA should consider landscape-scale connectivity and movement for wide-ranging species.

West Mountain WMA 'Core Area': As in the original process, the Core Area on West Mountain WMA generated numerous comments. Many commenters opposed establishing an ecological core, because some believed it wasn't part of the original public process, and

others felt it would diminish game populations. In contrast, many other commenters stated that establishing an ecological core was important for a variety of reasons, including: protecting rare species, protecting natural communities, providing a place where natural processes would prevail, providing an area for scientific study, providing an area which would offer more remote recreational experiences than offered elsewhere, and maintaining consistency with the State Lands Easement.

West Mountain WMA Road Access: Roads at West Mountain WMA received by far the most comments. In general, one group of commenters felt that planned road closures should not be implemented to benefit hunting, habitat management, recreation, access for the disabled, and other purposes. Other comments stated that roads should be closed as planned, in order to support ecological restoration, scientific study, more remote hunting and fishing experiences, and to preserve one of the last large pieces of land that has few invasive species and little fragmenting development. Still other comments stated that some road closures would be acceptable, that roads should be closed farther in the future, that roads should be allowed to revegetate passively.

Camps: Relatively few comments were made about camps. Comments generally fell into three categories: 1) the desire to maintain camps on West Mountain WMA in private ownership permanently, 2) positive interest in the use of private camps for the public, after leases expire, and 3) support for removal of the camps within the Core Area.

Other: Some comments stated that the “wilderness” feel of the area should be maintained. Others stated concerns over the possible negative impacts of proposed large-scale wind power generation facilities in the area, and directed the State to actively oppose such development. Other comments stated that the State should purchase inholdings and adjacent properties, especially those owned by The Nature Conservancy, to consolidate the West Mountain WMA ownership.

Access in the area: A variety of user groups cited increasing difficulties in the use of private lands in the area and the resulting importance of the Kingdom Heritage Lands. Most commonly cited was the case of nearby landowners who have recently gated roads, preventing public vehicular access. Some comments wanted to see the State take an active role with its neighbors in ensuring vehicular access throughout the area.

Relatively uncommon in scoping discussions for the 2014 plan update were comment related to local *culture*, the local *economy*, and “*traditional uses*.”

2. Draft Review Comments

Comments gathered in the draft review process were largely similar to those voiced in the scoping process. As a result, ANR believes the major balances struck in the draft updates are appropriate to maintain in these final plans. Numerous suggestions led to minor improvements in maps, explanations, and certain management strategies, but overall, the drafts have been adopted very close to their original states.

See Appendix H for a full list of public comments submitted in the draft review process, ANR's response to each comment, and a list of all subsequent revisions made to the drafts.

VI. MANAGEMENT DIRECTION, STRATEGIES AND ACTIONS

A. GOALS AND OBJECTIVES FOR MANAGEMENT OF WEST MOUNTAIN WMA

The following goals and objectives for the management of the West Mountain WMA identify, in broad terms, the ends to be achieved through management over the lifetime of this Plan.

1. Goals and Objectives for the Entire WMA

a. Overall Ecological Goals

- In keeping with legal requirements³⁶ and the overall management direction articulated for the Kingdom Heritage Lands, maintain the West Mountain WMA as a large-scale forested landscape that conserves ecologically significant and regionally representative terrestrial and aquatic natural communities and the full array of natural processes and native plants and animals, while accommodating compatible recreation goals and public use.³⁷
- Provide a mix of active and passive management for the benefit of a diversity of native wildlife³⁸ species.
- Manage the West Mountain WMA adaptively, using new understandings of changing resources and issues to guide management.
- Capitalize on the opportunity provided by the scale and natural features of West Mountain WMA to enhance the resilience of the property and surrounding landscape to climate change.

b. Overall Ecological Objectives

- Protect and conserve rare and exemplary terrestrial and aquatic natural communities³⁹ at spatial scales large enough to ensure long-term viability.
- Protect and conserve rare, threatened, and endangered species of plants and animals.⁴⁰
- Manage habitat for selected wildlife species that are native to the Northeastern Highlands biophysical region (including both game and nongame species) and are

³⁶ “Legal requirements” include the State Lands Easement, the 1999 Budget Adjustment Act, and applicable laws, regulations, and policies.

³⁷ The terms “representative” and “native” refer to the Northeastern Highlands biophysical region.

³⁸ The term “wildlife” refers here to all animal species, including mammals, birds, fish, amphibians, reptiles, insects and other invertebrates, etc.

³⁹ Rare and exemplary Natural Communities are defined per specifications developed by the Vermont Department of Fish and Wildlife, and Vermont Department of Environmental Conservation.

⁴⁰ Threatened and Endangered Species are protected by 10 V.S.A. Chap. 123. Rare species are as defined by the DFW.

identified as management priorities in relevant ANR, Department of Fish and Wildlife, and U.S. Fish & Wildlife Service plans.

- Maintain and enhance forest health, structural diversity, native species composition, and regeneration.
- Protect and conserve high value wildlife habitats, such as wetlands, deer wintering areas, bear-scarred beech stands, snags, woody material, vernal pools, and high quality streams and ponds.
- Enhance conditions that allow unimpeded movement of wildlife and plants across the landscape.
- Design and implement inventory and monitoring strategies that will further the attainment of these goals and objectives and support an adaptive approach to management over time.
- Control or eliminate non-native invasive species.

c. Overall Public Use Goals

- Provide a diversity of opportunities for public utilization of fish and wildlife resources and recreation that are compatible with legal requirements, ecological goals, and the management direction articulated for the Kingdom Heritage Lands.
- Maintain the remote, undeveloped, and scenic qualities of the West Mountain WMA.

d. Overall Public Use Objectives

- Provide opportunities for a diversity of fish and wildlife-based activities (including sustainable utilization of fish and wildlife resources through hunting, fishing, and trapping; wildlife viewing; and photography) and other dispersed pedestrian activities, provided such opportunities are compatible with ecological goals and objectives, legal requirements, and the overall goals and objectives for management of the Kingdom Heritage Lands as a whole.
- Provide corridor-based opportunities for motor vehicle access, snowmobiling, mountain biking, equestrian use, and/or hiking trails, provided that such corridors and use:
 - Are compatible with ecological goals and objectives, the State Lands Easement, applicable laws, regulations, and policies, and the overall goals and objectives for management of the Kingdom Heritage Lands as a whole;
 - Limit conflicts with ecosystem and wildlife management and other land management activities;

- Limit adverse impacts on cultural resources (*e.g.*, disturbance of archeological sites);
 - Limit conflicts with historic uses of the area (*e.g.*, hunting, fishing and trapping);
 - Emphasize the use of existing roads and trails rather than the creation of new ones;
 - Emphasize multiple use of recreational corridors by encouraging compatible uses on single corridors rather than creating separate corridors for each use;
 - Emphasize loop trails and connections with nearby trail networks; and
 - Are acceptable to the ANR as property owner and TNC and the VHCBC as State Lands Easement co-holders.
- Identify corridor managers to take responsibility for management and maintenance of designated recreational corridors for concentrated uses not managed by ANR, such as snowmobiling, horseback riding, hiking trails, and off-road bicycling.
 - Maintain the existing remote, undeveloped, scenic character of the West Mountain WMA to the greatest extent possible in planning and developing any recreational facilities.
 - Minimize the use of signs and structures, with priority given to those necessary to prevent or reduce safety problems or the detrimental ecological effects of recreational use.

In addition to this overall direction for the management of the West Mountain WMA, section II of the State Lands Easement specifies a number of uses that are restricted or prohibited on the property.

2. Goals and Objectives for the Active Management Area

a. Ecological Goals for the Active Management Area

- Benefit game and nongame species of state or regional importance⁴¹ through habitat management that complements the forest conditions and habitat availability on the rest of the Kingdom Heritage Lands and the surrounding landscape.
- Manage habitat for all rare, Threatened, and Endangered species, and maintain or improve the condition of all natural communities of statewide significance, as those species or communities are defined by the Vermont Fish and Wildlife Department, and the Vermont Department of Environmental Conservation.

b. Ecological Objectives for the Active Management Area

⁴¹ Species of state or regional importance will be identified from sources such as the Vermont DFW Wildlife Action Plan and Partners-In-Flight ecoregional plans.

- Provide habitat that is not adequately represented in the Core Area or surrounding landscape. This habitat representation will vary over long time periods as forest succession and/or forest harvest regimes change on nearby lands, particularly the Private Timberlands, Conte Refuge, Wenlock WMA and the Core Area of West Mountain WMA. Specific attention will be given to ensuring sufficient young forest habitat exists in the landscape to meet the needs of priority wildlife species, including: woodcock, ruffed grouse, whitetail deer, snowshoe hare, spruce grouse, Canada lynx, olive-sided flycatchers, and chestnut-sided warblers.
- Conduct sustainable forest management for wildlife, by using practices consistent with the State Lands Easement.
- Maintain and/or restore forest canopy over all roads and maintain roads in ways that minimize erosion.

c. Public Use Goals for the Active Management Area

- Provide the full range of opportunities for outdoor recreation and utilization of fish and wildlife resources that are allowed under Department of Fish and Wildlife rules and policies and are consistent with the State Lands Easement.

d. Public Use Objectives for the Active Management Area

- Provide dispersed pedestrian access in accordance with existing laws and regulations (*e.g.*, State regulations governing hunting, fishing, and trapping) and the State Lands Easement, and manage this pedestrian use so as to minimize or prevent adverse impacts on natural and cultural resources, other users, and resource management activities.
- Identify and provide recreation corridors and delineated sites to locate and manage concentrated uses.
- Manage group use (*e.g.*, commercial guiding⁴², not-for-profit educational or recreational outings) and scientific research by requiring special use permits to minimize or prevent adverse impacts on natural and cultural resources, other users, and resource management activities.
- Provide for the annual harvest of wild game, fish and other edibles at ecologically sustainable levels in accordance with applicable regulations.

3. Goals and Objectives for the Core Area

a. Ecological Goals for the Core Area

⁴² Commercial guiding of small hunting and fishing parties does not require a special use permit, in accordance with ANR policy. Other commercial guided recreational outings (such as hikes and snowshoe tours) on ANR lands, however, do require special use permits.

- Create and maintain an area where natural communities and associated species of plants and animals change over time in response to the natural processes that shape them, with minimal management of the system by humans. The area's spatial scale should be appropriate to ensure long-term viability of those communities and species and, over time, the representation of all age classes and successional stages of the communities.
- Informed by knowledge of historical conditions, limit management actions to those that help restore or maintain natural processes, natural communities, and all associated species, within their natural ranges of variation in this landscape. Such actions within the Core Area shall focus on (a) restoring or approximating, to the greatest extent possible, the natural processes, communities, and/or species that are currently missing or outside their natural range of variation; (b) protecting and conserving rare, threatened and endangered species and significant natural communities as defined by the Vermont Fish and Wildlife Department, and the Vermont Department of Environmental Conservation; (c) controlling or eliminating non-native invasive species; and (d) ameliorating the effects of human activities on the Core Area that are creating conditions that are beyond their natural range of variation.
- Provide, over time, a benchmark against which to compare the ecological effects of more intensive management in other parts of the landscape.

b. Ecological Objectives for the Core Area

- Allow natural communities and habitats to be shaped largely by unimpeded natural processes such as disturbances so that all age community classes and successional stages are represented simultaneously.
- Provide suitable habitat over time for source populations for those species that may require or benefit from old-growth⁴³ natural communities found within the WMA and that can be supported within the scale of the Core Area, such as American marten.
- Allow natural processes of insect outbreaks, disease and fire to run their course unless their scale is outside the natural range of variation, they threaten to remove rare species from the landscape, or they threaten adjoining property.
- Allow vegetative manipulation (*e.g.*, timber harvest, salvage, planting) only to further the ecological goals and objectives of the Core Area.

⁴³ Old-growth is defined in a forested natural community as the point where the forest shows characteristic patterns of age diversity created by natural disturbance processes acting over long periods of time. This forest will contain many larger old trees and large amounts of standing and fallen dead material of all sizes, as well as patches of young regenerating trees and middle-aged trees.

- In the long term, close all roads (except as specifically exempted herein) within the Core Area to vehicular traffic. Active restoration activities (*e.g.*, removal of culverts, , scarification of road surfaces, complete road removal) may be desirable and necessary to achieve ecological objectives such as restoring natural surface drainage, accelerating reestablishment of native forest on roadways, reducing fragmentation, and preventing the spread of non-native invasive plants.⁴⁴
- Monitor selected species, processes, and impacts of public use, and/or disturbance patterns over time to track the ecological integrity of the Core.
- Control or remove non-native invasive species.

c. Public Use Goals for the Core Area

- Provide a range of opportunities for outdoor recreation and utilization of fish and wildlife resources that are compatible with the ecological goals and objectives of the Core Area and are in keeping with the Rule Governing Public Use of Vermont Fish and Wildlife Department Lands, and other applicable ANR public use rules and policies.
- Manage public use at a scale and intensity that helps keep species or processes within their natural range of variation and has minimal effect on the Core Area’s ecological integrity.

d. Public Use Objectives for the Core Area

- Manage public uses of the Core Area according to the following categories:
 - *Permitted Uses*: Those uses that have little potential for detrimental ecological effects if they are carefully managed and their scale is reasonable.
 - *Prohibited Uses*: Those public uses that are likely to create ecological effects that are contrary to maintaining a Core Area with an exceptional level of ecological integrity. Most of these uses have a high potential for introducing invasive non-native species, damaging living material at a scale large enough or frequent enough to exceed natural variations, creating large canopy openings, creating erosion problems, and/or causing pollution.
- Manage recreational corridors for permitted uses that are compatible with ecological goals and objectives.

⁴⁴ Closure of roads is aimed at secondary roads and will not include primary corridors or roads across which the Private Timberlands owner has rights to remove harvested timber, even if the Core Area is on both sides of such a road. Also, secondary roads providing access to camps will not be closed during the lifetime of those camps.

- Provide dispersed pedestrian access in accordance with existing laws and regulations (*e.g.*, State regulations governing hunting, fishing, and trapping) and the State Lands Easement, and manage this pedestrian use so as to minimize or prevent adverse impacts on natural and cultural resources, other users, and resource management activities.
- Manage group use (*e.g.*, commercial guiding⁴⁵, not-for-profit educational or recreational outings) and scientific research by requiring special use permits to minimize or prevent adverse impacts on natural and cultural resources, other users, and resource management activities.
- Allow the annual harvest of wild game, fish, and other edibles at ecologically sustainable levels in accordance with applicable regulations.

B. NATURAL RESOURCE MANAGEMENT

1. Overall Strategy

The West Mountain Wildlife Management Area employs two strategies to conserve natural resources. In the Core Area, the principal mechanisms influencing the landscape will be natural ecological processes, such as disturbance by wind, fire, and insects, and forest succession. The forests, wetlands, and aquatic systems within this area are shaped by these largely unimpeded natural processes. This is passive management.

Natural processes also shape the features of the Active Management Area, that include those listed above, as well as active wildlife habitat management such as timber harvesting, mowing, burning, and creating nesting sites to improve wildlife habitat conditions and enhance species restoration efforts. These management activities seek to create a juxtaposition and interspersion of wetlands, open areas, and forest types with different age classes and features that provide habitat conditions that vary from suitable to optimal for a wide array of species. Additionally, as part of active management, fire and insect occurrences may be managed.

The overall strategy for West Mountain WMA as a whole is to use these two different types of management to complement one another as a holistic conservation approach to achieve a variety of natural resource objectives. The ecology and management of the AMA and Core Area are not discrete. They are integrated at the landscape level and provide different functions to achieve the overall objectives of West Mountain WMA and of the Kingdom Heritage Lands as a whole.

2. Management of the Active Management Area

The general approach in the Active Management Area is to maintain the area as extensively forested, protect valuable ecological resources (such as wetlands and rare natural communities), and develop spatial arrangements of vegetation types and forest size classes to create habitat

⁴⁵ As per ANR policy, guided hunting parties are not required to obtain Special Use Permits.

diversity for target and non-target species (for example, regenerating forest habitat and beech mast areas). This will be done by employing a variety of forest management techniques.

a. Species Management

Target species within the Active Management Area in West Mountain WMA were selected based on three criteria: 1) species of concern not adequately addressed in the Core Area or the broader landscape within which the West Mountain WMA is located; 2) species traditionally managed for wildlife-associated recreation and utilization; and 3) species for which public interest had been expressed during the planning process.

Target species are not the only species of concern on the WMA, but are those that will receive the most directed active management efforts. Target species include both those that are common and abundant and those that are rare, Threatened, or Endangered. Active management strategies will remain adaptive in order to respond to new information or concerns about declining, rare, threatened, or endangered species. Target species will be conserved in both the Active Management Area and the Core Area, although, because of habitat requirements, some will be more abundant in one area than in the other.

The target species for the Active Management Area, and a selection of their habitat requirements that may be provided in the Active Management Area include, but are not limited to, the following (not in priority order):

Table 8: Active Management Target Species and Habitat Features

<u>Target Species</u>	<u>Target Habitat Features for Active Management</u>
Black bear	Beech mast production areas Regenerating forest and openings Large dead logs and trees
Moose	Regenerating forest Conifer cover Wetlands
White-tailed deer	Regenerating forest and openings Conifer cover Beech mast production areas
Snowshoe hare	Regenerating forest and openings Young conifer cover Woody material and blowdowns
Ruffed grouse	Regenerating forest and openings Large dead logs Birch and aspen trees
American woodcock	Regenerating forest and openings Wetlands and riparian areas
Spruce grouse	Conifer cover, with low limbs Regenerating forest and openings
Canada lynx	Regenerating forest and openings Young conifer cover Large dead logs

American marten	Mature forest Mast tree retention and release Small-diameter dead wood Large dead logs and trees
Northern long-eared bat	Old, dying, and dead trees (especially large) Complex forest structure
Little brown bat	Old, dying, and dead trees (especially large) Riparian buffers
Brook trout	In-stream habitat Riparian buffers
Atlantic salmon	Species reintroduction (non-habitat)
Eastern pearlshell mussel	Protect clear, cool waters and riparian areas
Locally breeding boreal birds (including black-backed woodpecker, bay-breasted warbler, rusty blackbird, olive-sided flycatcher, boreal chickadee)	Coniferous forest Regenerating forest and openings Dead and dying wood, snags and cavity trees Forested wetlands and riparian areas

In addition to those listed above, other priority wildlife species that are known to occur in the area and are identified in the Vermont Wildlife Action Plan may be candidates for active management, and management of target wildlife species will be responsive to regional and statewide population and habitat goals and trends.

b. Vegetation Management: General Practices

Management practices that will take place throughout the Active Management Area include:

- As the AMA is almost entirely forested, manipulation of vegetation to provide and maintain wildlife habitat will most often be accomplished via commercial timber sales, however, some pre-commercial activities may be utilized to achieve desired habitat conditions (e.g., to improve crown development and species composition in deer wintering areas).
- At a minimum, following the guidelines for logging operations set forth in “Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont” (August 15, 1987 or successive versions) or Best Management Practices, if developed by ANR in the future, with the exception of protective strips which have been expanded to meet riparian area buffer guidelines provided below.

c. Wildlife Habitat Management

Of the approximately 10,000 acres in the Active Management Area, three natural community types dominate: northern hardwood forest (54% of the AMA) w, red spruce-northern hardwood forest (23%), and lowland spruce-fir forest (16%). Wetlands make up an additional 6%, and open water 1%.

Over the long term, the northern hardwood forest, which makes up about 51% of the AMA, will generally be managed with even-aged techniques, though only a fraction will be subject to treatment during this 10 year Plan. In addition, substantial areas of this total will be under uneven-aged management as beech mast production areas or riparian, vernal pool, or natural community secondary buffers. The red-spruce northern hardwood forest which covers about 24% of the AMA may be managed with either even- or uneven-aged techniques. uneven-aged management will also generally be applied to the lowland spruce-fir components of the AMA. The areas closest to wetlands and certain natural communities will be reserved from harvesting in “no-cut” primary buffers. In addition, retention (or “legacy”) trees, snags, cavity trees, and downed wood will be maintained throughout the AMA for their habitat value. Finally, active management may occur in the Core Area within the Transition Management Area or for structural complexity enhancement, as described below.

The major habitats, and primary active management goals, in this plan are summarized here. See below for details on each type of management:

Table 9: Habitat Management Targets

<u>Habitat</u>	<u>Active Management</u>
Northern hardwood and red-spruce northern hardwood forest	
Young forest	- Maintain up to 10% of the AMA as early successional forest, by regenerating 50-60 acres per year
Ruffed grouse units	- Long-term even-age management of 200 permanent acres to create three age classes (0-10, 10-25, 25-40, 40-60 years). All regeneration will count to the overall 50-60 acre per year target, above
Beech mast production areas	- Uneven-age management of 560 permanent acres for beech mast production - 200 foot uneven-aged buffer zone
Upland openings	- Create and maintain up to 50 acres in permanent shrubby openings. This does not count to the 50-60 acre per year target above.
Deer wintering area	- Uneven-age management of mixed forest to enhance softwood composition and functional shelter
Lowland spruce-fir forest	
Deer wintering area and uneven-aged boreal forest	- Uneven-age management for deer wintering cover and habitat for boreal forest species
Wetlands and Riparian Areas	
Riparian areas	- 100 foot no-cut primary buffers - 300 foot uneven-aged management secondary buffers
Vernal pools	- 100 foot no-cut primary buffers

	- 500 foot uneven-aged management secondary buffers
Ferdinand Bog and South America Pond Special Treatment Area (STA)	- 200 foot no-cut primary buffers - 300 foot uneven-aged management secondary buffers - On South America and Unknown ponds, and Ferdinand Bog
Rare or sensitive natural communities	
All rare or sensitive communities	- 50-150 foot no-cut buffers adjacent to uneven-aged treatments - 150-300 feet no-cut buffer adjacent to even-aged management treatments
Snags, cavity trees, legacies, and woody material	
Snags	- Retention of at least 5 snags per acre
Cavity trees	- Retention of all cavity trees, where possible
Recruitment/Legacy trees	- Retention of at least 5 recruitment trees per acre
Downed woody material	- Retention of all downed wood in most circumstances
Structural complexity enhancement	
Structural complexity treatments	- Treatments may be specially designed to accelerate the development of a more diverse forest structure with a broader range of age- and size-classes

10) Northern Hardwood Forest and Red Spruce-Northern Hardwood Forest

The northern hardwood forest type is 54% of the area designated for active management. The size class distribution of the hardwood forest is 11% early successional forest, 10% saplings, 55% pole timber and small sawlogs, and 20% mature forest across the AMA. The northern hardwood forest within the Active Management Area is comprised of a mix of sugar maple, red maple, yellow birch, American beech, white birch, and white ash. The average stocking for the northern hardwood stands within the AMA is 60 ft²/ acre with nearly half of the volume being unacceptable growing stock on average. As a result of past management, the low stocking of many of these stands has allowed an understory of advanced regeneration to develop. Management within the WMA will strive to provide habitat for a variety of wildlife species while improving the quality of the timber resource.

The red spruce northern hardwood stands make up 23% of the Active Management Area. These are primarily located at higher elevations and in the transition area from upland

hardwood communities to the lowland spruce-fir forests along the drainages. The size class distribution of the mixed wood forest is <1% early successional forest, 23% saplings, 58% pole timber and small sawlogs, and 18% mature forest across the AMA. Since many of the softwood species have been sought for numerous cutting cycles the percentage of softwood in these stands is less than might be expected. During harvesting operations, consideration will be given to practices that may result in a greater level of softwood species within the harvest unit.

- *Young, Regenerating Forest:* Regenerating forest provides important habitat and resources for deer, moose, black bear, snowshoe hare, ruffed grouse, woodcock, lynx, fisher, red fox, raptors, shrubland birds, and a variety of other species. The acreage of regenerating forest prescribed can support both deer and moose at the density goals DFW has prescribed for this Wildlife Management Unit.
 - Management will generally be with even-aged techniques for northern hardwood and red spruce-northern hardwood forest.
 - Management will seek to create 50 acres of regenerating forest each year, with an average rotation age of 117 years.
 - Regeneration cuts will be up to 25 acres in size, though most will be smaller. If strip cuts are used, the maximum length will be 800 feet.
 - Rotation ages will generally range from 80 to 120 years, but may be as little as 40 years for aspen dominated stands.
 - Ten square feet of basal area of per acre of American beech will be retained where practicable.
- *Ruffed grouse units:* Habitat requirements for grouse vary across the year for breeding, nesting, brooding, and winter roosting habitat. Grouse thrive in forested habitats with a variety of age-classes are present in small areas, particularly with aspen and birch trees.
 - 200 acres will managed in 2.5- to 5-acre blocks set in two checkerboard patterns to eventually provide the three key age classes (0-10, 10-25, and 25-40 years).⁴⁶
 - With a majority stocking of aspen, an optimum rotation age for grouse of 40-years is possible for commercial harvest, though rotation ages will generally be longer.
 - If aspen is already the dominate stand component, operations will be limited to winter conditions to promote aspen root sprouting
 - If aspen is limited, summer operations may be used to achieve scarification of mineral soil required for windblown seeding of aspen.

⁴⁶ Regenerating forest created in grouse units will count toward the overall goal of 50 acres for the AMA.

- Small patches of softwood trees will be retained for winter cover
- Mast trees (cherry, beech, yellow birch) will be maintained as residual food sources, where practicable
- *Upland Openings*: Openings provide much the same important habitat and resources as regenerating forest, but can provide a different species composition and structure, creating additional habitat diversity. These openings will complement natural disturbances like beaver activity and flooding, which can create similar, but often more ephemeral, openings.
 - Up to 50 acres of the area will be maintained in shrubby or herbaceous upland openings.
 - Openings will be developed by seeding and maintaining log landings and historical fields.
 - Mowing will be planned to occur after August 1 to allow fledging of ground nesting birds.
- *Beech Mast Production Areas*: American beech is the key mast producing tree in northern Vermont. Its nuts provide significant food resources for black bear, white-tailed deer, American marten, fisher, wild turkey, ruffed grouse, and many small mammal and bird species.
 - Beech mast production areas will be developed and maintained with at least 30% beech on, 10% of the acreage in northern hardwood stands (560 acres).
 - Uneven-age management will be employed in beech stands to maintain shaded conditions, numerous age classes, and continuous mast production, in accordance with VDFW *Guidelines for Managing Beech Mast Production Areas*.
 - Crowns of crop mast trees will be released from competition by crown-thinning on 3 sides (W-N-E).
 - In areas without crop trees, single-tree and ½ acre group selection may be used to encourage crown development on healthy trees and to encourage regeneration.
 - A 200 foot wide uneven-aged buffer zone will be established around the BMPA to maintain shade and prevent winter injury to beech crop trees from sun scald.
 - Operations will generally be conducted in winter conditions, on frozen ground or more than 12 inches of snow, to minimize injury to beech roots and boles.

- *Deer wintering areas:* Forests with conifers providing high, continuous canopies serve a crucial function in protecting deer from the deep snows, strong winds, and low winter temperatures in northern Vermont. While predominantly softwood forests are optimal for deer wintering habitat, mixed conifer-deciduous forests may also provide adequate winter protection. Red spruce-northern hardwood forest in the WMA identified as deer wintering area may be managed to enhance its value as deer habitat.
 - Management for wintering areas will seek to
 - Provide winter shelter by maintaining at least 50% of the deer wintering area in functional shelter⁴⁷ at all times;
 - Maintain deer mobility and access throughout all non-regenerating segments of the winter area; and,
 - Provide browse accessible from shelter areas.
 - Management will generally be uneven-aged, and techniques will be single tree or group selection (generally under 0.75 acres), to maintain canopy cover, promote regeneration of shade tolerant softwood species, and release regeneration.
 - If even-aged management is called for, it will use rotation ages from approximately 70-100 years. In hardwood stands directly adjacent to winter cover habitat, regeneration cuts from 1 to 2 acres should be conducted.
 - Thinnings and other treatments may be designed to actively remove or select against hardwoods, on sites that are better suited to conifers.
 - Operations will be conducted to promote desirable spruce regeneration (e.g., summer harvests and soil scarification).
 - Operations will be timed to make use of good conifer seed years, when feasible.

11) Lowland Spruce-Fir Forest

- *Deer wintering area and uneven-aged boreal forest habitat:* Uneven-aged spruce fir forests are vital to providing the high, continuous canopies that protect deer from deep snow, strong winds, and low winter temperatures. Such forests are also important for a host of boreal species including spruce grouse, gray jay, black-backed woodpecker, Canada warbler, and American marten.

These softwood forests represent 16% of the AMA and a majority of the deer wintering area on the WMA. The size class distribution of the softwood forest is 4% early successional forest, 17% saplings, 73% pole timber and small sawlogs, and 6% mature forest across the AMA. The species mix in many of these stands is heavy to balsam fir and one goal is to increase the abundance of other softwood species (red spruce, eastern white pine and eastern hemlock) within these stands.

⁴⁷ Functional shelter is defined as softwood cover ≥ 35 feet in height and with $\geq 70\%$ average crown closure.

- Management will be uneven-aged, to promote deer wintering habitat and to maintain wetland and riparian buffers, which contain most of the LS-F forest.
- Techniques will be single tree or group selection (generally under (0.75 acres), to maintain canopy cover, promote regeneration of shade tolerant species, and release regeneration.
- Stands will be evaluated for harvest on a 20 year cutting cycle with a goal of treating 10-15 acres/ year following the uneven aged management deer wintering area guidelines developed by ANR.
- If even-aged management is called for, it will use rotation ages from approximately 70-100 years. In hardwood stands directly adjacent to winter cover habitat, regeneration cuts from 1 to 2 acres should be preferred.
- Management for wintering areas will seek to
 - Provide winter shelter by maintaining at least 50% of the deer wintering area in functional shelter⁴⁸ at all times;
 - Maintain deer mobility and access throughout all non-regenerating segments of the winter area; and,
 - Provide browse accessible from shelter areas.
- Areas of softwood outside of the mapped deer wintering area will be managed utilizing a similar approach but the goal of 50% winter cover will not apply. Within these areas the desired conditions will be a structural diverse forest which will provide ideal habitat conditions for snowshoe hare and Canada lynx.

12) Wetlands

- Riparian areas: Terrestrial areas bordering streams, ponds, and wetlands are not only important habitats for many species, but also serve critical functions in protecting water quality.
 - Management will use primary 100-foot no-cut buffers directly adjacent to “blue lined” streams, lakes, wetlands and beaver ponds.⁴⁹
 - 300-foot secondary buffers (extending 300 feet past the primary buffer) directly adjacent to “blue lined” streams, lakes, wetlands and beaver ponds. Within the secondary buffer, uneven-aged management will be used, and at least 75% of the

⁴⁸ Functional shelter is defined as softwood cover ≥ 35 feet in height and with $\geq 70\%$ average crown closure.

⁴⁹ Exceptions to these buffer standards may occur for the purpose of forest health maintenance, aquatic habitat restoration (see Other Management Strategies, below), and in alder stands where 70 foot wide clear cut strips may be prescribed to improve and/or maintain woodcock habitat.

buffer will be maintained in closed canopy (defined as a minimum “B” line stocking level per U.S.D.A., Forest Service Silvicultural Guides).⁵⁰

- *Vernal Pools*: Vernal pools are critical breeding habitat for some amphibians. These small (usually less than one acre), seasonal wetlands lack perennial inlet or outlet streams and have no fish populations. During the wettest times of the year they hold standing water, but when the pools dry out they may only be recognizable as isolated depressions in the forest floor. The area adjacent to a vernal pool is also important, as the species that breed in the pool require deep uncompacted litter, coarse woody material, and canopy cover to successfully forage, disperse, and hibernate.

Currently, the AMA is known to contain seven vernal pools.

Vernal pools will be managed in accordance with the Vermont Fish & Wildlife Department’s *Amphibian Habitat Management Guidelines*, including:

- No ground disturbance or vegetation management will be allowed within the pool itself and within 100 feet of the pool edge.
 - Within a secondary buffer zone, extending 500 feet past the primary buffer zone, uneven-aged management will be used and at least 60% of the canopy will remain intact within this zone, composed of trees at least 25 feet tall.
 - Harvesting will be limited to times of completely frozen or completely dry soil conditions to avoid creating ruts. No landings, skid roads, or openings wider than 70 feet are to be created within the secondary buffer zone.
 - Operations will avoid disturbing fallen logs, leave limbs and tops where felled, and may create downed coarse woody material by cutting large trees and leaving them in place.
 - Functional shelter between pool, wetland, and riparian habitats will be retained.
- *Ferdinand Bog and South America Pond Watersheds*: South America Pond is important for aquatic rare plants, Ferdinand Bog is a fen of highest quality which is sensitive to changes in either water flow or water quality, and Paul Stream – which is fed by Ferdinand Bog – is one of the highest quality streams of this size in Vermont. To protect these resources, portions of the Ferdinand Bog and South America Pond watersheds that are within the Active Management Area will use special riparian buffers.

⁵⁰ Exceptions to these buffer standards may occur for the purpose of aquatic habitat restoration (see Other Management Strategies, below), and in alder stands where 70 foot wide clear cut strips may be prescribed to improve and/or maintain woodcock habitat.

- South America Pond, Unknown Pond, and Ferdinand Bog Wetland, and all “blue-lined streams within the Ferdinand Bog and South America Pond watersheds will have a 200-foot no-cut buffer (instead of the regular 100-foot), and a secondary 300-foot limited-cut buffer around them.
- All of the aforementioned Active Management Area management strategies, including the 25 acre maximum clear-cut size, may be used within the Ferdinand Bog and South America Pond watersheds, but in stands which use clear-cuts as the even aged management technique the emphasis will be on mid-sized and small-sized openings rather than large clearcuts.
- All management planning and harvest activity within this watershed will use best management knowledge and techniques to ensure there is no impairment of water quality in the streams, South America Pond, Unknown Pond and Ferdinand Bog.

13) Rare and Sensitive Natural Communities

Over 80 natural community types have been described in Vermont. Twenty-seven of these occur on West Mountain WMA. While the Core Area of West Mountain WMA has been designed to incorporate many of the rare and Significant natural communities on the WMA, the AMA contains at least 55 types of rare or uncommon natural community (e.g., spruce-fir-tamarack swamp and dwarf shrub bog), most of which are Significant for the state. In the AMA, there are 59 individual occurrences of such communities, covering 431 acres.

- Rare and sensitive communities (all Very Rare (S1) and Rare (S2) communities, all Uncommon (S3) communities, and all seep communities) are designated for no active forest management (unless absolutely needed to maintain the natural community itself).
- These protected areas will include no-cut buffers to further protect them: widths will be 50-150 feet for communities adjacent to uneven-aged treatments and 150-300 feet for even-aged management treatments). The actual width of buffer zones will be determined during the harvest planning process, based on the sensitivity of individual communities involved.
- Northern hardwood, northern hardwood-red spruce, and lowland spruce-fir natural communities will not be subject to the Rare and Sensitive Natural Community provisions. West Mountain WMA’s large, “matrix” natural communities will be actively managed without diminishing their condition, because steps will be taken to preserve and enhance their functioning, including: large areas will be set-aside from harvesting (in the Core Area and no-cut buffers), structural features of mature forest communities will be enhanced (e.g., snags and dead wood), and invasive species will be actively controlled.

14) Snags, cavity trees, and woody material

Dead and dying wood are important resources for wildlife habitat and ecosystem function. Snags (standing dead trees) are used extensively by insects, and all the species that prey on insects, and often become cavity trees. Cavity trees (living or dead trees with hollows in them) are critical nesting, denning, and roosting sites for species including owls, bats, wood duck, American marten, and black-backed woodpecker. Dead wood on the ground plays a role in regulating forest nutrient cycling, water flow, and erosion, while also providing a critical resource for dozens of species of wildlife, including: insects for bears; dens for bears, lynx, and American marten; and cover for snowshoe hare.

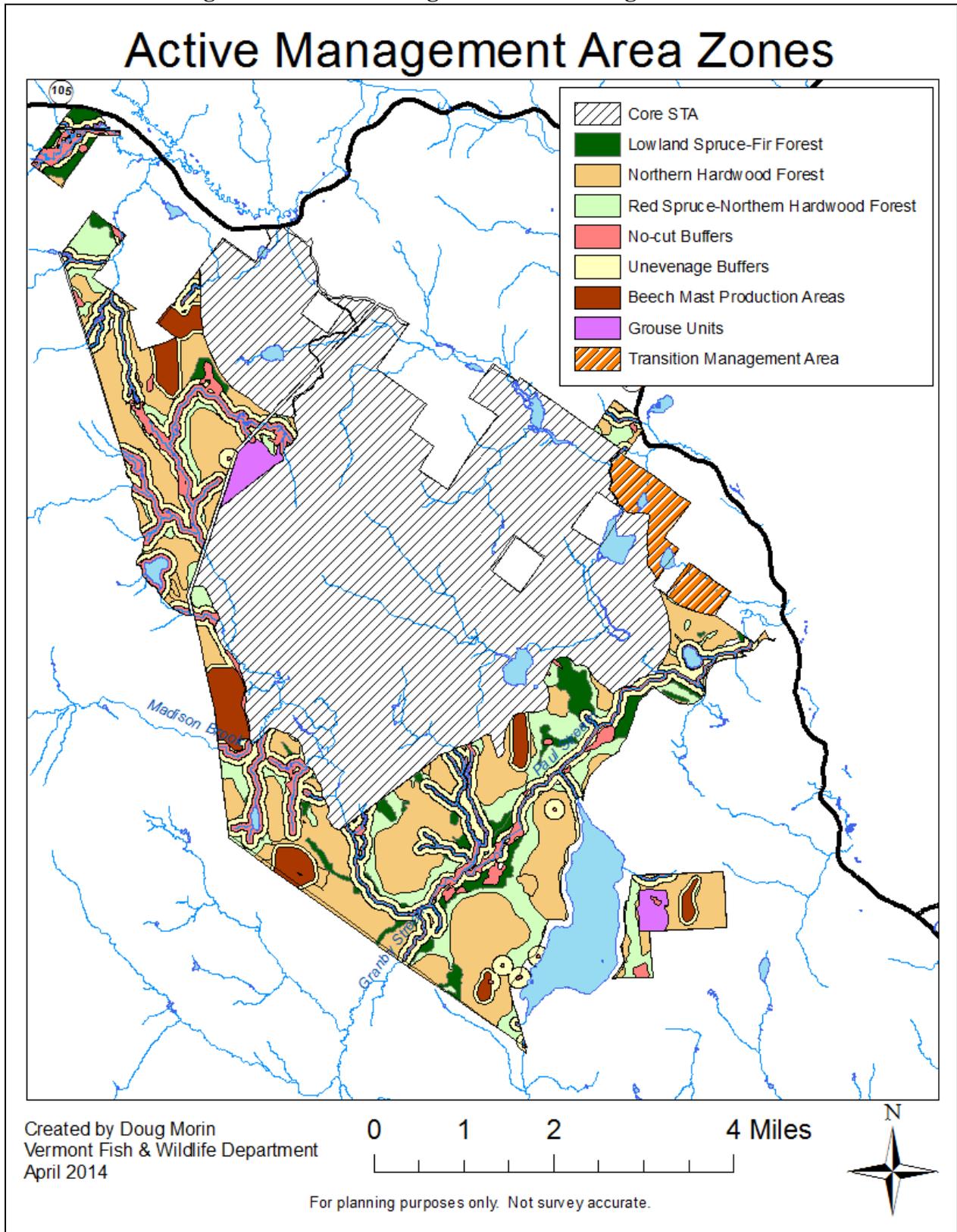
- All strategies in this section are minimum standards that apply to the entire AMA, regardless of habitat management classification or buffer type.
- A minimum of 5 snags per acre, four of which are >15” dbh and one of which is >20” dbh, will be retained where possible. Where trees of this diameter are lacking, retaining both large healthy trees, and large diameter trees with defects will maximize current and future snag habitat. Where standing dead trees are lacking entirely, live trees may be girdled to create snags.
- Where feasible, all cavity trees will be retained, unless they pose a safety hazard to the loggers or the public. When this target substantially conflicts with the silvicultural prescription, a lesser number of snags may be retained, counting as part of living “recruitment” tree goals below.
- Downed woody material will be retained in all but specific circumstances to meet defined management objectives. Whole-tree harvesting will be avoided in low-fertility sites, shallow-to-bedrock soils, coarse sandy soils, poorly drained soils, steep slopes, and erosion-prone sites
- A minimum of 5 living “recruitment” trees per acre, four of which are >15” dbh and one of which is >20” dbh, will be retained where possible, to ensure a future supply of snags, cavity trees, and dead material.

15) Structural Complexity Enhancement

The structural complexity of forests is key to their habitat value and ecosystem function. The history of intensive timber management on the WMA has left a simplified structure—for example, most of the forest belongs to one or two young age classes, dead and downed wood is limited, some features created by natural disturbances (like wind-thrown and ice-damaged trees) are uncommon, and large-diameter trees (live or dead) are relatively rare. Management to enhance the structural diversity of the forest may accelerate the development of such features and processes of old forests.

- Parts of the Active Management Area may be treated with uneven-aged techniques designed specifically for ecological restoration or the mimicking of natural ecological processes, in addition to or in place of the retention strategies already discussed.
- Treatments will be designed primarily for the purpose of enhancing ecosystem condition and function.
- Emphasis will be placed on noncommercial and/or research-based activities. For example, a study could compare the effects of active structural enhancement with the natural development of the Core Area.
- Treatments will be designed in cooperation with The Nature Conservancy, as holders of the State Lands Easement.

