Pine Ridge Forest Management Plan

Town of Williston, Vermont

Approved by the Williston Conservation Commission, August 7, 2019

Approved by the Williston Selectboard, September 3, 2019

Acknowledgements

The development of the Pine Ridge Forest Management Plan was made possible by a collaboration between the Town of Williston and the University of Vermont Rubenstein School of Environment and Natural Resources. NR 206: Environmental Problem Solving and Impact Assessment is a project-based service-learning class that serves as the capstone of the core curriculum in the Rubenstein School of Environment and Natural Resources. Each semester, UVM seeks community partners to engage students in collaborative projects that provide experiential learning for the students while offering authentic and tangible benefits to the community. This was one such project. The Town of Williston benefited immensely from this partnership, as evidenced by this document.

We wish to acknowledge and thank all who contributed to this effort:

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Williston Conservation Planner Melinda Scott provided guidance to the student team and compiled their deliverables into a cohesive Plan. The Williston Conservation Commission provided input and valuable feedback into the Draft Plan.

Thanks to the McCulloughs for allowing access to Pine Ridge across their lands.

Finally, we acknowledge the New England Theological Seminary for the donation of the 42-acre Pine Ridge Forest to the Town of Williston. This property is an ecological gem worth protecting.

DRAFT

Table of Contents

I. Purpose 4
A. Goal of the Management Plan 4
B. Responsibilities 4
C. Process of Developing the Management Plan 4
II. Physical Landscape 4
A. Climate 4
B. Topography 5
C. Bedrock 5
D. Surficial Deposits 5
E. Soils 7
III. Land Use History 8
IV. Forest Stands Delineation and Description 9
A. Stand 1: Hemlock-Northern Hardwood Forest 10
B. Stand 2: Hemlock-Northern Hardwood Forest 11
C. Stand 3: Hemlock Forest 12
D. Future Management Recommendations 13
V. Natural Resource Values and Notable Features at Pine Ridge 18
A. Natural Resource Values 18
B. Notable Features 19
VI. General Management of the Parcel 39
A. Best Use of Land 39
B. Structures 40
C. Vehicular Traffic 40
D. Upkeep, Damage, and Illegal Uses on the Property 40
E. Boundary Marking and Posting 40
F. Hunting 40
G. Harvest of Trees or Plants 40
VII. Recreation Assessment and Recommendations 40
A. Description of Cabin Condition and Recommendations 40
B. Cabin Photos 41
C. Trail Conditions and Connections 44
D. Potential Access Points 46

E. Recreational Use Potential and Recommendation 49
VIII. Proposed Action Schedule 49
IX. Adoption 50

Appendices

A. Pine Ridge Forest Assessment

B. Surficial Geology Map and Supplemental Information

C. Soils Map and Supplemental Information

D. Property Boundaries

E. Forest Stands Map

F. Invasive Plant Stands Map

G. Notable Features Location Map

H. Trail Map

I. Potential Access Points Map

I. Purpose

A. Goal of the Management Plan

This plan is intended to guide the management of the Pine Ridge Forest located in Williston, Vermont. The land is owned by the Town of Williston and is managed with the joint goals of natural resource protection and passive recreation.

B. Responsibilities

- The Town of Williston took fee title to the property on August 31, 2016.
- The Williston Conservation Commission (WCC) took the lead in drafting the management plan and will be primarily responsible for implementing the management plan.
- The Selectboard must approve the Management Plan before it can be implemented. Approval of large appropriations to make improvements on the property comes from the Selectboard.

C. Process of Developing the Management Plan

The Management Plan was drafted by the Williston Conservation Commission (WCC). The WCC partnered with the University of Vermont Rubenstein School of Environment and Natural Resources to conduct the background research needed for the Plan. In fall 2018, a team of students enrolled in NR 206 – Environmental Problem Solving and Impact Assessment conducted background research and field assessment of the property, and provided a series of reports, maps and photos that have been incorporated into this Plan (see Appendix A for summary report). Williston Public Works was consulted in the process. Public comment was taken on the document as part of the Selectboard approval process.

II. Physical Landscape

The primary elements of the physical landscape include climate, topography, bedrock geology, surficial geology, and soils. These factors, interacting with each other, largely influence the ecological and cultural patterns that exist on the landscape.

A. Climate

The Pine Ridge Forest is located in the Champlain Valley biophysical region. The Champlain Valley has the unique distinction of being not only one of the lowest parts of an otherwise mountainous state, but also of having its winter temperature extremes moderated due to the buffering effects of adjacent Lake Champlain to the west (Thompson and Sorenson 2005). As a result, the Champlain Valley is warmer in both the summer and the winter than the majority of the Vermont landscape. This temperate climate supported widespread agricultural uses in the region.

B. Topography

The Pine Ridge Forest rests on the flanks of what many Williston locals call French Hill. To the east, the land drops quickly to the Winooski River floodplain where Thomas Chittenden and other early Williston residents once farmed. To the north the land slopes more gently, and this fairly flat terrain makes up what is now the Catamount Community Forest. Meanwhile, to west of the Talcott and Pine Ridge properties, the flat to very slightly rolling terrain is currently occupied by the Williston Golf Course, and was formerly a dairy farm. Finally, the terrain to the south rises towards the northern tip of the north-south running Richmond Ridge, and is traversed by both by the east-west running Route 2 (which follows the path of an old Native-American foot path), and by the Interstate 89 corridor.

The large majority of the Pine Ridge Forest is characterized by steep, ravine-dominated terrain with permanent or seasonal streams flowing in nearly every ravine basin. Indeed, all of the low areas on the property are fairly wet despite the sandy surface soil and glacial outwash parent material, and there are a number of natural seeps along the main waterways. The highest point on the Pine Ridge Forest parcel is on the hilltop located near the eastern portion of the northern boundary line. A cabin once used by the Pine Ridge School currently sits in a small clearing on this hilltop.

C. Bedrock

The term “bedrock geology” refers to the study of how different types of bedrock were formed, and how they came to be where they are today. In its most basic form, bedrock geology focuses on what rocks are made of, how layers of bedrock are stacked, folded, split, or thrust in relation to one another, and what forces caused or allowed them to do so.

According to the 1961 Centennial Bedrock Map of Vermont, the Talcott Forest and Pine Ridge School Properties are entirely underlain by bedrock of the Pinnacle Formation. This extremely ancient bedrock formation has its origins in ocean bottom sedimentary rocks that formed during the late Pre-Cambrian Period, which ended approximately 542 million years before the present. The current structure of the Pinnacle Formation was created when the aforementioned sedimentary rocks were metamorphosed during the Taconic orogeny that created the Green Mountains around 450 million years ago. Schist and greywacke are two of the dominant rock types found in the Pinnacle Formation. Pinnacle Formation rocks are not generally calcareous in nature, and while areas of mildly calcareous rock may sometimes occur in these formations, one may assume that these rocks do not typically enrich the soil around them (Thompson and Sorenson 2005).

D. Surficial Deposits

Surficial geology describes and explains the deposit of loose sediments on top of bedrock from sources including glaciation, wind, river/stream deposition, lake/sea-bed sediment settling, or slow organic material deposition. Several of these factors are at play on the

Pine Ridge Forest parcel. Surficial geology is shown in the image below and in Appendix B.

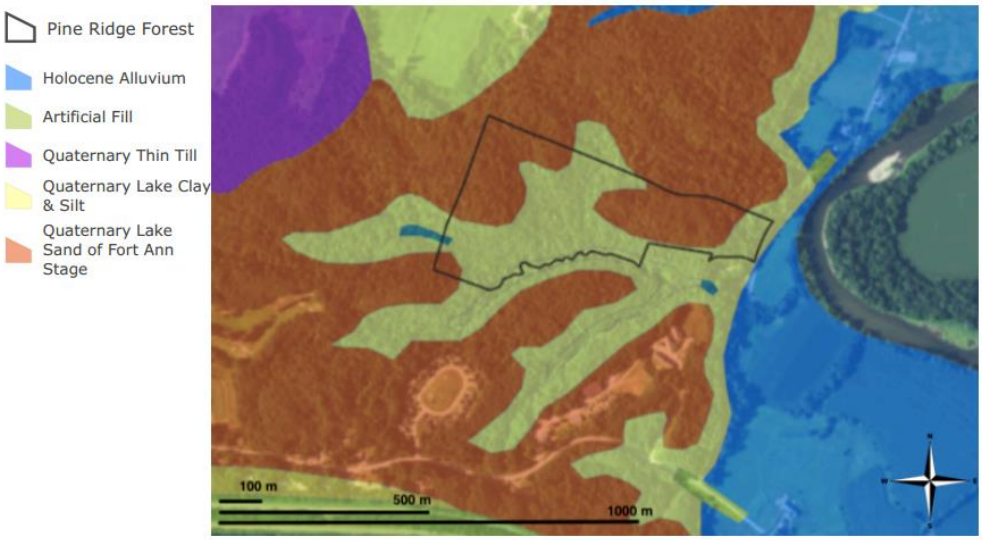
The dominant soil parent material type on this parcel is glacial outwash, which primarily consists of sand and/or gravel particles that have been spit out the leading edge of a glacier with the flow of glacial meltwater. This glaciofluvial parent material generally has the same bedrock origins as nearby glacial till, but the particles generally tend to be smaller and more homogeneous. As might be expected, outwash tends to be very permeable, and the associated soils well drained (USDA Soil Conservation Service 1989).

