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I. Property Data Summary

Prepared for:

Address:

Phone:

SPAN #:

Town Where Land is Located:

Grand List Acreage: 206 acres

Ortho Photo Number:

Sampling Method: variable radius plot sampling; 10 baf prism

Inventory Date: July 2012

II. Introduction

This Forest Management Plan for the property of xxx is designed to serve several functions:

1. To analyze the timber and non-timber related natural resources on the property
2. To identify property objectives within the framework of landowner goals
3. To make recommendations for any timber stand improvements that may be possible in light of current stand conditions
4. To make recommendations for wildlife habitat enhancement or to improve recreation potential
5. To fulfill the requirements of Vermont's Use Value Program
6. To update the 2003 Forest Management Plan for the property
7. To fulfill the NRCS *CAP-Forest Management Plan (106)* requirements.
8. To outline a comprehensive Schedule of Management Activities for plan implementation

III. General Description

The parcel consists of 206 acres with 152 acres of Productive managed forest, 18 acres of Ecologically Significant Treatment Area, 25 acres of Non-Productive Forest, 9 acres of Open land, and 2 acres excluded from The Use Value Appraisal Program (UVA). Terrain on the parcel ranges from gradually sloping to quite steep. Accessibility and operability are good throughout the property.

The property is located in the transition zone between the Champlain Valley biophysical region and Northern Green Mountain Biophysical Region. Thousands of years ago, as the glaciers retreated to the north, the Champlain Valley was lying under first the fresh water glacial Lake Vermont and then the salt water of the Champlain Sea. The water had a profound impact on the soils found here today. Many of the soils found in the valley are “lacustrine”, or water deposited. These soils are made up of fine sediment, sand and gravel that were carried in the water. Water moving at fast speeds is able to hold larger pieces, like gravel, but as the water slows down the largest pieces fall out. Fine sediments lay in the water until it is nearly motionless. This is why there is gravel and rocks in streambeds and clays and fine sediments in lake bottoms. As the glaciers retreated, salt water flowed in from the north, converting the lake to a smaller sea and depositing the sand we can find mixed in the soils today. The underlying bedrock is composed of carbonate-rich rock with some quartzite. The carbonate rich bedrock weathers easily and releases calcium and other important nutrients into the soil, making it very fertile. Glacial rebound gradually diminished the inland reach of the sea water to its present extent. The sea was eventually cut off from the St. Lawrence Seaway, and in time the salt water was replaced by the fresh water of Lake Champlain. The hills within the Champlain Valley were not flooded by either Lake Vermont or the Champlain Sea, but were scoured by the glaciers as they retreated north. This left the glacial till that the soils in these areas are made up of. The soils found on hilltops have much in common with those found in the Northern Green Mountains. Today, the Champlain Valley is low, warm, and comparatively dry. The soils, climate, and vegetation have more in common with the lowlands surrounding the Great Lakes than the Green Mountains. The summer temperatures in the Northern Green Mountain region are often 20 degrees cooler than the Champlain Valley. The Northern Green Mountains have the shortest growing season, and the coldest winter temperatures in Vermont are found on northern slopes. Annual precipitation can also be much greater, receiving up to twice as much as in the Champlain Valley. The present formation of the Greens is the result of glacial activity that carved the older metamorphic bedrock of these mountains 20,000 years ago.