Figure 18: Active Management Area Management Zones



16) Additional Management Activities

Nonnative Invasive Species Management and Control: Management activities to address nonnative invasive species include monitoring, and removal or control of all occurrences. Presently, nonnative invasive species have been successfully eliminated or controlled by targeted herbicide treatment or mechanical removal. Monitoring efforts, however, should be increased as recent years have detected new occurrences.

In addition, nonnative invasive aquatic plants are very easily introduced through boats and motors. None of the waters of West Mountain WMA are currently known to contain nonnative invasive aquatic plants, but future introductions are possible. Ongoing informational campaigns will continue to address this issue statewide, and additional targeted monitoring of boats may be required.

Bullthroat Bridge

As part of the road access plan (Section VI.E.), a bridge will be constructed over Paul Stream at the Bullthroat site. This will allow forest management access to approximately 2,000 acres of Active Management Area which are currently inaccessible for management, on the far side of Paul Stream. Additionally, it will enable easier public vehicular access to the southeast side of West Mountain Pond Road.

Roads: As specified in Section VI.E. certain existing roads in the Active Management Area will be maintained to facilitate management operations and public access to the WMA. Road closures may occur during selected times of the year to protect roads from erosion, allow for maintenance, avoid damage to road surfaces, protect wildlife, and maintain safe conditions related to logging activities. New roads will only be constructed if and where they are necessary to meet management objectives. In these instances, they will be as narrow as possible and located to avoid areas of ecological significance or sensitivity.

Fruit trees: Fruit bearing trees may be retained in appropriate locations, to provide mast for wildlife. Apple trees may be retained, release, pruned, and fertilized. This will improve tree vigor and increase apple crops, which encourages utilization by wildlife including bear, deer, fox, coyote, and grouse.

Plantations: Tree plantations may be harvested when they mature to allow the area to return to natural vegetation, which may provide better cover for birds and mammals.

Bird nests: Active raptor nests and heron rookeries will be managed with appropriate buffers, in accordance with DFW. Disturbance will be limited within buffer zones and any timber harvesting will avoid the active nesting period.

Nest boxes and platforms: Nesting structures such as osprey platforms, bat boxes, wood duck boxes, and kestrel boxes, may be used in suitable locations to enhance habitat or overcome limiting habitat elements for various species of wildlife.

d. Schedule for Implementation

The following stand data came from inventories to gain general information on the forests of the AMA, and to locate wildlife habitat treatments. Prior to the development of harvesting prescriptions a more intensive assessment of the wildlife and timber resources will be completed.

The AMA has been mapped into 15 administrative units called compartments containing 125 forested and non-forested ‘stands’. The basal area, cover type, and size class of individual stands is shown in.

Over the entire AMA, the diameter distribution shows a predominance of trees 4-9.9 inches in dbh (54%), with smaller amounts both larger (20% greater than 10 inches dbh) and smaller (17% between 1 and 3.9 inches dbh), and a small amount of young forest (5% less than 0.9 inches dbh).

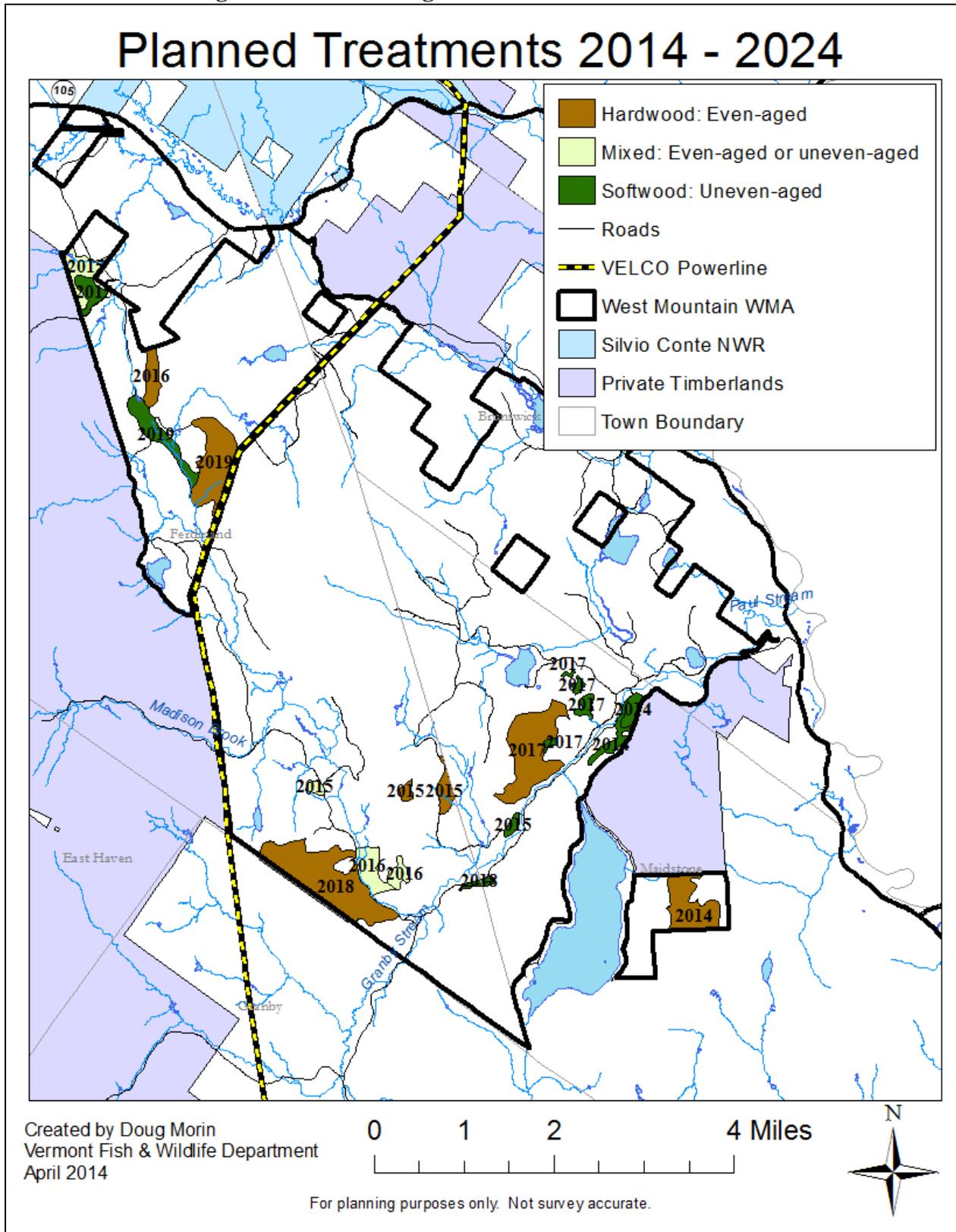
Table 10: Active Management Area Size Class Distribution by Compartment

Compartment	Size (Acres)	Young Forest (0 - .9 inches in diameter)		Sapling (1.0 - 3.9in)		Small Sawlogs (4.0 - 9.9in)		Large Sawlogs (10.0+in)		Other (wetlands, water, etc)	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
1	237	42	18%	0	0%	117	49%	0	0%	79	33%
2	643	48	7%	100	16%	318	49%	171	27%	6	1%
3	509	47	9%	0	0%	369	72%	94	18%	0	0%
4	718	0	0%	57	8%	629	88%	32	4%	0	0%
5	569	69	12%	188	33%	308	54%	0	0%	29	5%
6	373	27	7%	42	11%	229	61%	44	12%	30	8%
7	366	32	9%	81	22%	215	59%	38	10%	0	0%
8	1,390	59	4%	182	13%	895	64%	222	16%	32	2%
9	1,049	94	9%	203	19%	531	51%	219	21%	0	0%
10	1,223	0	0%	382	31%	616	50%	16	1%	208	17%
11	1,886	47	2%	377	20%	946	50%	508	27%	8	0%
12	482	0	0%	29	6%	365	76%	67	14%	21	4%
13	693	41	6%	51	7%	49	7%	398	57%	154	22%
14	113	0	0%	62	55%	51	45%	0	0%	0	0%
15	548	25	5%	29	5%	131	24%	363	66%	0	0%
Total AMA	10,778	531	5%	1783	17%	5769	54%	2172	20%	567	5%

Areas for treatment have been identified for the next 5 years as illustrated in Figure 19. These stands were identified based on the general condition of each stand, the size class distribution of habitats across the AMA, and the size class distribution within the individual compartments.

Generally, about 20% of the acreage of each even-aged stand will be regenerated in a treatment, and most harvests pair nearby even- and uneven-aged treatments, to use both techniques in a single operation, and reduce impacts on users of the WMA, where possible.

Figure 19: Stands Targeted for Treatment 2014 – 2024



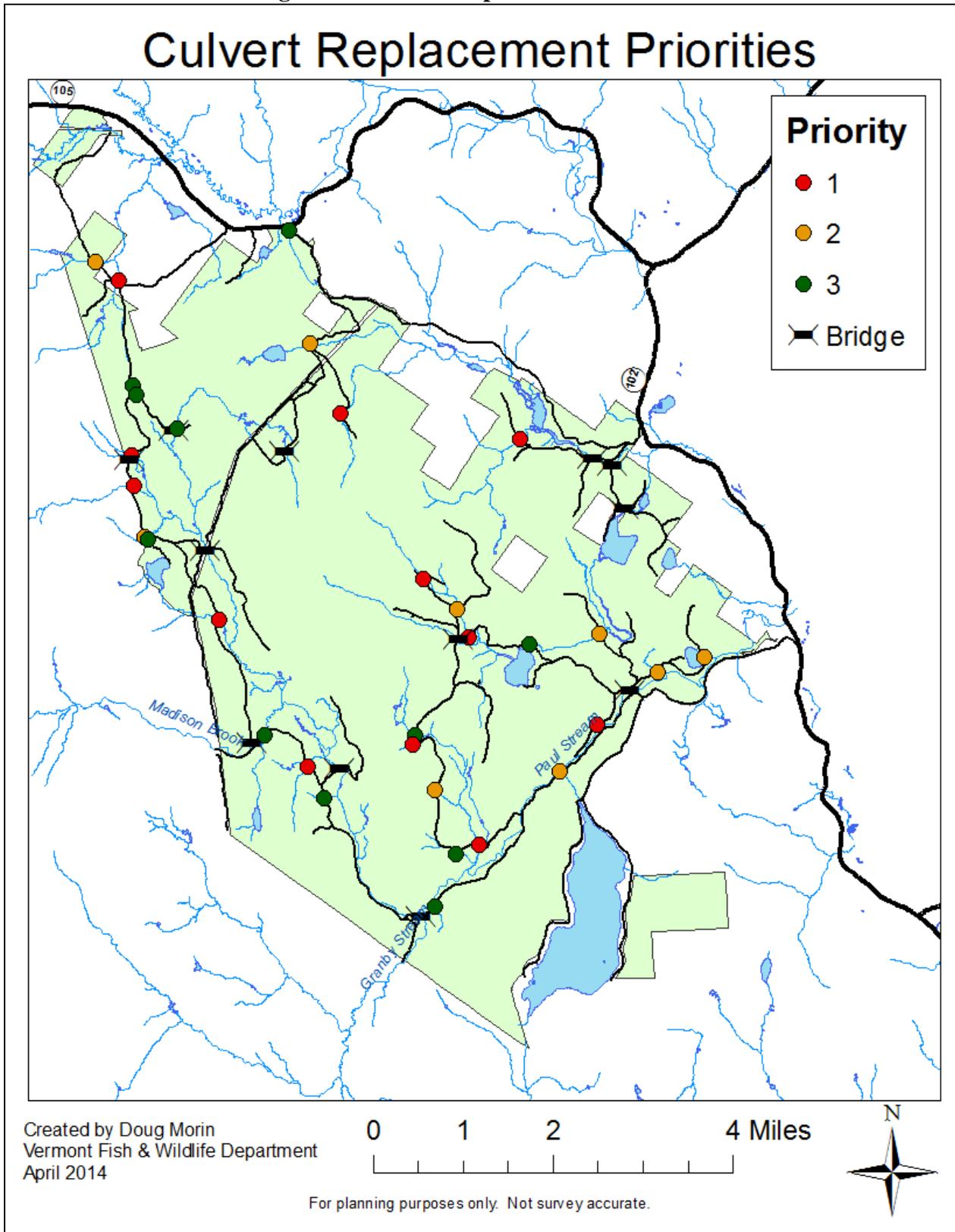
e. Aquatic Resources Management

West Mountain WMA has valuable aquatic features including high quality ponds and streams, diverse and rare wetlands, and both culturally and ecologically important species. To protect and enhance these and other aquatic resources, a variety of strategies will be used throughout West Mountain WMA (in both the Active Management and Core Areas):

- *Riparian Buffers*: Terrestrial areas bordering streams, ponds, and wetlands are not only important habitats for many species, but also serve critical functions in protecting water quality. The riparian buffers discussed above for use in the Active Management Area are a major mechanism of preserving the functions and values these lands provide.
- *Aquatic Habitat Restoration*: Oversimplified fish habitat may be enhanced by cutting riparian trees, dropping them into streams, and anchoring them to create structures that guide the stream and provide fish cover. Such “Strategic Wood Addition” restoration activity will be at the direction of the Fisheries Division of DFW.
- *Atlantic salmon restoration*: Paul Stream is one of the Connecticut River watershed’s sites for Atlantic salmon reintroduction. The stream provides good habitat and the introduction of salmon has little effect on other fish. This project is currently on-hold, but DFW may continue to use Paul Stream for any such efforts in the future.
- *Culvert replacement*: As discussed in Section IV.C.3., most culverts on the WMA are currently causing, or may soon cause, negative impacts to water quality, aquatic organism passage, and/or public infrastructure due to poor sizing and positioning. Based on a 2013 assessment, the major culverts on the WMA have been prioritized for replacement based on their geomorphic compatibility, aquatic organism passage, and ability to accommodate high flows.

As regular road maintenance is conducted, inadequate culverts will be replaced with larger and better aligned structures, and new structures will be added where necessary. This will include upgrades to the hundreds of small cross-drainage culverts on the WMA. In addition, at least one to two high priority major culverts will be selected for replacement each year, as funding allows, for the lifetime of this plan. Figure 20 shows the major culverts (those on blue-lined streams) and their replacement priority (high, medium, low).

Figure 20: Culvert Replacement Priorities



3. Management of the Core Area

The management approach in the Core Area is to allow, in perpetuity, the natural communities to be shaped and change in response to natural processes. Under some circumstances, however, management actions that further the ecological goals and objectives of the Core Area may be appropriate.

a. Active Management Activities Permitted in the Core

1) *Management actions to help conserve and protect populations of rare, threatened, and endangered species:*

Management activities may be used to maintain existing and future populations of rare, threatened, and endangered species found within the Core.

It is most likely that simply conserving the natural communities and aquatic resources within the Core Area will, itself, conserve these populations. Should it be determined, however, that the population of any rare, threatened, or endangered plant or wildlife species requires active management to sustain its population on West Mountain WMA, then appropriate measures may be taken within the Core Area. For example, it may be appropriate to protect rare plants in one or more of the pond-associated wetlands by placing beaver baffles to avoid extirpation of rare plants by prolonged inundation.

2) *Ecological restoration of natural communities or aquatic ecosystems:*

These activities include, but are not limited to, some of the efforts described above, such as Strategic Wood Addition for aquatic habitat restoration and the control of nonnative invasive species throughout the Core Area. Worthy of more detail are active management planned in the Transition Management Area and for the purpose of structural complexity enhancement:

Transition Management Area

In addition, active management will be undertaken to restore the deer wintering area in a 483 acre portion of the Core Area, northeast and east of Wheeler Pond. In general, the goal for this area is to provide for self-sustaining deer winter shelter under natural, mature forest conditions. However, the Core Area includes significant acreage of existing deer wintering habitat that has been heavily logged, and is currently either very young (nonfunctional cover) or provides only single-aged winter cover. Young stands will not provide adequate winter cover for a long period of time until they become more mature, and the remaining softwood cover may not have the structural diversity to provide suitable cover once the existing mature trees die.

- Uneven-aged management will be used to improve the age class distribution and forest structure for the thermal cover function of the deer wintering area.

- This transitional restoration forestry was anticipated to last until about 2040, but as new information on stand conditions is gathered, the time frame for this effort may need to be adjusted. The goal will be to shift to natural process management of this portion of the deer wintering area as soon as possible.
- All other applicable buffers and restrictions discussed above apply in the TMA.
- Restoration forestry within the TMA will be aimed solely at improving the protective function of the area (food and shelter) for wintering deer and not specifically designed to benefit other wildlife.

Structural Complexity Enhancement

Finally, as in the AMA, specially designed treatments may be used to enhance the structural diversity of the forest and accelerate the development of the features and processes of old forests that the Core Area is intended to provide.

- Parts of the Core Area may be treated with uneven-aged techniques designed specifically for ecological restoration or the mimicking of natural ecological processes.⁵¹
- Treatments will be exclusively noncommercial and/or research-based.
- Treatments will be designed in cooperation with The Nature Conservancy, as holders of the State Lands Easement.
- As required by the State Lands Easement, to prevent any detrimental effect on other ecological values of the Core Area, all harvest activity will be conducted consistent with the highest forest management standards.

4. Projected Future Conditions

The forests of West Mountain WMA have been heavily altered by more than 150 years of logging. Although the current forest structure over nearly all of the land, including the Core Area, is largely an artifact of even-aged forest management techniques, a more natural and complex structure will develop over the next several hundred years as the natural communities recover and mature, both in the actively managed and Core Areas. Both areas will regain a more complex vegetative structure overtime.

a. Future Vegetative Conditions in the Active Management Area

In general, the forest stands at West Mountain WMA are in younger age classes (≤ 60 years old) offering relatively little diversity in forest structure. Seedling stands (with

⁵¹ The State Lands Easement allows forest management in the Core Area with the stipulation that it would be, "...strictly limited to ecological restoration or mimicking a natural ecological processes that will enhance the biological integrity of the STA."

mean stand diameters in the 0 – 2.5 inch range), along with sapling (2.6 – 4.5 inches) and some pole stands (4.6 – 10.5 inches), may be identified as even-aged management areas and left to grow to rotation age (80 to 120 years). Thinning operations may be performed in the interim depending on specific stand conditions and habitat objectives.

Alternatively, these stands may be targeted for eventual conversion to uneven-aged stands and thus may be entered for treatment via selective timber harvesting once merchantable trees are present. Finally, some of these stands occur in State significant natural community types or directly adjacent to surface waters that require buffers. No active habitat management will occur in these areas.

Uneven-aged management will be used in beech stands, most deer wintering areas, and in secondary buffer zones around streams, ponds, vernal pools, and significant natural communities. However, the majority of wildlife habitat in the active management zone will be managed using even-aged management techniques. Up to 10% of the Active Management Area will be maintained as young, regenerating forest at all times.

Even-aged management regeneration cuts will range up to 25 acres in size, though most will be less than 10 acres. These are considerably smaller than most even-aged cutting practiced by the former landowner, therefore, over time, the forests will change and large patches of single-age trees will be less common. For some stands, rotation ages will also be longer than previously, resulting in bigger trees. Other changes from past management include more frequent use of and wider no-cut and limited-cut buffer strips, resulting in bigger trees and more dead and down material in buffer areas. In addition, a greater percentage of spruce may develop in lowland spruce fir stands due to silvicultural practices that favor spruce over fir.

b. Future Vegetative Conditions in the Core Area

Vegetative changes that are anticipated within the Core include the following: the development of uneven age and size-class structure including scattered, or perhaps clustered, occurrences of very old and/or very large trees of a variety of species; the growth of some tall emergent white pine in several natural community types; the accumulation of standing and downed coarse woody material; the accumulation of a deeper and moister layer of deciduous and coniferous leaf litter; and the development of scattered canopy gaps created mostly by small-scale disturbance events.

As the forest develops toward a structure that may be described by terms such as uneven-aged, all-aged, mature, over mature, and old-growth, trees of all ages and sizes will be present. Canopy gaps and very large, live and dead trees will occur across the landscape. It is expected that the gaps will be rather small and will be created primarily by small-scale blowdown and by individual tree death. Blowdowns in spruce-fir and red spruce-hardwood natural communities are likely to be somewhat larger. Except for in wetland, seepy, and very shallow-soil forests, wind events are more likely to affect only older trees (saw timber size and larger), and will blow down single trees or small patches of a few trees. Spruce budworm infestations and wind events may cause much larger blowdowns in those natural communities with more fir (and to a lesser extent spruce).

Although larger scale natural disturbances (>100 acres, *e.g.*, caused by hurricanes, tornadoes, wildfire,) that result in the creation of large patches of early successional vegetation are likely, these are expected to occur only at intervals exceeding 500 years (Cogbill 2001, Richburg and Patterson 2000)

For the purpose of modeling forest change in the Core over the next 200+ years, it is assumed that most canopy openings will be caused by very small scale wind events and will have an average size less than 0.5 acre. It has been theorized, based on an examination of the distribution of natural wind disturbance in northeastern deciduous forest, that the average annual disturbance rate will be 1%, with a range of 0.5 to 2%. That is, on average across the landscape any place in the forest is likely to be disturbed between every 50 and 200 years (Hunter 1990). Those natural communities that are more prone to disturbance, such as forested wetlands, those on seepy slopes, exposed shallow-soil ridges, or excessively bouldery slopes, will likely see blowdowns and overstory turnover closer to the 50 year end of the range. Other natural communities that are less prone to disturbance or that by chance are not exposed to wind events, may grow for considerably longer than 200 years without disturbance other than the death of individual trees.

In general, mid- and late-successional hardwood trees in a landscape disturbed only by natural processes, such as the Core Area, are expected to achieve a maximum age of approximately 200-250 years. Conifers, of which the late-successional species are spruce and hemlock, are predicted to reach maximum ages of approximately 250 years for spruce, and perhaps nearly twice that long for hemlock. Therefore, as the forest matures, there will be some very old (200-400 years) trees in many natural communities.

Revegetation of gaps in the northeastern forest canopy is rapid. Tree seedlings, which respond to the increased availability of sunlight, moisture and nutrients, quickly colonize and are recruited into the upper layers of the forest. Herbs and shrubs may experience a pulse of increased growth, but these are then shaded to more typical levels by the rapidly growing seedlings. Depending upon seed availability, gap size and chance events, gaps may be filled by early-, mid- or late-successional tree species. Over time, there will be revegetating gaps of a variety of ages distributed across the landscape, and these will contribute to the sort of habitat variability that is favorable to many wildlife species.

In the Core Area, the natural landscape pattern of upland and lowland deciduous, coniferous and mixed forests, herbaceous, shrub and forested wetlands, and ponds and streams, all shaped by dominant natural disturbances such as wind-throw and beaver activity, will come to provide a diversity of habitat types. Many species of native animals will find favorable conditions within this complex piece of landscape. In short, the natural forest structure and landscape pattern of the northeastern forest, to which the native species have adapted for thousands of years, will once again occur in the Core Area. In addition, most of the natural communities within the Core will develop into mature, high quality examples that will represent ecological benchmarks for their respective types in the Northeastern Highlands biophysical region.

5. Projected Implications for Animal Species of Interest and Natural Communities

a. Effects of Active Management on Animal Species

A number of birds and mammals utilize and/or require early successional forests for their seasonal or annual habitat requirements (Hunter et al. 2001, Dessecker and McAuley 2001, Litvaitis 2001, Thompson and DeGraff 2001). This suite of species should benefit from the management strategies designed for the Active Management Area. As was also previously noted, most other species will find suitable, though sometimes smaller patches of habitat throughout this zone.

1) *Effect of the Active Management Area on Birds:*

The Active Management Area will complement the bird conservation objectives for the Core. Active wildlife habitat management techniques, such as forest regeneration cuts and permanent upland openings, will provide good conditions for bird species that prefer larger openings and patches of early successional forest. Some of these species are listed by Partners-In-Flight as regional conservation priorities, and others are not listed as such but are suspected to be in decline (Sauer et al. 2000). These include chestnut-sided warbler, common yellowthroat, mourning warbler, olive-sided flycatcher, Philadelphia vireo, white-throated sparrow, ruffed grouse, and woodcock. Although these species will find some suitable habitat in the Core, especially in the more open natural communities, disturbance patches, and natural community ecotones, they are likely to reach higher population densities in the larger patches of early successional vegetation in the Active Management Area. Management activities that are targeted at particular species such as ruffed grouse and woodcock will provide appropriate habitat conditions for many other birds that prefer similar habitat (Sepik et al. 1981).

Bird species that thrive in larger patches of mature forest will, as noted earlier, find less optimum habitat in the Active Management Area. Incidence of nest predation by jays, crows, ravens, and raccoons, for example may be higher here than in the Core Area. Increase in nest parasitism by cowbirds is not expected to be significant because West Mountain WMA is not immediately adjacent to active farmland. Additionally, logging, other vegetative management activities, motor vehicle use, and easier access may result in less suitable breeding conditions for species that are more sensitive to human disturbances, such as loons, ospreys, and great blue herons.

2) *Effect of the Active Management Area on Mammals*

Active Management will be utilized to improve the structure of cover within deer wintering areas and adjacent early successional forage areas, maintain and enhance key mast areas, and provide permanent upland openings and a constant supply of early successional forest.

The Active Management Area will favor and produce higher densities of mammalian species that do well in landscapes that are a mix of early successional and more mature forest, including: moose, white-tailed deer, black bear, bobcat, fisher, coyote, red fox, snowshoe hare, red squirrel and chipmunk.

Estimated densities for moose and deer for this region of Vermont are 1-2 and 6-7 per square mile respectively. It is expected that the habitat management strategies of the Active Management Area will provide the habitat base to maintain these densities into the future. Similarly, the strategies of improving beech mast production, protecting wetland feeding areas, providing upland openings, and the growth of soft mast feeding areas (berries) resulting from even-aged management, should contribute to maintaining current black bear density in this region.

Most of the 15 species of terrestrial small mammals and two bat species known from West Mountain WMA occur in several age classes of forests. It is not certain what effects the different forest conditions present in the Core and Active Management Area will have on their populations. Although 6 small mammal species were captured in clearcuts during the inventory phase of this plan (Kilpatrick 2001) and openings may provide more feeding areas for bats, even-aged management units in the Active Management Area are likely to have short-term detrimental effects for most small mammals. Kilpatrick (2001) trapped a few species in low numbers in clearcuts in the Conte Refuge; however, the smaller regeneration cuts and lower percentage of very early successional vegetation are likely to have less effect on populations of small mammals than the previous management regime.

3) *Effect of the Active Management Area on Reptiles and Amphibians*

Over the entire WMA amphibian habitat quality will increase as forest structure recovers from past management. The protection of vernal pools, streams, and wetlands with forested buffers will benefit most amphibian species in the Active Management Area. However, reptiles and amphibians that range further from these buffers, including dispersing individuals, will generally find less suitable conditions in the Active Management Area than those of the Core Area. This is due to the combined negative effects of logging operations such as reduction in shade, increased surface temperature, reduced soil moisture, compaction of soil, reduction of coarse woody material, and disturbance of leaf litter (Semlitsch 2000). Clear-cutting has been shown to be detrimental to salamander and frog populations until pre-harvest structure redevelops in 30-60 years, and these effects have been shown to extend 80-115 feet into the forest edges surrounding cuts (deMaynadier and Hunter 1995).

Two snake species found more commonly in drier, open habitats, presumably would find favorable conditions in log landings and other small openings associated with Active Management Areas. One of these species, the red belly snake, was located in the West Mountain Wildlife Management Area, while the second, the smooth green snake was not located but considered a possible resident due to earlier reports (Andrews 2001). Otherwise, snake species in general, which often use gravel roads as sunning locations, along with other reptiles and amphibians in general, will suffer

increased incidental road mortality in the Active Management Area as compared to the roadless Core Area. The road densities and traffic volumes in West Mountain WMA, however, are not expected to have significant detrimental effects on the amphibian or reptile populations (deMaynadier and Hunter 1995).

b. Effects of Core Area Management on Animal Species

Predictions regarding changes in wildlife populations within the Core Area are less certain because: 1) we do not have any long-established Core Areas in the northeast where adequate research has been performed on wildlife populations, and 2) changes in habitat structure do not always relate directly to change in populations. With these caveats in mind, some general statements about relative habitat suitability follow.

1) Effect of the Core Area on Bird Species

As the Core Area develops a more complex and mature forest structure over time, it is expected to provide favorable habitat for many species of birds, while certain other species will be adversely affected. While all birds of the region that occur in uneven aged stands also occur in one or more size classes of even aged stands, and no breeding birds are restricted to uneven aged conditions (Thompson and DeGraff 2001), many species find optimum habitat in more mature forests. Several of these species are in decline elsewhere in the eastern United States where larger forested tracts have been fragmented by agricultural or urban development.

A representative of these “forest interior” species is the scarlet tanager, which occurs mainly in deciduous and to a lesser extent mixed forest types. Within 2,500- acre habitat blocks that are at least 70% forested (the entire Kingdom Heritage Lands, 132,000 acres, is virtually 100% forested), this species occurs in forest patches ranging from 9 – 41 acres. Patches 9 acres in size are 50% less likely to support breeding tanagers relative to unfragmented forests, whereas 41- acre patches have the same probability as an unfragmented forest (Rosenberg et al. 1999). Similarly, small forest patches (<50 acres) have been shown to be consistent population sources for wood thrush in the east (Trine 1998).

Mature forests stands of this size will be commonplace throughout all of the Kingdom Heritage Lands, thus scarlet tanagers, wood thrushes, and other species utilizing similar habitat will be found throughout the landscape of the Kingdom Heritage Lands. Virtually the entire Core Area, however, will be optimum habitat allowing for the highest possible density within each habitat block. Other species expected to benefit from the virtually continuous mature deciduous and mixed forests of the Core are red-eyed vireo, ovenbird, black-capped chickadee, veery*, wood thrush, rose-breasted grosbeak, yellow-bellied sapsucker, and blackburnian, black-and-white, Canada*, black-throated blue* and bay-breasted warblers*.⁵² Two of these priority species, the veery and Canada warbler, are experiencing continental declines.

⁵² Asterisks denote priority bird species of the eastern spruce hardwood forest as classified by the Partners in Flight Program (PIF) (Pashley et al. 2000).

The Core is also expected to especially benefit the black-backed woodpecker, a habitat specialist generally associated with both disturbed and mature coniferous forests (Weinhagen 1998). The main food source for black-backed woodpeckers is various life stages of bark and wood boring beetles. These beetles occur only in dying or recently dead trees. While black-backed woodpeckers often utilize recently dead standing or downed trees to forage after salvage cutting operations, the same site likely would have had prolonged value to black-backs if they had been left uncut. Home ranges of black-backs have been shown to be larger within habitats that had higher amounts of timber harvest (Googans et al. 1988).

The black-backed woodpecker is a “Species of Special Concern” in Vermont due to its relatively localized range (very rare outside the Northeast Kingdom) and special habitat needs. In short, if production of quality sawlogs and pulpwood is a primary goal of habitat management on a given parcel, then in theory the larger diameter dead and dying trees needed by black-backs will never be allowed to develop. Fortunately for Vermont black-backs, hundreds of acres of both public and privately-owned spruce-fir forests (including many sites on the Kingdom Heritage Lands) developed into breeding habitat in recent decades. This acreage occurs in patches of various sizes, 30 of these patches were found to have nesting black-backs in 1996 and 1997 (Weinhagen 1998).

Patches of dead and dying spruce fir will continue to occur on public lands in the region within no-cut buffers surrounding streams, ponds, wetlands and other significant natural communities, and within other established “old growth” areas, but the same cannot be guaranteed for private lands. Thus, the establishment of this Core Area, which includes several large patches of softwood forests, will contribute significantly to the conservation of black-backed woodpeckers in Vermont.

Another bird species of concern in this region is the State endangered spruce grouse. Within the State of Vermont, this species is currently known to breed only in the Nulhegan Basin, with the majority of its habitat located on the Conte Refuge. The bird also breeds at the adjoining Wenlock WMA and the northernmost reaches of West Mountain WMA. Spruce grouse have been known to occur rarely at Ferdinand Bog (but with no evidence of breeding) and were likely present historically in other lowland spruce-fir forests throughout the West Mountain area.

Spruce grouse “*apparently prefer relatively young successional stands*” (Boag and Schroeder 1992). Highest densities known are from fire-generated jack pine (Szuba and Bendell 1998). Because fires in this forest type typically leave islands of unburned habitat, timber harvesting in the Active Management Area could be used to mimic fire as long as clear-cuts are kept small and interspersed (Szuba and Bendell 1983).

Softwood trees in northeastern forests reach appropriate vertical complexity for spruce grouse at 20 to 50 years of age. Habitat becomes less suitable in stands where tree height is greater than 15m (49 ft) and live crown is present on less than 50% of

the total height of the tree. The key to good spruce grouse habitat appears to be a moderately dense shrub layer, produced either by young sapling-sized trees below the canopy layer trees, or by low live branches on the canopy layer trees (D. Keppie, pers. comm.).

Spruce grouse are expected to find improving habitat conditions in the Core Area over the next few decades, as some logged areas regenerate to early successional softwood forests. Other primary softwood sites may take longer to return to suitable habitat as they are currently dominated by intolerant hardwoods. Most all stands in the Core Area will begin as even-aged stands which will likely progress into less suitable habitat after a few to several decades. Over the longer term (*e.g.*, 200 years), however, the multi-aged, vertically diverse forest that is expected to develop should provide suitable and sustained habitat for spruce grouse.

Birds such as the American woodcock, whip-poor-will, chestnut-sided warbler, mourning warbler and common yellowthroat are all primarily associated with large patches (> 12 acres) of early successional forest (Hunter et al. 2001). Other species are associated with smaller scale disturbances, generally less than 10 acres, such as the brown thrasher and white-throated sparrow (Sauer, *et al*, 2000). These species, all of which are experiencing a significant decrease in continental populations (Sauer et al. 2000), are expected to find a limited amount of suitable habitat within the Core once old trees become established as the dominant age class.

Ruffed grouse are another bird species of interest in the region. This species is also experiencing a decline in the eastern United States as early successional forests decline in most of the region (Desseker and McAuley 2001). Ruffed grouse use a variety of stand age-classes, but depend mainly on young forest habitats. Home ranges are 6–10 acres for males and 15 to 46 acres for hens with broods (Gullion 1984). Patches of saplings that result from group-selection cuts are generally too small to provide secure cover for grouse, but young forest patches of 2.5- 5 acres are optimum (Desseker and McAuley 2001). Consequently, ruffed grouse populations within the Core are expected to eventually become relatively low

2) *Effect of the Core on Mammals*

Similar to birds, many mammalian species will eventually thrive in the forests and wetlands of the Core Area. Most of these, however, derive the greatest benefit when a multi-aged, vertically diverse stand structure has developed. These conditions will benefit species that utilize mature tree canopies, larger hollow trees and other tree cavities, larger dead standing and down trees, and deep, uncompacted litter. Examples of such species are bats, red squirrel, northern flying squirrel, and various smaller rodents such as red-backed vole and deer mouse. West Mountain is within the historical range of marten and could provide a site for potential reintroduction in the future, although competition with other predators (*e.g.*, fisher, bobcat and coyote) may influence any such restoration effort.

All of the species mentioned above also occur in managed forests throughout the northeast, and even marten (a species earlier thought to require old growth conditions) have been shown to do well in managed landscapes (Potvin et al.2000, Phillips 1994). Conversely, as eastern forests overall have matured, mammals that depend on early successional stages are declining (Litvaitis 2001). Snowshoe hares for example, exist in mature forest conditions, but greatly benefit from early successional forest conditions. Their abundance influences populations of bobcat and lynx, and possibly coyote. West Mountain is outside of the cottontails range, but is on the periphery of historical lynx range and could function as an important site for any future lynx restoration efforts. Litvaitis (2001) stated that it will take a century or more for patches of early successional habitats to develop within maturing eastern forests, and in the meantime, *“using even-aged silvicultural may be useful to alleviate current shortages”*. Opportunities for applying active habitat improvement techniques specifically to benefit these species will occur only outside of the Core.

Black bear rely heavily on beech mast found in mature northern hardwood stands, and thus they are expected to use the Core Area frequently. It is anticipated that the beech component within the Core will increase over time and provide a valuable source of fall food. Beechnuts influence bear productivity positively, especially in areas with little to no alternative foods such as apples or corn.

Black bear also use wetlands and regenerating forests in search of seasonal foods, such as grasses, forbs and buds in the spring and berries in the summer and early fall (Rogers and Allen 1987, Litvaitis 2001). Some of these food sources, which are important for cub rearing, are more abundant in recently logged areas and thus will be available mainly outside the Core. Those foods growing in wetlands, however, will be available in both portions of West Mountain WMA.

White-tailed deer and moose are two large herbivores that achieve high densities in early successional forest habitats, where preferred browse species, such as pin cherry and red maple, are most abundant (Williamson and Hirth 1985, Hunter 1990). Deer achieve highest densities in more agricultural landscapes, where they forage heavily on nutritious agricultural crops (Litvaitis 2001). Both species use older forests for travel cover and shelter from the elements. Moose use coniferous stands, or remnant patches within clear-cuts, to escape the hot sun throughout the year, including winter. Deer in northern latitudes must have access to mature conifer stands, usually located below 2000 feet, in order to survive harsh winter conditions such as those experienced at West Mountain WMA. Deer congregate in deer wintering areas, or ‘deeryards’, where trails are packed down by repeated use and function to allow quick movements from bedding to feeding areas and rapid escape from predators, such as coyotes.

Deer are expected to eventually find adequate winter shelter in the Core Area. When a virtually closed canopy is developed, with high, spreading spruce crowns intercepting snow and wind, and with mid-layer crowns functioning in the same way, microclimate (although untested due to the current lack of such stands) should be

favorable. Scattered small openings will provide winter browse in the form of seedlings, and additional food will be available in shelf fungi, litterfall and arboreal lichens.

Optimal winter shelter conditions may take 100 to 200 years or more to develop, due to present stand ages and composition. For stands already dominated by spruce, favorable winter habitat should be achieved at the earlier rather than the later in this range. For stands heavy to fir, spruce seedlings may not become established until the fir matures and dies out, which may take 80 years or more. In fact, it may take 2 or more fir generations before the stand moves away from an even-aged structure, and spruce achieves the proportion expected in a true expression of a lowland spruce fir community type. Active management of these stands could help lessen the time it takes to develop uneven-aged stand characteristics. Otherwise, the quality of winter deer habitat in the Core Area may experience wide fluctuations over the next century or two. The presence of deer winter range in actively managed, Core Area, and a transition area will, cumulatively, help guard against such fluctuations.

Moose at this latitude only need small softwood patches, sometimes individual trees, to escape the harshest winter weather or the hot sun on a clear March day. Moose frequently find these areas within or adjacent to their preferred feeding areas of cut-over hardwood forests at elevations between 1000 and 3000 feet. Unlike deer, moose do not migrate to and congregate in larger softwood stands. Moose will use the softwood forests at lower elevations more as travel and resting cover in the summer between feeding bouts in the wetlands that these forests often surround.

Again, without an existing Core Area to serve as a long-term reference, it is difficult to predict with certainty future moose and deer populations. However, at least until the forests of the Core Area at West Mountain WMA are influenced by natural disturbances, populations during the interim may be inferred from those currently found in other area of the northeast. In 2002, the estimated density of moose in northern New Hampshire where forests are mainly privately owned and actively managed was 2.5 moose/mi², compared to only 0.7-0.8 moose/mi² on the adjacent White Mountain region, which is largely comprised of the White Mountain National Forest, an area that has seen very little timber harvest over the previous 20 years (S. Williamson, pers. comm.) Similarly, in Vermont, Wildlife Management Unit (WMU) E, within which all the Kingdom Heritage Lands are located, has an estimated moose population of 2 moose/mi², while only 0.3 moose/mi² occur within WMU I, a unit largely occupied by the Green Mountain National Forest which has a very low percentage of young forests. These data indicate that moose populations in the Core Area may decline, at least initially, until natural disturbances influence the amount of available browse.

The estimated deer density of WMU E is 6-7 deer/mi², a density likely determined by the harsh winter climate and amount of functional winter shelter. Deer density is somewhat higher in WMU I, perhaps due to the milder winter climate and availability of highly nutritious agricultural crops in the Addison County portions of this unit. To

predict initial deer responses due to future habitat conditions in the Core, data from the Adirondack Park region of New York may be helpful. In this region, with a similar winter climate and low percentage of agricultural land, deer density has been estimated at 10 deer/mi² on the actively managed private land and 3-5 deer/mi² on the “Forever Wild” public land (Hodgson 1997).

Although active logging has not occurred on the “Forever Wild” lands for several decades, these forests have not reached an age where individual treefalls and other natural disturbances are commonplace. It is expected that deer densities on these lands will increase in the future as natural disturbances take effect, thereby increasing understory browse available for deer. A similar deer population response may occur in the West Mountain WMA Core Area where an initial decline is likely to be followed by an increase over time, especially as deer winter shelter improves. In addition, it is expected that an increase in the proportion of mature beech over time will enhance the availability of beechnuts and possibly improve the carrying capacity of the Core Area for deer.