This parent material dates to the period just after the Laurentide ice sheet receded northward across the Williston landscape between 10,000 and 13,000 years ago. As the glacier receded, a lake was formed in the Champlain Valley which dwarfed the present day Lake Champlain in surface area and volume. At the lake's maximum extent, its shore was located just to the south of present day Interstate 89, and the Pine Ridge Forest parcel was underwater for up to several thousand years.

The lacustrine (lake bottom sediment) deposits indicated on Map 3 date from this time period, and are characterized by their silty/clayey structure. Clayey lacustrine deposits tend to be fairly fertile, and their presence in the Champlain Valley lowlands is a primary contributor to the factors that have made the Champlain Valley so successful agriculturally (Thompson and Sorenson 2005).

Surfical Geology: Pine Ridge Forest, Williston, VT

Data from: USDA FSA, DigitalGlobe, GeoEye, CNES/Airbus DS



E. Soils

Soil type variations play an important and sometimes conclusive role in determining the vegetation present in any given landscape, and have greatly influenced land use choices throughout human history. Soil types are shown in the image below and in Appendix C.

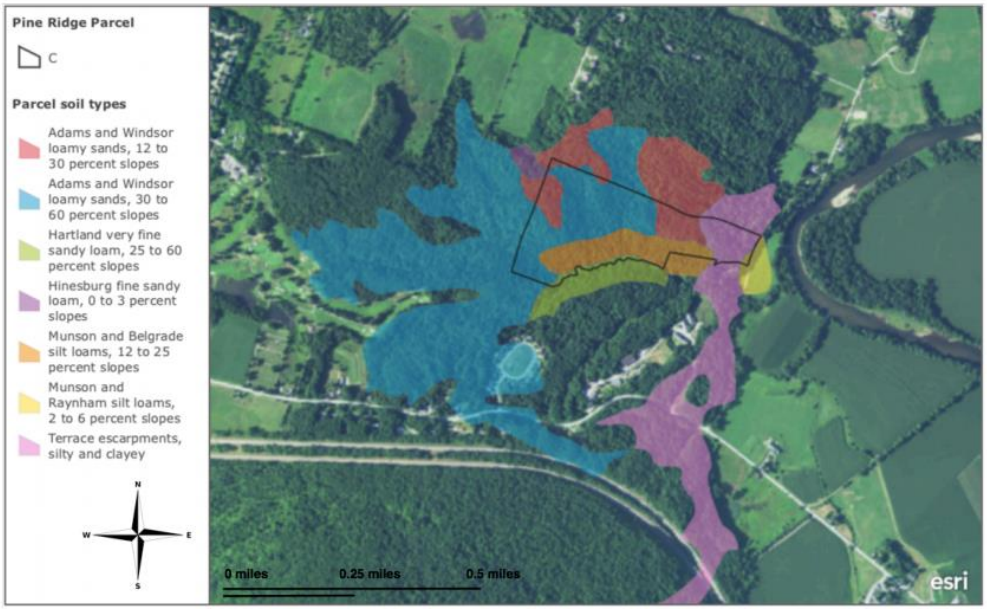
The **Adams and Windsor Loamy Sands** that dominate the Pine Ridge Forest property consist of "deep, loose, excessively drained soils that are sandy throughout. The sand is deeper than 4 feet, the soils are rapidly permeable, have a moderately low available moisture capacity, and have very low natural soil fertility. These soils formed in water-deposited sand (glacial outwash) that contains a large amount of quartz and schist.

An interesting soil feature at Pine Ridge known as a **Terrace Escarpment**. This soil unit is located on the steep slope just west of Governor Chittenden Rd. Originating from historic floodplain terraces of the Winooski River, this soil unit is notoriously prone to erosion when saturated with water. The most distinctive property of this unit is soil having more than one texture within a vertical section. Some locations could have a few inches or feet of loamy soil material overlying clay.

The **Munson Series Soils** are lacustrine in origin. This soil unit is located along the tributary which forms the southern boundary. These soils are deep and somewhat poorly drained. During spring, the seasonal water table may stand at less than a foot from the soil surface. This soil type has high fertility, and supports a rich diversity of plants.

Soil Types: Pine Ridge Forest, Williston, VT

Data from: USDA FSA, DigitalGlobe, GeoEye, CNES/Airbus DS



III. Land Use History

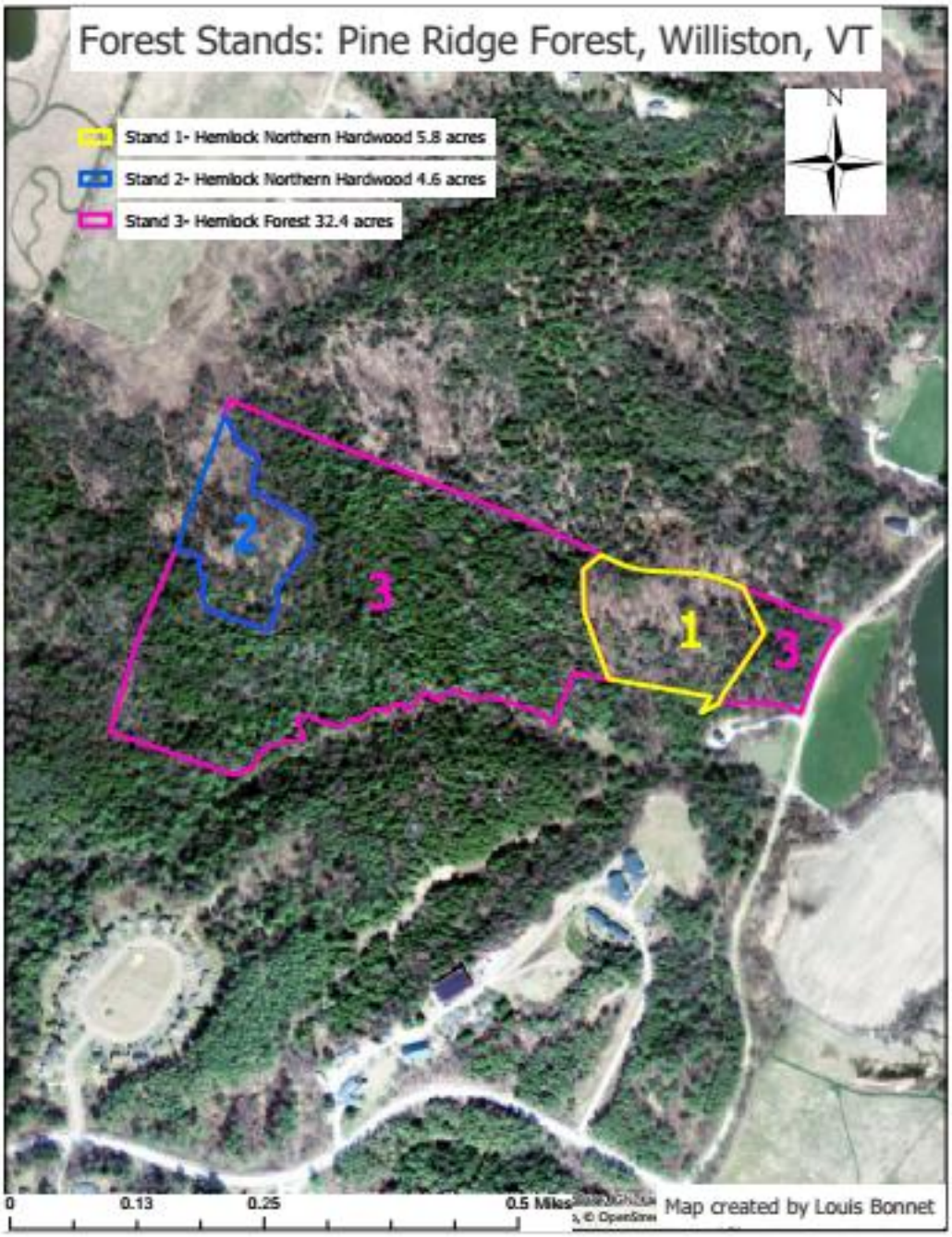
The parcel of open space acquired by the town of Williston was once the operating grounds for the Pine Ridge School. Founded in 1968, the school was able to get its start thanks to a purchase of 127 acres made by Howard Delano and Gardner Hopwood. Prior to this, the land, also known as French Hill, was the grounds of the "Twist O'Hill Lodge." This lodge was an essential tourist hub in the early to mid-1900's. In fact, the book "Williston: A Tourist Town?" by Richard H. Allen lays claim that the lodge had the "most comprehensive accommodations" and was "heavily advertised" throughout the region. This means that the parcel is no stranger to human activity (Allen 1986). Visitors loved this destination for its location in the woods and its spectacular view of Mt. Mansfield. Dozens of postcards of Twist O'Hill have been preserved and can be found at the Williston Historical Society or online through the Landscape Change Program's Web site (http://www.uvm.edu/perkins/landscape/).