The dominant soils found on forested portions of the property are of the Woodstock rock-outcrop complex, Cabot, Peru and Westbury series. **Woodstock** soils make up about 30% of Franklin county soils. The Woodstock out-crop soils are a mix of Woodstock, Tunbridge, and Stowe soils that are intermixed with a bedrock primarily composed of Schist. The Schist bedrock is generally low in essential nutrients, but local sources of enrichment do exist. The bedrock will make up 40-50% of the area, with the Woodstock soils making up another 40%. The Tunbridge and Stowe soils are minor components. This soil type is excessively well-drained, with pockets of deeper loamy soil that has accumulated in undulating depressions over the years since the last glaciation. They are relatively shallow to bedrock (12-20”), potentially restricting root development, and are excessively to somewhat excessively well drained. The productivity on Woodstock soils is good, especially where soil had accumulated in the many hollows and between rock outcroppings. Woodstock soils have a forest productivity rating of II. **Cabot** soils are extremely stony and formed in glacial till that is derived from mainly schistose rock. These soils are deep and somewhat poorly drained and commonly have a fragipan at a depth of 12-15”, creating a perched water table and seasonally wet soils or ponding after periods of heavy rain. These soils also have a productivity rating of II. **Peru** soils are deep, moderately well drained fine sandy loam and can be stony to extremely stoney. They formed in glacial till derived from quartzite, phyllite and schistose rock. Like Cabot soils, they commonly have a fragipan, though deeper at about 20” which may result in a seasonally high water table as well as prevent foot penetration. These soils are found on the slopes of the Green

Mountains and in the Champlain Valley, and also have a forest productivity rating of I. These soils are not considered suitable for farmland by today's standards, but were farmed in the 1800's. *Westbury* soils are deep and somewhat poorly drained. They consist of a sandy loam formed in acid glacial till derived from quartzite, phyllite and schistose rock. Also common to the Green Mountains and the Champlain Valley foothills, Westbury soils have a forest productivity rating of II.

The Non-Productive forest is found on Rumney Soils. A slow moving meandering brook and series of wetlands make up the Non-Productive area.

Long term objectives for the property are to conserve the land in a forested condition, and to practice long-term forest stewardship that increases the health of the forest and the quality of the timber resource. Primary objectives also include enhancing wildlife habitat for a number of species.

IV. Management Planning

This management plan is intended to be a guide in the ongoing management of the forest resources. It is designed for the 20-year period 2013-2033, with re-evaluation and updating on a ten-year cycle. A Schedule of Management Activities (Section VII) is included which specifies silvicultural treatments and other work for the 20 year period. Activities suggested for the immediate ten year period (2013-2023) are more detailed and specific than the following period. It is intended that upon re-evaluation activities for the subsequent ten years be more clearly defined. It is understood that modifications to the plan activities or schedule may be necessary as landowner objectives change.

This management plan meets the requirements of the Use Value Appraisal Tax Program. Use Value Appraisal status requires a commitment by the landowner to implement the plan as specified in the Schedule of Management Activities. Compliance with the plan is monitored by completion of each of the prescribed activities. It should be noted that the indicated year of implementation is, in most cases, a suggested time schedule that can be adjusted to compensate for market conditions, operating conditions as influenced by the weather, and other reasonable factors that might cause postponement or delay. Use Value guidelines allow for carrying out the individual prescribed activities within three years before or after the date. Compliance with the Use Value Appraisal Program and the management plan is reviewed annually through submission of a conformance report indicating activities completed, and by periodic field review by the County Forester. Landowners should be aware that when they place their land in the Use Value Program there is a permanent lien attached to their Deed by the State. This lien is removed if the state can no longer fund the program or if the landowner pays the land use change tax. The land use change tax is twenty percent (20%) of the fair market value on any land discontinued from the program that has been enrolled for ten years or less. The land use change tax is ten percent (10%) of the fair market value on any land discontinued from the program that has been enrolled for more than ten years.

This Forest Management Plan also meets the requirements of the Natural Resource Conservation Service (NRCS) Vermont Conservation Activity Plan (CAP) program. Individual practices with the potential to be implemented on the property through the Wildlife Habitat Improvement Program (WHIP) or Environmental Quality Incentives Program (EQIP) are identified here-in, the location of which shown on the Forest Stand Map which accompanies this plan.