The significance of the potential decline in moose and deer populations as a result of the Core Area will of course lessen with the increasing scale of the area evaluated. For example, since approximately 50% of West Mountain WMA is designated as Core Area, and if moose and deer densities in the Core eventually decline to one half of what is sustainable outside the Core, then the overall decline for the entire WMA would be 25%. In the context of the entire Kingdom Heritage Lands (132,000 acres) a 50% reduction on 10,000 acres (7.5% of the original ownership) would result in only a 4% overall decline.

Kilpatrick (2001) found 17 mammalian species in a variety of habitats on West Mountain WMA. The more abundant species (*e.g.*, red-backed voles, woodland jumping mice, meadow jumping mice, deer mice) occur in various age classes of forests, and, would likely be little affected by the establishment of a core. The rarer species were found in less common habitats such as wetlands and boulder fields, these special habitats would receive protection whether or not they were in a Core Area.

3) *Effect of the Core on Reptiles and Amphibians*

Andrews (2001) reported 17 species of reptiles and amphibians present at West Mountain WMA. Most of these species are closely associated with streams, ponds, vernal pools and other wetlands, and should find favorable habitat conditions in these habitat types and their designated buffers on the actively-managed portion of West Mountain WMA. Nonetheless, most will find the most ideal habitat conditions in the Core Area as average soil moisture and litter depth will be greater than in managed forests. The red back salamander, the only Vermont salamander that does not breed in standing or flowing water, is expected to benefit especially from the maturation of the extensive northern hardwood forests in the Core. Habitat conditions between all of the amphibian breeding sites will remain intact and permit free movement of these species. This is particularly important in repopulating any of the breeding sites should

they dry up in any given year. Road mortality should be nearly eliminated in the Core, and sedimentation rates in streams should be lower than managed areas (deMaynadier and Hunter 1995).

c. Effects of West Mountain WMA Management on Natural Communities

Many of the highly significant wetland natural communities on the Kingdom Heritage Lands have been impacted to some degree by previous land uses, and yet, many still maintain high ecological value. The explanation for this apparent contradiction is twofold. First, although the Kingdom Heritage Lands have seen heavy logging in the past 200 years, there has not been a great deal of direct alteration of wetlands, especially on the West Mountain portion of these lands. The direct alteration that has occurred has been less disruptive to wetlands than it might have been, as it includes mostly construction of roads across streams and wetlands and some logging of wetland buffers and spruce-fir swamps, rather than extensive filling or draining. Second, most of the wetland types that occur on the West Mountain WMA are quite robust and resilient, thereby not changing much in response to nearby alterations. Exceptions to this resiliency are the fen and bog wetland complexes at Ferdinand Bog and Dennis/Mud Pond – these communities are known to be very susceptible to changes in the quantity or quality of water flowing into them. Despite their resiliency, many of the wetland natural communities would be expected to change some over shorter and some over very long periods of time (possibly another 100 to 200 years) if there is continued alteration of vegetated buffers and wetland hydrology.

Because they have been the focus of timber cutting operations, past management of the WMA lands has had a much more serious effect on the ecosystem structure of the upland natural communities of the area. Many of the upland forests have been heavily cut over several times, with a resulting change in forest composition and the availability of organic matter and nutrients in the forest soils. In general, the natural communities found on the WMA will improve in quality as a result of public ownership and the new management approach; and, more specifically, most of the wetland, aquatic, and State significant natural communities will improve in quality from the management of the WMA. The wetland and aquatic communities will all become better buffered and will be protected from detrimental erosion and from uses that may potentially compromise the integrity of these communities, for example by disturbing fragile soils. All non-matrix State significant natural communities in the Active Management Area will be protected by appropriate buffers, and except for management activities needed to maintain the natural communities themselves, no active management will be conducted.

In the Active Management Area, natural communities will generally benefit from an approach to forest management that conserves the diversity of plants and animals native to the area. For some of the northern hardwood and red spruce hardwood natural communities, uneven-aged management will likely result in continuous, virtually unfragmented forest cover, development of more complex forest structure that includes several strata of trees and shrubs, more coarse woody material, a deeper litter layer, and a more stable soil and forest-floor microclimate than currently exists. Some of the lowland

spruce fir –forests will also be managed in a way that allows for more complex and natural forest structure to develop. Many of these areas will be allowed to develop multi-layered canopies, and in even-aged habitat management compartments, clear cuts will be relatively small, thus providing for less fragmentation and less disruption to the microclimate in the area around a cut.

Despite substantial ecological changes that have accompanied past logging, the two matrix natural communities that occur within the Core Area (northern hardwood forest and red spruce-northern hardwood forest) are now currently considered to be State significant, due to their size, landscape context, and potential to improve in condition as they develop. There are few examples of State significant matrix natural communities, especially those that occur in low- and mid-elevations, so these forests are particularly important. The forests will regain much of their ecological integrity within the next 100-200 years, as they begin functioning as mature forest ecosystems with old-growth characteristics prevalent across much of the landscape.

The future, mature, and ecologically intact matrix natural communities on the Core Area will provide habitat for known and potentially currently unknown species. Because of the physical complexity and size of the Core Area, the conservation of its natural communities also allows for greater genetic conservation. Gene flow among subpopulations of many types of organisms is more likely in a large intact landscape. This gene flow is a natural part of the evolutionary process and may be very important in enabling species to adapt in the face of rapid global climate change.

Thus, conservation of the natural communities in the Core has benefits that go beyond the expression of those natural communities as we see them today or over the next hundred years. Conservation of the matrix natural communities and their concomitant ecological processes at a landscape scale is beneficial to natural ecological functioning at population, genetic, and evolutionary levels as well.

In addition to the conservation of the two matrix natural communities, the Core conserves most of the State significant terrestrial, wetland, and aquatic natural communities, and substantial portions of reference quality stream ecosystems. These significant communities will have the highest level of protection and will gain all the benefits of an intact landscape.

An overarching reason for the establishment of the Core Area is to allow representative examples of matrix and patch communities to mature under the influence of primarily natural ecological processes. The Core Area is designed to allow these processes (natural disturbance, nutrient cycling, energy flow, succession, etc.) to operate within their natural range of variation. The expected result will be that all or most natural communities occurring in the Core Area will eventually develop into ecological benchmark examples of their type.

d. Projected Implications for Wildlife-Based Recreation Opportunities

Opportunities for diverse wildlife based recreational experiences will be enhanced as a result of having both an Active Management Area and an ecological Core Area. Hunters, in particular, will have the opportunity to hunt in a more remote setting that, due to limited access, will experience lower harvest rates of certain game species such as deer, moose, and black bear. Although deer and moose population densities in the Core Area may be somewhat lower than in the Active Management Area, reduced harvest rates in this area will likely result in game populations having a greater percentage of older, larger animals. Such conditions provide unique hunting opportunities, particularly for deer hunting. Throughout much of the State, deer hunter pressure limits the number of male deer entering the older age classes (3 years and older). There are some Vermont deer hunters who have advocated for the establishment of “quality deer management” programs, and the Core Area may likely provide a deer population with such characteristics.

On the other hand, in the actively managed portion of the WMA, the population densities of moose, deer, black bear, bobcat, fisher, coyote, red fox, and snowshoe hare will be higher than in the Core, and hunters and wildlife observers are likely to see more wildlife in a more accessible environment that will also include more users.

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C. FIRE, INSECT, AND DISEASE MANAGEMENT

Disturbances are a natural part of the ecological process of all ecosystems. Forest pests (insects and diseases), both native and exotic, effect changes in forest structure and species composition. When forests are managed for timber, aesthetic, recreation and wildlife values, managers often attempt to control impacts of pests that are causing unwanted or presumably unnatural changes to the system. Fire is another disturbance that is natural to the forests of the Northeastern Highlands. Fire management is a necessary aspect of public lands management to protect human safety and personal property and to uphold the goals and objectives of the public landholding. The other natural disturbances of Vermont's forests are wind, ice- and snow-storms, drought, and hurricane; these clearly cannot be managed *per se*.

In accordance with the complementary management goals of the Core and Active Management Areas, there will be different approaches to fire and pest management in the two areas. The essence of these different approaches is outlined here with the details to be developed during Plan implementation. While they differ, both approaches will protect the natural resources of the WMA in a manner appropriate to meeting the stated goals and objectives for the whole and its two subparts. In both areas, public safety and protection of personal property are foremost concerns of the Agency.

In general, the strategy for the Active Management Area will be to manage fires and pest infestations in accordance with the goals and objectives of offering high quality wildlife habitat and fish and wildlife-based recreation opportunities. The strategy for the Core Area will be in accordance with the goals and objectives of providing an area where natural ecological processes can function with minimal human interference. While camps remain within the WMA, protection of personal property and human safety will be given primacy above the ecological goals.

1. Fire Management

a. Past Fire Frequency and Causes

Fire is a natural disturbance that is likely to occur within the WMA. Historic evidence shows, however, that natural fires are rare and small in the West Mountain-Nulhegan Basin landscape. Most of the WMA is northern hardwood forest, which is highly resistant to burning. A lesser portion is conifer and mixed forest; in some parts of the country (*e.g.*, boreal Canada, the Rocky Mountain region) coniferous forests are very prone to burning and fires of various intensities are frequent in those landscapes. Although the lowland conifer forests of the Northeastern Highlands are in many respects similar to the boreal spruce-fir forests, the fire cycle of Vermont's coniferous forests appears to be very different from the fire cycle in the vast stretches of boreal forest across northern North America, and the climatic conditions are so different here than from the Rocky Mountain region, that the pattern and role of fire in the two ecosystems is at opposite ends of the spectrum.

Historically, large fires in the Northeast Kingdom occurred as a result of human activities on the land. Most of them occurred after cutting operations left huge amounts of logging slash on the ground and steam locomotives were throwing sparks from their fireboxes and the rails (Richburg and Patterson 2000, Pyne 1982).

The occurrence rate of recent fires, however, is similar to or lower than in other parts of the State. Historical evidence from early land surveys enforces the conclusion that large, naturally ignited fires have been rare in the West Mountain-Nulhegan Basin landscape over the past 250 years. The fire return time calculated from fires noted in the early surveys of 25 Northeast Kingdom towns is 1,333 years and the only large burnt patch noted was ½ mile in extent (Cogbill 2001).

To put the naturally ignited fires in perspective it is useful to look at available statewide statistics, as analyzed by Richburg and Patterson (2000). In Vermont during a similar time period (1913 – 1998: 44 years of data), there was an average of only 6 lightning-caused fires per year (0.1 fire per 100,000 acres), and these fires burned an average of only 9 acres per year across the entire State. Human ignitions, even during the early part of the 20th century when the reported number of fires were low (small fires were generally under-reported in the early years), were at least 5-to-20 times greater in number than lightning fires. Lightning fires have presumably always been rare in the Northeast, where lightning storms are usually accompanied by heavy rain and prolonged droughts are less common than in other areas of the country, so it seems reasonable to assume that

the majority of fires have always been caused by humans and their activities (from arson to machinery use to escapes of controlled fires).

For example, in Essex County, from 1990 to 2000, there were four lightning-caused fires and three of the four were under one acre in size, while there were 20 human-caused fires.

b. Fire Management Plan

A West Mountain WMA draft fire management plan has been developed, and will be refined in collaboration with local wardens, volunteer fire departments, area residents, ecologists, and controlled-burn specialists.

The plan addresses topics including:

- Differences in fire management between the Core Area, where the goal is to allow natural ecological processes to function without interference, unless there is threat to human safety or property, and the Active Management Area;
- Details on responsibilities of various State agencies and local organizations for fire monitoring and control plans;
- Notification procedure and evacuation plan for people using the WMA when a fire occurs;
- Analysis of existing natural and artificial firebreaks. Existing roads that will, under many fire conditions, function as effective firebreaks are in place throughout the WMA;
- Training for and application of fire behavior models. These are detailed, predictive models used by Federal agencies for developing plans and strategies for managing any given fire. They take in to account fuel conditions, fire location in relation to topography, present weather and incoming weather;
- Financial responsibilities for fire management, control, and suppression;
- Potential needs for acquisition of specialized fire management equipment; and

2. Insect and Disease Management

The Department of Forests, Parks and Recreation, Forestry Division, Protection section has conducted forest damage detection surveys on the lands that now make up the WMA annually since 1965. Annual, statewide forest health sampling includes both aerial and ground surveys. The Forestry Division plans to continue to survey this entire area to monitor both abiotic and biotic caused damage.

If destructive sampling is necessary in the WMA, it will first be conducted in the Active Management Area. If further, more widespread destructive sampling is required within the Core to monitor pest population levels, procedures will require prior approval from the Agency of Natural Resources.

In the event of a **native** insect or disease epidemic, neither the use of chemical or biological biocides nor the release of parasites or predators will be used in the Core Area. Natural ecological processes and cycles will be allowed to run their course within the Core Area.

In the Active Management Area, integrated pest management techniques will be utilized to protect forest resources. Integrated pest management is designed to maintain insect and disease pests at tolerable levels by the planned use of a variety of ecologically and economically efficient and socially acceptable strategies that include preventive, suppressive, and regulatory tactics (Coulson and Witter 1984). The Agency will give biological control methods priority over chemical biocides.

Studies of forest pest epidemics have shown that populations usually arise regionally. Thus, there is minimal risk for native pest outbreaks to originate and spread out of a small part of the regional landscape, like the Core or even the entire WMA. Furthermore, most native pest outbreaks do not affect large areas. For those that do, like spruce budworm (*Choristoneura fumiferana*), there is a body of scientific opinion suggesting that the huge scale of these outbreaks may be related to widespread, even-aged silvicultural practices intended to provide nearly equal annual harvests, rather than the natural population cycles of the pest (Coulson and Witter 1984).

The general exotic species management strategy throughout the WMA applies to exotic insect and disease pests also. Therefore, exotic forest pest species that are found within either the Active Management Area or the Core Area will be controlled using methods determined appropriate by the Agency. Among the more likely exotic insect pests that could occur are pine shoot beetle (*Tomicus piniperda*), which is now known to occur in Essex County, and brown spruce long-horned beetle (*Tetropium fuscum*), which was recently discovered aggressively attacking and causing mortality in native red spruce stands in Nova Scotia. Many other exotic pests (*i.e.*, Asian long-horned beetle (*Anoplophora glabripennis*)) are spreading world-wide. In the event that an exotic pest is detected in the WMA, quick and decisive action will be taken to prevent its spread to other areas of Vermont or to neighboring Canada. Federal or State regulatory procedures will be followed.

D. CLIMATE CHANGE ADAPTATION

The effects of climate change are an ongoing management issue at West Mountain WMA.

Historical data have shown changes across Vermont over the last 50 years, including:

- Summer temperatures increased 0.4 degrees F per decade
- Winter temperature increased 0.9 degrees F per decade
- Spring thaw arrives 2.3 days earlier per decade

- Precipitation increased 15-20%, with 67% from “heavy precipitation” events

1. Anticipated Climate Change Effects

Scientific studies estimate a variety of potential changes in the future, including:

- Increased temperatures, especially in winter
- Increased precipitation, especially rain in winter
- Increased extreme weather events, including floods, wind storms, and fires
- Longer growing seasons, shorter winters
- Changing biological interactions

These potential changes are expected to have a range of effects on the forested ecosystems of West Mountain WMA, as with forests across the state. Table 11 lists examples of anticipated effects and timeframes of many key climate factors on upland forests of Vermont.

Table 11: Expected Climate Change Effects and Timeframes⁵³

Key Climate Change Factors	Expected Effects	Timeframe
Warming temperatures	Compositional changes associated with changes in thermally suitable habitat (loss of cold-adapted species and increase in warm-adapted species)	Long-term, but localized effects could occur on a shorter timescale
	Increase in overwinter survival of pests, such as balsam and hemlock woolly adelgid	Immediate
	Increased physiological stress, resulting in increased susceptibility to pests and disease, decreased productivity and increased tree mortality	Immediate
	Increased evapotranspiration, resulting in a decrease in soil moisture; moisture limitation/stress negatively impacts productivity and survival in many species	Immediate
	Increased decomposition rate of organic material may enrich soils and make them more suitable for competitors	Long-term, but localized effects could occur on a shorter timescale
	Decrease in winter snow pack, leading to change in deer and moose browsing patterns, which affects regeneration	Immediate
	Lengthening of growing season resulting in changes in species competitiveness, especially favoring non-native invasive plants	Immediate

⁵³ Source: TetraTech. 2013. Climate change adaptation framework. Prepared for Vermont Agency of Natural Resources.

Increase in extreme storm events	Increased physical damage and disturbance, leading to gap formation, which could facilitate the spread of invasive plants	Immediate
Phenology (timing)	Longer growing season	Immediate
	Early spring thaws/late frosts can damage buds, blossoms & roots, which affects regeneration	Immediate
	Change in freeze/thaw cycles could disrupt regular periodicity of cone cycles	Immediate
	Asynchronous changes in phenology may negatively impact some migratory species and pollinators	Immediate
Increase in fire risk	Loss of fire intolerant species and increase in fire tolerant species, such as red and pitch pines	Long-term, but localized effects could occur on a shorter timescale
	Earlier and warmer springs and smaller snow packs, and hotter drier summers conducive to increased fire risk	Immediate
Increase in number of short-term droughts	Declines in forest productivity and tree survival associated with water limitation	Long-term

2. Land Management Adaptation Strategies

Adaptation to these effects will take a variety of forms, many of which have long been a part of the excellent land management ANR strives to practice. Some of these primary goals and strategies are listed below. Note that some, but not all, strategies are applicable in all parts of the WMA. For instance, while woody material will be retained throughout the WMA, Active vegetation management, is largely limited to the Active Management Area, as discussed in Section VI.B.

A) Sustain fundamental ecological functions: protect soil quality, nutrient cycling, and hydrology.

- Enhancing nutrient cycling and soil protection by retaining woody material on the forest floor.
- Matching harvesting equipment to the site for soil protection.
- Minimizing the number of skid roads and trails.
- Maintaining roads in good condition and following all AMP's.
- Replacing and enlarging inadequate culverts and stream crossing structures.

B) Reduce impact of existing biological stressors: increase pest and pathogen resistance, limit herbivory, and manage invasive species.

- Eradication and/or management of all non-native invasive plants.
- Avoiding negative impacts of overbrowsing through deer and moose population management.
- Management of Beech Mast Production Areas to promote resistant trees.

C) *Moderate impacts of severe disturbances, such as fire and wind disturbance*

- Managing for a multi-age, structurally diverse forest.

D) *Maintain or create refugia and increase ecosystem redundancy.*

- Maintaining the Core Area and rare and sensitive natural communities as potential refugia.
- Maintaining lowland spruce-fir forests as potential refugia.
- Maintaining and developing biological “legacies,” such as very old trees.

E) *Maintain, enhance species and structural diversity and facilitate community adjustments through species transition.*

- Maintaining and developing a forest with a diversity of species and age classes.
- Retention of biological legacies from a variety of tree species.

F) *Promote landscape connectivity.*

- Maintain a landscape-scale focus, by planning in conjunction with the other Kingdom Heritage Lands owners, and being mindful of management in the surrounding region.
- Reduce landscape fragmentation by closing designated roads in Core Area.

Taken together, these strategies will help the full range of native fish, wildlife, and plant species; natural communities; and ecological processes face a changing climate. For example, maintaining lowland spruce-fir forests, which may decline in a warming climate, and landscape connectivity should allow the rare boreal species of the region (e.g., spruce grouse, American marten) to persist on the WMA and move north across the landscape as needed.

3. Infrastructure and Public Use Adaptation Strategies

In addition to the far-reaching effects on ecological systems described above, climate change may also affect the infrastructure and public uses of West Mountain WMA.

Potential effects could include:

- Floods damaging roads, trails, and camp structures.
- Fires endangering WMA users, camp properties, and neighboring properties.
- Increased precipitation leading to more temporary/seasonal road closures and increased road maintenance.
- Shorter winters reducing snowmobile use seasons.
- Windstorms increasing maintenance needs to keep roads clear of trees.

Such effects will be dealt with on a case-by-case basis. It is anticipated that the systems in-place to manage many of these uses will readily handle these issues (for example, annual meetings with VAST which set appropriate snowmobile locations and seasons). Others will require more comprehensive considerations, for example, increased precipitation and flooding—maintaining the WMA as extensively forested, with significant riparian buffers and intact wetlands is a key strategy to reduce and mitigate flooding in the WMA and downstream to the Connecticut River. In addition, however, ANR has and will continue to replace undersized culverts (which can fail in flood events) with larger and better positioned structures, and—long term—may need to consider relocating some roads away from streams.

Future assessments of landscape and species vulnerability to climate change effects may be conducted to help management decision-making by identifying locations vulnerable to weather extremes and species vulnerable based on factors such as temperature extremes and habitat conditions.

E. MANAGEMENT OF ROADS

1. Background

Champion International and its predecessors developed a comprehensive road network on these lands when the use of trucks became common for the transportation of forest products. Even prior to the use of trucks for hauling logs to market, many sled trails and rail beds were developed to move logs and pulp to the main water courses for movement downstream or to connecting railroads. In addition, saw mills were established, in some cases on site, with a corresponding network of roads and skid trails to move material to the mill site. As would be expected for ease of construction and to minimize grades, much of the transportation network was built to follow the natural drainage patterns. Thus, many roads are very close to rivers and streams increasing the potential for impacts on water quality and riparian habitat.

The impacts of these roads and their locations on water quality were largely ignored until the last few decades. Over the last 20-30 years efforts have been made to minimize the impact of roads and ditches on water quality. Improved bridge crossings with better abutments and stabilized banks have reduced the amount of sediment entering streams. Increased frequency and sizing of culverts has helped to reduce culvert failure and the resulting siltation. In addition, more attention has been given to maintaining and stabilizing ditches, also critical to reducing siltation. Crushed gravel has replaced native material road surfaces reducing the amount of erosion by maintaining a more stable road surface and eliminating rutting from heavy traffic. These improvements have greatly reduced the impact of roads on water quality within West Mountain WMA. Likewise as sections of roads are relocated, or new forest management roads built, they are now located further away from rivers, streams, lakes, and ponds to reduce their impacts on sensitive and high value riparian and aquatic wildlife habitats.

Activities aimed at reducing the unintended impacts of the road network on aquatic and terrestrial habitats will continue.

2. Adequacy of the Road Network

a. Uses of the Road Network

The road network on the West Mountain WMA serves a variety of purposes, including:

- 1) *Wildlife Management*: A significant use of the road network will be for active wildlife management, which will include but not be limited to timber harvesting. Other wildlife management uses include pre-commercial thinning operations, bush

- hogging, inventory work, and other activities aimed at improving wildlife habitat conditions.
- 2) *Camp Access*: Leaseholders have been granted the right to continue their camp leases for extended periods of time. Given that the term of some of these leases extends for the life of the current lessees plus 20 years it is expected that some camps will remain for as long as 80 years or more. Although some camp leases will be relinquished before the full term of the lease, roads will be needed to ensure access to the camps for as long as they remain. Exceptions to this general situation are a number of camps in remote areas that do not currently have vehicular access. There are no intentions of building new roads to these locations.
 - 3) *Motor Vehicle Access by the General Public*: The general public uses the road system for a variety of purposes from vehicle access for hunting and fishing to pleasure driving. Public vehicular use is expected to increase as recreational activities increase. For example, since the inception of the October moose season in Vermont, traffic in this area has increased significantly during this period. As in the past, public vehicular use is allowed on most but not all roads on the Wildlife Management Area. Some roads are inappropriate for public vehicular use because of wetness, potential for erosion, or other reasons.
 - 4) *Recreation Corridors*: A number of roads each winter are used as part of the Statewide Snowmobile Trail System. While the location of trails may vary from year to year depending on management activities, etc, this use is guaranteed. In addition, a number of roads are open to horseback riding as part of the approved equestrian corridors, and all roads open to vehicular traffic are also open to biking.
 - 5) *Hiking Trails and Other Intensive Uses*: Hiking trails and other intensive, concentrated activities (such as dogsledding) are allowed uses on these lands provided the requirements for corridor designation and management are met (Section VI.F.3).⁵⁴ Many of these uses will occur on the current road system. Further, even for any off-road corridors that may be established, vehicular access will be needed to reach approved trailheads located within the Wildlife Management Area.
 - 6) *Use by the neighboring timberlands owners*: ANR has legal agreements with Plum Creek and the timberland owner to the south of West Mountain WMA (LIADSA, LLC), allowing use of West Mountain WMA's roads by those entities for a fee.
 - 7) *Use by VELCO*: VELCO owns and maintains a power line which bisects West Mountain WMA⁵⁵. This line requires periodic maintenance which necessitates the use of roads for access. There may also be situations where a line failure or emergency

⁵⁴ As discussed in Section VI.F.3., bicycling and horseback riding are allowed on all gravel roads that are open to public vehicular traffic outside the Core Area, except for spur roads (e.g., Madison Brook Road) leading directly to the Private Timberlands portion of the Kingdom Heritage Lands.

⁵⁵ The VELCO line is not actually on the West Mountain WMA as VELCO owns the land under the transmission line.

would require access during periods of time when access roads are closed. If this occurs during mud season, significant damage could occur to soft roadbeds. However, VELCO has indicated that they would repair any such damage. Under these same circumstances it could also become necessary to plow a road which is being used by VAST as a snowmobile trail. Hopefully such a case would be of short duration and impacts to snowmobiling would be mitigated by subsequent snowfalls.

b. Analysis of the Adequacy of the Road Network to Serve the Intended Uses

The existing road network, including a breakdown of roads into three classes based on use and condition (classes A through C⁵⁶), is described in section IV.D.1. Figures 4 and 12 show the location of these roads.

- 1) *Access to the West Mountain WMA:* Access to the West Mountain WMA is provided by two Class A roads from Route 105 in the north, two Class A roads from route 102 in the east, and one Class A road from public roads in the town of Granby in the southwest. Because East and Seneca Mountains lie to the west no access exists from this direction on a Class A road. Given uses and the intended management of the West Mountain WMA, the existing access points to the Wildlife Management Area are adequate and no new access points are needed.
- 2) *Internal Road Network:* Internal access to the Wildlife Management Area is provided by 73 miles of drivable roads. Of these, about half are Class A and half are Class B. In addition, there are less than 5 miles of Class C roads, which are not open to the public, but may be used for winter logging operations. The major Class A roads provide an adequate network for access on high standard roads to all parts of the Wildlife Management Area. These major roads include: the Paul Stream Road, the South America Pond Road, the VELCO Line Access Road, the Notch Pond Road, the West Mountain Pond Road, and the Dennis Pond Road. The overall road density is about 2 miles of road per square mile of land. In terms of the location of major roads and the distribution of lesser roads, the road network is adequate for the management purposes and the uses outlined earlier, therefore no new road construction is anticipated.

c. Improvements in Road Conditions

Despite the adequacy of the present road network to meet the current and projected demands, some improvements and modifications will be needed. All such improvements and modifications must be consistent with the provisions of the State Lands Easement.

Potential improvements include the creation of safe parking areas at trail heads associated with new recreational corridors that may be approved. Such parking areas should be designed not only to provide a safe parking site, but also to maintain the rugged, undeveloped character of the area.

⁵⁶ Class A roads are major gravel roads, Class B are minor gravel roads, and Class C roads are unsurfaced winter logging roads.

Parking areas may also be needed at informal recreation sites which receive heavy use. To avoid safety problems and congestion, temporary parking areas may also be needed for snowmobile trailer parking where roads plowed in the winter intersect snowmobile trails. Congestion at such sites has already proved to be a problem in some areas on the Kingdom Heritage Lands.

In addition, if the level of vehicular use increases certain sections of road may require increased clearing of vegetation on corners and at intersections to maintain safe conditions.

Other improvements to road conditions (*e.g.*, finer gravel to accommodate passenger car use, improved decking on bridges, and improved armoring at certain culverts) may also be necessary; these are described more fully in Section VI.E.7..

Many members of the public have spoken out at public meetings and in written comments objecting to the installation of directional signs on these lands. However some type of directional information is needed to allow people to find recreational features and to prevent uses from occurring where they are not appropriate. To fill this need the Agency has and will continue to install informational kiosks at main entry points to these lands. Proposals from corridor managers will be required to identify the signs necessary for their uses and address how to make sure that signs for these uses have been limited to be consistent with the minimalist policy on signs articulated elsewhere herein (see Section VI.F.).

3. Road Closures to Enhance the Ecological Integrity of the Core Area

The goals and objectives for the Wildlife Management Area include the creation of an ecological Core Area where natural processes are allowed to proceed with minimal human interference (see Section VI.A.3. for information on the goals, objectives, location, and management of this portion of the Wildlife Management Area).

Roads can disrupt natural processes in many ways, including by altering drainage patterns, increasing erosion and sedimentation, disrupting wildlife travel corridors, and providing avenues for the introduction of non-native invasive species. Therefore, to create an effective Core Area, consistent with the State Lands Easement, some roads will be closed to motor vehicles and restored to more natural conditions.

This vision was part of the original conservation design for the Kingdom Heritage Lands that led to the complementary uses seen across the landscape today, and was a central part of the original West Mountain WMA public planning process. The Core Area was chosen carefully as a small portion of a large area—it makes up less than 10% of the total 132,000 acres, and the roads within the Core Area are less than 10% of the total road mileage across the Kingdom Heritage Lands.

Rather than closing all roads immediately, roads will be phased out over time. A few of these road closures will occur in the near future, while others will be closed as the camp leases expire. As a result, some roads intended for closure could be in place for 80 years or more because camp owners can continue their leases for the life of the current lessee plus 20 years (or fixed terms pursuant to Act 215 of the 2006 legislature).

This management plan discusses both the original road access plan from the 2002 management planning process, as well as a new road access plan intended to address public comments during the 2013 scoping process. Both attempt to accomplish the original vision for the WMA and Core Area as well as the large amount and variety of public input on these issues.

a. Original Road Access Plan

The original (2002) road access plan lays out specific strategies for vehicular access within the West Mountain WMA Core Area (Figure 21).

This representation contains minor updates from the original plan to reflect mapping and classification errors in that document, a new label to clarify the timeline of some closures (“contingent” closures).

1) *Open roads:*

All roads outside of the Core Area remain open to motor vehicle traffic (including the major access roads—Paul Stream Road, South America Pond Road, and Notch Pond Road). This totals 35.25 miles, including:

- Paul Stream Road
- South America Pond Road
- Notch Pond Road
- Paul Stream Pond Road
- West Mountain Pond Road, from the Bullthroat Bridge site to the Core Area
- West Mountain Pond Road, from the Brown’s Mills Bridge to the Core Area
- Unknown Pond Road
- Madison Brook Road, to the boundary of the Private Timberlands
- Beaver Pond Road
- Stevens Brook Road
- Wenlock West Road
- Wheeler Pond Road, to the Wheeler Pond outlet stream

2) *Contingent closures:*⁵⁷

These roads serve existing leased camps. They were planned to be closed once they are no longer required to access the camps. None of these roads have been closed yet. In most cases, they will still be required for camp access for multiple decades, and, in some cases, it could be well over 50 years. Importantly, however, some of these roads

⁵⁷ This classification was called “Long Term” in the original Management Plan, but has been changed to clarify that these closures occur based on camp access needs, rather than a certain timeframe.

could have closed within the last ten years (for example, the West Mountain Pond Road inside the Core Area) if all original plans were implemented.

- Dennis Pond West Side Road (first 1.25 miles)
- Dennis Pond East Side Road⁵⁸
- Wheeler Pond Road⁵⁹
- Little Wheeler Pond Road
- West Mountain Pond Road within the Core Area.⁶⁰

3) *Short Term closures:*

Roads classified as Short Term are dead-end roads in the Core that do not serve camp access. The original plan calls for all to be closed within the first 10 year planning interval, including:

- The dead-end roads extending north and south off of West Mountain Pond Road
- Ferdinand Bog South Road to the outlet
- Ferdinand Bog North Road
- Esker North Road
- Esker South Road
- Telephone Brook Road
- Dennis Pond West Side Road (last 0.75 mi)
- Wheeler Stream Road

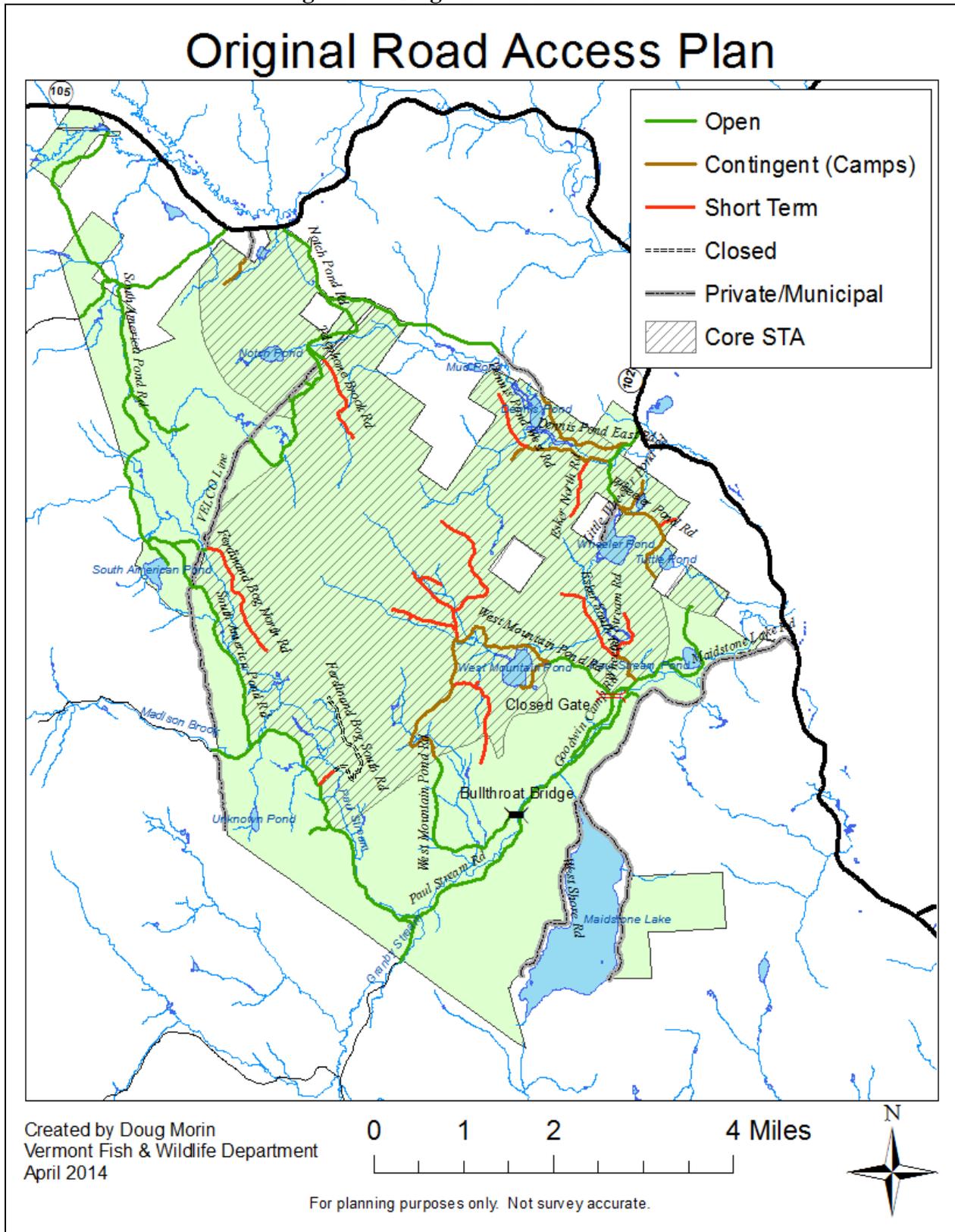
Overall, the original road access plan designates 35.25 miles for Open status, including all major travel corridors; 9 miles for Contingent closure, awaiting camp lease expiration; and 11 miles of Short Term closures. In addition, 15.5 miles of the adjoining roads are under private or municipal management.

⁵⁸ This road was originally designated for closure once no longer required for camp access, as specified in the text of the 2002 plan. An error in the original mapping, however, show this as an Open road. This error has been fixed to reflect the intent of the original plan.

⁵⁹ This road was originally designated for Short Term closure. Since the original planning process, however, ANR has learned this road is used for access to the camps on the southern side of Wheeler Pond. In response to this new information, this road has been reclassified, for Contingent closure.

⁶⁰ Camp leaseholders at the southwestern tip of West Mountain Pond Road drive around the pond to access their camps, because Paul Stream has no bridge at the “Bullthroat” site. In the original plan, the road around the pond could be closed as soon as the bridge was built. The bridge, however, has not been built.

Figure 21: Original Road Access Plan



b. Updates since 2002

1) *Implemented Road Closures*

Even though the original plan designated 11 miles of road for Short Term closure, only the Ferdinand Bog South Road has been closed and restored (1.4 miles) since 2002. In addition, at Ferdinand Bog, the previous vehicular bridge over the outlet was replaced with a foot bridge to facilitate pedestrian access across Paul Stream.

2) *2013 Road Condition and Impact Assessment*

In preparation for the 2014 Plan update, ANR Ecologists and Biologists evaluated the roads at West Mountain WMA and concluded:

“...all of the roads, to varying degrees, either show direct evidence of negative impacts, or have the potential to cause negative impacts...Without action, some ecological conditions of the roads will improve over time. In particular, canopy cover should continue to close. However, the erosion and hydrologic changes will likely continue to worsen. If the Department continues to keep these roads open to vehicle travel, the roads should probably be improved and actively managed to meet AMP standards and other best management practices. While ecologically appropriate, these steps seem at odds with the intent of restoring natural processes and ‘minimal management of the system by humans’ [a requirement of the State Lands Easement].”

The roads originally intended for Short Term closure were specifically assessed for prioritization, and found to demonstrate a range of negative impacts, including:

Habitat Fragmentation: The dead-end roads north and south off of West Mountain Pond Road present potential disturbance and barrier impacts occurring in the interior of the Core Area.

Invasive Species Introduction: The dead-end roads north off of West Mountain Pond Road present ongoing challenges to the ecological integrity of the Core Area from the introduction of nonnative invasive plants.

Water quality degradation: The dead-end road south off of West Mountain Pond Road, Telephone Brook Road, and Dennis Pond West Road present negative water quality impacts from erosion and sedimentation.

Natural Community Alterations: The Ferdinand Bog North Road and Dennis Pond West Roads present negative impacts to very high-quality wetland natural communities, due to hydrological alterations.

Impaired Accessibility: The dead-end road south off of West Mountain Pond Road, and the eastern-most dead-end road north off of West Mountain Pond Road present public access barriers due to failed water crossings.

Maintenance Problems: The two western-most dead-end roads north off of West Mountain Pond Road present high risks for failure – and resulting environmental impacts – due to steep slopes and poor drainage.

Overall, the unclosed roads at West Mountain WMA present ongoing ecological, access, and maintenance problems. Neglect will not be an effective strategy for managing or closing these roads; they must be intentionally closed and restored or receive significant maintenance in the near future.

3) *2014 Plan update public process*

Meanwhile, road closures at West Mountain WMA generated the most comments during the plan update public process. Stakeholder group meetings, public meetings, and written comments demonstrated that different segments of the public remain both strongly opposed to and strongly in favor of the planned road closures.

Those opposed to road closures cited reduced access for hunting, fishing, recreational driving, moose viewing, and other public uses, as well as reduced management and emergency access. The increasing loss of access to roads and land both statewide and locally was a theme in these comments. Those in favor of road closures emphasized the ecological benefits of the original plan, the desire for remote recreational and hunting experiences, and ANR's commitment to carry out the plan which resulted from the original public process.

4) *Preparation of a new road access plan*

While ANR and the Partners believe the original road access plan is still a valid way to balance the ecological and social effects of roads in the Core Area, the Agency's inability to implement the original road access plan during its first 10 years, and the continued high level of public concern about the ease of access statewide and in this area, justify a new set of strategies that fulfill the same vision and goals for the Core Area.

In this way, ANR and the Partners prepared a new road access plan with a carefully designed set of strategies to address both concerns expressed in public comments and evolving natural resource issues, while being consistent with the purposes, vision, and goals for West Mountain WMA as articulated by the Vermont Legislature, State Lands Easement, and original Management Plan.

Importantly, while the new plan alters the timing of some select road closures in the West Mountain WMA Core Area, it does so only after significant scientific investigation and prioritization. As a result, **it is the interpretation of ANR and the Partners that strategies extending road closure deadlines further or reclassifying roads from planned closure to "Open" status would be inconsistent with the original purposes, vision, and goals for West Mountain WMA.**

c. Principles of Road Access Plans

The following principles are the foundations for both the original and new road access plans:

1. The primary road network through the WMA (including, Paul Stream Road, South America Pond Road, and Notch Pond Road) will be open and maintained.
2. Access to leased camps will be maintained until leases expire.
3. No VAST trail will be made unusable due to a road closure without being relocated to a suitable alternative.
4. All parts of the WMA will remain accessible within two miles of a road.
5. All roads in the Core Area will be closed and restored to more natural conditions over time.⁶¹
6. In the Core Area, roads creating the greatest negative ecological impacts will be closed within this 10 year planning period.

d. New Strategies to Increase Access

The following strategies are significant new steps to provide increased pedestrian and vehicle access on both West Mountain WMA and the surrounding lands.