After the closing of the Pine Ridge School in 2009, the parcel and former school facilities sat dormant until it was acquired by the New England Theological Seminary (NETS) in 2016. NETS proposed redevelopment of a portion of the property as a religious seminary. Because the proposed use of the property was not an allowed use in the Agriculture/Rural Residential Zoning District, the developers were required to submit a Specific Plan to change the zoning for the parcel. In order to have their Specific Plan approved, they had to provide a significant benefit to the town. To satisfy that requirement, they deeded the town 42 acres of the northernmost portion of the parcel as open space (see Appendix D: Property Boundary).

Within the parcel itself, a history of management is evident by the existence of well decayed stumps. These stumps are likely left from small scale logging operations which took place decades ago. Aerial photography also shows a small forest clearing, cut in order to accommodate the construction of the cabin now present on the property. There are three old bridges, numerous trails and orienteering posts on the parcel, a relic of the Pine Ridge School Adventure Center.

IV. Forest Stands Delineation and Description

Forest stands, shown and described below, were inventoried and delineated in fall 2018. See also Appendix E: Forest Stands Map.



Pine Ridge Forest Stands

A. Stand 1: Hemlock-Northern Hardwood Forest

Description

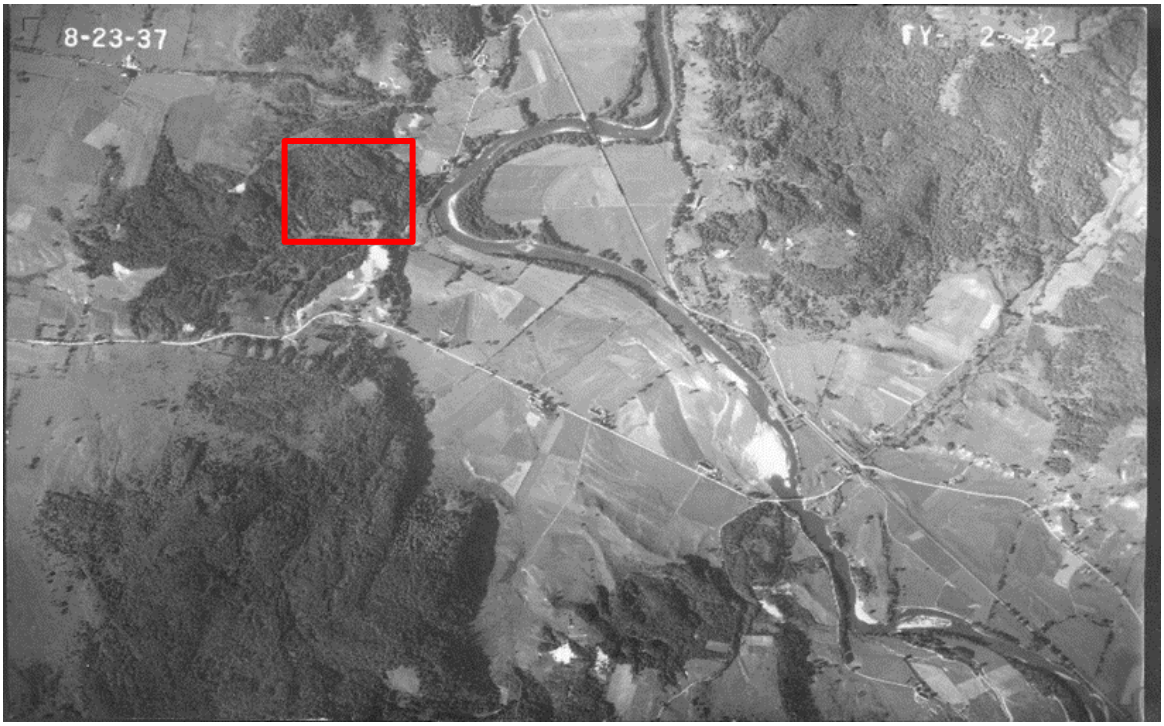
Stand 1, surrounding the cabin, is characterized by gentle to moderately sloping terrain and mid to late-successional overstory trees averaging approximately 14 inches in diameter at breast height. This stand contains a diversity of overstory trees with red maple and red oak the most common, and black cherry, white pine, eastern hemlock, and American beech also present at moderate levels. The midstory is dominated by American beech, red maple, sugar maple, eastern hemlock, black cherry, elderberry, and invasive honeysuckle, with common buckthorn, and Japanese barberry in lesser abundance. The understory is dense with invasive honeysuckle in areas but also has moderate densities of American beech and low levels of eastern hemlock. The stand has low structural complexity though downed wood and standing dead wood are present in isolated areas. Soils are comprised of loamy sands and silt loams.

Natural Community

Though currently this stand is dominated by mid to late-successional hardwoods, it is most likely a Hemlock-Northern Hardwood Forest Natural Community. This is evident by the regenerating eastern hemlock in the midstory and understory. These forests are comprised of "hemlock, pines, and hardwoods that are not nutrient demanding. They are found in areas of shallow bedrock or sandy to gravelly outwash, where soils are well drained to excessively drained. In many respects, they are similar are similar to Hemlock Forests, but hardwoods comprise 25 to 75 percent of the canopy" (Thompson & Sorenson, 2005). Steepness and thin soils characterize this Natural Community type and common associates of eastern hemlock are red maple, American beech, white pine, red pine, paper birch, and red spruce. In warmer climates red oak is an associate, as is currently the case in this stand. This Natural Community was historically much more common and many Vermont forests which currently are dominated by hardwoods will likely transition to contain more hemlock as succession progresses (Thompson & Sorenson, 2005).

Management History

This stand appears to be between seventy and eighty years old based on average tree diameters, heights, species composition, and aerial photography taken in 1937 (see historic photograph below). The 1937 photography shows much of the stand as pasture and the 1940s brought a wave of agricultural abandonment, so it is likely this stand originated in the 1940s. Trees were certainly cleared when the cabin was built approximately three decades ago, however historic forest management in the greater stand is difficult to assess. The invasive plants likely originated at the time of the cabin construction and these plants may even have been planted at that time, or their seed was tracked in during the construction process.



This photograph was taken in August, 1937. The red outline highlights the Pine Ridge Forest and a softwood canopy cover, mostly dominated by eastern hemlock, is visible. Within the highlighted area some open areas are visible, most notably what is now Forest Stand 1 just to the right of center. This stand has since regenerated and is now dominated by mid successional hardwood trees with some hemlock present as well.

B. Stand 2: Hemlock-Northern Hardwood Forest

Description

Stand 2 is characterized by varying slope with central portions of the stand nearly flat, while outer regions of the stand have slopes in excess of 30%. Mid to late-successional overstory trees average approximately 16 inches in diameter at breast height. This stand contains a diversity of overstory trees with red maple and red oak the most common, and yellow birch, American beech, eastern hemlock, white pine, and quaking aspen present in fewer numbers. A few areas of healthy-appearing American beech are notable as they seem resistant or tolerant of beech bark disease. The north of the stand contains a high density of large sugar maple in one area, likely due to enriched soils in that location. The midstory is well stocked with American beech and eastern hemlock, with species of lower shade tolerance growing in pockets of greater sunlight exposure. The understory is generally lacking, though American beech and eastern hemlock are found scattered throughout the stand. The stand has low structural complexity though downed wood and standing dead wood are present in isolated areas. A seep is located in the northeast of the stand and blowdown events over the years has created dense downed wood in this area. Soils are comprised of loamy sands.