1) Increasing Access at West Mountain WMA:

- i) The single currently gated road (Goodwin Camp Road) will be opened, adding about 1 mile of public vehicular access.
- ii) A bridge will be constructed at the former bridge location downstream from the Walker Dam site on Paul Stream (the “Bullthroat Bridge”), to provide increased access on the north side of Paul Stream for existing camp leaseholders, public access, and active management activities.
- iii) Footpaths will be maintained on some or all closed roads to increase pedestrian access into the Core Area.

2) Increasing Access on surrounding lands:

- i) ANR and Plum Creek have identified 15 miles of gated roads across the Private Timberlands that will be made available for public vehicular access as Secondary Corridors. Opening these roads will increase the total road mileage available for public vehicular use on the Private Timberlands to 85 miles (Figure 22).

Much of this mileage is presently suitable for public vehicular use, and will be made available in 2014. Other sections will require upgrades before they are travelable (for example, road surface material and new gates to protect winter roads). For this reason, each road will be made available as is appropriate given its specific circumstances.

⁶¹ Except a stretch of Wheeler Pond Road, the beginning of which serves as access to private inholdings northwest of the pond.

As upgrades make new roads suitable for public vehicular access, they will be added to the Road Crossing and Maintenance Agreement between ANR and Plum Creek at their Annual Meeting. In addition, these roads, like all roads on the Private Timberlands, will remain available based on the current conditions of natural resources, infrastructure, public safety, and maintenance funding.

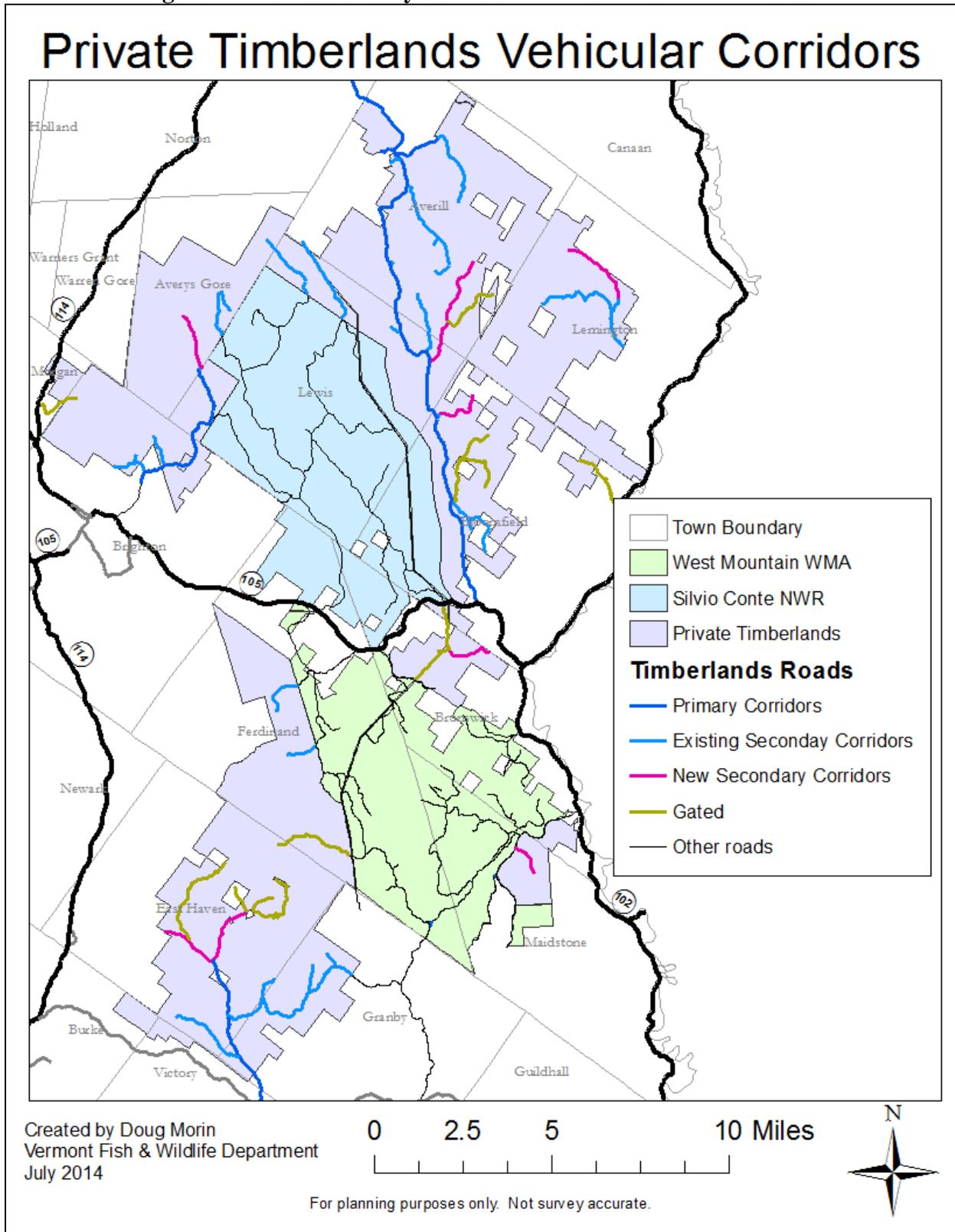
Adding these roads for public vehicular use will add an additional financial burden for ANR. Newly opened roads will be subject to cost sharing between ANR and Plum Creek under the Road Crossing and Maintenance Agreement, as part of the Public Access Easement. While specific road maintenance expenses are difficult to generalize because each road is unique and unpredictable events (such as storms) can cause very expensive repercussions, comparable roads on West Mountain WMA have cost ANR as much as \$1,000-\$1,500 per road mile per year over the last decade.

See the Private Timberlands Public Access Plan for additional details.

- ii) ANR will continue discussions with the Town of Granby and the adjacent landowner to the south of West Mountain WMA, to create an agreement to ensure public access across the Granby Stream Road and Stony Brook Road, important connections between the WMA, the Private Timberlands, and public roads to the south.

These measures preserve and enhance vehicle access on the WMA, while also increasing pedestrian access on the WMA and vehicle access in the surrounding region.

Figure 22: New Secondary Corridors on the Private Timberlands



e. New Strategies to Maintain and Extend Access in the Core Area

In addition to the strategies above, this plan offers a slightly altered road access timeline within West Mountain WMA, in order to provide a balanced approach to road closures that responds to the spectrum of concerns and perspectives voiced in the scoping process, and to fulfill the ecological goals of the Core Area without unduly impacting public access. This new set of strategies temporarily extends some vehicular access in the West Mountain WMA Core Area, but maintains the commitment to close and restore to more natural conditions all roads in the Core Area over time (Figure 23).

1) *Open roads:*

As in the original plan, all roads outside of the Core Area remain open to motor vehicle traffic (including the major access roads—Paul Stream Road, South America Pond Road, and Notch Pond Road). This totals 35.25 miles, including:

- Paul Stream Road
- South America Pond Road
- Notch Pond Road
- Paul Stream Pond Road
- West Mountain Pond Road, from the Bullthroat Bridge site to the Core Area
- West Mountain Pond Road, from the Brown's Mills Bridge to the Core Area
- Unknown Pond Road
- Madison Brook Road, to the boundary of the Private Timberlands
- Beaver Pond Road
- Stevens Brook Road
- Wenlock West Road
- Wheeler Pond Road, to the Wheeler Pond outlet stream

2) *Contingent closures:*

In this alternative, roads that serve leased camp access or current VAST trails are designated as Contingent. They will be closed once they are no longer required to access the camps or for VAST corridors. In most cases, this is likely to take multiple decades, and, in some cases, it could be well over 50 years. Others, however, could close within the next ten years (e.g., if VAST corridors are relocated).

- Dennis Pond West Side Road (entire 2 miles)
- Dennis Pond East Side Road
- Wheeler Pond Road⁶²
- Little Wheeler Pond Road⁶³
- Wheeler Stream Road

3) *Long Term Closures*

⁶² This road was originally designated for Short Term closure. Since the original planning process, however, ANR has learned this road is used for access to the camps on the southern side of Wheeler Pond. In response to this new information, this road has been reclassified, for Contingent closure.

⁶³ These roads may also be maintained for management purposes during the transitional period needed for restoration of the deer wintering area.

Under the original plan, numerous roads could be closed within this 10 year planning cycle (because they are Short Term or – in the case of West Mountain Pond – will become unnecessary with the construction of the Bullthroat Bridge). Such roads designated as Long Term in this alternative, however, will remain temporarily open during this planning interval (until at least 2024). Their final closure will be planned during the next planning process.

- West Mountain Pond Road within the Core Area.⁶⁴ (2.75 miles – without 0.25 mile segment discussed below and camp access areas by the pond)⁶⁵
- Telephone Brook Road, up to the first blue-lined stream crossing (0.75 miles).
- Esker South Road (0.36 mi), up to the first blue-lined stream crossing.
- Ferdinand Bog South Road to the outlet (0.25 miles)

4) *Short Term closures:*

Roads classified as Short Term are dead-end roads in the Core that do not serve camp access or snowmobile corridors and have not been reclassified to Long Term. These include the roads identified as having the most at-risk infrastructure (steep roads with insufficient drainage, underside culverts), the greatest barriers to public access presently (due to washouts) and the greatest negative ecological impacts (including altered water flows and habitat fragmentation). All will be closed within this 10 year planning interval (by 2024), including:

- The dead-end roads extending north and south off of West Mountain Pond Road
- Ferdinand Bog North Road
- Esker North Road
- Esker South Road (the last 0.71 miles after blue lined stream)
- Telephone Brook Road (the last 0.3 miles after blue lined stream)
- West Mountain Pond Road, for one-quarter mile, between the pond’s two major tributaries (at its north-western most extent).
 - Maintaining this road as a loop through the Core Area, once the Bullthroat Bridge is in place poses an unacceptable risk of worsening ecological impacts due to increased use. Closing this small section once the bridge is constructed will enhance access to the Core Area compared to current conditions, by providing two long, dead-end roads, while preventing through traffic.

Overall, this plan designates 35.25 miles for Open status, including all major travel corridors; 7.1 miles for Contingent closure, awaiting camp lease expiration and VAST trail relocation; 4.5 miles of Long Term closures, awaiting the next planning process; and 8.5 miles of Short Term closures within the next ten years.

These strategies create an extended period of public vehicular access to important segments of the Core Area, by shifting 20% of the eventual closures into the new Long

⁶⁴ Currently, camp leaseholders at the southern tip of West Mountain Pond Road drive around the entire road to access their camps, because Paul Stream has no bridge at the “Bullthroat” site. As soon as this bridge is built, this section of road will not be necessary for camp access, and will be closed.

⁶⁵ Vehicular access to West Mountain Pond will be possible as long as the existing camps require access, but after that point vehicular access will stop just before the pond to provide walk-in access to the pond.

Term classification. In addition, they target Short Term closures on the roads causing the most negative impacts for ecosystems, public access, and maintenance.

4. Impacts of Road Closures on Access

While these road closures will affect the ease of vehicular access to certain areas, the overall effect on access to the West Mountain WMA is not as great as one might expect. The WMA has numerous roads for a remote area. Drivable roads total nearly 73 miles on West Mountain WMA. In addition, only the summit of West Mountain is relatively remote from vehicular access, so road closures don't create new remote areas.

Currently 99.8% of the West Mountain WMA is within 1 mile of a drivable road. After roads are closed in the short term (within the initial 10-year lifetime of the Plan), 95% of the WMA still will be within one mile of a drivable road (Figure 24). Even over the long term, when all closures are eventually implemented, 88% of the WMA will remain accessible within 1 mile of an open road on the WMA and no part of the WMA will be more than 2 miles from a road. In fact, all but 750 acres will be accessible within 1.5 miles of an open WMA road. See Table 12 for further details. Essentially all of the more remote area is in the summit area of West Mountain (Figure 24).

With 90% of the road mileage across the Kingdom Heritage Lands outside of the Core Area, and planned closures affecting no main roads, these changes will have negligible effects on access throughout the 132,000 acres.

In summary, road closures provide increased ecological benefits for the Core Area, substantially reduce road maintenance costs, and only minimally affect access for hunting, fishing, trapping and other pedestrian uses on the West Mountain WMA and Kingdom Heritage Lands

Table 12: Accessibility of WMA from Only Permanently Open Roads

Distance From Permanently Open WMA Road	% of WMA Area Within Stated Distance	Acres Further Than Stated Distance
0.5 mile	65%	7775
1 mile	88%	2750
1.5 mile	97%	750
2 mile	100%	0

5. Road Restoration Implementation Planning

This implementation schedule lays out road closure and restoration/reclamation activities within the next 10 years, based on the new road access plan described above.

Road closures will focus on 1) preventing ongoing or future water quality, natural community, and infrastructure impacts by restoring natural water flows, 2) maintaining or encouraging regenerating vegetation on the roadbed, and 3) promoting canopy cover over road corridors.

A variety of methods may be used depending on conditions of each site. To restore natural water flows, low-grade roads will have their culverts removed, moderate- and steep roads may require additional restoration in the form of waterbars, broad-based dips, and plugged ditches. Roads with established vegetative regeneration will be allowed to regrow naturally, while those with poor regeneration will be scarified to promote seeding-in of colonizing plants. Where significant earth manipulation is required, mulching and seeding may be used to stabilize slopes until natural vegetation can develop. Gravel from road surfaces will be entirely removed in only a small number of roads. Finally, to prevent vehicles from continuing to use closed roads earthworks, boulders, or gates may be used to block road entrances.

Costs will vary significantly based on the particular road and method applied, but rough, preliminary estimates are supplied below. In addition, closure of these roads will save future maintenance costs, which are also estimated below (based on an estimated cost of \$1,500 per mile per year).

Figure 25: Road Restoration Implementation Plan

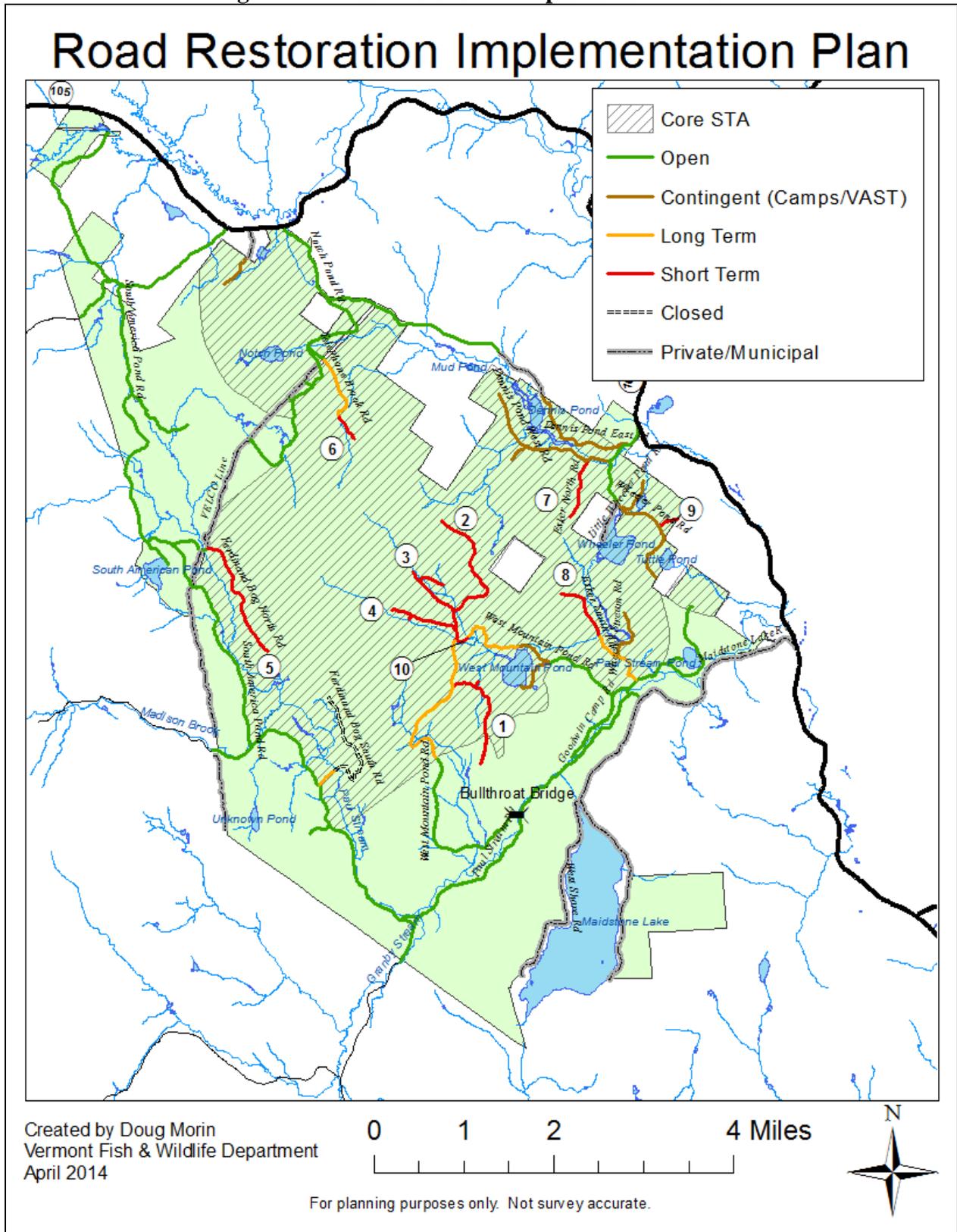


Table 13: Road Restoration Implementation Plan
(see Figure 25 for road identification numbers)

#	Year	Length (miles)	Assessment	Restoration Method	Estimated Cost⁶⁶	Estimated Cost Saved Over Ten Years⁶⁷
1	2015	1.25	Steep grade	Drainage restoration Scarification	\$6,000	\$12,500
2	2015	1.5	Flat grade Good regeneration	Culvert removal only	\$2,000	\$15,000
3	2016	1.25	Moderate grade	Drainage restoration Scarification	\$2,500	\$12,500
4	2016	0.75	Steep grade	Major drainage restoration Nonnative surface material removal Scarification	\$7,500	\$7,500
5	2017	1.5	Flat grade Surface water flow altered by ditching, impacting natural communities	Significant leveling of slope Mulch and seed	\$15,000	\$15,000
6	2017	0.3	Flat-Moderate grade	Culvert removal Scarification	\$500	\$3,000
7	2018	0.7	Beaver complications	Culvert removal Scarification	\$2,500	\$7,500
8	2018	0.7	Flat-Moderate grade	Culvert removal Scarification	\$1,000	\$7,000
9	2018	0.25	Flat-Moderate grade	Culvert removal Scarification	\$500	\$2500
10	N/A ⁶⁸	0.25	Flat	Culvert removal Scarification	\$500	\$2500
					<u>Total</u> \$38,000	<u>Total</u> \$84,500

⁶⁶ Preliminary cost estimates created based on anticipated equipment and time requirements for restoration due to length, slope, hydrology, surface material, and other considerations.

⁶⁷ Cost estimated based on average road maintenance requirements of \$1,500 per mile per year.

⁶⁸ Closure and restoration of this section will be implemented immediately following construction of the bridge over Paul Stream at the Bullthroat site.

6. Potential Road Use Conflicts

Plowing roads to perform management activities in the winter can create safety problems. Whenever roads are plowed from a town or State highway for the removal of forest products some of the general public will use the road for other purposes. This may result in collisions between cars and logging vehicles as these winter roads are generally very icy, narrow, and have poor visibility. On West Mountain WMA lands the logging contractor will be required to post signs at appropriate intervals warning motorists that they may encounter logging vehicles. In addition pull-offs will be plowed to provide for safe passage of vehicles. It is the Agency's intention to allow public access on plowed roads whenever possible to facilitate access by hunters and other recreationists. However, general public use on plowed roads that inhibits the contractor's ability to carry out his or her tasks may require these plowed roads to be gated and restricted to logging use only.

Plum Creek Timber Company may plow roads on the West Mountain WMA as well as on the Private Timberlands. Plum Creek will be encouraged to leave their plowed roads open for public access, however, safety problems may preclude them from doing so. Posting appropriate safety signs will also be a standard practice on roads Essex plows.

Snowmobile trails will need to be rerouted in most cases when the roads they normally follow are plowed for winter use. In some cases it is expected that rerouting cannot be reasonably accomplished and in these cases appropriate precautions will be taken to minimize the risk of accidents. The annual meeting between Plum Creek, ANR, USFWS, and VAST to designate trails for the upcoming winter will provide the opportunity to identify where these conflicts will occur and what remedial action may be needed to minimize safety problems.

Recreation corridors will create impacts specific to each use. Horses, for example, can create site damage in wet areas as can mountain bikes. Most Class C roads (designed only for winter use with a frozen surface) will not be available for these uses. Although both horses and mountain bikes currently share public highways with motor vehicles, this situation is not ideal either from the standpoint of safety or the quality of the recreation experience. This may be of particular importance when horses encounter logging trucks or when young children on horses or bicycles encounter vehicles. Safety issues related to horses and bikes using roadways need to be addressed by the respective corridor managers in a manner acceptable to the Agency.

7. Maintenance, Responsibilities and Funding

a. Road Maintenance

1) Road Maintenance Criteria

ANR plans to maintain roads open to general public use on the West Mountain WMA to a standard that will permit travel by cars at slow speeds. In addition:

- Road widths will be maintained at present levels unless safety issues necessitate widening;

- Visibility will be maintained or improved at problem areas by mowing roadside vegetation;
- All drainage and stream crossing structures will be maintained and/or improved to minimize erosion and rutting, to safely pass the increasing peak flows that are anticipated with climate change; and to minimize fragmentation of fish communities; and
- Road surfaces will be maintained at an appropriate quality for their intended use. Main, Class A, roads (Paul Stream, South America Pond, Notch Pond) will be maintained to the highest standard, while other roads will be maintained less intensively.
- Bridges and major drainage structures will be evaluated for safety and performance and repairs or upgrades made as needed.
- As much as practical from a safety perspective, the goal will be to maintain a canopy of trees over most roads.
- Any roads retained within the Core Area will be maintained in a manner that minimizes or avoids adverse effects on natural processes – *e.g.*, extra attention will be given to preventing erosion and sedimentation, insuring unimpeded flow of surface water and reducing the width of road clearings. In this regard, the objective will be to have tree canopies cover the roads wherever possible.

2) Road Maintenance Schedules:

Since it took ownership of the land, ANR has spent an average of \$26,000 each year on road and bridge maintenance at West Mountain WMA.

Bridges have been, and remain, a major concern. Decking has been replaced on all bridges on the WMA, though exposure to the elements and public use make this an ongoing task. In addition, structural members of bridges (abutments, beams, etc) are in a range of conditions and will need to be regularly evaluated for safety.

Most ditches and associated cross drainage devices are in good shape. Old, damaged or undersized culverts will be replaced as they are identified. Ditches are currently in stable condition. Cleaned ditches will be seeded and mulched where necessary to minimize erosion.

It is anticipated that Roadsides need to be mowed every 3-5 years to maintain road widths, facilitate ditch maintenance and to allow for adequate visibility.

A Some large culverts (4' +) are in need of header work. New headers will be installed to minimize erosion and to eliminate any unsafe conditions resulting from slumping or washed out road shoulders at these crossings. Culverts will be assessed

for hydraulic adequacy and aquatic organism passage, as well as for sediment contributions due to road shoulder slumping and gullyng, and prioritized for full replacement with more appropriated structures. If culvert replacement in the short term is not anticipated, then headers will be repaired or replaced.

Winter-only truck roads will be closed to the public in the Active Management Area, to insure their integrity is not compromised for use in performing management activities. The level of maintenance will generally be less than what is required for roads open for public use. Emphasis will focus on maintaining drainage structures and road surfaces to minimize soil movement and sedimentation. Unlike roads open to the public, surfaces will not necessarily be re-graveled.

b. Shared Responsibilities and Funding

ANR will bear the responsibility for conducting and paying for maintenance activities on Class A and B roads on the West Mountain WMA, in addition to overseeing public use. Annual lease payments from camps on the WMA are earmarked for road maintenance on these lands. In addition, ANR receives road construction and maintenance funds annually through its budget, which is approved by the Vermont Legislature. In addition, neighboring forest landowners that receive permission from ANR to use the roads for trucking contribute a negotiated amount of funding towards the maintenance costs of these roads. Some funding may also become available for road maintenance from the Vermont Electric Transmission Company, which owns the power line corridor that runs through parts of the property, and recreation corridor managers. VAST has contributed funds and manpower in the past to accomplish projects such as roadside mowing and bridge repair and has indicated that they intend to continue to help fund road maintenance costs.

ANR, and the Private Timberlands Owner have entered into a Road Maintenance Agreement pursuant to the Public Access Easement that further outlines the responsibilities of each owner regarding road use and maintenance on the Private Timberlands and on West Mountain WMA.

8. Temporary Road Closures

There are a number of situations in which roads on the West Mountain WMA that are normally open to public will be closed temporarily. These include the following:

- a. Prior to complete snowmelt each year, roads will be closed to all use with the exception of dispersed pedestrian use. Such closure generally will begin on or around March 15 and last until mid to late May. This closure is to protect road and trail surfaces during the annual spring mud season.
- b. Roads that are designated as snowmobile corridors will be closed to auto and truck traffic on December 16 each year. This is to prevent the possibility of collisions between

snowmobiles and motor vehicles. If typically closed roads are plowed for active timber harvests, they may be made available for public vehicular access.

- c. Roads may also be closed temporarily for maintenance and repair. These closures may occur for a variety of maintenance operations, but most likely will occur when safety becomes a problem, *e.g.*, a bridge becomes unsafe. Any such closure will be for the minimum time necessary while repairs are being made.
- d. Roads may be closed when timber harvest operations are underway and it is determined that a significant conflict could occur between logging equipment and public vehicular use. In the case of primary access roads an alternative route will be located prior to closure to minimize impact on public access.
- e. Roads may be closed to protect wildlife during periods of migration or movement.

Whenever roads are temporarily closed or reopened under the conditions described above, ANR will update the Kingdom Heritage Lands roads website to reflect the change (http://www.vtfishandwildlife.com/wildlife_WestMtnWMARoads.cfm). The general public is encouraged to use this website for updated information whenever they anticipate a visit to these lands.

F. MANAGEMENT OF PUBLIC USE AND RECREATION

1. Introduction and Goals and Objectives Relevant to Recreation

The goals and objectives for the management of the Kingdom Heritage Lands as a whole and the West Mountain WMA have a number of provisions relevant to recreation on the Wildlife Management Area. In brief, the goals and objectives relevant to recreation call for providing opportunities for a wide variety of backcountry recreational activities including, but not limited to those which are dependent on wildlife. They stress retaining the rugged, undeveloped and remote character of the area and maintaining the special recreational opportunities dependent on these characteristics.

Excerpts from the Vision, Goals and Objectives for the Kingdom Heritage Lands as a Whole, and Goals and Objectives for the West Mountain WMA include the following:

For the Kingdom Heritage Lands as a whole –

- *“...maintenance of the special opportunities for public use and recreation provided by this large, undeveloped landscape and primitive setting.”*
- *“Protect the predominantly wild, undeveloped, rugged character of the Kingdom Heritage Lands, with a minimum of developed recreational infrastructure.”*

- *“Continue compatible dispersed pedestrian utilization of the lands and their resources for such activities as hunting, fishing, snowshoeing, wildlife observation, and trapping in a “big woods” northern Vermont setting.”*
- *“Provide for other forms of public use and recreation (e.g., trail-oriented activities such as snowmobiling and hiking) as compatible with the easements and agency policies and mission.”*

More specifically for the West Mountain WMA –

- *“Provide a diversity of opportunities for public utilization of fish and wildlife resources and recreation that are compatible with legal requirements, ecological goals, and the management direction articulated for the Kingdom Heritage Lands.”*

For more specifics on this topic or to see how recreational goals and objectives fit in with ecological and other goals, see Section III.F. for a description of the overall vision, goals, and objectives for the management of the Kingdom Heritage Lands as a whole, and Section VI.A. for a discussion of the goals and objectives for the West Mountain Wildlife WMA.

2. Permitted and Prohibited Public Recreational Uses

Public recreational uses permitted and prohibited on the West Mountain WMA are guided by both the State Lands Easement and the fish and wildlife-based activities generally promoted by VDFW and ANR policy and State statute and regulation. In general terms, dispersed recreational activities such as walking, snowshoeing, cross-country skiing, hunting, fishing, trapping, boating, swimming, and wildlife observation are permitted on the property. More intensive and concentrated uses, including motorized, mechanized, and equestrian activities, may occur only on approved Recreation Corridors. (See section VI.F. for further discussion of the location and management of designated Recreation Corridors.) Beyond these broad guidelines, there are some differences in public uses between the Active Management Area and the Core Area in light of the heightened attention to the protection of ecological values and natural processes in the Core Area. These are spelled out in subsection 3 below.

a. Generally Permitted and Prohibited Uses

1) Permitted Public Uses Throughout West Mountain WMA:

The permitted uses listed below are consistent with the goals and objectives for West Mountain WMA, the requirements of the State Lands Easement, and State policy. These uses are believed to have had limited impacts in the first 10 years of the West Mountain WMA and are expected to have limited impacts into the foreseeable future.

The permitted uses include a number of uses that generally are confined to specific locations, require prior approval from ANR, and/or require an approved Corridor Manager to oversee management of the activity. Following some uses is a brief description of these or other associated conditions.

- *Bushwhacking (i.e., dispersed cross-country walking, snowshoeing, and skiing).*
- *Walking on roads.*
- *Wildlife viewing, bird watching, and photography.*
- *Hunting, fishing, and trapping in accordance with applicable State regulations.*
- *Swimming.*
- *Picnicking.*
- *Canoeing, car-top boating, and use of slow-speed electric trolling motors.*
- *Hiking with dogs*
- *Gathering of wild edibles or other gathering activity of renewable and abundant species for personal, non-commercial use.*
- *Dispersed primitive, no-trace camping* in accordance with ANR’s primitive camping regulations for State lands. Groups of more than 10 people must obtain a permit in advance from ANR.
- *Campfires.*
- *Hiking trails* are permitted on designated Hiking Corridors under the management of an approved Corridor Manager. (Section VI.F.3. of this Plan.)
- *Bicycling* is permitted on 1) all gravel roads open to vehicular traffic, with the exception of spur roads leading directly to the Private Timberlands (e.g., Madison Brook Road), and 2) other designated Bicycling Corridors under the management of an approved Corridor Manager. (Section VI.F.3. of this Plan.)
- *Backcountry skiing and snowshoeing on ungroomed trails* is permitted on designated Backcountry Skiing and Snowshoeing Corridors under the management of an approved Corridor Manager. (Section VI.F.3. of this Plan.)
- *Commercial guiding* requires a license in advance from ANR. (Section VI.F.5. of this Plan.)⁶⁹
- *Non-commercial group outings (e.g., non-profit tours, school trips)* require a Special Use Permit or license in advance from ANR. (Section VI.F.5 of this Plan.)
- *Scientific research* requires a license in advance from ANR. (Section VI.F.5 of this Plan.)
- *Target and skeet shooting* is permitted in designated areas or on lands under lease by camp owners.
- *Motor vehicle (car, truck, and motorcycle) access* is permitted only on designated Motor Vehicle Corridors under ANR management.⁷⁰ Long term, this use is inconsistent with the Core Area and will be prohibited once designated corridors are phased-out. (Section VI.F.3 of this Plan.)
- *Snowmobiling* is permitted only on designated Snowmobiling Corridors under the management of an approved Corridor Manager, and for winter access to

⁶⁹ In accordance with ANR policy, guided hunting parties do not require Special Use Permits.

⁷⁰ In accordance with the State Lands Easement and Agency policy, ANR may permit the use of motor-driven wheelchairs or all-terrain vehicles (ATVs) for access on designated corridors by those with disabilities. For any such access by ATV, prior written authorization from the ANR District Office in St. Johnsbury is required. See Section VI.F.3. of this Plan for further information.

camps for the duration of existing leases.⁷¹ Long term, this use is inconsistent with the Core Area and will be prohibited once designated corridors are phased-out. (Section VI.F.3 of this Plan.)

2) *Prohibited Public Uses Throughout West Mountain WMA:*

The following prohibited uses significantly conflict with other public uses, have detrimental impacts to the fish, wildlife, and habitat of the West Mountain WMA, and/or are inappropriate for the physical and aesthetic setting of the WMA.

- *All-terrain vehicles (ATVs) (except for access by persons with disabilities provided prior written authorization is obtained from ANR).*
- *Motorized watercraft except those using slow-speed electric trolling motors.*
- *Ice and rock climbing.*
- *Commercial activities other than ANR-licensed guiding (e.g., commercial group tours; collection of fish, wildlife, plants and their fruits for sale).*
- *Athletic events and competitions.*
- *Timber harvesting, including cutting and collection of firewood or Christmas trees.*⁷³
- *Hang gliding and parasailing.*
- *Artifact hunting.*
- *Use of herbicides, pesticides, or other toxic chemicals.*
- *Planting or cultivation of any vegetation.*
- *Maple sugaring.*
- *Model airplane flying.*
- *Permanent structures, including permanent hunting stands.*
- *Importation of firewood from outside of Vermont.*

3) *Uses allowed in the Active Management Area, but prohibited in the Core Area*

There are some differences in public uses between the Active Management Area and the Core Area in light of the heightened protection of ecological values and natural processes in the Core Area. The uses listed below are allowed in the Active Management Area, but prohibited in the Core Area because they are contrary to the goal of maintaining a very high level of ecological integrity in the Core Area.

- *Equestrian use* is prohibited in the Core Area. It is permitted on 1) all gravel roads in the AMA open to vehicular traffic, with the exception of spur roads leading directly to the Private Timberlands (e.g., Madison Brook Road), and 2) other designated Equestrian Corridors under the management of an approved Corridor Manager. (See Section VI.F.3. of this Plan.)

⁷¹ In addition to the requirement of the State Lands Easement that snowmobiling be confined to designated corridors, public use of snowmobiles on waterbodies within the West Mountain WMA is prohibited under ANR's Snowmobiling Regulations (with the exception of activities allowed under a permit, lease, or contract with ANR).

⁷³ Camp leaseholders are permitted to harvest firewood at sites designated annually by ANR.

- *Dog Sledding* is prohibited in the Core Area. It is permitted in the AMA on designated Dog Sledding Corridors under the management of an approved Corridor Manager. (See Section VI.F.3. of this Plan.)
- *Large gatherings of people for events* (10 or more people for ceremonies, filming, etc) are prohibited in the Core Area. They are permitted in the AMA with a Special Use Permit in advance from ANR. (Section VI.F.5. of this Plan.)
- *Retriever trials* are prohibited in the Core Area. They are permitted in the AMA with require a Special Use Permit in advance from ANR. (Section VI.H.5. of this Plan.
- *Importation of vegetation of any kind* is prohibited in the Core Area. (except for ecological restoration work using native species and under the direct control of ANR).
- *Removal of dead wood from streams* is prohibited in the Core Area (except under the direct control of ANR).
- *Fish stocking* is prohibited in the Core Area. (except for Notch Pond and ecological restoration work using native species and under the direct control of ANR).
- *Designated camping areas* are prohibited in the Core Area as per the State Lands Easement (no such sites have been, or will be, designated). In the AMA, designated camping areas are allowed (and two exist), with camping not to exceed a three-night duration. At designated sites, groups of more than 10 persons or those wishing to stay more than three nights, must obtain a Special Use Permit in advance from ANR.

4) *Additional considerations for use of the Core Area*

Following are specific considerations related to some of the permitted and prohibited uses that will be factored into future management of the Core Area.

- *Sensitive Sites*: Certain sites on the West Mountain WMA are so ecologically sensitive, either year-round or at certain times of the year, that visitation by the public even while participating in permitted uses may need to be limited or prohibited. Examples include sensitive wetlands such as fens. ANR will work to identify such sites and to inform the public of specific sites or categories of sites to which access may be restricted.
- *Transporting Carcasses*: As roads are closed over time in the Core Area, vehicular access for hunters to remove deer and moose carcasses from that area will become more difficult than has traditionally been the case. However, in other parts of the country—particularly in wilderness areas in the West—alternatives to road access and transport by motor vehicle have been successful. Especially when it comes to moose, it may be necessary to explore creative ways of transporting carcasses if true backcountry hunting (in which carcasses would be carried out by backpack) is not enough to preclude moose populations from increasing to a point at which they are causing undesirable levels of herbivory. Other methods of moving carcasses that minimize ecological effects could include using horses whose feed is free of invasive or non-native seeds, or using two-wheeled carts

similar to those used on long canoe portages in other places. Given the general prohibition on horses in the Core Area due to ecological concerns, allowing the first alternative would necessitate establishing a Special Use Permit requirement from ANR and verification of the feed being free of invasive or non-native seeds.

- *Hiking Trails:* ANR will work with any Corridor Manager approved for hiking trails to ensure careful siting of any trail in the Core Area so as to avoid ecologically sensitive areas and to leave some examples of every natural community type free of trail access. In addition, good management of trails will be critical to control erosion.
- *Canopy Over Trails:* A closed forest canopy should be maintained above all trails in the Core Area. If the canopy is currently missing due to a trail being situated on a road or in a remnant clear-cut, then the canopy should be allowed to regrow gradually to its natural condition over the trail.
- *Scientific Research:* Scientific research can span a spectrum from passive observation to massive manipulation of populations and ecosystems. Within the Core Area, research should be designed to minimize any ecological effect of the work, with as little destructive sampling as possible. All research in the Core Area either should further scientific understanding about the species, populations, and ecosystems found there, or should be dependent upon data collection in core conditions as a necessary part of the experimental design. The collection of data that can be gathered elsewhere (i.e., in areas not controlled by natural processes) with no loss of scientific validity should not be permitted within the Core Area.

3. Designation and Management of Recreation Corridors

a. Overview

The State Lands Easement allows motorized, mechanized, equestrian, and other “intensive, concentrated” uses including hiking trails⁷⁴ and disabled access on the West Mountain WMA, provided that such uses are confined to approved corridors and are “conducted in a manner that minimizes negative impacts on the [property’s] natural resource values.”⁷⁵ While the State Lands Easement does not require the identification of a “Corridor Manager” that will assume management responsibility for each corridor (as is the case on the Private Timberlands), ANR expects any Corridor Manager approved for a given use on the Private Timberlands portion of the Kingdom Heritage Lands to play a

⁷⁴ Note that hiking *trails* are to be confined to designated corridors. As described in Section VI.F.2 of this Plan, dispersed hiking and walking (i.e., “bushwhacking”) is generally permitted throughout the property pursuant to section III.1 of the State Lands Easement.

⁷⁵ Although not explicitly mentioned in the State Lands Easement, other uses typically confined to established trails (such as dog sledding and skiing/snowshoeing on groomed or ungroomed trails) also would be restricted to designated corridors and could occur only if an organization assumed responsibility to serve as Corridor Manager for each such use, received the necessary approval from ANR, and entered into a formal management agreement with ANR.

parallel role in managing any corridors designated for that use on the WMA *other than those located on existing gravel roads outside the Core Area*. Also, while ANR will manage corridors designated for motor vehicle (car, truck, and motorcycle) and motorized disabled access on the WMA (and on the Private Timberlands) since it would be difficult if not impossible to find another organization to do so, the Agency does not anticipate playing this role for any other corridors not located on existing gravel roads.

Corridors may be used only for the use(s) for which they are designated. With the exception of motorized disabled access as discussed below and in Section VI.F.6., public use of all-terrain vehicles (ATVs) is prohibited on the property. Use of any Recreation Corridor is at the risk of the user.

b. Corridor Locations and Designations

- 1) *Motor Vehicle and Motorized Disabled Access Corridors*: All gravel surface roads on the West Mountain WMA that are not posted, gated or otherwise obstructed are designated corridors for motor vehicle (car, truck, and motorcycle) access and motorized access by those with disabilities.^{76, 77} These roads are shown in Figure 4. (Note that as discussed in Section VI.E.3., certain roads in the Core Area will be closed in the short and/or long-term to help restore ecological integrity.)
- 2) *Snowmobile Corridors*: The Public Access Easement for the Private Timberlands portion of the Kingdom Heritage Lands requires that each year, on or before October 15th, ANR, the Landowner of the Private Timberlands, and USFWS will jointly identify snowmobile trails across all three parts of the Kingdom Heritage Lands that will be the designated corridors for the coming winter (the “Snowmobile Network”). The aggregate length of trails in the Snowmobile Network each year will not exceed the documented, historical annual average that prevailed during Champion’s ownership (approximately 150 miles). The specific trails included in the annual Snowmobile Network may change from year-to-year in response to annual changes in the management needs of ANR, the Landowner of the Private Timberlands, and/or USFWS.

The designated Snowmobile Network on the West Mountain WMA for the winter of 2013-2014 is shown in Figure 12.

Relocation of VAST Trail #98: Two sections of VAST Trail #98 in the West Mountain WMA Core Area will be rerouted over time—where the trail passes west of Dennis and Mud Ponds and east of Wheeler Pond (Figure 26). The current route is a mix of rough roads and off-road trails. Both sections will be rerouted outside of the

⁷⁶ All motor vehicles must meet applicable Vermont laws and standards for on-road operation (registration, inspection, etc.)

⁷⁷ In accordance with section II.7 of the State Lands Easement, ANR may permit the use of motor-driven wheelchairs or all-terrain vehicles for access to designated corridors by those with disabilities. For any such access by ATV, prior written authorization from the ANR District Office in St. Johnsbury is required. See section VI.F.6 of this Plan for further discussion.

Core Area. Along Dennis and Mud Ponds the relocated trail may utilize the existing rough road. Existing sections and the new relocated sections will not be enlarged or improved more than necessary, and to the extent possible canopy will be maintained or allowed to regrow over both the existing and new sections. The only long-term motorized use of these sections (except for emergency purposes) will be for winter snowmobile use. (Motor vehicle access will continue to be allowed on those sections providing access to existing camps for the duration of their leases.) As with all corridor-based uses, trail locations (and relocations) will be mutually agreed upon by ANR and the Corridor Manager.

- 3) *Other Corridor-Based Uses:* With the exception of spur roads leading directly to the Private Timberlands (e.g., Madison Brook Road), all gravel surface roads outside the Core Area that are designated corridors for vehicular traffic are also designated as corridors for bicycling and equestrian use. These corridors are shown in Figure 12. (Readers should note that these roads are also open for pedestrian use. Since walking on roads is a permitted activity throughout the West Mountain WMA, it is not necessary to designate these routes as “Hiking Corridors”.)

Since adoption of the first Public Access Plan, the Green Mountain Club (GMC) has become Corridor Manager for hiking corridors, and the Vermont Horse Council (VHC) has become Corridor Manager for equestrian corridors.

In 2009 GMC was designated as the Corridor Manager for hiking trails and work began on a trail network on the Private Timberlands. New hiking trails are not anticipated on West Mountain WMA in the foreseeable future, however, footpaths created on closed roads will be managed as recreation corridors by either GMC or ANR.

In 2003, the Vermont Horse Council was designated as Corridor Manager for equestrian trails across the Kingdom Heritage Lands. VHC has made use of 25 miles of gravel roads across the West Mountain WMA and Private Timberlands, and has cooperated in the creation of two camping areas for use by riders and the general public, at West Mountain WMA.

In soliciting and considering Corridor Manager proposals, ANR the following considerations have been used as guidance:

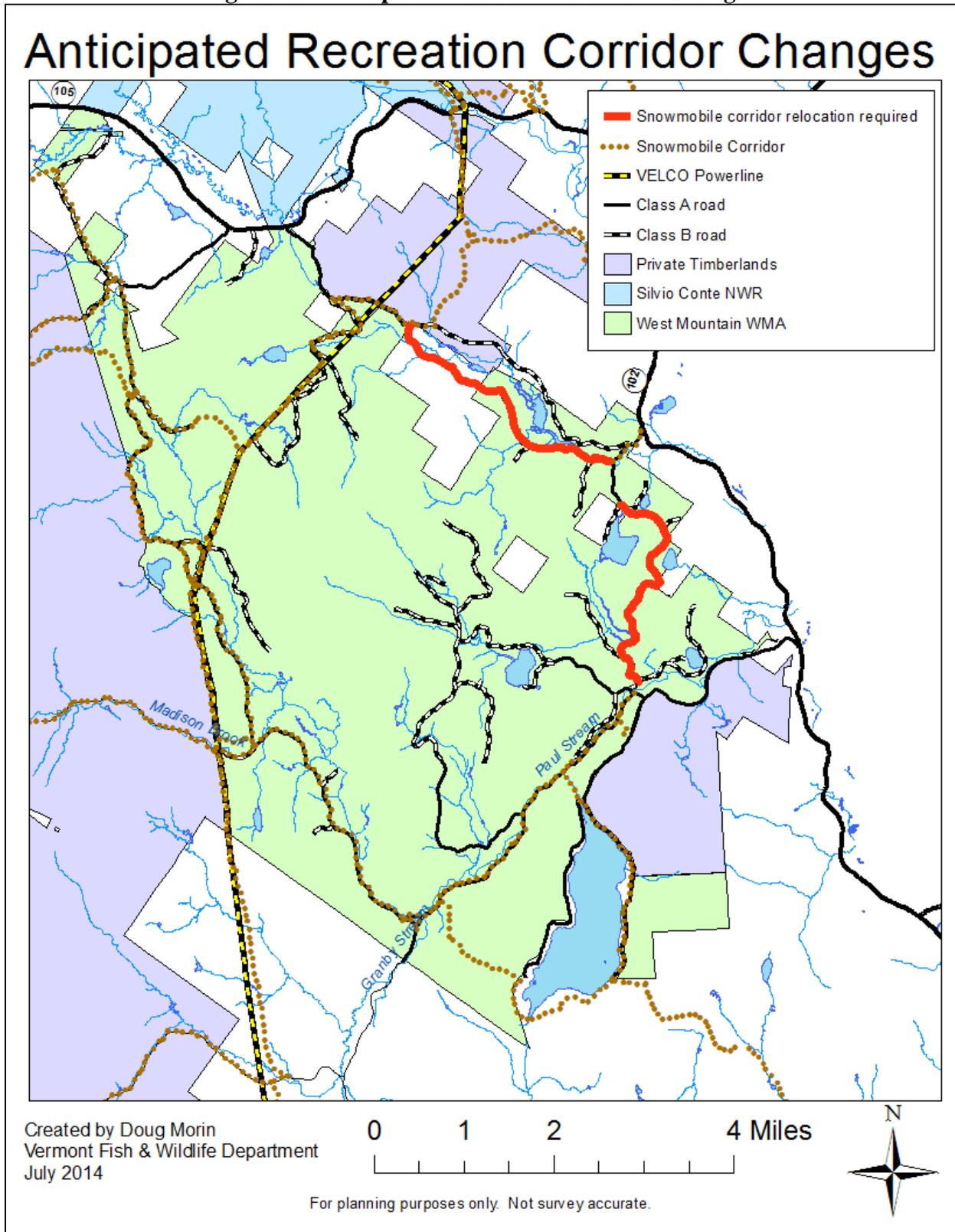
- Consistent with the management direction stated earlier, to maintain the existing rugged, undeveloped character of the area, the number of new trails allowed off existing roads is expected to be quite limited. This is an area where maintaining peaks and ridges without trails is an intended outcome of management designed to maintain existing opportunities for self-directed bushwhacking, orienteering, hunting, and trapping without trails.

- A “go slow” approach should be followed in establishing additional recreational corridors. That is, relatively few corridors should be established initially, while keeping the possibility open for adding more over time if they are needed and desired.
- Corridors should be located on existing routes (*i.e.*, gravel roads, winter roads, and skid trails) to the greatest extent possible (recognizing that this may be less desirable or appropriate for some uses, such as hiking trails or when seeking to create connections for loop corridors, but should be pursued even in those situations where feasible).
- Corridors should be classified and used for multiple activities to the greatest extent possible while not creating safety problems or conflicts with other uses.
- Any proposed corridors that are not located entirely on existing gravel roads will require additional discussion and field work with ANR to determine if an acceptable route can be identified on the ground.
- Areas should be avoided where there is a high likelihood of conflict with other uses (such as seasonal camps and incompatible recreational activities).
- Corridors should take advantage wherever possible of opportunities to provide recreational links to adjacent or nearby publicly owned lands and private lands with guaranteed public access and to existing corridor systems traversing those lands.
- Corridors should avoid areas of high ecological significance and sensitivity (wetlands, steep slopes prone to erosion, deer yards, etc.) and high archaeological significance and sensitivity.
- Corridor proposals must consider the various constraints on current or future recreational use of these lands, including provisions of the State Lands Easement, relevant state and federal regulations and policies, and other legal rights and restrictions on both the West Mountain WMA and the Private Timberlands.
- Prospective Corridor Managers should be mindful of the potential for misuse of a corridor, and the associated enforcement burden for the Corridor Manager and law enforcement authorities. Continued misuse may necessitate temporary or permanent closure of the corridor in question.

With those considerations in mind, ANR (and Plum Creek) will continue work with the recreational groups to further evaluate existing corridor network and the feasibility and desirability of establishing any additional proposed corridors.

More broadly, Section VII of this Plan outlines a process for the consideration and possible designation of additional corridors for all corridor-based uses during this Plan's 10-year lifetime. In essence, any proposal for such corridors will require public discussion of the issues involved with the proposed corridors; the approval of a Corridor Manager for the use involved if none already exists; and approval of the corridors by ANR.

Figure 26: Anticipated Recreation Corridor Changes



c. Corridor Management

1) *Designation of Corridor Managers*

- a) *Motor Vehicle and Motorized Disabled Access Corridors:* As it has done since the acquisition of the West Mountain WMA, ANR will manage these corridors. ANR will play the same role on the Private Timberlands.
- b) *Snowmobile Corridors:* The Vermont Association of Snow Travelers (VAST) will continue to serve as Corridor Manager for the snowmobile network on the West Mountain WMA (as well as on the Private Timberlands and the Conte Refuge).
- c) *Hiking Corridors:* The Green Mountain Club will continue to serve as Corridor Manager for hiking trails on the West Mountain WMA and Private Timberlands (though no formal hiking trails exist for West Mountain WMA, and none are envisioned in the near future).
- d) *Equestrian Corridors:* The Vermont Horse Council (VHC) will continue to serve as Corridor Manager for the equestrian network on the West Mountain WMA and Private Timberlands.

These organizations have been given approval to serve as Corridor Managers because: 1) each of the organizations has an established presence in Vermont for its respective activity; 2) each has experience in managing corridors on West Mountain WMA and/or the Private Timberlands over the previous 10-year Plan; and 3) no other organization has expressed an interest in becoming Corridor Manager for that use on either property.

- e) *Other Corridor-Based Uses:* No other corridor managers have indicated an interest in managing a use on the Kingdom Heritage Lands, nor is ANR intending to manage a new corridor-based use.

2) *Responsibilities and Authorities of Corridor Managers*

- a) *Corridor Management and Maintenance:* Corridor Managers will have primary responsibility for the management of public use and maintenance of the Recreation Corridor(s) for which they assume responsibility. (However, as described in subsection V.H.3.c.3) below, ANR will retain ultimate authority and responsibility for managing public use.) Corridor Managers must manage and maintain the corridor(s) for which they are responsible in accordance with all terms, conditions, and provisions of the State Lands Easement and this Plan. Specific requirements and guidelines for corridor management and maintenance (*e.g.*, regarding signage, vegetation management, use of motor vehicles, management of unauthorized use of corridors) will be specified in the formal management agreements between each organization and ANR.

- b) *Management and Enforcement Costs:* Corridor Managers will be expected to cover the costs of establishing, maintaining, and/or managing public use of the corridors for which they are responsible. Corridor managers will be responsible for constructing or modifying facilities needed for those activities for which they are responsible to take place safely (e.g., protective surfaces on bridge decking to prevent damage from use or to allow safe passage over them), and any such facilities or modifications must be constructed and maintained without damaging existing facilities or natural resources. For any improvements to corridors that provide benefits shared by other parties (e.g., a bridge repair that facilitates the transportation of wood products as well as recreation), the Corridor Manager will be expected to pay an appropriate proportion of the cost, as determined through negotiation with the other beneficiary(ies).

ANR will not provide funding from its operating budget directly to any organization(s) approved to serve as Corridor Manager(s). However, state and/or federal funding for corridor management may be available on a competitive basis through new or existing grants programs, such as the Vermont Recreation Trails Grant program administered by ANR. Applications for such grants from Corridor Managers will not be given any greater or lesser priority than those received from other applicants.

- c) *User Fees:* Provided written approval is obtained from ANR, Corridor Managers may require membership or charge the public as a condition of access to snowmobile, bicycle, or equestrian corridors for which they have management responsibility, but not for pedestrian access. Such use fees must be reasonably necessary to support the Corridor Manager's maintenance and/or management of the Recreation Corridor(s) for which they are responsible, and shall not be based on place of residency.⁷⁸
- d) *Corridor Relocation:* If a corridor needs to be relocated due to problems arising from the use of the corridor (for instance, excessive erosion or safety hazards from conflicts with other uses), the Corridor Manager will be responsible for carrying out the relocation in consultation with and upon approval from ANR, and for restoring the original corridor to a condition satisfactory to ANR.
- e) *Corridor Evaluation:* Corridor Managers will be expected to collaborate with ANR on at least an annual basis to evaluate whether the corridor(s) for which they are responsible are achieving identified objectives.
- f) *Communication and Reporting:* In carrying out the responsibilities described above, Corridor Managers will be expected to maintain frequent communication with ANR about any existing or potential issues related to the corridors for which they are responsible. This will include regular meetings (at least annually and more frequently if necessary) between the Corridor Manager and ANR (and the

Landowner of the Private Timberlands for any corridors extending onto that property). In addition, Corridor Managers will be required to submit written annual reports to the relevant parties summarizing noteworthy management issues, an assessment of the extent to which objectives for the corridor(s) are being met, funding obtained and expended for corridor management, work performed during the previous year and additional work planned for the coming year, etc. Additional provisions related to communication and coordination among those organizations involved in public access management on the West Mountain WMA are presented in Section VI.N. of this plan.

- g) *Sub-contracting*: Corridor Managers shall not subcontract any of their responsibilities for management of the specified corridor(s) to another organization or individual without written permission from ANR.
- h) *Liability Insurance, Indemnification, and Legal Defense*: Prospective Corridor Managers must commit, to ANR's satisfaction, to provide liability insurance, indemnification and legal defense against potential actions resulting from use of the specified corridor(s). The liability insurance will need to include coverage limits of at least \$1,000,000. ANR will provide additional legal specifications for the prospective Corridor Managers.
- i) *Corridor Management Agreements*: Each Corridor Manager will be required to enter into a written agreement with ANR specifying the terms and conditions for the management of the identified corridor(s) as outlined in this section. Such agreement will constitute ANR's formal approval of the Corridor Manager. Each agreement will be for a five-year term, with renewal annually provided the Corridor Manager has continued to fulfill the provisions of the agreement and provides evidence satisfactory to ANR of continued liability insurance, indemnification, and legal defense. At the end of each term, the agreement will be renewable for another five years with the mutual consent of the parties.
- j) *Default*: If a Corridor Manager defaults in the responsibilities and obligations specified in this Plan and subsequently in its corridor management agreement, ANR shall have the right to unilaterally close the corridor(s) for which the Corridor Manager is responsible until the default is remedied to ANR's satisfaction.
- k) *Non-renewal of Agreement*: If a Corridor Manager decides not to renew its management agreement, it must provide ANR with written notification of such decision not less than 90 days before the termination of the agreement. If no other organization is willing to assume responsibility for management of the corridor(s) in question, the Corridor Manager will be responsible for taking any steps necessary to preclude public use of the corridor(s) (e.g., removal of signs) and to restore the corridor(s) (e.g., bridge removal, erosion control) to a condition satisfactory to ANR.

- 1) *Bonding*: To protect itself against incurring substantial expense in the event of default or non-renewal of a management agreement, ANR may require a Corridor Manager to post a bond for any major structures (*e.g.*, bridges) it plans to establish. (As stated earlier, any physical improvements would require prior approval from ANR.) Bonds will not be required for normal corridor establishment and/or maintenance (*i.e.*, not involving any major new structures).

3) *Management Obligations Retained by ANR*

Notwithstanding its approval of one or more Corridor Managers for the West Mountain WMA, ANR shall retain ultimate responsibility for the management of public access on the property, including compliance with the terms, conditions, and limitations of the State Lands Easement and this Plan.

As part of these overall responsibilities, ANR will be the permitting authority for special use permits or licenses required for organized events on designated corridors on the West Mountain WMA, even if Corridor Managers have been approved for those corridors. Special use permits or licenses will be required both for organized groups participating in the activity for which the corridor was designated (*e.g.*, a group snowmobile outing that is publicized and organized by a local snowmobiling club and planned for a designated trail in the Snowmobile Network), and for any type of organized group activity other than the designated corridor use (*e.g.*, an organized group of dog sledders wishing to use a designated snowmobiling trail). In either case, the group organizer would be expected to coordinate closely with the Corridor Manager as well as with ANR, but ANR would have authority over issuance of the required permit. (See Section VI.F.5 for further discussion of the requirements and process for special use permits and licenses.)

4) *Closure of Recreation Corridors*

- a) *Weather-Related Closure*: ANR may temporarily close all roads, including designated Corridors, to non-pedestrian use during seasonally adverse conditions (*i.e.*, mud season).

In general, all roads will be closed to non-pedestrian traffic on or around March 15 during mud season. With the exception of any roads closed due to active forestry operations (see below), roads designated as Motor Vehicle and Motorized Disabled Access Corridors will be reopened no later than May 30.

- b) *Winter Closure*: All unplowed roads will be closed to motor vehicles on December 16 to avoid conflicts between snowmobiles and motor vehicles.
- c) *Other Closures*: ANR may close selected Corridors to public use due to safety concerns, management activities, impacts of public use on road conditions, and/or impacts of public access on conservation values including wildlife habitats, wildlife movement or migration, and surface water quality.

- d) *Public Notification:* The public will be notified of all Corridor closures through periodically updated announcements on the Kingdom Heritage Lands website (http://www.vtfishandwildlife.com/wildlife_WestMtnWMARoads.cfm) or by contacting the district office at 802-751-0100

4. Public Recreation Facilities and Signs

a. Management of Existing Facilities

Existing recreation facilities include snowmobile trails, equestrian and bike corridors, two campgrounds, a moose viewing platform, and information kiosks. (See Section IV.D. for a description of these existing recreation facilities.) In the near term all such facilities are to be retained. These facilities and management activities related to them (*e.g.*, improvements needed to prevent or mitigate environmental impacts or monitoring for impacts) are summarized in the following Table.

Table 14: Management of Existing Public Recreational Facilities

Facility	Management
Equestrian Trails	Monitor for future safety or environmental issues.
Snowmobile Trails	Monitor for future safety or environmental issues.
Biking Corridors	Monitor for future safety or environmental issues.
Gates that are open for snow machine travel but are closed to wheeled vehicular travel.	VAST will be responsible for opening gates at the start of the snow machine season and will either place the locks and chain on the gate or they will be returned before spring thaw to the appropriate land manager. (Dave Willard for ANR)
Wooden Bridges	VAST will be responsible for the annual placement of a travel surface for snowmobiles on the decks of these bridges will be required. This will reduce the wear caused by studded tracks on snow machine to newly decked bridges.
Moose Viewing Platform	Monitor for future safety or environmental issues.
Designated Camping Areas	Monitor for future safety or environmental issues.
Information Kiosks at Browns Mills, the Dennis Pond entrance, and South America Pond Road at Route 105.	Informational kiosks will be maintained on a regular basis and as time permits. The signage will include information concerning permitted, prohibited and conditional uses, maps, and other appropriate signage approved by legal interests.

As pointed out earlier in the description of existing recreational resources (Section IV. D.), while not formally developed or sanctioned as recreation facilities, a number of other sites are used by the recreating public and some of these sites need management to repair

or prevent environmental damage and prevent conflicts between camp owners and the public. These needs are as follows:

- Trail up West Mountain – Monitor for erosion and consider replacing all or part of the trail to reduce conflicts with private property at the summit and provide scenic vistas. Locate any new section of trail to avoid impacts to natural resources.
- Trail to south side of Notch Pond - Corduroy, buildup with cobble, or relocate wet sections of the trail as needed to prevent environmental damage. Also provide access to the pond in a location that does not conflict with camp use.
- Trail to east side of Notch Pond - Stabilize the portion of the trail that is eroding. Monitor trail for erosion and provide access to the pond in a location that does not conflict with camp use.
- Shoreline access at South America Pond - Monitor for damage to resources, *e.g.*, soil compaction, damage to vegetation at the site. Develop a plan for stabilizing the access road to prevent further erosion.
- Shoreline access at West Mountain Pond – Monitor for damage to resources, *e.g.*, soil compaction, damage to vegetation at the site.
- Shoreline access at Dennis Pond - Develop a plan for either providing an alternative site that does not impact wetlands or providing access at this site that does not impact wetlands. Finding an alternative site is preferable.
- Shoreline access at Wheeler Pond - Monitor put-in site at the outlet for erosion.
- Shoreline access at Paul Stream Pond - Monitor for soil compaction and damage to vegetation.
- Access to Paul Stream below Ferdinand Bog - Monitor for erosion and stabilize shoreline if needed.

In the longer term, *e.g.*, after the expiration of existing camp leases (scheduled for the life of the current leaseholder plus 20 years) or the sale of camps to the State, the following facilities and informal recreation sites will be phased out as Core Area management and road closures are implemented.

- Vehicular access to existing informal shoreline access sites at West Mountain Pond, Dennis Pond, Wheeler Pond, and Paul Stream below Ferdinand Bog.

b. Proposed Facilities

Only one potential new public use facility is planned for the West Mountain WMA. The Fish and Wildlife Department is making efforts to site a designed shooting range in the West Mountain area, possibly in an existing gravel pit on the WMA. If constructed, this low-infrastructure site (appropriate safety berms, possibly with simple covered benches) would provide a safe location for hunters and shooters to practice with their firearms. As holders of the State Lands Easement, TNC and VHCB will be given full consideration in the siting, construction, and operation of this facility, if it moves forward.

In the longer term GMC, VAST, VHC, or other prospective corridor managers may come forward with proposals for additional trails. These will be considered on their merits and judged for their consistency with the goals and objectives of this plan at the time when they are submitted. Approval of any new corridors would require amending this Plan; the process for such amendment is discussed in Section VII. Consistent with the management direction stated earlier to maintain the existing rugged, undeveloped character of the area, the number of new trails allowed off existing roads is expected to be quite limited. Maintaining peaks and ridges without trails is an intended outcome of management in order to maintain existing opportunities for self-directed bushwhacking, orienteering, hunting, and trapping without trails.

When current leases expire, some of the existing private camps on the actively managed portion of the West Mountain WMA may be acquired by ANR and retained for public use. (See Section VI.F.7. for more on this topic.)

c. Signs

Consistent with the management direction specified for the West Mountain WMA, as well as the Kingdom Heritage Lands as a whole, signs in the interior of the property will be minimized and made as unobtrusive as possible while serving their intended function. Further, whenever possible, signs that are legally required or otherwise considered to be necessary will be located on the periphery of the wildlife management area and at road intersections leading to the wildlife management area. The rationale behind this approach is to view the sign program as a part of the conscious effort to maintain the character of the area and the special recreational opportunities that it provides. In fact, an important part of this character results from not having internal directional signs, thus allowing recreationists to use their map reading and orienteering skills in finding their way to their intended destinations. This approach both provides a different recreational opportunity than generally available elsewhere and should help reduce crowding and the resulting stress on resources. (See Section VI.M. for more on the topic of social, physical and ecological carrying capacities.)

Consistent with these purposes and approaches the design and locational standards for signs on the West Mountain WMA are as follows:

First and foremost, signs that are unnecessary or not consistent with the management direction specified herein will not be installed.

- 1) *Design standards:* Signs on the West Mountain WMA will be designed to be consistent with signs on other wildlife management areas. In general this means:
 - a) Entrance signs at major access points (as on other wildlife management areas).
 - b) Boundary signs (as on other wildlife management areas).⁸⁰
 - c) Safety warning signs (as needed and appropriate and as on other wildlife management areas).
 - d) Signs identifying entrances to recreation corridors (as on other wildlife management areas).

- 2) *Locational standards:* Signs identifying the direction to the West Mountain WMA will be located at all major access points on the periphery of the property. These will be located in conjunction with information Kiosks described under the section on recreational facilities. Signs warning of danger, needed for safety, or to prevent damage to fragile features will be located close to the feature in question and in a location where they will not be overlooked by the target audience. Trails approved as recreation corridors will be blazed as specified in ANR standards. Signs directing recreationists to specific recreational resources or facilities will not be provided in the interior portions of the property.

d. Maintenance of Recreation Facilities and Signs

Recreation facilities and signs will be maintained to keep them in good and serviceable condition and avoid adverse environmental impacts. Consistent with the management direction stated earlier, maintenance will be aimed at maintaining the existing primitive character of the area and recreation facilities. The maintenance planned for each facility is summarized in table V-3 below.

Informal public use sites will also be inspected annually for environmental impacts and appropriate action will be taken to prevent or mitigate any such damage.

⁸⁰ Boundary signs are envisioned at applicable locations on roads and designated recreation corridors, but are not likely to be placed around the entire perimeter of the West Mountain WMA.

Table 15: Maintenance of Recreation Facilities and Signs

Facility	Maintenance	Frequency	Responsibility
Snowmobile Corridors	Comply with corridor management agreement regarding maintenance. This includes but is not limited to inspecting and repairing/ stabilizing any damages as needed.	Annually	VAST
Hiking Corridors (if any)	Comply with corridor management agreement regarding maintenance. This includes but is not limited to inspecting and repairing/ stabilizing any damages as needed.	Annually	GMC
Biking Corridors (if any other than those located on existing gravel roads that are open to vehicular traffic)	Comply with corridor management agreement regarding maintenance. This includes but is not limited to inspecting and repairing/ stabilizing any damages as needed.	Annually	Designated Corridor Manager
Equestrian Corridors (if any other than those located on existing gravel roads that are open to vehicular traffic outside the Core Area and do not lead directly to the Private Timberlands)	Comply with corridor management agreement regarding maintenance. This includes but is not limited to inspecting and repairing/ stabilizing any damages as needed.	Annually	VHC
Kiosks	Inspect and repair any damages as needed.	Annually	ANR
Moose Viewing Platform	Inspect and repair any damages as needed.	Annually	ANR
Designated Campsites	Inspect and repair any damages as needed.	Annually	ANR
Signs	Inspect and repair any damages as needed.	Annually	ANR

5. Uses Requiring Advance Written Authorization

As indicated in Section VI.F.A. of this Plan, most of the public uses that are permitted in the Active Management Area and Core Area on the West Mountain WMA do not require formal, written authorization from ANR. However, certain activities specified in those sections (such as commercial guiding, scientific research, non-commercial group outings, and others) do require a

special use permit, license, or lease in advance from ANR. In general terms, such written authorization is required for activities that involve groups of more than 10 people; are organized or publicized; require participants to pay a fee;⁸¹ involve potential alteration of a site or removal of vegetation or mineral resources; or may conflict with established uses such as hunting, bushwhacking, and dispersed cross-country skiing.

Applicants for special use permits, licenses, and leases may be required to pay a fee, and must demonstrate proof of insurance to protect State interests from liability that could be incurred as a result of the authorization. Each permit, license, or lease spells out the duration of the allowed use, responsibilities for maintenance and repair of any developments involved, and a statement to the effect that the authorization is not an exemption from other local, state and federal rules, laws, permits or licenses.

Subsections a, b, and c below provide specific information on special use permits, licenses, and leases, respectively. In addition, readers may refer to the ANR policy *Uses of State Lands* for more details. Copies of that document are available upon request.

a. Short-term Uses—Special Use Permits

ANR may grant special use permits for permitted activities identified in Section VI.F.5. that require advance written authorization, provided the proposed activities are short-term and low-impact, requiring little or no development and no permanent structures. Examples could include one-time use of the property by a commercial guide service or by an organization planning a publicized, non-commercial group outing. Requests for special use permits will be considered on a case-by-case basis by the St. Johnsbury District Office. The term for each special use permit will be one year or less, and during that period the permitted activity shall not dominate or exclude all other public uses of the land for more than one week at a time.

b. Longer-Term Uses without Transfer of Rights—Licenses

A license from ANR generally is necessary for those permitted activities identified in Section VI.F.5. that require advance written authorization, are longer-term, and do not involve the transfer by the State of any contractual, vested, or property rights to a business or individual. Examples could include a commercial guiding service that wishes to use the West Mountain WMA on a continuing basis, or an organization that wishes to conduct ongoing scientific research on the property. License agreements will be prepared by the ANR District Office in St. Johnsbury, and approved by the Commissioner of the Department of Fish and Wildlife. Such agreements will include specific dates for review

⁸¹ The State Lands Easement generally prohibits commercial activities (i.e., activities for which a fee may be charged) on the West Mountain WMA. However, ANR and the Easement holders (TNC and VHCB) amended the Easement in December, 2001 to clarify that commercial guide services may be permitted by ANR. Also, in accordance with the Easement, ANR may charge fees for maintaining and managing public use on the property, and Corridor Managers may charge fees or require membership in certain circumstances. Refer to the State Lands Easement Section III.17.

and renewal. As with uses allowed under special use permits, licensed uses must not dominate or exclude all other public uses of the land.

c. Long-Term Uses with a Transfer of Rights—Leases

Leases are formal written agreements for long-term uses of state lands involving the transfer of some rights and usually some type of development. The only leases currently in effect on the West Mountain WMA are the 74 active camp leases. These leases are valid for the duration of the lessee's life, plus an additional 20 years if transferred to an immediate family member. No new leases for any use are anticipated on this property.

6. Access for Persons with Disabilities

The Americans with Disabilities Act of 1990 (ADA) extended civil rights to persons with physical and mental disabilities and concomitantly extended the reach of the Rehabilitation Act of 1973 to programs and services of state and local governments. More recently in 2011, the U.S. Department of Justice (DOJ) issued regulations on the use of wheelchairs and Other Power Driven Mobility Devices (OPDMDs) by persons with mobility disabilities on lands owned or managed by non-federal public entities. Under section 504 of the Rehabilitation Act, an agency must provide “meaningful access” to its programs by making reasonable accommodations. “Meaningful access” means the program must be accessible when viewed in its entirety, *i.e.*, not all portions need to be accessible and no modifications are necessary if those modifications would fundamentally alter the nature of the program provided, *i.e.*, the government entity must maintain the use and character of the land in question.

In the context of West Mountain WMA, the use and character of this land is remote, rugged, and undeveloped. There are few, if any, structures on the WMA with the exception of the approximately 64 hunting camps that are privately owned. No new structures are proposed over the next ten years. Future plans may propose the construction of parking areas and fishing access. Those facilities will have to be constructed to insure access for persons with disabilities.

Portions of the network of roads on the West Mountain WMA have been designated as corridors for motor vehicle access and are available in the same manner for persons with mobility impairments. In addition, section II.7 of the State Lands Easement for the West Mountain WMA allows ANR to provide for both ATV and motor-driven wheel chair access for persons with mobility impairments.

The DOJ regulations clarify and enhance the level of access to state lands by persons with mobility impairments. The ruling requires states to permit individuals with mobility disabilities to use wheelchairs (including both motorized and non-motorized wheelchairs) in any areas open to pedestrian use. Additionally, these regulations require states to permit the use of OPDMDs by persons with mobility disabilities on established road and trail facilities unless it can demonstrate that the device cannot be operated in accord with legitimate safety requirements or fails to meet established assessment factors for a facility. OPDMDs include any power driven device that is used by persons with mobility disabilities for the purpose of locomotion including but not limited to ATVs, golf carts, Segways®, and snowmobiles.

Accordingly, wheelchair access (including both motorized and non-motorized wheelchairs) is allowed anywhere on West Mt. WMA and other state lands that are open to pedestrian access. While the use of all-terrain vehicles (ATVs) is prohibited on all State lands (23 V.S.A. section 3506), ANR has followed a policy of site-specific special use permits for persons with mobility impairments to access State lands on ATVs. Going forward, the Agency will work diligently to accommodate requests for use of ATVs and other OPDMDs by individuals with mobility impairments on the West Mt WMA and other ANR lands and develop appropriate and responsive policies and procedures in accord with the DOJ regulations. Persons interested in using an OPDMD for mobility purposes on West Mt. WMA should contact the St. Johnsbury District Office for additional information.

7. Private Camp Management

At the time of the development of the West Mountain Wildlife Management Area (West Mountain WMA) Long Range Management Plan in 2002, there were 78 privately leased lots on the WMA with structures on 73 of the lots.

In the 1999 Budget Adjustment Act, the Vermont Legislature laid out a plan for extinguishing leases on the WMA, requiring their termination after the lifetime of the leaseholder, with an option of renewal for up to 20 years thereafter by immediate family. Once terminated, the State receives full ownership of the land and any structures on the lot.

ANR continues to manage this unique private, exclusive use of public land in accordance with the direction and terms set out by the Legislature.

a. Background

1) *Lease ownership*

Of the 78 leased lots existing when the State took ownership of West Mountain Wildlife Management Area, there are now 64 active leases, all of which have camp structures. Leases on five vacant lots, five lots with structures, and two lots with structures which burned down have been relinquished to the State or terminated due to non-payment of fees. In addition, two lots with structures have been purchased by The Nature Conservancy (TNC) in anticipation of funds being available for State purchase.

2) *Lease durations*

Of the 64 active leases, 12 are set to expire in 2078, 9 are set to expire in 2056, and 43 retain the original term of the life of the leaseholder plus 20 years. Section 347 of Act 215 of the 2006 Acts and Resolves of the Vermont Legislature gave camp owners the option to add immediate family members to their lease, with the consequence of changing the expiration date of the lease to January 1, 2078. Twelve leases have been so altered. Act 215 also enables the transfer of a lease to an unrelated third party, with the consequence of changing the expiration date of the lease to July 1, 2056. Nine leases have been so altered. The remaining 43 camp leaseholders retain the original “life plus 20” term.

3) *Lease administration*

Administration of the camp leases is managed by the St. Johnsbury office ANR. Annual billings, lease renewals, requests for firewood, annual snowmobile permits, requests to add family members to leases, and requests to transfer leases to unrelated parties are routine tasks.

4) *Lease Fee Structure*

Lease fees on camps changed slightly with the start of State ownership, but have since been surpassed by similar fees on the other Kingdom Heritage Lands.

Champion International lease fees were \$650 for a camp on or near a body of water and \$550 for those not near a body of water. State lease fees, beginning in 2001, were increased to \$675 and \$575 and have not changed since, though there are no restrictions on changing the fees.

Lease fees on the US Fish and Wildlife camps remained at \$650 and \$550 until 2011. At that time, a private appraiser was contracted to perform a market appraisal of the camp lease rates using federal guidelines. After appraisal, the 2012 lease fee rose to \$1,125 and \$950.

Lease fees on the private timber lands were raised from \$550 to \$1,000 per year by Essex Timber Company and then again to \$1,200 per year when Plum Creek Timber Company became the landowner. Most camps on the private timber lands are not near bodies of water.

5) *Use of lease funds*

Lease payments are set aside, by law, for maintenance of the Fish and Wildlife Department's (DFW) roads, and have been used on West Mountain WMA. Road maintenance is an ongoing process at West Mountain WMA, and both routine and emergency maintenance are contracted out as needed. From 2000 through 2012, ANR spent an average of \$26,000 each year maintaining roads and bridges on West Mountain WMA.

6) *Camp conditions*

Camp inspections were done in 2001 and a comprehensive inventory of camps was done in 2007. This assessment used a variety of factors to evaluate each structure, including: location, ecological impacts, structural integrity and suitability, assessed value, and structure accessibility and security. The results of this assessment have informed the decisions outlined in this document.

b. Operational Plan

Regardless of lease durations ("life plus 20," 2056, or 2078), **all camp lots and abandoned structures on West Mountain WMA will eventually revert to State ownership.** A variety of management options exist for the future acquisition and use of camp structures on West

Mountain WMA including demolition, relocation, and retention for public use or Agency use.

Long term, ANR will manage the West Mountain WMA as a uniquely remote place for Vermonters to hunt, fish, trap, and recreate—with limited infrastructure and an emphasis on dispersed uses. The permanent presence of a large number of camps on the WMA is inconsistent with the primary goals of the West Mountain WMA: natural resources conservation and dispersed public access.

Consequently, over time, most camps will be eliminated from West Mountain WMA, with a small number potentially retained for their historic, management, and recreational value.

1) Camp Acquisition Procedures and Revenue Sources

Act 215 of 2006 requires ANR to discuss with the legislature a camp purchase fund and to seek private funding, with TNC, to purchase camps in ecologically sensitive areas. Without any such funding, and with limited funds for land and property acquisition statewide, the Agency has not purchased any camps at West Mountain WMA.

In 2000, the initial plan was for TNC to provide interim sources of funds to the State to purchase camps at fair market value. Two camps were purchased by TNC at a cost of \$55,000 and TNC also paid for appraisals of 11 additional camps. The two camps purchased by TNC remain in TNC ownership, though they may be transferred to the State as part of a purchase of additional inholdings at West Mountain WMA as early as 2014.

In the near future, ANR will renew discussions with the legislature to create a camp purchase fund and with TNC to seek private funding. While such funds remain unavailable, ANR will not purchase any camps, but will rely on the natural termination of camp leases over time.

If funding becomes available to acquire camps, ANR may approach leaseholders to discuss acquisition and/or exercise its right of first refusal on all camps located on West Mountain WMA (granted in Act 215 of 2006). ANR will prioritize funds for camp acquisition based on the following considerations:

- Located in the Core Area
- Located on any stream, pond, or wetland shoreline
- Located off the major permanent road system
- Located on Dennis Pond or the surrounding wetland complex
- Located on Notch Pond or its outflow
- Located on southern side of Wheeler Pond, not serviced by a road
- Opportunity to remove one or more camps on a pond in the Core Area, resulting in the pond having no camps on the shoreline
- Opportunity to remove one or more camps that would significantly reduce infrastructure maintenance costs (for example, allowing the planned closure of a stretch of road or bridge in the Core Area)
- Introduces pollution into a stream, pond, or wetland

2) *Archeological and historic considerations*

Before removal or renovation, camps will be assessed for their archeological/historical significance. In 2001, when the University of Maine at Farmington was preparing the cultural resource assessment on the Kingdom Heritage Lands, preliminary camp assessments were conducted. The assessments were done using photographs of the camps and no site assessments were done. The findings, which can be found in Appendix I of the report “People, Land and History: The Cultural Landscape of the Nulhegan District”, prepared for the Vermont Land Trust by the Archaeology Research Center of the University of Maine at Farmington, showed 48 of the 73 buildings assessed required further assessment in order to determine significance. Of those 48 buildings, 35 were considered potentially significant and 8 were considered possibly significant. Five buildings were marked as unknown due to photo quality, and 25 buildings were not recommended for further assessment due to age of the buildings. ANR will consult with the Vermont Division of Historic Preservation to review all camp buildings in the coming years.

c. Other Camp Issues

1) *Public Access Near Private Camps*

In order for camp lessees to have a reasonable amount of privacy from the public, the terms of the camp leases allow lessees to request that members of the public remain at least 125 feet from camp structures when they are occupied. This provision does not apply in cases where such structures are located within 125 feet of any water body.

2) *Access to Camps*

Leaseholders on West Mountain WMA have enjoyed reasonable access to camps under previous paper company ownerships. It is the Agency’s intention to maintain roads open for public access to a standard that is equivalent to or better than the standard maintained by Champion International. Many camps are located such that the leaseholder has developed a short spur, or driveway, to the structure itself. As in the past leaseholders will be permitted and expected to maintain these “driveways” at their own expense. In cases where gates have been installed to restrict access to a camp driveway, it will be the responsibility of the leaseholder to maintain them. All gates must be located so as not to interfere with winter plowing. It will also be the responsibility of leaseholders to maintain their driveways in a manner that diverts water flowing down the driveway from entering the main access road. Waterbars and other necessary drainage structures must be maintained by the leaseholder.

3) *Firewood*

Camp owners may be permitted to harvest firewood on the WMA outside the Core Area with a permit from ANR.

8. Linkages with Recreational Opportunities on Nearby Lands

The West Mountain WMA offers significant opportunities for both dispersed and corridor-based backcountry recreational activities. These opportunities are enhanced by the fact that the West Mountain WMA is part of a larger, undeveloped forested area with road and trail linkages to the surrounding lands (Figure 27).

Because of the large block of lands available for public use that includes and surrounds the West Mountain WMA, the Kingdom Heritage Lands provide unusual opportunities for dispersed uses (not dependent on trails) such as hunting, bushwhacking, foraging, nature walking, and wildlife observation in a backcountry environment. For example, certain types of hunting activities require or benefit from being connected to other publically accessible lands. While the area included within the West Mountain WMA is substantial, game species travel across the boundaries of these lands onto other properties. Hunting activities, such as hunting with hounds and certain forms of deer hunting, *e.g.*, tracking, can take place over miles of terrain. A hunt that starts on the West Mountain WMA may lead onto other properties or vice versa. Hence, large undeveloped contiguous forested areas that are open to public use are important for these sorts of backcountry hunting activities.

Activities that make use of roads and trails, such as snowmobiling and hiking, also benefit by being part of a large block of land with interconnecting road and trail corridors. The West Mountain WMA is located centrally in a large block of lands available for public use. As such, it provides important linkages to recreational corridors located on adjacent public lands, and in the case of snowmobile trails, connecting to the White Mountain National Forest in New Hampshire and adjacent areas in southern Canada. These lands, now publicly held, will assure that existing recreational corridors, including the VAST trail system are not interrupted; and provide the potential for other recreation trail corridors to be established, in accordance with this plan and other guiding documents. For example, in the future there is the potential to further connect trails passing through these lands with trail systems in the White Mountain National Forest, other Vermont and New Hampshire State lands and existing private land trail systems. It is also conceivable that a corridor network could link these lands to public lands in central and southern Vermont, *i.e.*, Green Mountain National Forest, existing rail/trail corridors such as the Cross Vermont Trail and St. Johnsbury and Lamoille Valley Railroad; the Catamount and Long Trails, and perhaps west to the Adirondack region of New York.