Natural Community

Though currently this stand is dominated by mid to late-successional hardwoods, it is most likely a Hemlock-Northern Hardwood Forest Natural Community and. This is evident by the regenerating eastern hemlock in the midstory and understory. These forests are comprised of "hemlock, pines, and hardwoods that are not nutrient demanding. They are found in areas of shallow bedrock or sandy to gravelly outwash, where soils are well drained to excessively drained. In many respects, they are similar are similar to Hemlock Forests, but hardwoods comprise 25 to 75 percent of the canopy" (Thompson & Sorenson, 2005). Steepness and thin soils characterize this Natural Community type and common associates of eastern hemlock are red maple, American beech, white pine, red pine, paper birch, and red spruce. In warmer climates red oak is an associate, as is currently the case in this stand. This Natural Community was historically much more common and many Vermont forests which currently are dominated by hardwoods will likely transition to contain more hemlock as succession progresses (Thompson & Sorenson, 2005).

Management History

This stand appears to be about eighty to one hundred years old based on average tree diameters and heights. It was likely cleared and used as a pasture more recently than the surrounding hemlock forest. The 1937 photograph shows this area as being mostly forested at that time, though there are some open areas visible. It is likely that the pasture was abandoned in the early 1900s. The large quaking aspen trees likely regenerated following agricultural abandonment on this site and these species are a good way to assess historic management. Stumps that are approximately two decades old are visible in some places in the stand, though no widespread forest management has occurred since that time.

C. Stand 3: Hemlock Forest

Description

Stand 3 is characterized by very steep slopes, many perennial streams, and is dominated by even aged eastern hemlock trees averaging approximately 16 inches in diameter at breast height. Mixed in with the hemlock are a variety of other species present in small numbers and at times dense in isolated patches. These include white pine, yellow birch, red maple, quaking aspen, American beech, and paper birch. White pine is the most common species besides hemlock and many large pines are found throughout the stand. Scattered large red maples are also present. In southern sections of the stand white pine makes up a large portion of the overstory. Midstory and understory trees are largely absent from the stand due to very dense shade from the hemlock overstory and also a high deer population. Eastern hemlock and American beech make up the understory and midstory in isolated areas of the stand. There is very little structural complexity in the stand and downed wood as well as standing dead trees are largely absent. A medium-sized stream comprises some of the southern boundary of the stand and the riparian areas adjacent to the stream are important wildlife habitat. Generally the southern areas of the

stand contain more plant and tree diversity as well as more complex forest structure while the remainder of the stand is dense, even aged hemlock. Soils in this stand vary but are dominated by loamy sands and silt loams.

Natural Community

This stand is a Hemlock Forest Natural Community. According to Wetlands, Woodlands, Wildlands, Hemlock Forests historically comprised "about ten percent of the Vermont forest, but today it probably covers less than five percent of Vermont's land area. Hemlock was used widely for tanning leather in the 18th and 19th centuries, which is one of the factors leading to its decline in the state. It is a shade tolerant, long-lived species, capable of living up to 1,000 years. It is therefore a late-successional species, persisting under the shade of a hardwood canopy for decades, eventually becoming dominant." (Thompson & Sorenson, 2005).

These stands occur on hill summits, steep ravines, and areas dominated by bedrock. Soils tend to be droughty or wet and in the case of this stand, soils are generally dry though they are highly erodible and wet in areas Hemlock needles tend to acidify the soil and hemlock is known to perpetuate itself due to the acidity of its needles and the very dark conditions that hemlock stands create. Eastern hemlock is known to be the most shade tolerant tree in the northeast. Hemlock Forests contain 75% or more hemlock and are typically very dark which prevents flowering plants in the understory (Thompson & Sorenson, 2005).

Management History

Logging has occurred in this stand periodically, most recently approximately two decades ago as evidenced by well decomposed stumps. Areas of the stand were likely cleared as pasture in the 19th century but have since grown back to trees. In 1937 some parts of the south-central and southwestern area of the stand was pasture. Today, these areas are filled with young, small white pine and a mix of other species. It appears that streamside areas were cleared and steeper areas in this part of the stand were forested in 1937. Other areas of the stand were likely never cleared for agricultural purposes due to the very steep slopes and highly erodible, poor quality soils. These areas were logged over the years and sheep and cows were probably both grazed throughout this stand in the past.

D. Future Management Recommendations

The populations of invasive plants in this forest should be removed before any other large scale activity occurs. More information is offered about the invasive plants present and recommendations are given in the Invasive Plant Description and Recommendations section. Generally, the forest provides good habitat for a variety of species but is lacking in several components which encourage biodiversity, forest health, and resilience to climate change. Standing dead trees provide habitat for a variety of wildlife species and offer a food source for woodpeckers and other foraging animals. Downed wood similarly provides habitat for a diversity of wildlife and is good cover for animals such as bobcat. Downed wood also benefits forest health. A forest that is diverse in structure and species

composition is advantageous in many ways. These forests offer a greater array of habitats and feeding areas for wildlife and ensure that a variety of seed sources are available so that future adapted trees can grow as the climate changes. Such diverse forests are less vulnerable to insect or disease outbreaks. Currently these components are present in low levels and occur in pockets throughout the landscape. Management options are presented below and vary in their impact on wildlife habitat, intensity, aesthetic alteration, and financial outcome.

Three options were proposed for forest management: 1) Hands-off approach, allow natural processes to shape forest evolution; 2) Limited active forest management to enhance wildlife habitat and forest diversity; or 3) Commercial tree harvesting. A discussion of the three options is presented as follows.

Option 1 – Hands-Off Approach

Leaving the forest as it is would allow for maximum carbon sequestration. Over time natural disturbance and normal tree mortality will create diverse structure in the forest which will benefit some wildlife species. Wind events will create blowdowns which lead to the release of trees in the understory and midstory. The advantages of Option 1 are it is simple, easy to carry out, sequesters carbon, preserves aesthetics, and is free. Disadvantages include lower resilience to climate change, susceptibility to pests and pathogens, and the exclusion of certain wildlife and plant species from the current forest due to relatively low diversity of structure and composition.

Option 2 - Habitat Creation and Improvement Cuttings

A variety of silvicultural prescriptions could be implemented on the property that would allow for improved wildlife habitat, forest structure, and resilience to climate change. These may be implemented with greatest benefit in Stand 3 which currently most lacks components mentioned above. Girdling individuals or groups of mature trees would create standing dead trees and bring more light to the forest floor, improving growth in the understory and midstory as well as encouraging a greater diversity of understory plants. Cutting mature trees individually or in groups and leaving them on the ground would provide similar benefits. Additionally, the crowns of these cut trees would protect seedlings from deer browse and allow the development of preferentially-browsed species (sugar maple, red oak, yellow birch) into the midstory.

Cutting trees that compete with red oak, black cherry, and healthy American beech would allow these species to produce higher levels of mast which is important food to many wildlife. Added benefits could include the improved growth of understory plants and trees and midstory trees, which would benefit forest structural development. Many other types of cutting could be done that would benefit wildlife, forest structure, and resilience to climate change in many ways.

The potential advantages include more rapid development of wildlife habitat and forest structure, higher levels of tree diversity, greater tree health and strength due to increased light levels, and good carbon storage and sequestration. This kind of work could serve

educational purposes as visitors to the property could learn a little about forest management and see the results of these practices firsthand.

Disadvantages include the cost of this work, reduction in aesthetics to the average recreationalist, potential danger to recreationalists (standing dead trees), and higher potential for invasive plant invasions into the cut areas. Another concern would be the failure of some of these cuttings to meet their objective. For example, cutting trees and leaving them on the ground may be problematic if deer browse all the seedlings and a failure to regenerate the forest occurs.