Recreational corridor linkages for various activities are summarized below (Figure 27).

a. Motor Vehicle Road Linkages

A number of motor vehicle access linkages currently exist with adjacent lands, mostly in the form of gravel roads that connect to nearby State roads (*e.g.*, Vermont Routes 102, 105, and 114). These linkages provide opportunities to access both nearby and more distant recreational lands in all directions, including across the borders into Canada and New Hampshire.

b. Snowmobiling Linkages

The VAST network of trails relies on linkages between the West Mountain WMA and other properties to the north, south, east and west for providing continuity in the VAST system. The Island Pond area generally and the Kingdom Heritage Lands more

specifically are seen as important hubs and connectors in the regional network of snowmobile trails.

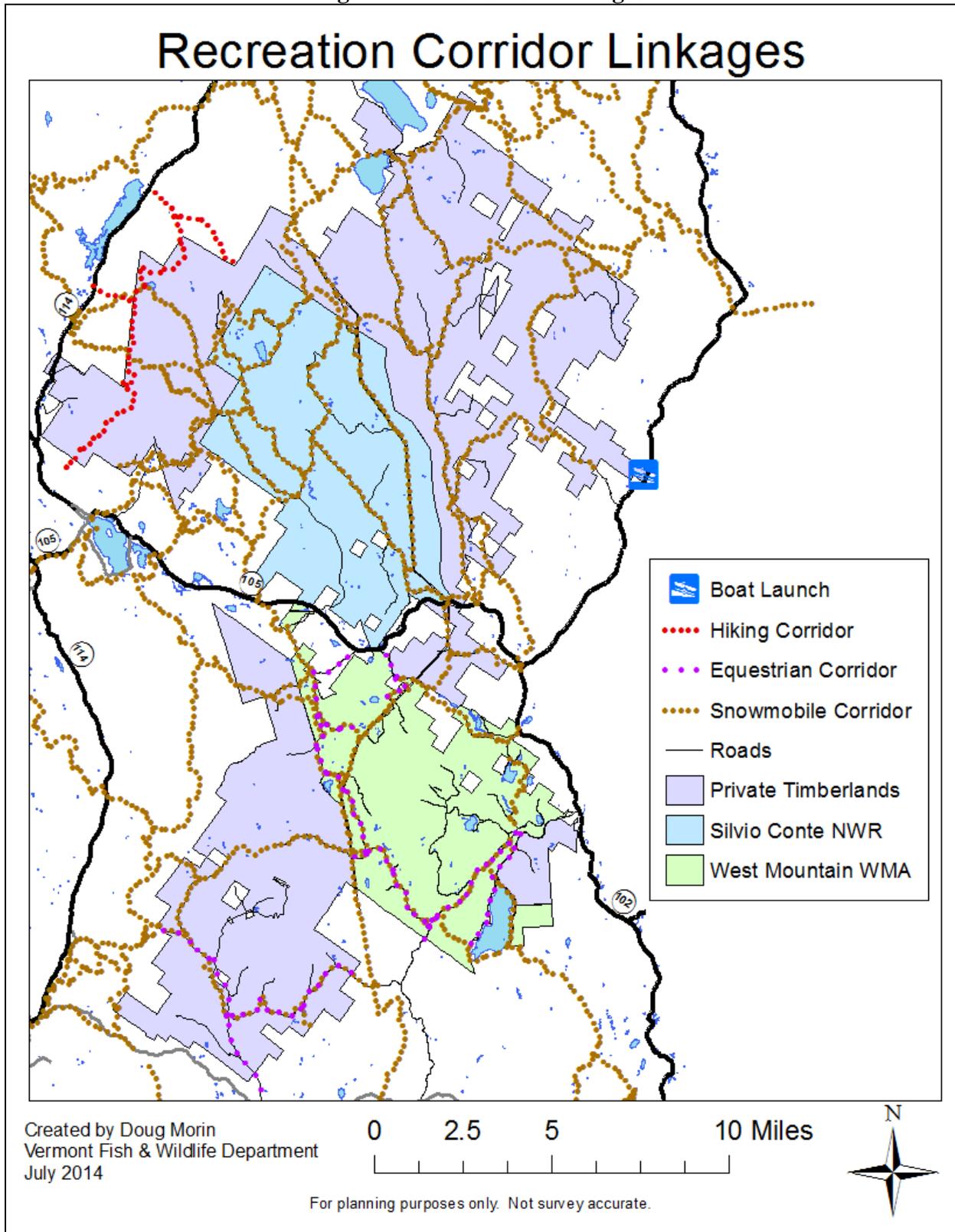
c. Hiking Trail Linkages

The potential exists for hiking trails interconnecting with other trails on surrounding lands. However, no specific proposal has been submitted thus far.

d. Equestrian Linkages

Corridors for horseback riding extend beyond the West Mountain WMA across private lands, the Private Timberlands, and other state-owned land (Victory Management Unit). There is potential for expanding this network farther.

Figure 27: Recreation Linkages



9. Summary of Closures Affecting Public Use and Recreation

As described in several of the preceding parts of Section VI, there are a number of instances in which public access on the West Mountain WMA will be curtailed to protect public safety, facilities, resources, or the privacy of camp leaseholders. These closures, which affect public access to roads, private camps, and areas with active logging operations, are listed below.

- Closures for public safety and compliance with the State Lands Easement
- Closures in areas of active forestry operations
- Short- and long-term closure of roads in the Core Area
- Temporary road closures
- Closure of recreation corridors
- Exclusion zones around private camps

H. CULTURAL RESOURCE MANAGEMENT

1. Background

In the report, People, Land and History, prepared by researchers at the University of Maine at Farmington, Maine (Scharoun et. al, 2001), historic and archaeological resources were inventoried and analyzed, research needs were assessed, and management recommendations were proposed. The report includes a summary of significant areas. Two areas within the West Mountain WMA were identified in the UMF report as historically significant:

Paul Stream: Paul Stream is an important historic landscape associated with the logging and saw milling industries. As a stream used by log drivers, Paul Stream is a significant historic feature in the cultural landscape. Historical sites other than those shown in Figure 13 may exist also along this waterway. Water-powered mill sites, dams and logging camps are among the kinds of historic sites that might be found. Lower portions on this stream, beginning at Brown's Mill are likely to contain a higher concentration of water-powered mill sites than portions above Brown's Mill. However, upper portions indicate the presence of dams and camps and therefore also may contain additional sites and features associated with logging, lumbering and agriculture.

Dennis Pond Brook/Wheeler Stream: The area surrounding Dennis Pond Brook and Wheeler Stream is another historically sensitive area. Early saw mills were located in this area according to the historic record. Remnants of a mill site have been located on lower portions of Wheeler Stream. Other sites may remain to be identified in the future. Early saw mill and other historic sites are associated with lower portions of most feeder streams into the Connecticut River. The Dennis and Wheeler ponds area also contains a segment of an early transportation route, the Magog Road. Cellar holes and other signs of habitation and transport may exist along this corridor.

2. Management Recommendations

The UMF report includes a variety of management goals and recommendations that would protect cultural resources. The Agency will review these recommendations over time to determine what measures are appropriate, and will develop a specific cultural resources protection plan for the West Mountain WMA based on these recommendations and other relevant considerations. On an interim, basis, consistent with these recommendations, the Agency will:

- Consult with the Vermont Division on Historic Preservation regarding establishing appropriate buffer zones around known sites as well as linear features (*i.e.*, Magog Road, waterways); and
- Conduct periodic monitoring of known archaeological and historic sites.

In addition, the Agency will follow standard management protocols for protecting cultural resources from impacts due to management activities. These include:

- Prior to any construction activity or other activity that involves earth moving, including logging, the Agency will:
 - 1) Examine archaeological sensitivity maps and maps plotting known archaeological sites;
 - 2) Conduct a field inspection, using a qualified professional archaeologist, for potential historic Euro-American remains, and ground-truth the results of the archaeological sensitivity model for Native American remains; and
 - 3) If the proposed action would result in potential adverse effect to known or expected cultural resources and avoidance is not an option, initiate archaeological investigations (phase I survey –identification; phase II testing – evaluation; and phase III data recovery – mitigation).
- In the event cultural remains, including but not limited to human remains are *inadvertently* identified in the West Mountain WMA, protocols will be followed as detailed below.
 - 1) If archaeological remains are newly identified, determine preliminary location with GPS and contact the Vermont Division for Historic Preservation and the appropriate Federal or State agency depending on property jurisdiction. Vermont Division for Historic Preservation guidelines for archaeological studies should be followed (Pebbles 1989).
 - 2) If human remains are found, or suspected, their treatment will be guided by the policy of the Advisory Council on Historic Preservation (ACHP) (Appendix III) including in-place preservation and protection followed by immediate contact with Vermont's

Abenaki communities, the Vermont Division for Historic Preservation, the Chief Medical Examiner and the appropriate State agency.

3. Camp Culture Resource Investigations

During the acquisition process for the Champion lands, the Vermont Legislature decided that, consistent with past practice and policy, private camps could not be allowed on public land in perpetuity. Therefore, it called for removal of those camps at the end of the current lessees' lives plus 20 years. The State Lands Easement also includes this same provision.

Because this directive from the Legislature legally settled the issue, the cultural significance of the seasonal camps was not the subject of a separate formal study during the development of this plan; however, the broader issue of cultural significance of these lands and resources to the public at large was considered. Public comment throughout the development of this plan indicated that this area of Vermont was special for its remoteness, traditional activities related to utilization of wildlife resources, and natural resource based culture, which includes the private camps within the now publicly owned lands.

Therefore without undermining the Vermont Legislature's decision to remove the camps, VDFW believed it was important to achieve a better understanding of the importance of these lands, or "place meaning," and the cultural significance that users attach to them and their natural resources. To this end the Fish and Wildlife Department in partnership with the Lyndon State College Institute for Northeast Kingdom Studies (LINKS) initiated a formal study of the socio-cultural aspects of seasonal camps and cottages in the Northeast Kingdom of Vermont. The final report, issued in 2004, is listed in Appendix E, and describes the uses of camps, their meaning to owners, and aspects of "camp culture."

Further, separate from the planning process for the West Mountain Wildlife Management Area, the State Legislature in section 57. of No. 61 Acts of 2001 authorized a "Study Committee On West Mountain Wildlife Management Area Leaseholders" to consider and recommend actions relative to leases held by camp owners in the West Mountain Wildlife Management Area. This committee submitted a report to the Legislature in January of 2002, see Appendix E for full information.

Composed of members from diverse interests, this committee made recommendations including, that the legislature allow camp owners to sell their leases and that more permanent alternatives to the "life-plus-20" lease terms (either private ownership or perpetual leasing of camp lots) were contrary to the best interests of most Vermonters.

I. LAND ACQUISITION

Statewide strategies and priorities for land acquisition by the Agency of Natural Resources can be found in the ANR "Lands Conservation Plan", adopted in October 1999. The purpose of the plan is to guide the Agency in land transactions. It describes land acquisition priorities and outlines a process for evaluating and acting on land offers that come before the Agency. The

priorities, outlined below, will be used to evaluate any additional acquisitions in the vicinity of West Mountain WMA.

1. Land Acquisition Priorities

a. Recreation Resource Values and Priorities

Water Resources – priority will be given to parcels that provide meaningful access to public waters; protection and access to important swimming holes; protection for undeveloped/remote ponds, rivers and shorelines; and opportunities for primitive canoe camping.

Trails and Greenways – priority will be given to parcels that provide protection for long distance trail systems including trailhead areas; protection for prominent mountaintops and ridgelines that have existing trails or are otherwise suitable or desirable for trails; meaningful linkages between blocks of conserved land with new trail opportunities; and for the development of water recreation trail system.

Needed Additions to Existing State Parks – priority will be given to parcels that provide buffers to State parks, are inholdings, or are adjacent additions needed for planned facility expansions.

b. Ecological Resource Values and Priorities

Unique or Special Natural Areas – priority will be given to parcels that protect exemplary or significant natural communities and habitat for rare, threatened or endangered species.

Critical Wildlife Habitat and Corridors – priority will be given to parcels that protect critical wildlife habitat such as deer wintering areas, waterfowl production areas and wildlife travel corridors.

Connections and Corridors between Blocks of Public Land – priority will be given to parcels that provide connections between public lands.

c. Forest Resource Values and Priorities

Establishing working forest conservation easements will be a priority to promote sustainable timber harvesting while ensuring that the following values inherent in large acreages of forest land are protected in perpetuity: wildlife and fisheries production; aesthetic values; recreation opportunities; and watershed values. Such easements are also intended to discourage forest fragmentation.

d. Other Additions to Agency Lands

Acquiring additional parcels that are adjacent to or within other existing Agency holdings (not just parks) and contain resources with important public values or serve a specific

function that is important to the management of Agency lands or to public use and enjoyment thereof, remains a high priority for the Agency. Examples include inholdings, parcels that enhance or facilitate public access to existing Agency lands, and parcels that are necessary for maintaining or enhancing the integrity of existing State holdings.

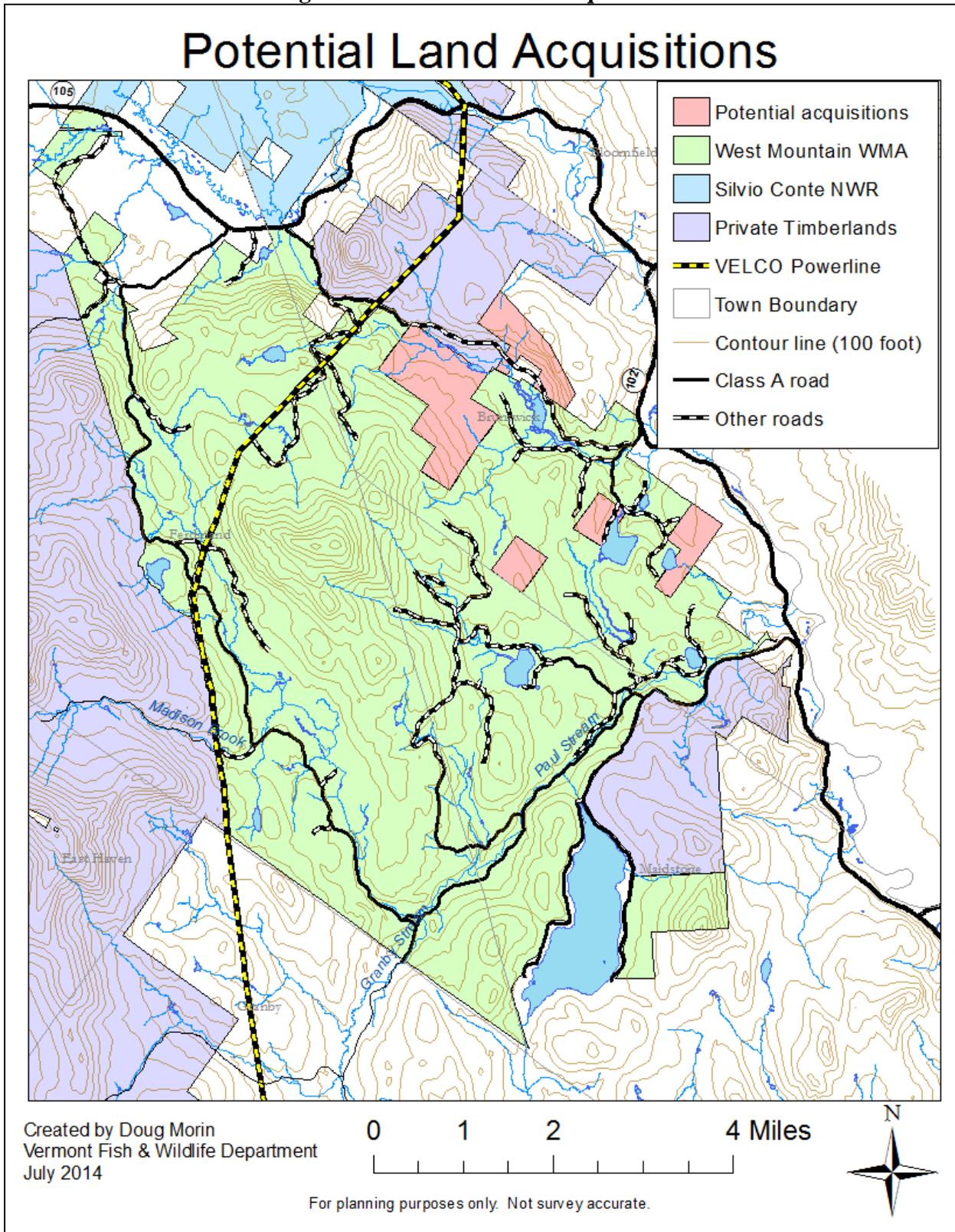
Parcels that address one or more of the above priorities will be reviewed by the Agency's Land Acquisition Review Committee to determine their suitability and priority for State acquisition. In addition to the considerations outlined above, the Committee will consider the specific circumstances for each parcel, including location, size and configuration, presence of structures, property encumbrances or restrictions, threats, management considerations, and local support for acquisition. The Committee's recommendations will then be forwarded to the Agency Secretary for action.

2. Potential Land Acquisition

Since the state took ownership of West Mountain WMA, The Nature Conservancy of Vermont has purchased five parcels that are inholdings of or adjacent to West Mountain WMA (Figure 28, with the intention of conveying them to the state.

These parcels are all subject to conservation easements, which will continue to encumber them if and when the lands are transferred to the state. As part of the WMA, these parcels will be managed in accordance with their legal restrictions, and in the context of the surrounding WMA lands and the direction of the property as a whole.

Figure 28: Potential Land Acquisitions



J. PUBLIC INFORMATION, EDUCATION AND OUTREACH

The citizens of Vermont have a right to accurate information about their public lands and easements that the State and other organizations hold for their benefit. Therefore, information on the West Mountain WMA will be included in State publications on the nature and character of public lands, and shown on maps prepared by the State for these same purposes. Further, Agency personnel will, of course, have a responsibility to characterize the opportunities on state lands accurately and will, in response to inquiries, provide such information for the West Mountain WMA.

However, it is important to remember that the West Mountain WMA has a large number of very sensitive resources within its boundaries. Further, the management direction established for both for the WMA and the Kingdom Heritage Lands as a whole is intended to maintain the relatively remote, rugged and undeveloped character and the special recreation opportunities that are available because of this character, *e.g.*, hunting and bushwhacking in a big woods setting. Therefore, information provided regarding the West Mountain WMA, while accurate, will not be directed at significantly promoting and increasing the level of use, rather it will be aimed at disseminating factually correct information and informing people about the area's intended management and the sensitivities of its resources. This is a subtle but important distinction and is part of a conscious strategy to maintain the area's character and not to exceed the capacity of its resources to accommodate use.

Educational efforts on and about the West Mountain WMA and the Kingdom Heritage Lands as a whole are to be aimed at informing the public on these same topics – that is, informing people about the intended management of the area, the importance of protecting sensitive resources, carrying capacity issues, and the need to manage State lands to provide a diversity of recreational opportunities for the public. In this latter regard information will describe the niche that West Mountain WMA occupies in the continuum of developed to undeveloped State lands in Vermont and the spectrum of recreation opportunities available as a result of this continuum. Onsite educational activities will be managed in a way that is consistent with these principles. For example, onsite group use and size will be carefully reviewed to assure that carrying capacities (social, physical and ecological) are not exceeded, *e.g.*, it would be inappropriate to schedule onsite field trips by school groups during moose or deer hunting season. Further, because the mere presence of a large number of people could impact wet, mucky sites and sensitive biota (*e.g.*, breeding birds), it would not be appropriate to have large numbers of people guided into the middle of sensitive bog areas except during the winter. (In this regard, use by groups larger than ten people and all commercially guided activities require advance written authorization from ANR. See section VI.F.5. for more information on this topic.)

Relationships with numerous institutions or organizations have been or may be established to encourage appropriate use of the area, including the Northwoods Stewardship Center, the Vermont Outdoor Guides Association, the Boy Scouts of America, and Vermont Audubon.

K. ENFORCEMENT

Enforcement of state laws and regulations on West Mountain WMA is performed primarily by Vermont Fish and Wildlife Department game wardens and Vermont State Police officers.

In general, State Game Wardens are empowered to enforce all state laws. The focus of their enforcement is civil crimes, usually pertaining to fish, wildlife, and plant violations and motor vehicle violations (*e.g.*, snowmobiling, all terrain vehicles). Wardens are stationed throughout the region, report to a Lieutenant warden stationed in St. Johnsbury, and enforce such regulations by providing frequent patrol from a four-wheel drive vehicle, boat, snowmobile, and on foot.

In addition to the above, Game Wardens perform enforcement of laws pertaining to destruction of state property on wildlife management areas, search and rescue, fire warden duties, and assist with all emergency incidents that may occur.

Vermont State Police officers primarily enforce criminal laws (*e.g.*, personal property, bodily harm), as well as snowmobile violations. In addition, State Police also provide search and rescue and emergency assistance. State Police Officers patrol out of their St. Johnsbury police barracks.

State Police officers and State Game Wardens readily coordinate their activities, particularly regarding investigations and usually at the field level. Both State Game Wardens and State Police Officers are dispatched through a single dispatcher at the St. Johnsbury police barracks.

Staffing of law enforcement personnel in both the Fish and Wildlife Department and the Vermont State Police are below historic levels, despite increasing demand for their work. As a result, enforcement activities must often be prioritized and response times may vary accordingly. However, five new game warden positions were recently approved by the Vermont Legislature in order to enhance enforcement activities.

L. EMERGENCY RESPONSE

Emergency response falls into two distinct categories: accidents and medical emergencies; and search and rescue. With a projected increase in both dispersed pedestrian uses and corridor-based activities such as motor vehicle travel and snowmobiling, a corresponding increase in the need for emergency services can be expected. Different protocols exist for each of the two categories of emergency response, as described below.

1. Accidents and Medical Emergencies

All medical emergencies and accidents should be referred to the closest provider by dialing 9-1-1. Depending on where the assistance is needed different units will respond. It is expected that Colebrook, Brighton, Lyndon, Stratford and Groveton may all at one time or another be asked to respond to an emergency. These providers will be supplied with information to aid in locating victims.

2. Search and Rescue

All search and rescue activities in Vermont are coordinated by the Vermont State Police.⁸³ All requests for this activity on West Mountain WMA and on the Private Timberlands should go directly to them. The Vermont State Police advise that individuals not organize or begin searches prior to instructions from them. At the request of the Vermont State Police, ANR will make resources available to aid in search and rescue efforts, including maps, gate combinations and personnel knowledgeable of the terrain where the search is occurring. State Game Wardens are involved with search and rescue efforts in cooperation with State Police.

M. MONITORING, EVALUATION, AND FUTURE RESEARCH

1. Monitoring and Evaluation

a. Needs and Concerns

Monitoring and evaluation are essential to any adaptive management program as they provides information necessary to track progress in achieving management goals and objectives and the effectiveness of particular approaches to resource management issues.

For the development of this Management Plan, selected natural resource field inventories were conducted with regard to the following: fish, breeding birds, amphibians, reptiles, odonates, bats, butterflies, insects, small mammals, beaver, and natural communities. (See Section IV of this document for further information). In addition, traffic counters were used to gain information on public use across the seasons in many different locations, assessments were conducted of the condition of roads and other recreational infrastructure, and information was solicited from the public on levels of use and user conflicts.

Additional monitoring and evaluation are needed on wildlife, ecological and recreational management efforts in the West Mountain WMA. **An example of how this process works to inform recreational management efforts follows, but the same process is applicable to tracking the success of wildlife habitat management and ecological restoration efforts.**

Levels of recreational use have implications for natural resources, the types of recreational activities occurring on a given piece of property and the quality of recreational experiences. With regard to natural resources, recreational use can have direct or indirect ecological effects. For example, indirect effects can result when recreational vehicle or foot traffic results in soil erosion or disturbance to wildlife. Levels of recreational use can also impact the types of recreational use taking place on an area and the quality of recreational experiences. Further, interactions among recreational users can degrade the quality of recreational experiences for those activities or users that are dependent upon or seeking a certain level of solitude. For example, certain activities, such as group tours, may interfere with the quality of hunting experiences during specific times of the hunting season.

⁸³ The State Police are part of the Vermont Department of Public Safety, and have the central role of coordinating and implementing the Department's search and rescue responsibilities.

As a result, it is important to monitor recreational use as part of an adaptive management program to maintain the nature and quality of resources and ensure that recreational experiences are not adversely impacted.

Regarding the Kingdom Heritage Lands, based on extensive interactions with the public through a series of meetings held during the planning process, levels of recreational use are not believed to be a problem at this time. Field surveys identified a few spots with soil compaction and erosion but these are relatively minor and can be easily mitigated. (See Section IV.E. for information on levels of recreational use and Section IV.D.4. for information on recreational sites.)

Furthermore, the strategy of maintaining the area's relatively remote, rugged and undeveloped character, as articulated in the goals and objectives for these lands, should avoid, or at least reduce, the problem of overcrowding in the future. This consideration was a conscious part of the decision to adopt this approach to management.

Despite these facts and the desire to maintain the character and condition of the area for the future, levels of recreational use could become a problem either for specific areas or on a more widespread basis. Therefore, recreational use should be monitored as part of an adaptive management program aimed at insuring that resources are not stressed or that existing traditional recreational uses are displaced or adversely impacted.

Effects of recreational use might take several forms. Among those that are most significant, and that should be the focus of the monitoring strategy include:

- 1) *Physical Capacity*: Physical capacity refers to the capability of these lands to physically accommodate recreational and other forms of public use. Can existing facilities or infrastructure such as roads, parking areas, snowmobile trails, and hiking trails handle the amount of use that is currently taking place and that can be anticipated to occur in the future? Are parking areas able to accommodate the number of vehicles that may be present at any one time? Are snowmobile staging areas adequate to meet demand? Physical capacity effects are usually localized – on a specific snowmobile staging area at the terminus of a popular trail, a road providing access to popular leaf-viewing areas, or a narrow bridge that will not accommodate two way traffic. These effects are also time sensitive – a snowmobile parking area may fill on a weekend but may be nearly empty the rest of the week, or a road providing access for leaf-viewing might be crowded during leaf season and virtually empty during other times.
- 2) *Social Effects*: Social effects refer to the extent to which the enjoyment of a recreational activity is affected by increased numbers of users or interactions with those participating in other recreational activities in the same vicinity. Potential conflicts among all users, including horseback riders, hikers, bicyclists, snowmobilers, and hunters should be monitored and, if needed, addressed. Social effects are often difficult to quantify. One person's perception of desirable levels

of social interaction or of over-crowding will differ from that of another. Perceptions may also differ from one time to another even for one individual. A person who, for example, wishes to escape a hectic day at work by observing wildlife at twilight may have a different expectation than the same person visiting the same area on a family picnic or snowmobile outing.

- 3) *Ecological Effects*: Ecological effects include to the extent to which public use is compatible with maintaining the ecological resources and integrity of the wildlife management area. For instance, does hiking, snowmobiling, or horseback riding damage sensitive plant communities? Do these or other recreational activities disrupt mammal or bird populations? Do activities that occur near streams or ponds negatively affect water quality? It is anticipated that dispersed pedestrian uses will have significantly less ecological effects than the more concentrated, intensive activities.
- 4) *Effects on Public Safety*: Effects on public safety include situations where increases in the numbers of recreational users, introduction of new types of recreational use, or concentrating uses in certain areas may increase the potential for recreational users or others in the area to experience physical harm. What is the possibility for collisions between automobiles and snowmobiles where trails meet public roads? What is the possibility for harm to children and other walkers by vehicles driving near popular recreation areas? An evaluation of public safety must use as a departure point the fact that there is an inherent risk in participating in any outdoor recreation activity. The question that needs to be addressed, then, is whether management decisions – to add new uses, to relocate uses, or to otherwise facilitate increased public use – might increase the potential for accidents to happen and whether or not these risks are tolerable, and/or can be mitigated.
- 5) *Conflicts with Other Non-Recreational Uses*: Recreational use may come in conflict with other legitimate uses of these lands, such as wildlife and timber management.

b. Strategy for Monitoring and Evaluation

An effective monitoring program starts with establishing baseline conditions. This involves inspecting and documenting conditions in the field, particularly at selected sites where significant recreational use occurs. (See Section IV.D.4. for more on known recreational sites.) The results of this work should be documented through a combination of photographic records, surveys, and a natural resource inventory and evaluation. This effort to establish baseline conditions should involve evaluating:

- Road, parking lot, and trail conditions;
- Impacts on natural resources (*e.g.*, soil compaction, erosion, damage to vegetation, disturbance of wildlife; introduction of nonnative invasive species);

- Levels of use;
- Quality of recreational experiences; and
- Reports of accidents and injuries.

Even if no adverse conditions are evident, it is important to document the condition of the resources, as problems could arise in the future.

Following these inventory efforts managers can develop resource and recreation quality thresholds to establish when impacts would be judged to be unacceptable. It is best to set these thresholds conservatively so that adverse impacts can be detected early rather than when they have reached substantial proportions.

If, as is the case of the Kingdom Heritage Lands, one of the objectives of management is to maintain **existing** recreational opportunities, establishing a baseline of information about recreational uses involves interviewing and surveying recreational users to document specific recreational activities, levels of use, and the quality of the recreational experiences available on the property. This work should also involve assessing the tolerance of recreational users to changes in the experience before the quality of that experience is felt to be unacceptably reduced, or the use in question is displaced to another area.

Establishing such baseline information and thresholds, at which further change is unacceptable, is fundamentally important as managers need to be able to track trends and document changes in conditions and identify the point at which additional management action is needed. In this regard, it is important to recognize that this is not just a matter of documenting average user satisfaction at any point in time. For, as in this case, if an objective of management is to maintain existing uses, managers need to understand what makes the area attractive and make sure that the use, or uses, in question are not being displaced over time.

To identify trends in resource conditions, recreational uses, or the quality of recreational opportunities, baseline information needs to be supplemented with information from periodic monitoring of the same parameters assessed in establishing baseline conditions. The time period between monitoring activities depends on the resources and uses involved. In this case reevaluation every five to ten years should be sufficient. When monitoring is conducted the same information should be collected at the same locations to compare resource conditions and recreational conditions over time and to determine if thresholds have either been exceeded or are in danger of being exceeded. In such cases, this information and adaptive management would lead to corrective action to insure that the goals and objectives for the management of the Kingdom Heritage Lands are achieved.

To summarize:

This Management Plan does not define specific actions that will be taken to monitor recreational use. Rather, it offers a five-point strategy for developing a monitoring plan. The five aspects of recreational use described above – physical capacity, social capacity, ecological capacity, public safety, and conflicts with other uses – should be the aspects of recreational use monitored. The strategy involves the following elements:

- 1) A benchmark should be established for each aspect of recreational use that represents the status quo. Using ecological capacity as an example, the question that needs to be addressed is: What is the existing situation regarding the effects of recreational use on the various aspects of the physical and biological environment?
- 2) An additional threshold should be established for each of the five components of recreational use that defines a theoretical condition that represents the maximum amount of adverse effect that will be tolerated. This might be lower than, equal to, or higher than the condition at present.
- 3) Near-term corrective action plans should be established for all instances where the threshold is lower than or equal to the present situation.
- 4) A timetable and strategy should be developed for periodically and methodically monitoring the ongoing effects of recreational use covering all five aspects of use identified as important. This monitoring will involve site inspections, user surveys, analysis of records (*e.g.*, information on levels of use accidents) and other methods. This should include close communication with the managers of the other Kingdom Heritage Lands parcels to develop collective strategies for addressing issues that transcend land ownership boundaries.
- 5) To assist in monitoring changes and/or increases in recreational use over time, a program should be established for counting recreational use at strategic locations and times. The purpose is to establish trends regarding the amount and type of use that is occurring and to discriminate between levels of use during different seasons and times of the week.

2. Research

Good management of public lands requires knowledge of the resources on those lands. Although rather extensive species inventories and natural community mapping were undertaken as part of the planning process, there are many gaps in the knowledge of the animals, plants and natural communities that inhabit the WMA, and even less is known about the ecological interactions and processes that are part of the WMA ecosystem.

The complementary management strategy of an Active Management Area and a Core Area provides a unique opportunity to learn about the species, habitats, and natural processes within the Wildlife Management Area. In fact, one of the benefits of a Core Area is in serving as a “benchmark” for studying how the forces of nature influence the land. A Core Area will also

enable us to better understand the effects of human activities on actively managed sites. In effect, the Core Area will serve as a “control” site for much of the research on these questions. This benefit of the Core Area, however, can only be realized if there is quality research that is designed to describe and monitor various ecological aspects of the WMA and the broader Northeastern Highlands region.

In general, only non-destructive research will be permitted within the Core to maintain the ecological integrity of the area. Furthermore, research interests must be weighed against potential impacts to the species, habitats, and natural processes within the Core, as well as against potential conflicts with other permitted uses within the entire WMA.

Research priorities for the wildlife management area, particularly involving the Core Area, may be directed at:

- Species occurrence, distribution, and abundance data, particularly for species for which there is little information or those that are rare, threatened, or endangered;
- Population dynamics (*e.g.* source-sink patterns, reproductive success, etc.);
- Changes over time in the structure and composition of natural communities, particularly matrix and state-significant natural communities;
- Natural ecological processes, such as disturbance regimes and interspecific interactions;
- Effects of management and recreational activities on the Core Area.
- The ecological effects and effectiveness of road closure methods.

ANR lacks the staff and funds to carry out many large-scale or long-term research projects. As a result, research proposals will be solicited and encouraged from other organizations and institutions, and grants may be sought to support ANR staff or others to carry out research projects. Research within the West Mountain WMA requires a permit and must be reviewed and approved by the Vermont Fish and Wildlife Department. Research proposals will be evaluated by the Department based on their consistency with the goals and objectives for the West Mountain WMA as a whole, and depending on the location of the research, consistency with the goals and objectives for the actively managed and/or Core Areas. They will also be evaluated for credibility of the researcher and/or institution, effects on biological resources, potential conflicts with other permitted uses, and other similar criteria. In general, research data and results must be reported to the Department in order to advance its understanding of the West Mountain WMA.

N. COMMUNICATION AND COORDINATION

1. Local communities

In recognition of the important roles local communities play in these lands, including public access, emergency response, and resource management, and in response to the request of the Town of Brunswick, ANR will meet annually with the town Selectboard and/or Planning Commission to discuss ongoing and planned management of these lands. ANR will hold similar meetings with other local municipalities at their request.

2. Kingdom Heritage Lands Partners

The development of this Management Plan has involved all of the owners (ANR, Plum Creek, and USFWS) and easement holders (VHCB, TNC and VLT) of the Kingdom Heritage Lands. Communication among the parties and coordination of planning efforts has been key to determining the management strategies for this Plan. As a practical matter, staff of all the entities named above are in regular contact by phone, e-mail, and in person.

In addition, formal communication on an annual basis is addressed in the State Lands Easement for the West Mountain WMA and in the Stewardship Memorandum Of Understanding (MOU) among and between ANR, VLT, TNC and VHCB. Although USFWS is not a party to the Stewardship MOU, it executed a “Conservation Partnership Agreement for the Nulhegan Basin and Paul Stream Areas” with ANR on January 28, 1999. This agreement states that: “Both government entities intend to work collaboratively to conserve and manage the outstanding ecological, cultural and economic, and recreational values of the Nulhegan Basin—Paul Stream Area ...”

The following subsections provide a brief summary of the communication and coordination requirements contained in the State Lands Easement and the Stewardship MOU.

a. State Lands Easement Requirements

Section I.C of the State Lands Easement requires an annual conference between ANR, TNC, and VHCB to review proposed management activities and to evaluate management activities commenced in the previous year. As the primary holder of the Conservation Easement on the Private Timberlands portion of the Kingdom Heritage Lands, VLT may be included in this conference for matters related to management activities on the West Mountain WMA that impact adjacent areas of the Private Timberlands.

b. Stewardship Memorandum of Understanding Requirements

The following provisions of the Stewardship MOU related to communication and coordination are derived from and elaborate upon the requirements of the State Lands Easement.

Section III.D of the MOU requires an annual conference between TNC and ANR and/or ANR’s managing department to address the following:

- a. Status of management plans and timeline for implementation;
- b. Discussion of any proposed activities that are permitted by the State Lands Easement but require prior written approval of TNC/VHCB;

- c. Disclosure and discussion of any plans ANR may have for application of herbicides and or pesticides;
- d. Description of objectives, location and timing of any sustainable forestry activities ANR proposes to undertake; and
- e. Plans for management of the Special Treatment Area(s) (now the “Core Area”).

Also, pursuant to section V.A.(6) of the MOU, ANR is required to convene an annual meeting with VHCB to report on issues which have been raised by TNC and VLT and to report on any decisions made pursuant to section V.C (delegation of approvals to ANR).

O. OTHER MANAGEMENT RECOMMENDATIONS

During the process of developing the original management plan, teams of expert researchers conducted field inventories of the ecological and cultural resources of the West Mountain WMA. In addition to describing those resources (as summarized in the relevant parts of Section IV of this document), the teams provided detailed recommendations for future management that would further the protection, enhancement, and/or public understanding of those features. These recommendations are contained in the reports from the individual research teams, which are listed in Appendix E and available on request from ANR. Over the lifetime of this Plan, ANR may work with TNC, the Vermont Division for Historic Preservation, and other appropriate collaborators to evaluate the specific recommendations from each of the teams, identify priorities, and implement those of highest priority to the extent possible given budgetary and staffing limitations.

VII. PROCESS FOR AMENDING THE PLAN

As required by the provisions of the 1999 Vermont Budget Adjustment Act, this Plan will be reviewed and updated as necessary every 10 years with involvement of Vermont citizens and municipalities. Such updates will be developed collaboratively by ANR and the holders of the State Lands Easement (TNC and VHCB), and will be consistent with ANR's standard planning processes.

The Plan may be amended at any point up until it is updated. Either minor or major amendments are possible. Minor amendments are those that do not change the fundamental direction of management, approaches to management issues, or public uses, but rather modify details of the plan. Examples of minor amendments include increasing the emphasis on uneven-aged vs. even-aged management to benefit particular wildlife species or rerouting a recreation corridor in the same general vicinity, and other similar changes. Major changes include changes in the fundamental direction outlined in the plan. Examples include substantively changing the goals and objectives of the plan, changing the major approach(es) to achieving the goals and objectives, adding or eliminating uses, adding or eliminating recreation corridors, and other similar changes.

The process for considering adoption of a minor amendment includes an opportunity for public comment as follows:

- Posting the proposed amendment on ANR's website;
- Notifying parties known to be interested in the issue; and
- Allowing 30 days for written or electronic public comment before a final decision by ANR in collaboration with the easement holders.

The process for a major amendment includes all of the above, and:

- Publishing a legal notice consistent with the requirements of State law;
- Conducting a public meeting on the proposed amendment; and
- Posting on the website, and in writing to those that request it, the decision on the amendment and reasons therefore, a summary of the public comments received, and an explanation of how they were considered in the decision-making process.

To be approved, amendments must be judged to be consistent with the terms of the easements on the property. Other factors to be considered include whether or not:

- The change is needed to achieve the Agency's mission and its goals for the West Mountain WMA; and/or

- Changed circumstances render the plans existing provisions ineffective or counterproductive in achieving their intended purposes; and/or
- New knowledge or information indicates that the approaches specified in the plan are ill considered or that more effective means are available for achieving objectives.

Consistent with the State Lands Easement on the property, decisions on amendments shall be reached by ANR in collaboration with the easement holders (*i.e.*, TNC and VHCB).