Option 3 - Commercial Tree Harvesting

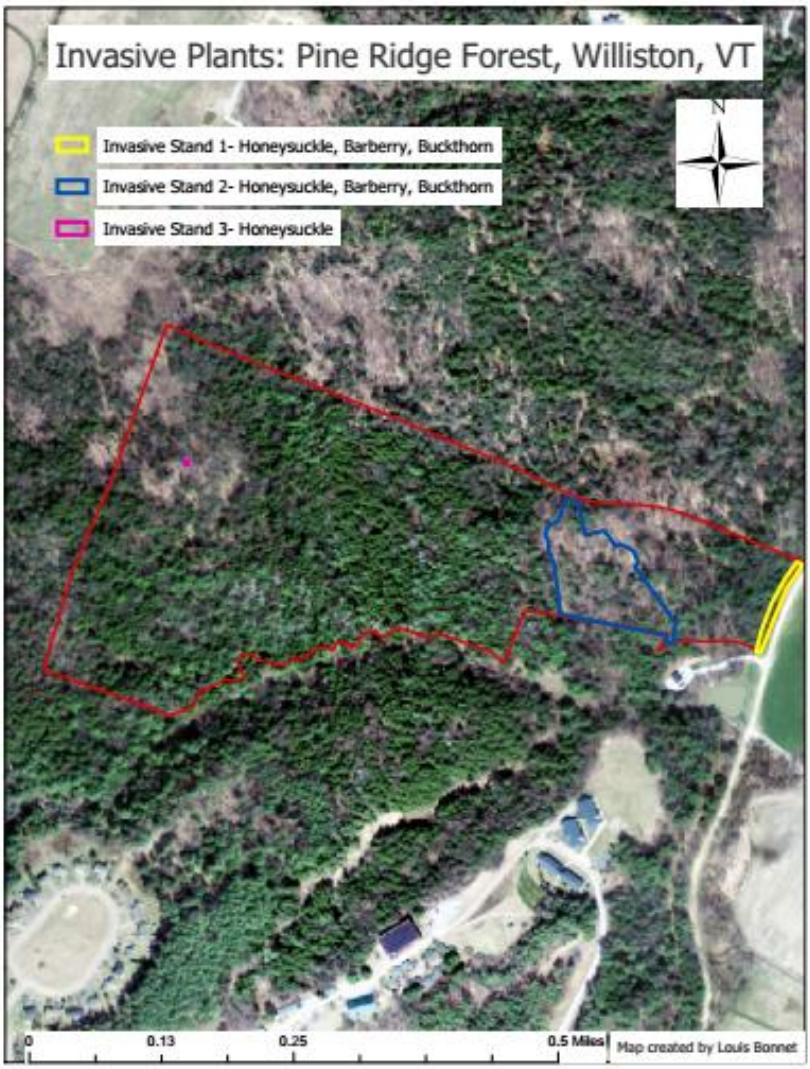
The silvicultural prescriptions mentioned in Option 2 could be implemented with the modification that some or all of the wood is removed from the forest. A variety of other prescriptions not highlighted in Option 2 could be implemented as well. This Option has much in common with Option 2 with the large difference being the potential for economic gain. There are some valuable trees present in the forest including well-formed red oak, black cherry, a small component of sugar maple in stands 1 and 2. There is a large component of white pine in some areas which is commercially valuable. Eastern hemlock dominates the forest and is not as commercially valuable, however some money could still be made if enough was cut. Skid roads exist on the property and most are in fair to good shape. Access to the forest would be difficult without temporary access being given by adjacent landowners.

The potential advantages include more rapid development of wildlife habitat and forest structure, higher levels of tree diversity, greater tree health and strength due to increased light levels, and economic gain to the Town of Williston. This money could be used to further the development of trails on the property or fund invasive plant treatment on this property or others owned by the town. This option may also be advantageous in that a contractor on site with logging equipment would easily be able to do recreational trail work in addition to tree harvesting.

Disadvantages include reduction in aesthetics, disturbance to wildlife communities and adjacent landowners and residents, potential damage to soils, and a reduction in the current carbon storage on the property. Slopes are steep in many areas and harvesting would be tricky in those spots. Additionally, regeneration failure and stakeholder resistance could be a concern with this option just as it would be in Option 2. This option may be best if the town seeks some income from the land while also allowing for future recreational use.

At this time, the Conservation Commission recommends implementing Option 1: Leave the Forest Alone/Allow Natural Processes to Occur. If forest management activities are planned for the abutting Talcott Forest, then the Town should explore opportunities to collaborate with UVM in implementing limited forest management activities at Pine Ridge. However, this should not preclude potential management of invasive plants on the property.

V. Description of Invasive Plant Locations and Density



Pine Ridge Forest Invasive Stands

Invasive plant stands, shown above and described here, were inventoried and delineated in fall 2018. Also see Appendix F: Invasive Plants Map. The property's road frontage with Governor Chittenden Road is characterized by a moderate to dense level of invasive honeysuckle with a lesser component of buckthorn and barberry (see Invasive Stand 1 on Invasive Plants Map). These plants receive full sun for most of the day and are producing a large seed crop every year which creates a high potential for spread. Fortunately, the forested area just behind the road has very low to no levels of invasive plants due to a dense hemlock forest cover. This invasive plant stand is characteristic of many road frontages in the area as these frequently disturbed edges of forests are ideal habitat for invasive plants.

The second stand of invasive plants comprises most of the hardwood stand that surrounds the cabin (see Invasive Stand 2 on Invasive Plants Map). Honeysuckle is most common,

but buckthorn and barberry are present to a lesser degree. This stand is very dense with large honeysuckle in some areas, particularly around the cabin and in sections near the cabin with low overstory shade. Other areas in this stand have lower densities with much fewer seed producing plants, however any type of disturbance would allow for rapid growth and thus seed production in these moderately infested areas. It is evident that the population of honeysuckle particularly is rapidly spreading throughout the hardwood stand with many young plants dominating the understory.

The third stand of invasive plants is quite small with just a few honeysuckle plants noted. It is located in the hardwood stand adjacent to Talcott (see Invasive Stand 3 on Invasive Plants Map). These plants are short and not yet producing copious seed, however larger plants could occur in small groups in this stand which were not noticed during field data collection.

Management Recommendations

Invasive plant infestations should be controlled as soon as possible in this forest. Populations of invasive plants are still at low enough levels that densities can be significantly reduced and perhaps eradicated in some areas. As the plants are rapidly spreading, especially in Invasive Stand 2, treatment will become more difficult and costly every year. An invasive plant management specialist should be hired to assess and treat the problem. Alternatively, volunteers could be coordinated to do the work. It should be noted that significant labor will be expended in order to control these stands if herbicides are not used. All invasive plants noted on the property are prolific sprouters and a single mechanical cutting of the plants will control the spread of seeds and the size of the infestation in the short term, but without follow up cutting every year the problem may be made worse in the long term. Flame weeding is an effective treatment, though still requires at least a few treatments to kill plants. Volunteers must be well trained and safety is of concern if flame weeding is used.

Treatment in Invasive Stand 3 is of top priority as this stand has low existing invasive populations and a low amount of work would result in controlling any further spread in this stand. Invasive Stand 2 is the second priority. Plants are actively spreading in this stand and populations are still financially and ecologically feasible to treat. Invasive Stand 3 is the third priority. As mentioned previously, road frontages are very susceptible to invasive plant problems and because adjacent properties contain high levels of these plants, management cannot expect to eradicate the populations here. However, controlling the seed producing plants will help to limit any spread and free up native species to colonize the area and provide more quality wildlife habitat. If recreational use of the property increases through this stand then management here should be of greater concern- increased food traffic means a higher potential for spreading of seed.

Annual monitoring and treatment as needed is recommended. Any initial treatment should be followed with at least one year of follow-up treatment. It is feasible that

populations could be knocked down to a level that would allow recreational users of the property to hand-pull any new plants that may grow.

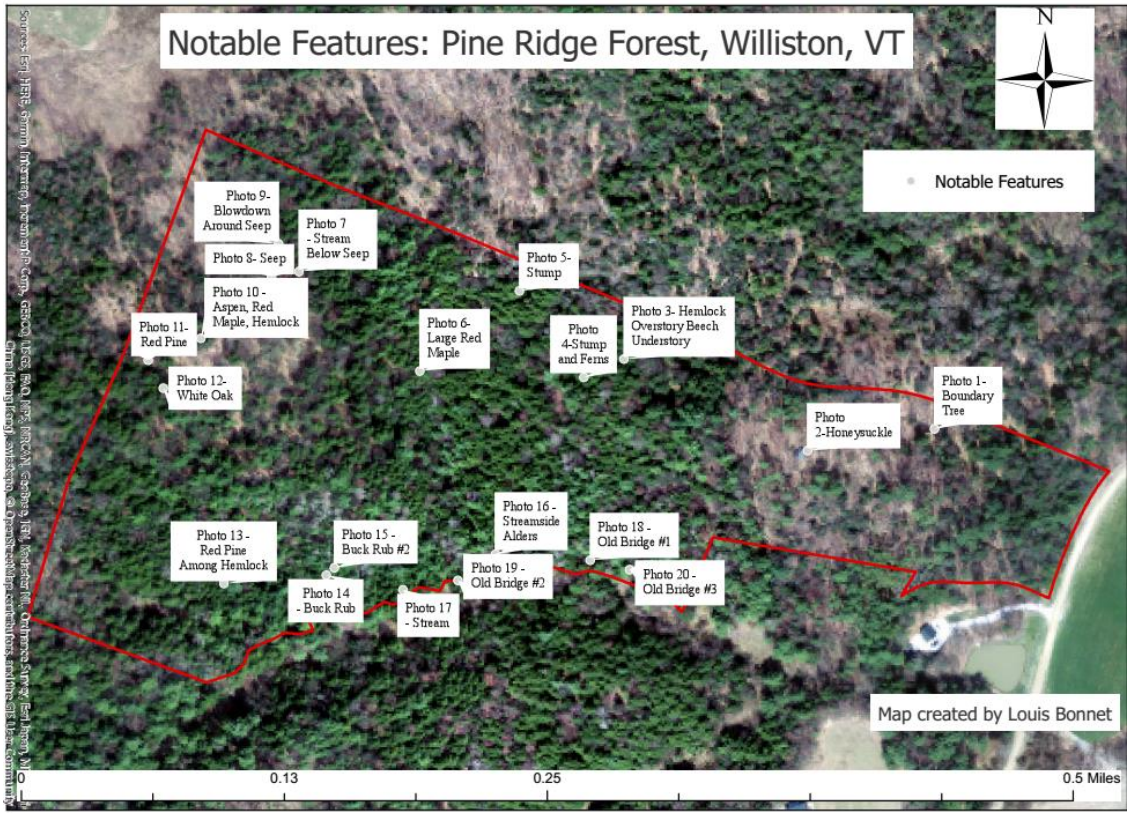
VI. Natural Resource Values and Notable Features at Pine Ridge

A. Natural Resource Values

The Pine Ridge Forest contains a variety of elements which stand out from a conservation perspective. Most evident is the dense stand of eastern hemlock which covers most of the property. The steep topography, peaks, valleys, and perennial streams make this area aesthetically pleasing. The Pine Ridge Forest is part of a mapped Deer Wintering Area by the state of Vermont. Deer rely on these habitats in the winter and benefit from protection from harsh weather and the reduced snowpack. A seep is present in the northeast of Stand 2 and this natural feature supports unique flora and fauna that cannot thrive in drier areas of forests (see photos 7,8, and 9 below). The combination of dense softwood cover through much of the property and the stream which makes up a portion of the southern boundary are ecologically important. The dense canopy of eastern hemlock, in particular, helps to moderate rainfall and serves a role in flood mitigation. Riparian forest cover helps moderate stream temperatures and ensure suitable conditions for the variety of stream biota. The stream and riparian corridor (see photos 14-20 below) appear healthy and function well to support a variety of wildlife and plants, some of which could not exist without the presence of these natural resources. Several large trees, likely legacies that weren't cut during widespread agricultural clearing, are present on the property and they are beautiful. A mature white oak tree located in the west of the property, is atypical for this type of site and was the only white oak seen during field visits (see photo 12 below). Similarly, isolated red pines, rarely seen outside of plantations, were found in a few places (see photos 11 and 13 below).

All of these features should be considered when future management decisions are made. Increased human visitation to the forest will undoubtedly disturb wildlife who rely on the wintering area. The potential development of trails, or improvement of existing trails, could disturb wildlife and this impact could be significant along the stream and in riparian areas. Riparian habitat is much less common on the landscape than other habitat types. Similarly, the seep should be protected from any damage. Even significant foot traffic could compromise these highly sensitive soils. Future activities should provide for the protection or conservation of these natural resource values while also allowing for other sustainable uses.

B. Notable Features



Pine Ridge Forest Notable Features

Notable features were inventoried, GPSed and photographed. Mapped locations are shown above and in Appendix G. Photos are shown below.

Photo 1 - Boundary Tree

Blue flagging and barbed wire marks the northern boundary of the property.

Photo 2 - Honeysuckle

Invasive honeysuckle surrounds the cabin and is present in much of forest Stand 1. Mature plants, such as the one pictured here, are as tall as 15 feet. Invasive Japanese barberry and common buckthorn are present in lesser numbers in Stand 1.

Photo 3 - Hemlock Overstory Beech Understory

An eastern hemlock overstory with an American beech and fern understory is common throughout Stand 3. Dense overstory trees creates a very low light environment allowing only certain shade tolerant plants and trees to grow. Stand 3 is important as a deer wintering yard.

Photo 4 - Stump and Ferns

Decomposed stumps are present throughout Stand 3. This stump, likely a former hemlock or white pine, is approximately two decades old. No recent forest management has occurred.

Photo 5 - Stump

Note the lack of understory or midstory vegetation in this photo. A combination of high deer populations and dense shade inhibits the development of new trees. This is a common scenario in northeastern hemlock forests. Though some harvesting occurred about 2 decades ago, not very many new trees were recruited from this harvest.

Photo 6 - Large Red Maple

This big red maple has an open-grown structure, indicating that it grew up in a high light environment. Several other trees exhibiting similar open-grown characteristics are found throughout the forest. This tree, located in Stand 3, may have grown early after agricultural abandonment and was never cut in subsequent logging activities due to its poor form and size.

Photo 7 - Stream Below Seep

A small stream forms from a seep on the edge of Stand 2. Numerous perennial streams of this size exist throughout the property, especially in the steep areas of Stand 3.

Photo 8 - Seep

This seep is a notable element of the forest. Seeps are defined by year-round wet soil conditions and are frequented by a variety of wildlife. Note the lack of large overstory vegetation and the fallen trees. Wet soil conditions create greater incidences of windthrow in and around seeps. It is important that this seep be protected from any harm that could be caused by increased traffic from humans, bicycles, or forestry equipment.

Photo 9 - Blowdown Around Seep

On the edge of the seep there are many windthrow trees. Some are more recent- perhaps from the late October windstorm in 2017. Single trees and small groups of trees being tipped over or broken from wind is the most common natural disturbance in Vermont. This serves to add dead wood to the ground and open the understory and midstory to greater levels of light. Over time, this type of disturbance brings greater species diversity and structural complexity to second growth, even-aged forests.

Photo 10 - Aspen, Red Maple, Hemlock

This photo shows the diversity of trees growing in Stand 2. The presence of aspen in the overstory indicates high light conditions that would have allowed aspen to thrive approximately 80 to 100 years ago.

Photo 11 - Red Pine

This red pine is surrounded by hemlocks. In the southwest corner of Stand 2. Red pine are often used by black bear as marking trees and they will return to the same tree each year to mark their scent during the mating season. A few other red pine grow in isolation in the western part of the forest. This species was historically planted in plantations but natural populations are found in Vermont. This tree may have been planted on purpose or could have escaped a plantation years ago.

Photo 12 - White Oak

An isolated white oak grows among hemlock, red oak, and red maple. White oaks are found in Vermont's warm valleys and are uncommon in northern Vermont outside of the Champlain Valley. This was the only white oak seen in the Pine Ridge Forest.

Photo 13 - Red Pine Among Hemlock

A red pine grows in isolation among a young stand of white pine and eastern hemlock. Southern areas of Stand 3 contain patches of dense white pine in an otherwise hemlock dominated stand.

Photo 14 - Buck Rub

A male whitetail deer created this rub on a young hemlock. This photo was taken near the stream in the south of the forest. This area is important for a variety of wildlife and future activities on the property should be mindful of this area.

Photo 15 - Buck Rub #2

Another buck rub on hemlock saplings. Riparian forest can be seen in the background.

Photo 16 - Streamside Alders

These speckled alders are unique habitat and cover for a variety of wildlife. Such alder thickets grow in the riparian areas along the stream and future activities on the property should be mindful of this area.

Photo 17 - Stream

The stream that makes up a portion of the southern boundary of the property is significant and future activities on the property should be mindful of this area.

Photo 18 - Old Bridge #1

Multiple old bridges cross wet areas or streams along the south central part of the property.

Photo 19 - Old Bridge #2

Multiple old bridges cross wet areas or streams along the south central part of the property. It may be helpful to remove these bridges, especially if they are directly in the water. It is likely they were built with pressure treated lumber the chemicals present in the wood may be leaching into the water.

Photo 20 - Old Bridge #3

Multiple old bridges cross wet areas or streams along the south central part of the property. This was is an old bridge that was moved from its original placement.

VII. General Management of the Parcel

A. Best Use of Land

Intensive uses with negative resource impacts are prohibited. The best use of the land is for passive recreational use and protection of wildlife habitat. Trail development should avoid riparian areas, seeps and wetlands.

B. Structures

No structures are permitted except the existing cabin as allowed in this Management Plan.