VIII. APPENDICES

A. Summary of easements and other important legal and policy factors affecting future use of the Kingdom Heritage Lands

B. List of legal references

C. Summary of public involvement during the original (2002) planning process

D. Land management classifications

E. List of supplemental studies and references developed to support the plan

F. Data sources for figures

A. SUMMARY OF EASEMENTS AND OTHER IMPORTANT LEGAL AND POLICY FACTORS AFFECTING USE OF THE KINGDOM HERITAGE LANDS

	Private Timberlands	West Mountain WMA	Conte Fish & Wildlife Refuge (Nulhegan Basin Division)
Area (approximate)	84,000 acres	22,000 acres	26,000 acres
Easements	1) Conservation and working forestry 2) Public access	1) Conservation and public access	None
Purposes	<p>Conservation Easement:</p> <ol style="list-style-type: none"> Principal objective: Establish & maintain productive forestry resources & facilitate economically sustainable forest management while minimizing negative impacts on conservation & recreation values Secondary objective: Conserve biological diversity, soil productivity, native flora & fauna, and ecological processes <p>Access Easement:</p> <ol style="list-style-type: none"> Provide perpetual public access for traditional and/or compatible recreational uses (including fishing, hunting—including training and using dogs, trapping, equestrian uses, birdwatching, hiking, biking, snowmobiling, cross-country skiing, and snowshoeing) while limiting negative impacts of access on landowner’s forestry use. Provide dispersed pedestrian access to whole property while confining motorized, mechanized and equestrian uses to defined corridors. Provide recreational links to adjacent public lands and trails. Effectively manage access consistent with purposes and limitations of Conservation Easement. 	<p>Conservation & Access Easement:</p> <ol style="list-style-type: none"> Primary purposes: <ol style="list-style-type: none"> Conserve and protect biological diversity, wildlife habitat, natural communities, native flora and fauna, and ecological processes. Foster compatible pedestrian recreational use. Secondary purposes: <ol style="list-style-type: none"> Provide non-commercial recreational uses with more intensive uses (motorized, mechanized, equestrian) confined to defined corridors, provided any negative impacts of those intensive uses on natural values are minimized. Conduct sustainable wildlife management and utilization Conduct sustainable forest management Protect remote, undeveloped, and scenic open space resources 	<p>Legislated purposes:</p> <ol style="list-style-type: none"> To conserve, protect and enhance the Connecticut River populations of Atlantic salmon, American shad, river herring, shortnose sturgeon, bald eagles, peregrine falcons, osprey, black ducks, and other native species of plants fish and wildlife; To conserve, protect and enhance the natural diversity and abundance of plant, fish and wildlife species and the ecosystem upon which these species depend within the refuge; To protect species listed as endangered or threatened, or identified as candidates for listing, pursuant to the Endangered Species Act of 1973 as amended (16 U.S. 1531 et seq.); To restore and maintain the chemical, physical and biological integrity of wetland and other waters within the refuge; To fulfill the international treaty obligations of the United States relating to fish and wildlife and wetlands; and To provide opportunities for scientific research, environmental education, and fish and wildlife oriented recreation and access to the extent compatible with the other purposes stated in this section when they don’t interfere with or detract from the mission of the National Wildlife Refuge System or the

			purposes for which the Refuge was established
Primary Uses	<ul style="list-style-type: none"> · forestry · open space · non-commercial recreation · education 	<ul style="list-style-type: none"> · wildlife habitat conservation and management · natural areas · non-commercial recreation · forestry · open space 	<ul style="list-style-type: none"> · wildlife and habitat conservation and management · public uses where appropriate and compatible with wildlife values
Residential Activities	Generally prohibited	Generally prohibited	Generally prohibited
Commercial Activities	Generally prohibited	Generally prohibited	May be allowed subject to Special Use Permit
Industrial Activities	Generally prohibited	Generally prohibited	Generally prohibited
Mining / surface disturbance	<p>Generally prohibited</p> <p>Sand and gravel extraction permitted for maintaining roads and driveways on site</p>	<p>Generally prohibited</p> <p>Sand and gravel extraction permitted for maintaining roads and driveways on site or on adjacent state lands</p>	Generally prohibited
Rights-of-way, driveways, etc	<p>Construction, development or maintenance generally prohibited without written permission from Vermont Land Trust (VLT)</p> <p>Maintenance of driveways to existing seasonal recreation camps permitted</p>	<p>Construction, development or maintenance generally prohibited without written permission from The Nature Conservancy (TNC)</p>	<p>Establishment of new ROWs generally prohibited.</p> <p>Access to existing camps administered via Special Use Permit. Deed allows for access across several refuge roads for timber management purposes on adjacent lands.</p>
Roads	<p>Landowner and ANR will maintain existing road system in coordination with USF&WS</p> <p>Landowner permitted to maintain existing forestry roads, and to construct new forestry roads with VLT's approval</p> <p>Other road construction or maintenance generally prohibited without written permission from VLT</p> <p>Landowner must repair damage caused by its activities; ANR must repair damage caused by public use</p> <p>Landowner and ANR may close roads to protect public safety or roads' integrity</p>	<p>ANR permitted to maintain and replace existing roads and construct new roads if consistent with easement purposes and permitted by Management Plans</p> <p>ANR permitted to construct and maintain roads necessary for sustainable forest and wildlife management if in accordance with forest management plan</p> <p>Other road construction or maintenance generally prohibited without written permission from The Nature Conservancy (TNC)</p>	<p>USF&WS may maintain and replace existing roads, close roads, and construct new roads based on wildlife considerations, management needs, or public safety</p>

	Landowner permitted to close all roads during mud season		
Pesticides and nonnative species	Generally prohibited (except for specific forestry purposes with written permission from VLT)	Prohibited without prior consultation with TNC	Authorized use permitted subject to specific environmental, regulatory, and policy safeguards
Firewood harvest by users for on-site use	Permitted for Landowner Camp leaseholders may collect designated wood for personal use with a written permit from Landowner	No live vegetation may be cut without a written permit from ANR No live vegetation may be cut in the Core Area Dead down wood may be collected for primitive camping fires	Firewood collection authorized for Camp leaseholders only No live vegetation may be cut Dead and down wood may be collected within vicinity of lease lots or in or along gravel roadways
Forest management and timber harvest	Permitted for Landowner, subject to: Forest Management Plan approved by VLT, supervision by a professional forester, adherence to Vermont's "Acceptable Management Practices" (AMPs) Emphasis: long rotations, sustainable harvest, forest health/diversity	"Sustainable forest and wildlife management" by ANR permitted if in accordance with a forest management plan developed collaboratively with TNC Emphasis: natural ecological processes, ecosystem integrity; wildlife habitat management	Conducted for the purpose of enhancement of priority wildlife species' habitat; subject to approved comprehensive conservation plan and habitat management plan
Special Treatment Areas	Special management restrictions apply to the following areas: <ul style="list-style-type: none"> • Ferdinand Bog and South America Pond watershed STA • Mud Pond STA • East Mtn. Old Growth STA • Willard Mtn. Old Growth STA • Unknown Pond STA • Winter Deer Habitat STA • all surface water bodies (wetlands, streams, rivers and ponds) 	Special management restrictions apply to the following areas: <ul style="list-style-type: none"> • Core Special Treatment Area • Portions of the Ferdinand Bog and South America Pond Watersheds which are outside the Core STA 	Establishment of special management areas and the management regimes applicable to those areas yet to be determined pending development of comprehensive conservation plan and step-down habitat management plan
Closure zones	Landowner may exclude the public from areas of active forestry operations, subject to specific conditions	Not addressed in easement	As needed based on public safety, wildlife, or habitat concerns
New forestry structures	Landowner permitted to build one permanent wood processing mill, one log concentration yard, and up to three forestry housing camps on site	Not addressed in easement	Generally prohibited
Wildlife management	Wildlife considerations must be addressed in Forest Management Plan (continued on next page)	Same as provisions for forest management described above	Based on specific approved plans and consistent with refuge purposes; targeting priority species

	Forest management in Winter Deer Habitat STA must be consistent with Vermont's deeryard management guidelines		
Hiking/walking (dispersed)	Permitted (subject to forestry closures and ANR's discretion)	Permitted	Permitted
Cross-country skiing (dispersed)	Permitted (subject to forestry closures and ANR's discretion)	Permitted	Permitted; except on snowmobile trails
Snowshoeing (dispersed)	Permitted (subject to forestry closures and ANR's discretion)	Permitted	Permitted; except on snowmobile trails
Hunting (including training and using dogs)	Permitted (subject to forestry closures, ANR's discretion, and applicable state laws and regulations)	Permitted (subject to applicable state laws and regulations)	Permitted; subject to applicable state laws and refuge-specific regulations
Trapping	Permitted (subject to forestry closures, ANR's discretion, and applicable state laws and regulations)	Permitted (subject to applicable state laws and regulations)	Permitted; subject to applicable state laws and refuge-specific regulations Special Use Permit required
Fishing	Permitted (subject to forestry closures, ANR's discretion, and applicable state laws and regulations)	Permitted (subject to applicable state laws and regulations)	Permitted; subject to applicable state laws and regulations
Boating	Permitted (subject to forestry closures, ANR's discretion, and applicable state laws and regulations)	Permitted (subject to applicable state laws and regulations) Motors prohibited (except slow-speed electric trolling motors)	Permitted; applicable state laws and regulations 5 mph speed limit on Lewis Pond
Swimming	Permitted (subject to forestry closures and ANR's discretion)	Permitted	Prohibited
Wildlife observation	Permitted (subject to forestry closures and ANR's discretion)	Permitted	Permitted
Other dispersed pedestrian uses	May be permitted through Special Use Permit from ANR under specific conditions	Permitted consistent with easement	Generally permitted
Automobile use	Permitted in identified Corridors, provided a Corridor Manager is designated	Permitted at ANR's discretion in identified corridors	Permitted on designated roads Subject to applicable state laws and Refuge-specific regulations
Snowmobiling	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Permitted Subject to applicable state laws and regulations

		Generally prohibited on water bodies	Travel on approved trails only Special Use Permit required
Bicycling	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	On-road bicycling will be considered in pending comprehensive conservation plan, subject to appropriateness and compatibility
Horseback riding	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Riding on roads will be considered in pending comprehensive conservation plan, subject to appropriateness and compatibility
Hiking trails	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	Permitted in identified Recreation Corridors, provided a Corridor Manager is designated	New trails may be constructed pursuant to NEPA compliance, appropriateness, compatibility, and approved management plan
All-terrain vehicles	Generally prohibited except for emergency or management purposes	Generally prohibited except for emergency or management purposes	Generally prohibited except for emergency or management purposes
Special access for disabled persons	Permitted in identified corridors and with a permit from ANR May include use of motorized wheelchairs or all-terrain vehicles	Permitted in identified corridors and with a permit from ANR May include use of motorized wheelchairs or all-terrain vehicles	Permitted with a Special Use Permit May include use of motorized wheelchairs or all-terrain vehicles
Pedestrian recreation in groups	May be permitted through Special Use Permit from ANR subject to specific conditions	Not addressed in easement Permitted by groups over 10 in size, with Special Use Permit, by this Plan	Generally permitted; Special Use Permit required for groups of more than 20
Commercial recreation (including guide services)	May be permitted through Special Use Permit from ANR subject to specific conditions	Generally prohibited Commercial guide services allowed if a license is obtained from ANR (guided hunting does not require a license as per ANR policy)	Commercial guiding to be considered in pending comprehensive conservation plan; may be administered via fee-based Special Use Permit
Camping	Permitted only with prior consent from Landowner or pursuant to written agreement between Landowner and ANR; provision of such consent or agreement is at Landowner's sole discretion	ANR permitted to establish dispersed tent sites and concentrated camping areas after consultation with TNC Dispersed camping subject to ANR's statewide rules for primitive camping on state lands	Generally prohibited
Campfires	Permitted only with prior consent from Landowner or pursuant to written agreement between Landowner and ANR; provision of such consent or agreement is at Landowner's sole discretion	Permitted at designated primitive camping areas, using only dead and down wood	Generally prohibited
Existing camps	Existing leases shall continue for	Existing leases continue for lifetime of	Existing leases continue for lifetime of

	<p>lifetime of current leaseholder plus 20 years, provided Landowner is able to secure commercially reasonable lease terms</p> <p>Landowner permitted to use, lease, maintain, demolish, replace, but not to expand the existing camps, subject to specific conditions</p> <p>Public may be excluded from 1-acre area around each camp</p>	<p>current leaseholder, plus 20 years if transferred to immediate family member(s), or expire in 2078 if additional family members are added to lease, or 2056 if lease is sold/transferred</p> <p>ANR permitted to occupy, lease, use, maintain, replace, & demolish existing camps, subject to specific conditions</p> <p>Upon expiration/termination of leases, ANR permitted to allow noncommercial use of camps for recreation, education, management or research</p>	<p>current leaseholder or 2049, whichever is less</p> <p>Current leaseholder cannot sell structure/lease to outside party</p> <p>Pending availability of funding USF&WS will acquire camps outright or via term use from willing sellers based on a fair market value appraisal</p> <p>Substantial improvement or additional buildings not permitted; routine maintenance allowable</p>
Trail construction and maintenance	Landowner and ANR permitted to construct and maintain trails for non-commercial activities	ANR permitted to construct, maintain, replace and close recreational trails if consistent with easement purposes and permitted by Management Plans	<p>If need exists, USF&WS may construct new trails following NEPA requirements, and appropriateness/compatibility policies.</p> <p>Trail maintenance is included as part of on-going operations.</p>
Fees for public use	Fees may be charged by ANR or Corridor Managers (but not by Landowner) to offset management and maintenance costs, although not for dispersed pedestrian activities and related motor vehicle access	Fees may be charged by ANR (or any organization it designates to manage recreation) to offset management and maintenance costs, although not for dispersed pedestrian activities and related motor vehicle access	Fees may be charged by USFWS. This would most likely apply to commercial uses managed pursuant to a Special Use Permits

B. LEGAL AUTHORITIES FOR WEST MOUNTAIN WILDLIFE MANAGEMENT AREA

- 1999 Budget Adjustment Act, Section 87a, Subsections (A)(I) et seq.
- State Lands Conservation Easement
- Warranty deed from The Conservation Fund to the State of Vermont dated 8/6/99
- Warranty Deed from The Conservation Fund to the State of Vermont dated March 28, 2000 (Brunswick parcel)
- Warranty Deed from The Conservation Fund to the State of Vermont dated March 28, 2000 (Maidstone parcel)
- Quit Claim deed from Vermont Land Trust to The Nature Conservancy dated 8/6/99
- Quit Claim deed from Vermont Land Trust to The Nature Conservancy dated 3/29/00
- 23 V.S.A. Section 3506(b)- Secretary's authority regarding ATVs on public lands
- 10 V.S.A Section 4041- establishes Fish and Wildlife Board
- 10 V.S.A. Section 4082- rule making authority of Fish and Wildlife Board
- 10 V.S.A Section 4138- Fish and Wildlife Commissioner's authority to control fish/game
- 10 V.S.A. Sections 5402 and 5403- Secretary's authority to list and protect threatened and endangered species
- Executive Order #12-02 by Governor Howard Dean
- Act 215 of 2006, Section 347
- Approximately 66 hunting camp leases
- Road Management Agreement with Plum Creek Timber Company

C. SUMMARY OF PUBLIC INVOLVEMENT DURING THE ORIGINAL (2002) PLANNING PROCESS

This Management Plan for the West Mountain Wildlife Management Area was developed with an unprecedented level of public involvement for a VANR project, both in terms of the amount of effort invested in obtaining public input and the number of people and organizations who participated through various means. The original plan used two complementary processes for this involvement: an extensive effort by the Kingdom Heritage Lands Steering Committee to provide for public involvement through numerous public meetings, requests for written comments, and inclusion of representatives of interest groups on its Cultural and Recreational Resources Subcommittee; and a separate but coordinated effort by the Champion Land Transaction Citizen Advisory Council, which was legislatively established to ensure public involvement. In addition, the web site developed by VANR for the West Mountain Wildlife Management Area (www.state.vt.us/anr/fpr/lands/westmt/) was used to inform interested citizens about the public involvement process for all of the Kingdom Heritage Lands, and to make the various planning documents prepared for these lands available to the public.

1. Steering Committee Public Involvement Process

The Steering Committee undertook an ambitious and broad effort to involve the public in the planning process. This effort was designed to inform interested citizens and organizations of the process and schedule for development of the respective plans; to explain the requirements for future management imposed as part of the acquisition of these lands; to share research findings, analyses, and other important planning documents developed as part of the planning process; to solicit input on issues, problems and opportunities to address in the plans; to solicit participants' concerns, hopes and vision for the future of the Kingdom Heritage Lands; to solicit input on management policies for these lands being considered by the Steering Committee; and ultimately, to solicit public comments on the draft plans when they were released on October 9, 2001.

a. Public Meetings Held During the Development of the Draft Plans

As part of this process, the Steering Committee held sixteen public meetings *prior* to the completion of the draft plans. These meetings, which took place from May 2000 through June of 2001, were aimed at three distinctly different purposes:

- *scoping*: identifying issues of concern that should be addressed in the plans;
- *information gathering*: soliciting information and detailed input on specific issues identified in the scoping process; and
- *information sharing and development of preliminary management concepts*: sharing research results, and soliciting input on preliminary management concepts being considered by the Steering Committee.

Extensive reports were prepared describing the meetings that were held during each of these three phases.

1) *Scoping Meetings*

Workshops: The process began with a series of four separate workshops held May 23, 2000 at Lyndonville, Vermont, to solicit specific information from the public and representatives of organizations known to have an interest in the management of these lands. These workshops were organized around the following topics:

- Environmental Conservation, Ecology, and Open Space Protection
- Recreation (specifically those activities that have not been prevalent historically on these lands, such as bicycling and horseback riding)
- Community and Economic Issues
- Traditional Uses (such as hunting, fishing, trapping and snowmobiling)

Public Scoping Meeting: The workshops were followed with a public meeting held on July 20, 2000, at the American Legion Hall in Island Pond, attended by 92 people. The agenda included presentations to explain some of the important considerations and issues identified by the planning process up to that point, including conditions imposed on the future management of the properties by easements put in place at the time of the acquisition from Champion; issues identified during the scoping workshops; and information to be collected. It also provided an opportunity for the attendees to make comments on the materials presented, or to offer additional thoughts on important issues related to management of the Kingdom Heritage Lands, including but not limited to information needs.

- 2) *Focused Issue Meetings:* Between September 25 and December 11, 2000, nine meetings were held in Essex County, Vermont to answer people's questions and to solicit specific information on particular activities or issues. The purposes of the meetings were to explain the planning process for the Kingdom Heritage Lands; provide information on the constraints affecting future use and management of these lands; solicit participant's concerns, hopes and vision for the future of the Kingdom Heritage Lands; solicit participant's perceptions of problems and opportunities for use and management of these lands, including existing and potential conflicts between recreational activities or between recreation and resource management; and collect specific information on levels of recreational use.

The specific meetings held were as follows:

Commercial Guiding Brighton Elementary School, Brighton, VT	September 25, 2000 15 participants signed in (all participants may not have signed in)
Hunting, Fishing and Trapping American Legion Hall, Island Pond, VT	September 26, 2000 49 participants signed in
Boating	October 10, 2000

Brighton Town Hall, Brighton, VT	13 participants signed in
Non-Motorized Trails Town Hall (Old School House), Bloomfield, VT	October 10, 2000 36 participants signed in
Cultural and Economic Issues Town Hall (Old School House), Bloomfield, VT	October 11, 2000 Hosted by the Citizen's Advisory Council
Organized Group Activities Brighton Elementary School, Brighton, VT	November 1, 2000 13 participants signed in
Snowmobiling Town Hall (Old School House), Bloomfield, VT	November 2, 2000 33 participants signed in
Hunting American Legion Hall, Island Pond, VT	November 16, 2000 67 participants signed in
Economic Issues Town Hall (Old School House), Bloomfield, VT	December 11, 2000 Hosted by the Citizen's Advisory Council

- 3) *Public Meetings on Preliminary Management Direction:* Two public meetings were held in late June, 2001 to share information on the progress in planning for the future of these lands and solicit input on key topics, including the management direction being considered for the lands overall and for each of the three individual ownerships. The meetings were held:

June 21, 2001 at Island Pond, VT (over 100 people attended)

June 26, 2001 at Montpelier, VT (over 150 people attended)

The purposes of the two public meetings held in June were to provide an opportunity for the public to review and comment on: 1) the Steering Committee's preliminary proposals for overall goals and objectives for management of the West Mountain WMA and access provisions for the Private Timberlands, options for defining an "ecological core area" and an "actively managed area" on the West Mountain WMA, and proposed allowed and prohibited uses for these areas; and 2) preliminary recreation corridor proposals by the Green Mountain Club (for hiking trails) and the Kingdom Trails Association (for bicycling and backcountry skiing/snowshoeing).

b. Written Comments Submitted During the Development of the Draft Plans

In addition to input received at these public meetings, the Steering Committee also solicited written comments during the process of developing the draft plans. Altogether, approximately 540 letters, postcards and emails were received prior to the completion of the official drafts, along with petitions signed by nearly 500 individuals. Most of these comments were submitted soon after the meetings held in June, 2001 to review the preliminary management direction.

c. Public Comment Period on the Draft Plans

Upon release of the draft plans on October 9, 2001, VANR initiated a six-week formal public comment period on the Draft Long Term Access Plan and the Draft Management Plan for the West Mountain WMA. Also, USFWS opened a concurrent comment period for its Draft Visitor Services Plan for the Nulhegan Basin Division of the Conte Refuge. Halfway through the comment period, VANR held six well-publicized public “listening sessions” at the following locations around Vermont to solicit oral feedback from interested citizens on the draft plans:

- October 29, 2001 – Brighton Elementary School, Island Pond
- October 30, 2001 – Lyndon State College, Lyndonville
- October 31, 2001 – Agency of Natural Resources, Waterbury
- November 1, 2001 – Springfield High School Library, Springfield
- November 5, 2001 – Howe Center, Rutland
- November 6, 2001 – Essex Middle School, Essex

These sessions also served as public hearings for the USFWS plan and associated documents. Attendance at these meetings ranged from roughly 75 to 200 people, and approximately 400 comments were recorded over the course of the six sessions.

In addition to those oral comments, VANR received a tremendous volume of written opinions from interested citizens and organizations during the formal comment period. Altogether, 6,280 people shared their views through one written mechanism or another. This included 551 personalized letters and emails from individuals and organizations, along with 5,729 pre-printed postcards, petition signatures and other standardized written submissions from members of several organizations (National Rifle Association, Vermont Federation of Sportsmen’s Clubs, Forest Watch, and Northern Forest Alliance). The vast majority of public input, both in writing and at the listening sessions, addressed issues relevant to the Draft Management Plan for the West Mountain WMA. Only a relative handful of comments were focused on the Draft Long Term Access Plan for the Private Timberlands.

2. Citizens Advisory Council Public Process

The Former Champion Land Transaction Citizen Advisory Council was established by the Vermont Legislature to provide a public forum for discussing and attempting to resolve concerns

regarding ongoing use and management of the West Mountain WMA, collaboration with the US Fish and Wildlife Service, and public access to both the publicly and privately held portions of the Kingdom Heritage Lands. The Council is composed of representatives of the logging industry, private business, local hunting and fishing groups, the Vermont Sportsmen Federation, snowmobilers, camp leaseholders, municipal governments, The Nature Conservancy, Essex Timber Company, the Vermont Agency of Natural Resources, and the US Fish and Wildlife Service. The CAC held a total of 13 meetings over the course of the planning process, from its initial meeting on November 8, 1999, to a meeting on the release date of the official draft plans, October 9, 2001.

3. Summary of Public Input

a. Scoping Workshops (May 23, 2000)

The following summarizes the comments and concerns voiced at the four workshops held on May 23, 2000. The four workshops were centered around the following topics: (1) Environment/ Conservation/Open Space Concerns; (2) Recreation Management; (3) Economic and Community Issues; and (4) Traditional Uses. The comments and concerns, taken as a whole, clustered into five themes, which are summarized below:

Natural Resources Management: Some participants supported managing the Kingdom Heritage Lands for “ecological integrity”. Related to this, the concept of a Core Area where natural processes are allowed to proceed without intervention was supported by some participants but concerned others. Issues raised by those in favor of a Core Area included restoration of natural processes in order to provide future generations with “old-growth” forests and to support non-game species; and the desire to protect ecosystem components including soil, water quality, micro climates, micro habitats, micro organisms, and imperiled species. Those opposed expressed concern for the possible impacts of non-intervention (especially the elimination of timber harvesting in the core area) on future wildlife habitats, particularly habitat for game species, and on hunting and trapping uses.

Access: In planning for the management of access to these lands, it was suggested that consideration should be given to: provisions for disabled access (compliance with the Americans with Disabilities Act); access needs for specific activities or users; the need to have access without financial barriers; the demand for recreational use of the property in light of the regional context (supply and demand of recreational opportunities and public access to lands for various activities); the history of road access to these lands (in the recent past, the road network on these lands was expanded radically); the history of off-road access, which also has changed significantly in the recent past with the advent of snowmobiles; the impacts of increased access on wildlife and environmental quality (e.g., increases in erosion, human litter and waste); road closures which may be needed in the long term, particularly in light of interest in ecological reserves; and striking a balance appropriate for this property between the degree of control on access and the public right of access and freedom to use these lands.

Recreation Management: A number of considerations were identified as important in

planning for the recreational use of the Kingdom Heritage Lands. This included but was not limited to planning based on carrying capacity. There were concerns expressed about whether, how, and how much this area will be promoted for recreational use; and that the area not be over developed. There were also concerns over conflicts with the environment that might require special restrictions for sensitive areas. Protecting the rural and primitive experience was a concern, with suggested remedies including use standards (maximum number of people in each group, different standards for day vs. overnight use, different standards for different days of the week and seasons), and establishing quiet zones.

Concerns were expressed over potential seasonal use conflicts, particularly between mountain bikes/horses and hunters (especially mid-September till snowfall); and in winter (through February) between cross-country skiers/snowmobilers and hunters. Remedies suggested included segregating uses through separate corridors (however, some were opposed to new trails for mountain biking and horseback riding and felt these uses should be kept to existing roads; others believed that multiple trails would contribute to further fragmentation of wildlife habitat); eliminating certain uses during hunting season; requiring use of blaze orange by all recreationists during the hunting season; and increasing public awareness of conflicts. Concern was expressed about how the plans would address enforcement, and that there be consistency in the regulations across the three jurisdictions.

While some expressed a strong desire to limit new recreational development, others called for the plan to address options for new amenities including new day-hiking and long distance trails; developing trail heads and signage; overnight facilities; parking; waste disposal facilities; a visitor center; and adequate information (signage, maps, boundaries, and notification procedures for trail or road closures). The need for search and rescue plans was raised, and there was recognition that funding would be required to support new functions and amenities. Participants were concerned about how maintenance and liability costs would be covered, and saw a need to specify funding mechanisms in the plan for oversight/enforcement related to “new” uses. Some expressed concern about funds from hunting licenses being used for these purposes and argued for a separate funding source, such as a user fee (e.g., White Mountain National Forest).

Research and Education: Participants commented on the need for research to document baseline ecological, cultural, and recreational conditions, and to monitor changes over time. Some participants expressed the hope that this information would provide the basis for adaptive management. Some participants felt that in planning for these lands, opportunities for research and education should be addressed; specifically, it was noted that these lands provide opportunities for demonstrating model forestry practices that are ecologically sustainable and can be models in achieving species recovery. Other related issues included keeping an “open door” policy towards research, and open communications between ownerships. The concept of establishing biological stations for research was suggested; it was noted that Lyndon State College has been conducting research in the area for years. Research and education opportunities should be pursued with area institutions, including Lyndon State College – (“Links” Initiative); the Fairbanks Museum; local schools; the Montshire Museum (Conte Link); UVM; Local Audubon Chapter’s “Citizen Science” – using volunteers; and Sterling College.

Impacts on Local Communities and Economies: Participants expressed concern that in planning for the management of the Kingdom Heritage Lands, all management policies be analyzed in terms of socio-economic impacts (not all impacts will be positive for average residents). Commenters stressed that the health of gateway communities depends on having a diverse economy. Maintaining the timber base for value added wood processing was seen by some as important in this respect; also, some participants emphasized the importance of compatible economic development in gateway communities.

Participants stated that the importance of commercial recreational use (i.e., guiding) to the local economy and way of life should be considered; and in general, there was acknowledgement that recreation is an important part of Vermont's economy. However, while the increased recreational use of the Kingdom Heritage Lands would undoubtedly provide opportunities, there were concerns that this would also exert demands on local infrastructure and might require development of additional infrastructure and services, e.g. roads (bridges, culverts, maintenance, etc.); water supply; sewage disposal; law enforcement; emergency response.

The impacts of the shift to a protected landscape on the surrounding communities were viewed as likely to be both positive and negative. Some commenters noted that this change would likely attract new residents who are able to telecommute. However, local communities would need better communications links to capitalize on these economic opportunities. Also, this could raise land values and affect affordable housing. Impacts to the local tax base were a concern to some participants. Some were concerned that conflicts could develop between local community members and visitors (us/them; locals vs. outsiders), with conflicting visions for the future of these lands. In light of this some participants called for developing a collective vision for the future. A Cultural Heritage Inventory was suggested, including an assessment of the cultural importance of the Kingdom Heritage Lands to the fabric of local communities.

b. Public Scoping Meeting (July 20, 2000)

At this meeting, participants echoed a number of concerns heard at the May 23 workshops, covering a range of topics including:

- keeping the area's distinctive backcountry character, not over-developing the area (e.g. keeping roads narrow), and not promoting the area for new uses;
- maintaining timber harvest and hence traditional harvesting and manufacturing jobs;
- clarifying what rights camp leaseholders have, and objecting to termination of leases in the future;
- avoiding conflicts between "historic" and "new uses"; and

- ensuring that management of these areas maintains wildlife diversity and restores past diversity.

c. Focused Issue Meetings (September 25, 2000 – December 11, 2000)

Comments and concerns expressed at the special focus meetings held in the fall of 2000 are summarized below.

Concerns and Hopes for the Future of These Lands: Participants expressed concerns and hopes regarding the future of these lands. These included: concern that changing the character of the lands from their “rugged” and “primitive” nature to a more “developed” and “typical” landscape would attract crowds of new users; concern that new uses and users might create conflicts with, or object to, historic uses of the Kingdom Heritage Lands, such as hunting and trapping; concern with the scheduled termination of private camp leases on the U. S. Fish and Wildlife Service lands (50 year tenure) and the West Mountain WMA (tenure of life of the current leaseholders plus 20 years); concern with the establishment of an ecological Core Area (the “Special Treatment Area” called for in the easement) on the West Mountain WMA (i.e., loss of timber products and jobs, change in wildlife habitat from conditions favoring species like deer, concern that hunting, fishing and trapping be allowed to continue on these lands, and concerns that camp use and/or camp access might be adversely impacted by designation of a core area). Also, many participants expressed hope that the Kingdom Heritage Lands could be “kept as they are” and that their historical uses and values could be maintained.

Recreational Activities: Participants confirmed that current levels of recreational activities are generally low, with the exception of snowmobiling and deer hunting. They expressed the view that the Kingdom Heritage Lands were especially valuable for certain recreational activities because of the remote, rugged setting and the large, contiguous forested land area they occupy. Participants contrasted the characteristics of the Kingdom Heritage Lands with the other more pastoral settings typical of other parts of Vermont and noted that the environmental characteristics of the Kingdom Heritage Lands also contribute to their special value.

Existing Facilities/Infrastructure: Participants confirmed that, aside from snowmobile trails, there were no formal, and very few informal, facilities in existence for recreational activities. There are a few short, informal trails existing on the property and there are a few areas used for informal boat access.

Conflicts Between Recreational Activities: Few significant conflicts between existing recreational activities were noted by the participants. Some concern was expressed with: high levels of use in the Wenlock Bog for wildlife viewing; the speed of snowmobilers as well as the noise they create near camps; and problem areas where the public gains access to ponds across private holdings. Considerable concern was expressed by some participants with the potential for conflict between hunting and uses such as horseback riding, cross country skiing, and hiking.

Conflicts Between Recreational Activities and Natural Resources: No significant conflicts between existing recreational activities and natural resource values were identified by participants. Concern was expressed for the potential for conflict between recreation and natural resource conservation if large numbers of people started using the area for activities such as wildlife observation, and such use is focused on areas where wildlife might be particularly sensitive to disturbance. However, no such conflicts were identified as existing currently.

New Facilities and Infrastructure: It was generally agreed among participants that existing conditions should be maintained and new facilities and infrastructure either ought to be avoided or be very limited, and should be carefully planned to avoid conflicts with existing uses.

Current Levels of Overall Recreational Use for Typical and Peak Days by Season: Participants were asked to complete a questionnaire regarding levels of recreation use on the Kingdom Heritage Lands. For ease in developing these estimates, the Kingdom Heritage Lands were divided into 11 sub-units⁸⁴. Participants were encouraged to provide information only for areas that they knew well and to estimate the level of use on each of the days in question at the peak time of day for the season involved. Very few (14) questionnaires were returned, with a number only partially completed. Some meeting participants expressed concern that the information “might come back to bite them”. More specifically, participants expressed concern that use might be curtailed in areas that were heavily used, or that lightly used roads or trails might be closed off. However, the limited data obtained from the questionnaires generally were consistent with the description of level of use by activity indicated at the meetings (see “Recreational Activities” above).

Issues Related to Local Economies: Participants identified the following as contributions the Kingdom Heritage Lands made to the local economy in the past: timber supply; manufacturing supported by timber supply; secondary/indirect economic activity from timber harvesting/land management (surveying, road work, forestry, etc.) and forest manufacturing; direct and indirect economic activity from recreation (i.e., hunting, fishing, snowmobiling, trapping, photography, use of camps, walking, and wildlife observation); jobs from photography; guiding; local stores, gas stations, restaurants, Bed & Breakfast’s, etc. patronized by those using lands; and a stable tax base for local towns.

Participants identified the following as the principle issues of concern regarding the future:

- Viewed as **positive** - Increase in jobs, students, etc. related to land management; stable yield of forest products; outdoor education opportunities both for local communities and “outsiders”; new recreational businesses focused on “historic” use (hunting, fishing, trapping, snowmobiling), “new” uses (hiking, mountain biking, horseback riding), and unusual uses (llama trekking).

⁸⁴ The division of the land into 11 sub-units was based on access and homogeneity of use. The map was developed in consultation with the guides who attended the meeting held on September 25, 2000.

- Viewed as **negative** - Changes in the tax base; change from higher paying jobs to lower paying ones; increased demand for second homes and camps on surrounding lands; “cultural pressure” on historic uses; and upward pressure on land values.

The participants went on to brainstorm strategies for how to achieve the positive and avoid the negative. They were also informed that outside sources of assistance were available for working to achieve their vision of the most desirable future. These included a variety of state, regional and local organizations.

As the focus of the planning process is on 1) a management plan for the West Mountain WMA and 2) a long term public access plan for the Private Timberlands rather than community development plans, it was made clear to participants that the decision of whether and how to pursue these issues was up to them and the communities involved.

Importance of These Lands To the Fabric of Local Communities: A strong theme expressed at the meetings was the importance of these lands to what was termed the “fabric” of the local communities. That is, these lands were seen by participants as contributing significantly to the sense of identity and character of these communities, and as fundamentally important to the way of life of local residents. An aspect of this value cited by participants, but not its entirety, is the camp culture that exists on Kingdom Heritage Lands, a place where, according to participants, youngsters learn about woods skills and where generations come together to enjoy the north woods in one another’s company.

d. Public Meetings on Preliminary Management Direction (June 21 and June 26, 2001)

These meetings represented the first opportunity for the public to review and comment on draft goals and objectives developed by the Steering Committee, which provided an indication of how the lands and natural resources in the West Mountain WMA might be managed.⁸⁵ It was also the first opportunity for the public to review and comment on specific proposals related to defining the location and the geographic extent of an ecological core area. The Steering Committee presented a map which depicted an approximately 10,000 acre area which all of the scientists involved agreed should be included in the Core Area and showing an additional 6,700 acres surrounding this area which also had significant ecological value. These additional lands (all or portions thereof) were under consideration as additions to the core area. Thus a total of 16,700 acres was under consideration as a potential ecological core area. This total represents approximately 12% of the total area of the Kingdom Heritage Lands (134,000 acres), and roughly 75% of the West Mountain WMA. The Steering Committee also distributed a document describing the uses that were under consideration as permitted or prohibited uses within that core area, and on other lands in the West Mountain WMA outside of the core area.

In general, most comments received at these two public meetings, held prior to the preparation of the formal draft plans, reflected a heightened level of concern among some participants about the overall direction that the Steering Committee was proposing for

⁸⁵ The proposed Goals and Objectives, and a number of other planning documents were posted on the West Mountain WMA web site prior to the meeting; and these materials were also made available at the meetings.

establishment of a core ecological area on the West Mountain WMA. A majority (67%) of participants who spoke expressed concerns that the proposed Core Area was either too large, or unacceptable for other reasons; and felt the management measures and restrictions on uses were contrary to their understanding of the purpose of the WMA - to ensure the continuation of traditional uses and to actively manage the area for wildlife habitat. However, there were also a number of participants (18%) who supported the creation of a sizable ecological Core Area where motorized recreation would be prohibited.

Concerns expressed on other aspects of the proposed management direction contained in the draft documents were limited to doubts that the management plan and on the ground implementation would maintain the existing backcountry character of these lands. No comments were made bearing directly on the bulk of what was proposed in the draft documents on management direction.

The following provides more detail on the comments voiced at the meetings. The comments generally focused on three broad themes: (1) the process for developing and adopting a plan for the West Mountain WMA and the extent that local concerns were being considered; (2) concerns related to the proposed Core Area including the balance or tradeoffs between use and protection; the location, size and uses permitted or prohibited in the core area; and the land management measures being considered for the core area, and (3) the impacts of the proposed management direction and specific policies or measures under consideration on traditional uses and the local economy.

Planning Process: There were a number of participants who felt that the planning process was not being responsive to local concerns; were concerned that difficult tradeoffs between the views of protectionists and traditional users would be decided only by the VANR; felt that a preservationist agenda was dominating the process; and expressed a desire to have legislative approval of the final management plan.

The Core Area and Specific Management Policies and Objectives: A majority of participants speaking at these two meetings had serious concerns about the size and location of the proposed ecological core area, based on concerns about proposed restrictions on “traditional uses” and snowmobiling. A potential 16,000 acres out of 22,000 acres, located in the heart of the West Mountain WMA parcel, appeared to these participants as tantamount to dedicating the vast majority of this parcel to a core area, although it represented only 12% of the entirety of the Kingdom Heritage Lands. Some speakers saw the disappearance of a way of life, were the proposals to be adopted. The proposed management policy of letting natural processes restore the area to a healthy mature forest with a range of habitats capable of supporting a high diversity of wildlife was viewed as likely to cause a decline in game species over the next 100 years, if not permanently. Proposed elimination of fish-stocking raised fears that there would be a decline in the game-fish populations. The need to evaluate the progress of this natural process was expressed. There was also concern expressed over the proposed policy of non-interference with fire and disease outbreaks in the forest. Road closures were a concern, as well as the potential loss or need to relocate snowmobile trails. At the same time there was great concern that the backcountry character of the area be protected with specific measures to prevent “over-marketing” and over-development of the area with trails, maps

and brochures. It was suggested that underutilized state parks could accommodate some of the unmet recreational demands in the state.

There was a sense of betrayal expressed by some participants who felt that the purpose of these lands was to ensure the future of traditional uses, and that the focus on an ecological Core Area with restrictions on traditional uses was contrary to their view of the intended purposes of these lands. There were fears that this was the beginning of eliminating all hunting on these lands. Others expressed concern that the management direction reflected more of a preservationist approach than they considered necessary to protect the important resources, and felt some of the use restrictions went too far; that “people” were given too low a priority as a management consideration. Some wondered if the intent of the VANR was to manage these not as a wildlife management area but as a “wilderness” area (the perception being that practically all human uses would be prohibited in a wilderness area). “Stewardship” was suggested as a more desirable approach, encouraging responsible use rather than restricting use.

Others were clearly of the view that an emphasis on an ecological reserve or Core Area on the West Mountain WMA, with restrictions on some historic uses, was entirely appropriate since the area is adjacent to 85,000 acres of lands in the Essex Timber Company holding that would allow the full range of traditional uses. It was suggested that without the acquisition of these lands and controls proposed, the area could have been degraded by unrestricted development and public access could have been precluded altogether. Some argued for a Core Area even larger than that proposed. There was the view that protecting this area from motorized recreation and restoring natural processes would restore the historic uses associated with old growth forests, of which there are very few in Vermont. These participants held a vision of a future forest that supported outstanding natural communities, rare plants and animals, larger game, cleaner water, and better fishing. Motorized use was not viewed as “historic” use, and there was concern that the impacts of motorized access, including air pollution, be fully evaluated for all of the lands, not just the core area. The educational value of establishing a core ecological reserve area surrounded by an actively managed wildlife management area and actively managed forest was noted; here, stated some speakers, was an unprecedented opportunity to implement and study land management at the landscape level.

Impacts to the Local Economy and Communities: Concerns expressed at previous meetings and workshops were reiterated at these two meetings: that any plan developed for management of these lands should include an assessment of the economic and social impacts on local communities. There was strong concern about the impacts of timber harvesting restrictions on the local forest-based economy. On the other hand, it was suggested that the local economy was already in trouble due the exodus of the Champion International, Inc., and that the management of these lands under the proposed policies would make the area more attractive, create new opportunities for economic development, and provide a more sustainable flow of timber products than was the case historically.

e. Summary of Written Comments Submitted During the Development of the Original Draft Plans

A substantial majority of the written comments received prior to the completion of the draft plans were in favor of establishing a sizable ecological Core Area on the West Mountain WMA, many requesting a Core Area of at least 16,000 acres. Most of those who wrote in opposition to the proposed management concepts presented at the June, 2001 meetings were concerned about maintaining “historic” uses on all these lands, or had concerns with the proposed management of the core area, particularly the elimination of timber harvesting which was viewed as having adverse effects on the local wood products industry and certain game species (especially deer and moose, but also grouse and rabbits).

In addition to individual letters, support for an ecological Core Area was expressed in a letter from the organization Forest Watch, representing 22 environmental organizations including Audubon Vermont, Northeast Kingdom Audubon, the Association of Vermont Conservation Commissions, and a number of regional and national level organizations such as the National Wildlife Federation, Northeast Forest Alliance, Appalachian Mountain Club, and the Wilderness Society. Also, petitions with 149 signatures were submitted supporting the proposed core area.