C. Vehicular Traffic

No motorized vehicles are allowed on the property except for emergency access and for normal maintenance of the property. If vehicles are found to be entering the land in the future, gates should be erected.

D. Upkeep, Damage, and Illegal Uses on the Property

The WCC with limited assistance from Public Works will provide any needed maintenance. A yearly site walk should be completed by town staff to monitor the property and identify any desired projects to be undertaken. The Williston Police can also be contacted if serious or recurrent problems occur.

E. Boundary Marking and Posting

The property was surveyed prior to its acquisition by the town. The boundary needs to be permanently blazed. The parcel is not currently posted against hunting but is located within the Restricted Firearms Discharge Area.

F. Hunting

The property is located in the Restricted Firearms Discharge Area (RFDA). The Town of Williston Firearm Discharge Ordinance prohibits the discharge of a rifle, pistol, revolver, or single projectile from a shotgun or muzzle loader within the RFDA. Any non-firearm (such as bow and arrow) and any firearm projecting or throwing more than one projectile in a single discharge is allowed in the RFDA. The town has the option to post the land to prevent hunting, trapping and fishing that are otherwise allowed under the ordinance.

G. Harvest of Trees or Plants

Silvicultural practices are allowed following the approval of the WCC. If any silvicultural activities are to occur on the land a forest management plan must be prepared by the County Forester or a certified forester. Other cutting, removal, or harvesting of native plants is prohibited unless specified in this Management Plan.

VIII. Recreation Assessment and Recommendations

A. Description of Cabin Condition and Recommendations

The cabin currently appears to be structurally sound in terms of its foundation and roof. However there is a significant amount of debris (oak leaves, pine needles, logs) leaning up against the footings of the building -- this has led to some minor rotting on the wood siding and floor joists. Left alone this will impact the longevity of this cabin's stability. It is clear that some rodents have found their way into the insulation and have created a mess on the interior of the cabin. This contributes to an unpleasant odor that exists within the cabin and reduced insulative abilities. If this structure is to be used in the future, it should be thoroughly cleaned and secured to prevent animal intrusion. No smoke or

carbon monoxide detectors are present, which poses a hazard for whomever may stay at the cabin, assuming the wood and propane heat is used. The active propane lines and open wood stove present a liability risk to the town, and the town should consider removing them. There is currently firewood stored inside the main cabin and on the porch; it should be removed and deposited in the surrounding forest. If the cabin is to be used by the public in the future, there may be additional requirements imposed by the Vermont Division of Fire Safety.

In conclusion, this cabin may offer an opportunity to enhance the experience for those exploring Pine Ridge; however, town resources will be needed to renovate it to meet public safety standards. Alternately, the cabin could be dismantled and removed; however, this option poses significant costs due to poor access. A recent estimate for removal of the structure (burning in place and removing non-wood material) was quoted as $7,000. For the short term, the cabin should be stabilized and secured to prevent public entrance by boarding up the windows and installing a lock on the door. For the long term, the town should consider the utilization of the cabin for educational or recreation purposes. It could be rented out to specific groups for day or overnight use, for example. To accommodate future use, the cabin's interior should be thoroughly cleaned and all trash removed; the wood stove should be dismantled to prevent usage and all firewood removed from the cabin; the propane tanks should be removed and properly disposed of; and the siding should be washed and stained.

B. Cabin Photos

Front side of the cabin showing entrance and porch

Inside the main room of the cabin, showing wood stove and cabinetry

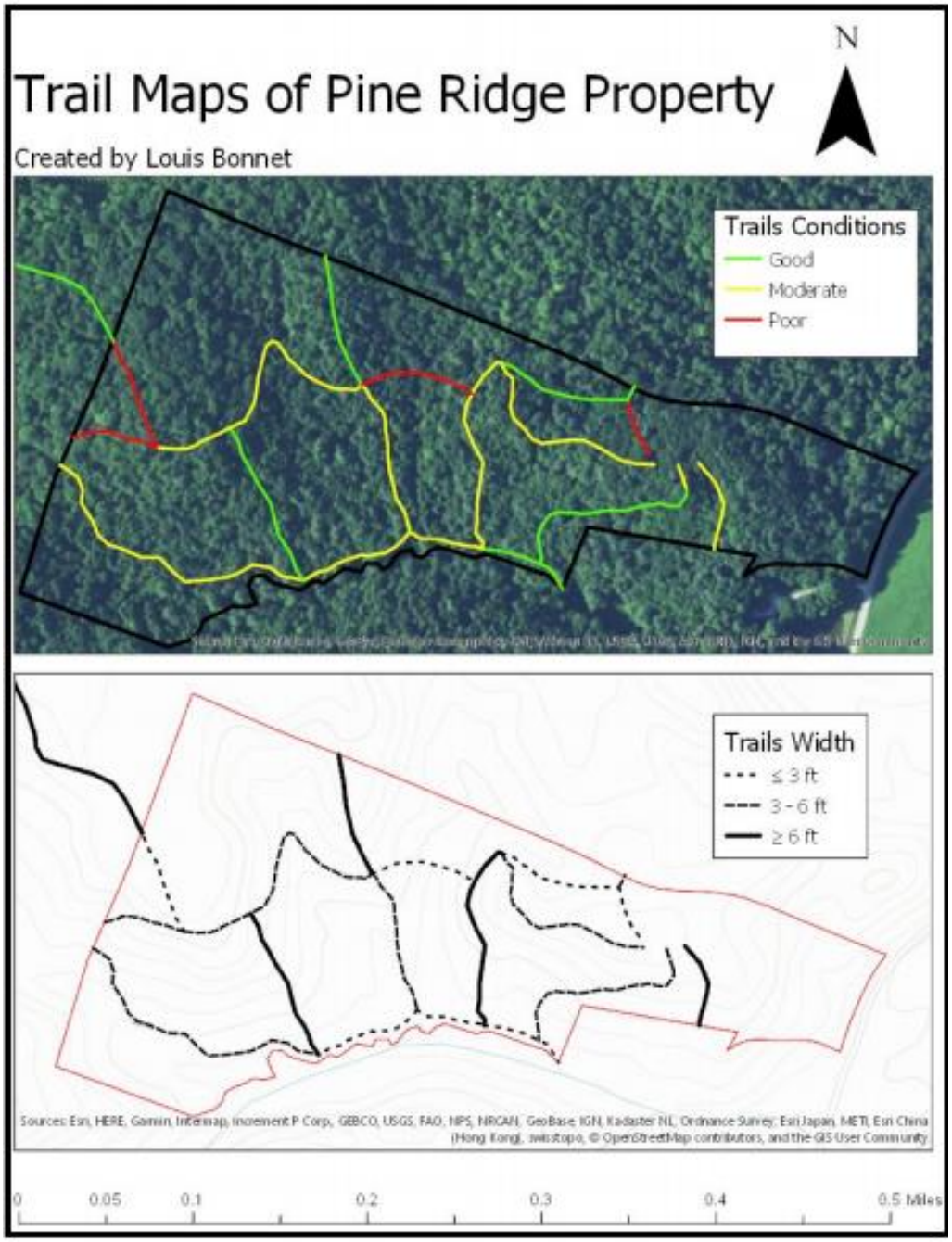
Cabin loft showing structural beams and chimney from the stove

Perspective of the cabin's backside, some wood rot present lower down (snow builds up against wall and keeps the wood moist for too long)

Right hand side of cabin, showing propane tanks and decaying wood pile

C. Trail Conditions and Connections

There are 1.5 miles of existing trails in the property. The figure below shows the assessed trail conditions and widths (see also Appendix H). Conditions were determined by estimating the amount of brush and downed wood laying on or across the trails as well as the general visibility and clearance of foliage along each segment. Most of the trails are in good to moderate condition, with a few segments in relatively poor condition. The trail widths vary across the site, from less than 3 feet wide to greater than 6 feet wide.



There are minimal signs of erosion to be concerned about, except for the area of northeast Talcott Woods where the topography is steep and the hydrology is a concern with several points of flowing water. Additionally, the stream at the southern boundary of Pine Ridge has evidence of past flooding – where sediment has been moved and banks eroded. Because of this and the risk of erosion, any trail building in this area should proceed with caution and use expert guidance to follow best practices. Slopes are estimated at 10-15% grade in the majority of Pine Ridge, with some slopes approaching 25-30%. The eastern portion of the property, between the cabin and the eastern boundary, is characterized by steep slopes and ravines all the way to the road. This would pose a challenge to building new trails, but it would not be impossible – they would need to be built across the slope with switchbacks for gaining and losing elevation.

A sign in the southern portion of the Pine Ridge forest that reads “The 19 Hole”.

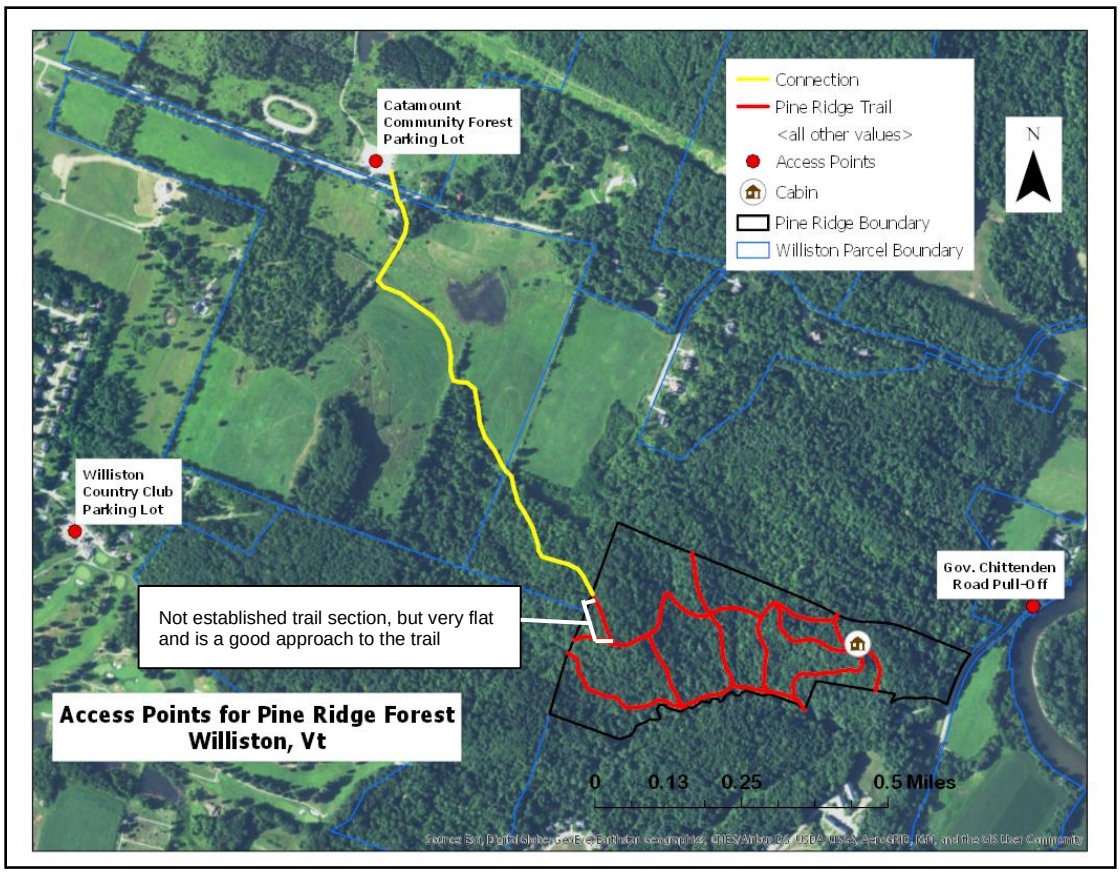
An assessment should be conducted by a qualified trail builder to determine the overall suitability of the property for trails. Then, if determined to be feasible and desirable to improve the trails and/or construct new trails, a trail or system of trails should be professionally designed with the following objectives considered:

- Avoid impact to the riparian areas and seeps,
- Avoid traveling directly up steep gullies and use switchbacks to avoid trail erosion,
- Minimize the trail footprint to avoid impacting sensitive wildlife,
- Avoid routing trails near the cabin to discourage vandalism.

A horseshoe shaped bend in the river located on the southern boundary in the central part of the property.

D. Potential Access Points

Potential access points are shown below and in Appendix I. Access to the Pine Ridge property is difficult because the only side that borders a road is the short eastern boundary, adjacent to Governor Chittenden Road. A few hundred feet north of Pine Ridge's northeastern corner, there is a shoulder on the road alongside the Winooski River which can fit about three vehicles. This eastern section of the property leading to Gov. Chittenden Road contains a series of considerably steep hills which makes access tough. This does not necessarily prohibit the construction of a trailhead here, but the main limitation of this location is the width of the road. It would be quite difficult to install a parking lot along this road as it juts up directly against the neighboring farm field and the Winooski River. The most viable point(s) for access to any potential future recreational trails at Pine Ridge would be through inland connections forged between its existing trails and trails on the Catamount Community Forest.



The northeastern edge of UVM's Talcott woodlot, which abuts Catamount, Riverhill, and Pine Ridge, is considerably hilly with numerous ravines. There are no existing trails in this section of Talcott, and the steep terrain will make designing future routes of travel difficult. Some of the trails on the upper edge of Pine Ridge cross over the northern boundary onto the adjacent Riverhill Farm property. Along the western boundary of Pine Ridge lies the most potential for establishing routes that join the Catamount recreation trails. This section is very approachable in relation to the topography, and is a reasonable point to enter/exit the properties. This connection point will require passage through the Riverhill Farm property.

The Gully Whumper trail on Catamount Outdoor Center's property is the nearest trail to the Pine Ridge property, and this would be an ideal area to establish a connection between the two going through Talcott and/or Riverhill. Bushwhacking from Gully Whumper heading southeast, within 5 minutes or so there is a trail roughly at a clearing in Pine Ridge, shown below. The most viable connection appears to be along a path through the Riverhill farm property, shown above. At the boundary between Riverhill and Catamount, an opening in the fence exists. A large double track trail leads towards and partially into Pine Ridge to the southeast, and a patch of dense but clearable shrubs can be crossed to gain access to the Catamount trails.

The town should investigate the southern and southwestern border of the property for additional points of access and connections possibly through some trails crossing the stream or entering Talcott Woods.

Miniature gulley w/ large downed tree in the northeast corner of the Talcott Woods property.

E. Recreational Use Potential and Recommendation

Balancing the growing desire for new recreation opportunities with the need for landscape-level conservation poses a challenge for decision making on this property. The opportunities for recreation on this site are promising. With an undulating landscape and interesting natural features, the area could serve hikers, bikers, and potentially skiers. However, this increased activity in the landscape also comes at a risk. High volume trail activity poses a greater threat of erosion and the spread of invasives, which are already present on the landscape. Also, this parcel is located within one of Williston's largest intact forests. It serves as an essential wildlife corridor for the surrounding area, and an increase in recreation causes disturbance which may threaten its continued use by wildlife.

To protect sensitive natural resources and wildlife habitat, recreational uses at the Pine Ridge Forest should be limited to pedestrian only. At this time, no additional improvements for recreation are planned; rather, the property should remain as it is. The Pine Ridge Forest can accommodate dispersed pedestrian usage on the existing trail network. Because the access from Governor Chittenden Rd is very steep, the recommended approach to Pine Ridge Forest is from the Catamount Community Forest, utilizing an easement across the Riverhill Farm.

There is an opportunity for restoration of existing trails within Pine Ridge and construction of new connections. The terrain is hilly and undulating, with much variance in slope and aspect, lending to the desirable characteristics of any interesting outdoor recreational space. If this is pursued in the future, the town should collaborate with the Vermont Youth Conservation Corps (VYCC) or the Winooski Valley Park District.

IX. Proposed Action Schedule

The following schedule is only a plan and may change due to available resources and/or changing circumstances.

Years 1-3

- Seek guidance on implementing invasives management from Vermont Department of Forests, Parks and Recreation.
- If funding is available, hire a contractor to mark the property boundaries.
- Secure and stabilize existing cabin.
- Develop a plan for the cabin; i.e., whether to dispose of it, renovate it for public use, or maintain the status quo.
- Decide the types of recreational uses that will be permitted on the property.

Years 4-5

- Consider and evaluate a plan for access.

- Evaluate a plan for use of existing trails and the development of connections to Talcott Woods and Catamount.
- Organize a volunteer work day to control invasives, utilizing assistance from state agencies and/or professional contractor.

Years 6-8

- If a decision to improve access is made, further scope out and design a trail connection to the Catamount property.
- If previous scoping determines it is feasible, construct a trail connection to Catamount.
- If a decision is made to improve the existing trails, develop a plan to do so.
- Organize a volunteer work day to control invasives, utilizing assistance from state agencies and/or professional contractor.

Years 9-10

- Update management plan through a public process.

X. Adoption

This Management Plan becomes effective upon approval of the Selectboard.

_____ Signature September 3, 2019 Date

Selectboard, Chair

References

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