Opponents of the proposed management policies and proposed ecological Core Area included persons who signed a petition with nearly 350 signatures. In addition, three legislators wrote expressing their concerns about the proposed management direction. State Senators John P. Crowley and Hull Maynard, both of Rutland, expressed concerns over impacts of an ecological Core Area on forest product industries and habitat of wildlife that depend on successional forests, including deer, ruffed grouse, and snowshoe hare. They were also concerned that proposed use restrictions in the area would “remove or severely restrict traditional uses.” Representative Stephanie Bourdeau expressed her understanding that the intent of the legislature to preserve traditional uses of these lands was not being honored, quoting her 1999 statement on record in the House Journal explaining her vote to approve funds toward the purchase of the Champion lands.

f. Summary of Public Comments on the Original Draft Plans

The vast majority of comments made during the comment period (both in writing and at the “listening sessions”) focused on issues related to the Draft Management Plan for the West Mountain WMA; only a handful of comments addressed issues in the Draft Long Term Access Plan for the Private Timberlands portion of the Kingdom Heritage Lands. Further, most of the comments received on the plan for West Mountain WMA focused on issues related to establishing an ecological core. In this regard, the proponents and opponents of an ecological core were both numerous and expressed their views strongly. To give readers a sense of the full breadth of input received by VANR, a summary of the major categories of comments received on both plans is presented below.

General Comments: General comments included remarks made that represented individuals’ general sentiments regarding the draft plans, particularly the Draft Management Plan for the West Mountain WMA. These sentiments ranged from opposition to any plan whatsoever, to support for the proposed plan, to criticism of the plan because it did not propose to protect

enough of the natural environment. These comments also reflected support for scientific research, improved public relations between the State and the public, as well as other points of view held by the individuals who commented on the plan.

Planning Process: Many of these comments reflected ideas about what the foundation of the planning process was or should have been and the commenter's view on how the process proceeded. Some commenters felt the process was open and informative, while others criticized it strongly as they felt their points of view had not been heard. Some comments suggested that the plan should have included an economic and social study; others called for 'trust, honesty, and long term predictability'; while still others called for 'collaboration and partnership' among the interests that care about the future of the West Mountain WMA.

Legal Issues: The comments in this category touched on three specific areas: legality of the easements, legislative intent, and constitutional rights. Commenters differed on how to interpret legal issues, but many people who commented on this topic were critical and felt that aspects of the acquisition or the planning process were, in their words, "*illegal*". Comments reflect a need for clarification by VANR in the aforementioned areas.

Socio-economic Issues: This category included comments regarding the potential impacts of the West Mountain WMA on the economy and the culture of the local area, region, and Vermont at large. These two subject areas (economic and cultural issues) are combined because many comments reflected the view that they are closely linked. Some comments suggested there will be an increase in economic activity in the local area and the State due to the public acquisition of the WMA and planned use of the land; however, concerns were raised regarding how such increased prosperity could affect the character of the Northeast Kingdom. Other commenters were concerned with the decline of logging and how this would affect the local economy and jobs for woodworkers. A number of comments suggested that VANR should have undertaken a study on the social and economic impacts as part of the Agency's research on the West Mountain WMA plan.

Traditional Uses: Many commenters supported maintaining "*traditional uses*"; however, the term obviously meant different things to different people. Some commenters appeared to define traditional uses as hunting, fishing and trapping, and virtually everyone supported these "*traditional uses*" although there were some objections to trapping. However, others included a broader range of activities as "*traditional uses*," including existing levels of road access and the use of private camps. Many people saw establishing an ecological Core Area as threatening "*traditional uses*," while others welcomed the proposal as an opportunity to re-establish "*traditional uses*" that were lost when the extensive haul road network for timber harvesting was established on these lands.

Some persons advocated opening the land up to additional uses not common previously, *e.g.*, mountain biking, hiking on formal trails, and equestrian use. However, other commenters opposed establishing "*new uses*", a term that also was defined in different ways by different people. Activities such as snowmobiling, mountain biking, climbing and motor vehicle use raised specific concerns for some commenters. These concerns focused on how these

activities are categorized (e.g., “*traditional*” or not) and what type of restrictions may be placed upon them in the future.

West Mountain WMA ‘Core Area’: As noted earlier, the proposed Core Area on the West Mountain WMA generated the most comments from the public. These comments reflected interest in the size of the area, the scientific evidence supporting establishing a reserve, perceived losses and gains resulting from the reserve, and specific recommendations and considerations that commenters felt should be considered when establishing the core. Many commenters opposed establishing an ecological core. They offered several reasons. Some viewed it as a breach of faith, others felt it was based on an “*illegal*” part of the land transaction (granting the State Lands Easement). Others felt it would diminish game populations. Some shared all these concerns.

Other members of the public who commented expressed the view that establishing an ecological core was important for a variety of reasons, including: protecting rare species, protecting natural communities, providing a place where natural processes would prevail, providing an area for scientific study, and providing an area which would offer more remote recreational experiences than offered elsewhere. Many comments reflected an interest in broad social and ecological concerns (e.g., concern for future generations, the landscape of the Northeast Kingdom, of Vermont, and of the planet.)

West Mountain WMA ‘Active Management Area’: Comments in this category were in general very specific, and a number were quite lengthy. They focused on particular questions and recommendations regarding management practices in the Active Management Area and related implications for various species of wildlife (especially game species) that require or benefit from early successional forest conditions.

Camps: The comments made about the camps located within the West Mountain WMA fell into three main categories: 1) some commenters addressed the use of private camps on public land (with many supporting retention of the camps and others supporting removal), 2) other commenters were concerned with preserving the “*camp culture*,” and 3) many persons supported establishing an ecological Core Area and, hence, removal of the camps.

Trails and Recreational Uses: The comments in this category were mostly specific to particular activities. The activities mentioned include snowmobile and ATV use, mountain biking, access for rock climbing, equestrian uses, snowshoeing, and bird watching. Developing any trail systems and/or enhancing current conditions for recreational activities caused concern for many commenters because they felt it could alter the character of the area. There was an interrelationship between comments on this topic and those listed in the next category.

Road System, Use and Access: Comments made regarding roads involved the status of the current road system and who should have access to these roads. In general, the comments reflected concerns for introduction of exotic species, impact on the landscape, equal access for all persons and interests, and enforcement of closures. Many people opposed closing roads as part of establishing a core area. These commenters felt reduced access would

adversely impact uses such as hunting, fishing and trapping. Others favored establishing a core and reducing access.

Disabled Access: related to the issue of access, specific comments were also made about access for individuals with disabilities and the elderly. These commenters raised concerns that the plan did not in their view address this topic adequately and that the current plan would, by closing roads, restrict access to this user group. They emphasized maintaining road access for persons who could not walk long distances. Other commenters, while not speaking against disabled access, clearly favored closing some roads and creating an ecological core area, which would require walk-in access.

Long Term Access Plan: The relatively small number of comments that focused directly on the Draft LTAP tended to be quite specific, addressing issues such as boundary signs, uses requiring written authorization, and the need for road management decisions to be consistent with the Conservation Easement on the Private Timberlands.

D. LAND MANAGEMENT CLASSIFICATIONS

Vermont ANR lands are managed using four categories of use or types of management to 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 West Mountain WMA is based on a thorough understanding of the resources identified and the application of over-arching lands management standards. The resources include natural communities, plants, and wildlife as well as recreation, historic, forest, and water resources.

1) Highly Sensitive Management Areas – Areas designated as Highly Sensitive Management are described as “*areas with uncommon or outstanding biological, ecological, geological, scenic, cultural, or historic significance...*” Acres managed under this category will have no timber management, salvage harvest, or active wildlife habitat management. However, trees and other vegetation may be cut to restore natural community species composition and structure in limited locations; manage specific habitat conditions for rare, threatened and endangered species; and to maintain safe and enjoyable recreational conditions.

At West Mountain WMA, these areas are limited to Rare and Sensitive Natural Communities, as discussed above.

2) Special Management Areas – Areas designated as Special Management include areas ***“...where protection and or enhancement of those resources is an important consideration for management.”*** Timber harvesting and wildlife habitat management as well as recreation are considered to be complementary uses within this classification to the extent that they do not impact special features.

At West Mountain WMA, these areas include Beech Mast Production Areas, the Transition Management Area, the Core Special Treatment Area, the Ferdinand Bog and South America Pond Watershed Special Treatment Area, and all lowland spruce-fir forest/deer wintering area within the AMA.

3) General Management Areas – The General Management category includes areas where ***“dominant uses include vegetation management for timber and wildlife habitat, concentrated trail networks, and dispersed recreation ...”*** A primary consideration for management is minimizing conflict between activities. Sensitive resources that occur within these areas may require special attention.

At West Mountain WMA, these areas include extensive acreages of northern hardwood and red spruce-northern hardwood forest in the active management area, which are not designated as either category 1 or 2 above.

4) Intensive Management – The Intensive Management category is 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.

At West Mountain WMA, no areas are designated for Intensive Management.

F. LIST OF SUPPLEMENTAL STUDIES AND REFERENCES DEVELOPED TO SUPPORT THE PLAN

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Cogbill, C. V., 2001. Natural Ecological Processes Affecting the Nulhegan Basin. Plainfield, Vermont.

Kilpatrick, C. W., 2001. Small Mammal Survey of the Nulhegan Basin Division of the Silvio O. Conte NFWR and the State of Vermont's West Mountain Wildlife Management Area, Essex County, Vermont. Dept. of Biology, University of Vermont, Burlington, Vermont.

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Land & Water Associates, 2001. An Assessment of the Regional Context for Recreational Use Planning for the Former Champion Lands. L&WA, Hallowell, Maine.

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Land & Water Associates, 2000. Planning for the Future of the Former Champion Lands. Public Meeting, July 20, 2000, American Legion Hall, Island Pond, Vermont. L&WA, Hallowell, Maine.

Langdon, R. and S. Fiske, 2001. A Survey of the Fish and Macroinvertebrate Communities of the Silvio Conte National Wildlife Refuge in the Nulhegan Drainage and the West Mountain Wildlife Management Area. Vermont Department of Environmental Conservation, Waterbury, Vermont.

Lapin, M. and B. Engstrom, 2001. Natural Communities and Rare Vascular Plants of West Mountain Wildlife Management Area and Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge, Essex County, Vermont

Longcore, J. R., 2000. Report of Survey for Waterfowl Broods and Marsh Birds at Nulhegan Basin Division, Silvio O. Conte National Fish and Wildlife Refuge and West Mountain Wildlife Management Area, Island Pond, Vermont.

Miller, D. H., 2001. A Survey of the Adult Butterflies (Lepidoptera: Papilionidae) and Damselflies and Dragonflies (Odonata: Zygoptera and Anisoptera) of the Silvio O. Conte National Wildlife Refuge and the West Mountain Wildlife Management Area, during the field season of 2000 in Essex County, Vermont, USA. Department of Science, Lyndon State College, Lyndonville, Vermont. USGS Patuxent Wildlife Research Center-Orono, Orono, Maine.

Scharoun, S., E. Frank, R. N. Bartone, and E. R. Cowie, 2001. People, Land, and History: The Cultural Landscape of the Nulhegan District. Cultural Resource Assessment and Management Plan of the Former Champion Lands Held in Public Ownership. Archaeological Research Center, Department of Social Sciences and Business, University of Maine at Farmington, Farmington, Maine.

G. DATA SOURCES FOR FIGURES

<u>Data Type</u>	<u>Data Source</u>
<i>Data common to many figures</i>	

KHL Boundary	Agency of Natural Resources (ANR)
State, County, and Town boundaries	Vermont Center for Geographic Information (VCGI) - BoundaryOther_BNDHASH
Public roads	VCGI - TransRoad_RDS
VECLO Line	VCGI - UtilityTransmit_ELTRN
KHL Roads	ANR
Streams	VCGI - WaterHydro_DLGSW
Waterbodies	VCGI - WaterHydro_DLGLAKE
Core STA boundary	ANR
Equestrian corridors	ANR
Snowmobile corridors	ANR
Biking corridors	ANR
Hiking corridors	ANR
<i>Figure 1: Location of the Kingdom Heritage Lands in Vermont</i>	
(all in common data above)	
<i>Figure 2: The Kingdom Heritage Lands in Vermont</i>	
(all in common data above)	
<i>Figure 3: Publicly Conserved Lands in Northeast Vermont</i>	
Conserved Lands	VCGI - CadastralConserved_PRCONLND, CadastralPublands_CONSPUB
<i>Figure 4: West Mountain Wildlife Management Area Base Map</i>	
Countour intervals	VCGI - ElevationContours_CN50T
<i>Figure 5: West Mountain WMA Bedrock Geology</i>	
Bedrock	VCGI - GeologicBedrock_BDRK100K
<i>Figure 6: West Mountain WMA Surficial Geology</i>	
Surficial geology	VCGI - GeologicSurficial_SURFICIAL62K
<i>Figure 7: Aquatic Ecosystems</i>	
Aquatic classifications	ANR
<i>Figure 8: Forest Types</i>	
Forest types	ANR
<i>Figure 9: Nonnative Invasive Plant Locations</i>	
Invasive locations	ANR
<i>Figure 10: Terrestrial Natural Communities</i>	
Natural communities	ANR
<i>Figure 11: Rare Plant and Animal Locations</i>	
Rare, Threatened, and Endangered Species	ANR
<i>Figure 12: Roads and Other Public Access Facilities</i>	
Campsites and moose platform	ANR
<i>Figure 13: Historical and Archaeological Features</i>	
Historical and archaeological features	ANR
<i>Figure 14: Leased Camp Lots</i>	

Camps	ANR
<i>Figure 15: Wildlife Habitat Management Activities from 2002 - 2014</i>	
Commercial and noncommercial treatments	ANR
<i>Figure 16: Active Management and Core Area</i>	
(all in common data above)	
<i>Figure 17: West Mountain WMA Core Area Within the Entire Kingdom Heritage Lands</i>	
(all in common data above)	
<i>Figure 18: Active Management Area Management Zones</i>	
Forest types	ANR
Buffers	ANR
Beech production areas and grouse units	ANR
Transition management area	ANR
<i>Figure 19: Stands Targeted for Treatment 2014 – 2024</i>	
Forest types	ANR
Stands	ANR
<i>Figure 20: Culvert Replacement Priorities</i>	
Culverts and bridges	ANR
<i>Figure 21: Original Road Access Plan</i>	
(all in common data above)	
<i>Figure 22 Potential Roads to Open on Private Timberlands</i>	
(all in common data above)	
<i>Figure 23: Alternative Road Access Plan</i>	
(all in common data above)	
<i>Figure 24: Distance of WMA Areas from Permanently Open WMA Roads</i>	
Distance buffers (0.5, 1, 1.5, 2 miles)	ANR
<i>Figure 25: Road Restoration Implementation Plan</i>	
(all in common data above)	
<i>Figure 26: Anticipated Recreation Corridor Changes</i>	
Snowmobile corridor relocation	ANR
<i>Figure 27: Recreation Linkages</i>	
(all in common data above)	

H. SUMMARY OF PUBLIC COMMENTS WITH RESPONSES AND DESCRIPTION OF CHANGES TO DRAFT PLANS

1. Summary of Public Comments with Responses

The following is a comprehensive list of all comments submitted to ANR on the Draft West Mountain WMA Management Plan and Private Timberlands Public Access Plans during the open comment period from April 9, 2014 to June 11, 2014.

Comments were compiled from three public meetings (held in Brighton, Montpelier, and Lyndon), which were attended by a total of 60 members of the public, and 20 emails and letters.

Headings (underlined) have been created to organize general groups of comments. Similar comments have been grouped together into single, paraphrased statements (listed by number and in italics). Responses are provided below each comment, to clarify how the plans address the comments and indicate the rationale for either leaving the draft plan unaltered or any alterations made in light of the comment.

Core Special Treatment Area (“Core Area”)

1. *Maintain the extent of the Core Area.*

The size of the Core Area was designed, in accordance with the State Lands Easement, to cover the area required to preserve local wildlife and ecological functions into the future. Its boundaries were based on the locations of ecologically-significant watersheds and natural communities.

While scientific estimates of optimal reserve sizes in the northeast are often greater than 20,000 acres, it was determined that a 12,500 acre Core Area would be appropriate in this landscape given the extensive conserved lands surrounding it.

As the Core Area continues to develop subject to natural processes, its ecosystems and wildlife will benefit from increasing mature forest conditions and habitat features. Meanwhile, active forest and wildlife habitat management will continue on the more than 120,000 acres of West Mountain WMA, Conte Refuge, and Private Timberlands surrounding the Core Area.

This mix of management strategies will provide ample management opportunities while also supporting wildlife species and ecological processes. The original rationale and designations of the Core Area remain scientifically sound and will be maintained unchanged from the original plan (noting that future land acquisitions may add acreage to either the Core Area, Active Management Area, or both).

2. *Shrink the Core Area to increase timber and wildlife habitat management opportunities.*

(See #1)

3. *Expand the Core Area to protect important wildlife species and ecologically processes.*

(See #1)

4. *With many intensively managed lands in the region, passive management and reduction of outside stressors, such as non-native invasive species and human disturbance, should be the priority for the Core Area.*

As reflected in these plans, ANR does attempt to manage these lands as part of the broader regional landscape. The West Mountain WMA plan maintains the passive management called for in the original plan, while also speaking to the needs of reducing outside stressors like those mentioned.

Vehicular access and roads

5. *There is more than enough vehicular access in the area, and public access does not require a vehicle. Road closures will not impact public access.*

A primary goal of both West Mountain WMA and the Private Timberlands is dispersed public access (such as bushwacking, bird watching, hunting, and fishing), while a secondary goal of each is concentrated public access, including vehicular access. This plan attempts to fulfill these goals by placing emphasis on dispersed uses of the properties and managing concentrated uses in carefully considered corridors.

6. *Many hunters and other users want a more remote experience. Keep gates closed on the Private Timberlands roads and make some areas more remote by implementing road closures on the WMA.*

As one of a small number of regions in Vermont where users can have a more remote experience, this plan acknowledges the importance of providing the opportunity for those experiences here. This plan will add additional publically accessible road mileage on the Private Timberlands and contract it on West Mountain WMA, maintaining the overall remoteness of the landscape.

7. *Footpaths on closed roads are a good addition.*

Footpaths are a new strategy designed to enable better pedestrian access over roads that have been closed. This is one of the package of strategies intended to promote public access throughout the Kingdom Heritage Lands, and has been maintained in the final plans.

8. *Without road closures, the Core Area is not being managed for its committed purpose, acting as an ecosystem with minimal intervention.*

This plan update sets out a new schedule for road closures, and includes new details for priorities and methods for closures based on recent assessments.

9. *Nonessential roads that are now, or may soon, create environmental and infrastructure impacts should be closed.*

This plan update sets out a new schedule for road closures, and includes new details for priorities and methods for closures based on recent assessments, including assessments of ecological and infrastructure impacts.

10. *Keep this area as free of non-native invasive plants as possible. Closing roads sooner rather than later will help slow the spread of these plants.*

Nonnative invasive plants are a focus of this plan update. Early detection and management of these species is key. In addition, these plants are being found disproportionately along roads in West Mountain WMA, and road closures are being targeted on roads placed most centrally in the Core Area, to begin establishing a central, unfragmented portion of the Core Area.

11. *Wood turtle, a species of Special Concern occurs in or around the WMA. This species is vulnerable to being killed by traffic on roads and being taken by pet collectors. Decreasing the number of roads in the area will benefit this species.*

Given the particular location wood turtles are known from, the location of planned road closures, and the levels of traffic on the roads, it is unlikely these closures will have substantial effects on local wood turtle populations. The wood turtle, however, is only one example of the many kinds of impacts roads may have on wildlife, and why road closures are a part of the vision of the Core Area.

12. *Roads should be closed on the same 10-year timeline envisioned in the original plan.*

The lack of success implementing road closures from the original plan has necessitated the creation of a new set of strategies for this plan. This plan includes details on the priority, order, and methods for closing each road. In addition, this new phasing creates focuses closures on roads with the greatest ecological, infrastructure, and access impacts. This set of strategies should allow the successful implementation of road closures and restoration activities over the next 10 years.

13. *All roads in the Core Area should be kept open.*

The State Lands Easement specifically states that the Core Special Treatment Area “be an area with the highest ecological integrity, with natural ecological processes as intact as possible.” and that “...all current management decisions should advance the goal of allowing the Special Treatment Area to function as an ecosystem with minimal intervention.”

Because the ecological impacts of roads, can include altered water flows, diminished water quality, altered plant and wildlife movement, decreased wildlife survival, and non-native invasive species establishment, amongst others, the presence of roads within the Core Area is considered to be incompatible with the management goals and easement for this portion of the WMA.

14. *Open more roads for public use on West Mountain WMA and the Private Timberlands.*

With the opening of Goodwin Camp Road, as described in this plan, all currently passable roads on the WMA will be open to vehicular use. No other roads exist on the WMA. In addition, some dead-end roads will be closed over time, to fulfill the goals of the Core Area.

The additional Private Timberlands roads that have been identified as possibilities for opening in the Public Access Plan represent the roads believed to be appropriate for public vehicular travel. Public vehicular travel on other roads would create concerns for natural resources and/or public safety.

15. *Open Madison Brook Road.*

Madison Brook Road is one of the roads believed to be too difficult to manage for public vehicular travel. This road is very steep and, in places, confined to a narrow footprint between the brook and bedrock. In addition to resource concerns based on the fragility of this infrastructure, this road also presents public safety concerns due to its steep drops down to the brook, narrow width, and sharp corners.

16. *Continue West Mountain Pond Road as a loop once the Bullthroat Bridge constructed. Or consider gating instead of closing a section of the road.*

With construction of the Bullthroat Bridge, the West Mountain Pond Road would form a loop around the pond with Paul Stream Road. Establishing this loop would likely result in a significantly increased level of vehicular use on the road. Because this road runs through much of the Core Area, such increased use would be inappropriate. In addition, the road is very rough and fragile. Increased vehicular use would likely cause significant impacts to the road itself and require an unjustifiable level of maintenance.

Gating the road to prevent through travel is an excellent idea. Unfortunately, gates can also be circumvented and/or damaged, creating additional management needs. This plan has proposed removing a small section (1/4 mile) of the road to prevent loop travel and the impacts from users circumventing or damaging a gate, and to allow the removal of a high priority culvert causing negative impacts on water quality and fish passage. At the same time, this strategy will allow the public full vehicular access from both ends of the road, increasing the ease of vehicular access from the present, and encouraging dispersed uses such from these dead-ends, rather than recreational driving.

17. *Maintain public vehicular access south of West Mountain WMA across Granby Stream Road and Stony Brook Road*

As part of this plan, ANR will continue discussions with neighboring towns and landowners to encourage public access across these roads.

18. *Do not implement road closures until agreements to open additional roads nearby are in effect.*

As described in this plan, ANR intends to pursue these strategies as part of a comprehensive vision of vehicular access across the Kingdom Heritage Lands. Each strategy within that vision will be carried out on its own timeframe based on the numerous factors involved.

It is anticipated that the first additional Private Timberlands roads will become available for public use in the summer or early fall of 2014, before roads on West Mountain are closed. This will include much of the total 15 miles identified in these plans. The remaining sections will require upgrades (for example, road surfacing and new gates to protect winter roads) before they can be opened to the public. For this reason, each road will be made available, and will remain open, as is appropriate given its specific circumstances (including considerations of natural resources, infrastructure, public safety, and maintenance).

Meanwhile, it is anticipated that the first road closures and reclamations will begin in the fall of 2014 or spring of 2015, as per the schedule in this plan and depending on the availability of funding and logistics of contracting such work.

19. *Roads on West Mountain WMA should be allowed to revegetate passively, rather than being closed actively.*

When roads are not maintained properly, they cause negative impacts to water quality and aquatic ecosystems. Even on roads that are well-maintained, we see the failure of drainage features and stream crossing structures that lead to erosion, sedimentation, and loss of other infrastructure. Allowing these impacts to compound over time by not maintaining roads could cause significant degradations of water quality and aquatic systems and damage to other infrastructure. Actively reclaiming roads includes restoring water flows, creating appropriate drainage, and promoting revegetation, all of which are necessary to prevent these and other impacts.

Recreation

20. *Keep snowmobile trails open.*

This plan makes no changes to the snowmobile trail network, with the exception of noting that a re-route is needed in the eastern portion of the WMA. In addition, a new Corridor Manager Agreement will be created with VAST in the near future, at which point VAST may request changes to existing corridors. Proposed changes as a result of new Corridor Manager Agreements will undergo an additional public process at that time.

21. *Snowmobile trails need better drainage and stream crossings and restrict summer vehicles from accessing.*

Using appropriate stream crossings and conducting necessary trail maintenance are ongoing management tasks that VAST and ANR are mindful of. In addition, ANR is aware of multiple locations where public vehicle access on ungated snowmobile trails has caused

extensive damage on its lands and will continue to address these locations as they are discovered. ANR would welcome reports of any such sites.

22. *Create more biking opportunities across the Kingdom Heritage Lands, including a loop for biking around West Mountain WMA.*

Biking is allowed on roads open to vehicles on the WMA, but no off-road biking trails currently exist on the WMA. There are no road loops that could enable biking entirely around the WMA, but an off-road trail to connect roads could be considered. As with all concentrated recreational uses, new off-road trail proposals require in-depth evaluation, in accordance with their potential natural resource impacts and the management goal of maintaining a rugged, remote experience for users.

Biking is currently prohibited on the Private Timberlands, but could be considered if a potential Corridor Manager organization applied to ANR. With significant logging truck traffic on many roads, the Private Timberlands present additional concerns for public safety that would need to be mitigated.

Biking on the Conte Refuge will be addressed in the US Fish and Wildlife Service's forthcoming Comprehensive Conservation Plan.

23. *Create more equestrian trails, especially loops.*

A new Corridor Manager Agreement will be created with the Vermont Horse Council in the near future, at which point VHC may request additions or changes to existing corridors. Proposed changes as a result of new Corridor Manager Agreements will undergo an additional public process at that time.

As with all concentrated recreational uses, new off-road trail proposals require in-depth evaluation, in accordance with their potential natural resource impacts and the management goal of maintaining a rugged, remote experience for users.

24. *Construct a hiking trail up West Mountain and rehabilitate the fire tower on the summit.*

An informal trail exists up to West Mountain presently, but serves mostly for access to the privately leased camp lot rather than as a piece of public infrastructure. A new Corridor Manager Agreement will be created with the Green Mountain Club (which manages hiking trails on the Kingdom Heritage Lands) in the near future, at which point GMC may request additions or changes to existing corridors, including this option. As with all concentrated recreational uses, new off-road trail proposals require in-depth evaluation, in accordance with their potential natural resource impacts and the management goal of maintaining a rugged, remote experience for users.

The fire tower, however, is privately owned and thus outside the scope of this planning process.

25. *Do not create new hiking trails. Emphasize bushwhacking and use of existing trails and logging roads.*

Construction is in progress on trails to Bluff, Middle, and Gore mountains, in accordance with the original Public Access Plan and Corridor Manager Agreements. No plans exist for other new hiking trails at this time.

A new Corridor Manager Agreement, however, will be created with the Green Mountain Club (which manages hiking trails on the Kingdom Heritage Lands) in the near future, at which point GMC may request additions or changes to existing corridors. Proposed changes as a result of new Corridor Manager Agreements will undergo an additional public process at that time.

26. *Allow limited clearing on Gore and Middle mountains for views from hiking trails.*

This could be allowable in consultation with GMC, VLT, and the Landowner. Such management would need to be proposed as part of the Corridor Manager Agreement for the hiking trails, and to be found as in accordance with the easements on the property.

27. *Create more multi-use trails.*

Trails are considered as part of the Corridor Manager application process. In accordance with the goals for West Mountain and the Private Timberlands, dispersed public access is preferred to concentrated public use, so most concentrated uses are currently designated as multi-use corridors on existing roads. Multi-use, off-road trails are a possibility, subject to approval through the Corridor Manager application process.

28. *Sign trails better.*

As part of the goal to maintain the rugged and remote character of the Kingdom Heritage Lands, a decision was made to keep signage to a minimum. Some signs do exist to guide users, and Corridor Managers or ANR can provide maps of approved corridors. If specific signs are necessary for public safety, user conflicts, or other purposes, please contact ANR.

29. *Limit recreation signage. Maps are sufficient.*

(See #28)

30. *Consider developing birding platform at a suitable site.*

Specific proposals for such a platform would be welcomed and evaluated based on their impacts to resources, the character of the area, and other users, as well as all applicable legal restrictions.

31. *Allow camps to be bought privately rather than exercising ANR's right of first refusal.*

ANR appreciates its relationship with camp owners and the “camp culture” present in the region. Generally, ANR has not exercised its right of first refusal, but may do so contingent on the situation and availability of funding.

32. *Some camps should be made available to the public in the future.*

While it will likely be many decades before most camp leases expire and any abandoned structures fall to ANR, the Agency may eventually choose to make such structures available for public use. The decision to do so will be made in the future, and based on the condition and location of the structures, the ability of ANR to manage such public use, any perceived conflicts with other uses, and other factors.

Hunting/Fishing

33. *Create more early successional habitat, especially for grouse, woodcock, hare, and deer.*

A new set of silvicultural treatments have been planned, which will create a level of early successional habitat that DFW Biologists believe is appropriate within this landscape. While some species of plants and animals thrive in early successional habitats, others do not. The level targeted in this plan was derived from considerations of both current and historical levels of such habitats on the landscape, trends in forest management in this area of Vermont, and the needs of a variety of wildlife species.

34. *End salmon stocking to reduce competition with brook trout.*

Salmon stocking is undertaken by the Fisheries division of DFW as part of the federal program to restore Atlantic salmon to the Connecticut River. Fisheries Biologists consider competition between salmon and brook trout to be negligible, and Paul Stream to be good habitat for salmon. While this program has been suspended as of 2014, Paul Stream will continue to be considered for this use if the program restarts in the future.

35. *Increase fish stocking on the WMA.*

Fish stocking decisions are made by the Fisheries division of DFW. Fisheries Biologists do not anticipate an increase in stocking within the WMA in the near future, particularly with the diminished capacity of DFW to produce fish given the loss of the Roxbury Fish Hatchery. Fisheries staff, however, have also identified Paul Stream as a good candidate for in-stream habitat improvements, which might take place in the next few years.

36. *The creation of a shooting range on South America Pond Road is a good idea.*

The creation of a shooting range would create a safe and convenient place to sight-in and practice with firearms. If placed at West Mountain WMA, a range would make use of an existing gravel pit and be very low-infrastructure. The details and prospects of this idea are still in progress, and will be evaluated by ANR and the State Lands Easement holders.

37. *Hunters should be allowed to use ATVs to access hunting areas.*

ATVs are allowed on the WMA and the Private Timberlands only for management purposes or by a member of the public with a mobility disability that has obtained a Special Use Permit from ANR. Use of ATVs on the Private Timberlands by the general public is prohibited by the easements on the property, and use of ATVs on state land by the general public is prohibited by law (unless specifically designated).

Wildlife, Forest, and Habitat Management

38. Be mindful of development around the conserved lands, to protect their unique character.

ANR considers the unique character and lack of development of these lands to be among their most important features, and will continue to work to maintain and enhance these values. This planning process, however, does not have implications for other lands in the area.

39. Loss of softwood regeneration in deer wintering areas is a concern.

DFW works across the state to preserve deer wintering habitat. On West Mountain WMA silvicultural prescriptions in softwood and mixedwood stands will favor maintaining and enhancing softwood cover, as well as providing the necessary age classes, canopy characteristics, and browse to provide functional deer wintering habitat. On the Private Timberlands, Plum Creek, ANR, and VLT often all collaborate on the management of deer wintering habitats, with the goal of increasing softwood cover.

40. Manage for connectivity and core habitat.

The Kingdom Heritage Lands represent some of the largest habitat blocks in the state. Connectivity for plants and animals to move between these core habitats and to and from other habitat blocks is critical. ANR considers the management of these lands in this context and will work to maintain and enhance the connectivity in and around these lands.

41. Conduct a wildlife crossing study on Rt105 and Rt102 using cameras.

Presently, both the Staying Connected Initiative (of which DFW is a member) and The Nature Conservancy are beginning studies that will investigate wildlife crossings in this area.

42. Consider rock-lined water bars (rock fords) for stream crossings when culverts fail.

Rock fords are generally not appropriate on the publically traveled roads of the WMA due to their impacts on water quality and aquatic ecosystems.

43. On West Mountain, use timber rotations of 80-100 years rather than 80-120 years.

Rotations of 80-120 years are a commonly used prescription to grow mature hardwood trees especially on relatively low productivity sites like West Mountain WMA. This is in accordance with NE-603 Northern Hardwoods Silvicultural Guide. In addition, longer

rotations allow the development of important habitat features including snags and large-diameter wood, and provide other ecosystem benefits.

44. *On West Mountain, 300 foot buffer areas adjacent to streams, lakes, wetlands, and beaver ponds are unnecessary, and timber management should be conducted within these areas.*

Forest management can and will be conducted within these secondary buffer areas. In contrast to general management areas, however, buffer management will focus on smaller openings and lighter harvests. These large buffers with lighter forest management will maintain and enhance a variety of ecological processes including the development of large trees (habitat for many animals including waterfowl), the addition of woody material into aquatic environments (creating habitat for trout and other species), and the movement of amphibians from aquatic habitats to uplands (which can travel hundreds of feet).

45. *On West Mountain, even-aged openings should not be limited to a 5-10 acre maximum size.*

This plan specifies a maximum opening size of 25 acres. Generally, however, smaller openings will be used (at the discretion of Biologists and Foresters), to diversify the largely homogenous age and structure of the current forest.

46. *On West Mountain, the level of even-aged management planned for hardwood forests is too high. This will increase the susceptibility of the forest to nonnative invasive species and will not provide the large blocks of late-successional habitat favored by some species.*

The new set of silvicultural treatments have been planned to create a level of early successional habitat that ANR Biologists and Foresters believe is appropriate within this landscape. Overall, the level of forest management will regenerate forest at a rate somewhat greater than estimates from natural disturbances. This was deemed appropriate due to the presence of the passively managed Core Area and the need for regenerating forest habitats by a variety of wildlife species (including Canada warbler and ruffed grouse).

47. *It is good the new plan addresses climate change, the habitat needs of Canada lynx and American marten, and aquatic organism passage.*

These are some of the high-priority resource concerns that have surfaced since the development of the original plan. This speaks to the need to continually evaluate situations on the ground, and manage in response to changing conditions.

48. *Do not reintroduce wolves in the WMA. Catamounts, however, should be considered for reintroduction in the WMA.*

While the WMA, and the Kingdom Heritage Lands as a whole, represent very large blocks of habitat for Vermont, large predators such as catamount require immense ranges and the Kingdom Heritage Lands could likely only support a small number. For that reason, any such

reintroduction effort would be led by the US Fish and Wildlife Service and is not within the scope of this plan.

49. *Game species (deer, ruffed grouse, moose, and snowshoe hare) have their place in management, but get more attention than they deserve.*

The mission of the Fish and Wildlife Department is “the conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont...” Game species are managed closely given their importance to the people of Vermont and the level of impact that humans have on them. Nongame species, other ecological considerations, and non-consumptive public uses, however, are just as important in management planning.

Planning Process

50. *The many compromises apparent in this plan are appreciated.*

With many users and interested parties, management of these lands requires a great deal of balancing.

51. *ANR cannot keep reconsidering long-term strategies every 10 years. It must implement them and stick to them.*

The plan update seeks to maintain all of the major management direction for the Kingdom Heritage Lands and the vast majority of the finer-detail management strategies that will get us there. While some changes have been made, ANR is committed to the long-term vision of these lands.

52. *There are issues with representation in the planning process. Those who want large protected places to exist may represent a majority but may not attend a meeting or submit a comment, while local, vested interests may submit more comments.*

Public participation is a key element in ANR’s land management planning. There are, however, numerous challenges around representation in the planning process, which is why ANR seeks the broadest possible participation. In addition, ANR does not conduct planning as a voting process where the largest or loudest groups hold the greatest sway—each idea submitted is evaluated on its own merits and anticipated effects on resources and users.

53. *Altering the road closure schedule disrupts the balance reached in the original planning process.*

This plan update relies heavily on the original plan, and seeks to maintain the vision it set forth. This update does not change the prescription for any roads originally intended for closure to permanently open.

54. *It is good that not many changes have been proposed to the intent and practices of the original plans.*

The levels of both public participation and expert input to the original plans are unrivaled. These plan updates rely heavily on the original, and seek to maintain both the broad directions and many of the specific strategies that the original set forth.

Other

55. *The new plan needs much more detail on how climate change will be addressed. This plan should include estimates of the increased costs of road repair and the increased ecological damage that will result from greater erosion, siltation, and other climate change impacts.*

Certainly climate change will bring increased resource and infrastructure impacts, including those listed above. While estimating the severity, frequency, and costs of such impacts, would be both revealing and informative, ANR does not currently have a way to create such estimates with reliability.

56. *Illegal dumping is a problem in some areas of the WMA.*

ANR spends considerable time and energy cleaning and following-up on illegal dumping. Land managers notify Environmental Enforcement Officers and Game Wardens, who investigate and prosecute dumping activities. Please contact ANR if you discover such activity.

57. *In the Camp summary discuss the 2006 legislation affecting camps at West Mountain WMA, and in the full Camp Management Section discuss the minority report of the Study Committee On West Mountain Wildlife Management Area Leaseholders*

These details, while important, are not significant enough to warrant adding to the already very long document. The 2006 legislation is discussed in the full Camp Management section and does not need repeating, and the inclusion of minority reports from committees is at a level of detail unnecessary in this document.

58. *The state shouldn't buy more land with easements.*

Easements are one of the most common tools in modern conservation. ANR both holds easements on the property of others and owns properties with easements. While easements sometimes offer challenges (for example, management restrictions), they also offer benefits (for example, lower costs of ownership and perpetual protection from development).

59. *Acquire the inholdings and adjacent parcels currently owned by TNC, and add them to the Core Area.*

ANR places a high priority on consolidating its existing ownerships by acquiring inholdings and adjacent parcels. Acquiring the TNC parcels in and adjacent to West Mountain WMA is a high priority for this ownership, and would bring the advantages to users of having a single land owner and set of policies.

60. *Do not build industrial-scale wind turbines on the Kingdom Heritage Lands.*

Industrial-scale wind turbines would not be in conformance with the easements or management goals for these properties.

61. *ANR should meet with the town of Brunswick annually, to discuss management on the WMA and related issues on this “gateway town.”*

ANR will plan to meet with Brunswick annually, as now reflected in section VI.N. of the West Mountain WMA Management Plan.

2. Summary of Changes to Draft Plans

This is a list of all changes made to the West Mountain WMA Management Plan and the Private Timberlands Public Access Plan between the draft and final plan stages. These changes arose as a result of public comments, ANR staff input, and input from legal partners.

a. Changes Applicable to both the West Mountain WMA Management Plan and the Private Timberlands Public Access Plan:

1. This Public Responsiveness Summary was added as an appendix to each plan.
2. One road on the Private Timberlands designated to be opened was changed: the west fork of the longest road off of the East Branch road was identified as being in better condition and not crossing private land, compared with the east fork designated in the draft plan. The mileages are very similar.
3. A description of the public draft review process was added to the Public Comment (V.) section.
4. Old, unusable trails were removed from the snowmobile corridor maps.
5. To simplify maps, biking corridors were removed and replaced with the statement that biking is allowed on all ANR roads on West Mountain WMA that are open to vehicles.
6. The web address for the new Road Conditions website was added.
(http://www.vtfishandwildlife.com/wildlife_WestMtnWMARoads.cfm)
7. Language was added to clarify that roads on the Private Timberlands newly designated for public vehicular travel will be made available as their conditions allow. Some will likely be available in 2014, while others will require improvements before they are travelable.
8. Language on recreation corridors was changed to clarify that corridors are located (and relocated) at locations mutually agreeable to Corridor Managers and ANR.
9. Champion Lands Leaseholders and Traditional Interests Assoc was added to the constituent group list in the Public Involvement section.

b. Changes Applicable to the West Mountain WMA Management Plan only:

10. A new Ecological Objective was added to recognize the importance of forest health, structure, native species composition, and regeneration.
11. An exception to no-cut riparian buffers was added for forest health management.
12. The timeline for road closures and restoration was changed from beginning in 2014 to beginning in 2015, based on time constraints around the approval of the final plan and ability to contract the necessary work.
13. The preliminary nature of road closure cost estimates was emphasized.
14. To ensure that all roads are reevaluated in the next plan update, Long Term roads are now designated to be planned for in “the next” planning effort, rather than “a future” effort.
15. Language emphasizing the ecological restoration intention of road closures was added.
16. The intent to meet with the town of Brunswick (and other municipalities on request) annually was added in the Communication and Coordination section.
17. A paragraph and map were added describing inholdings and adjacent parcels which ANR hopes to acquire in this planning cycle to add to the WMA.
18. Language clarifying that leased camps are currently not a public use, but a private one, was added, and the heading “Camp Management Plan” was changed to read “Private Camp Management.”
19. The need for new “footpaths” on reclaimed roads to be managed as Corridors was clarified.
20. The stated target moose density was corrected to 1.75 moose per square mile for WMU E.
21. A small amount of text was added in Management for Climate Change Adaptation to emphasize the benefits to wildlife and other resources.
22. The text describing allowed and prohibited camping uses in the Core Area was clarified.