V. General Land Management Requirements

Forestry

Landowner objectives identify long term forest management that increases the health of the forest and the quality of the timber resource in concert with other objectives, primarily concerning wildlife. As is evident on the property, there are a mixture of desirable and undesirable species, well-formed and misshaped trees, healthy and diseased trees, young growing stock, and mature timber. Management activities on the property are designed to remove defective and over-mature trees not retained as legacies, as well as a portion of the mature sawtimber, releasing quality stems in the understory while at the same time maintaining an ideal stocking for the production of high quality saw timber. Thinning is recommended in areas which have become over-stocked or are reaching a fully stocked condition in an effort to increase tree growth and vigor, and allow for full crown development. Harvests will also allow for the advancement of established regeneration, though regeneration is generally not a problem on the property. Species to be managed for on the property include sugar maple, white ash, northern red oak, red maple, black cherry, yellow birch, American beech, service berry, eastern hemlock, red spruce and hop hornbeam. Trees should be selected based on stem character and crown development, as well as overall health and vigor. Amenities to wildlife such as mast, browse and cover should be considered as well. Both even-aged and uneven-aged silvicultural techniques will be implemented on the property. Specific recommendations based on the inventory conducted, follow in Section VI.

In an even-aged system the goal is to create large disturbances that result in the establishment of shade intolerant species such as pine, oak, birch or aspen. This system is also appropriate for natural communities that in nature regenerate after larger disturbances from wind or insect defoliation such as spruce-fir. The shelterwood system is an even-aged method for regenerating more shade tolerant species. An overstory is retained in the stand until the desired regeneration has become established. In all even-aged methods the overstory is eventually removed. A delayed shelterwood could retain a component of the overstory.

In an all-aged management system the goal is to mimic an undisturbed natural forest. In an undisturbed site, the trees will grow to biological maturity and die as individual trees or in small groups due to minor wind-throw events. In Vermont, the climax types that regenerate themselves and develop an all-aged system are northern hardwood (beech-birch-maple), hemlock, and red spruce. This natural disturbance paradigm for management coincides with small, frequent disturbances forming canopy gaps that result in diverse mosaic of age classes dominated by late successional species.

The all-aged system has an equal distribution of stand basal area in each of the following age classes: sapling, poles and sawtimber. The sawtimber class is further broken into small, medium and large sawtimber. All-aged management is generally more intense in terms of planning, and number of treatments over time than even-aged management; however, the all-aged silvicultural techniques have less overall impact to the site. The amount harvested at each entry is less than in an even-aged harvesting system. The all-aged system is also more aesthetically pleasing because large diameter trees are always retained to maintain the size distribution. These large diameter trees include final crop trees that will bring the highest return for timber, as well as trees that will be retained for their wildlife or aesthetic value. These latter trees will not be cut but left to natural senescence.

In order to establish a stand-structure goal, it is necessary to determine its present structure. Diameter distributions are approximated by a reverse J-shaped curve, with a slope of q , the quotient between numbers of successively smaller diameter classes. The stand structural goal does not remain fixed throughout the stand development period, but management is directed at increasing the proportion of sawtimber or lowering the Q value. Stand Q values range from 1.3 to 2.0. The lower Q values correspond to a higher percentage of sawtimber. Better sites approach a lower Q value than poor sites.

Water Quality

One of the most critical measures of a healthy forest is the ability to produce clean, clear water. The protection of streams, seeps, vernal pools and other wetlands is crucial for the maintenance and improvement of Vermont's water quality and aquatic habitat. Careful management of all forestry activities on the property is of high importance as run-off into waterways can lead to increased turbidity and reduced available oxygen content. A lack of shade can also increase water temperatures.

All Acceptable Management Practices (AMP's) will be in place during any logging operation to prevent discharge into water bodies or sources. Special management considerations are in place along the buffer area of Beaver meadow brook and adjacent to several vernal pools on the property.

Wildlife Habitat

With some exceptions, wildlife can benefit from careful manipulation of the land. Forest management activities will create openings in the forest canopy, create slash for cover, and stimulate re-growth for wildlife browse and fruit and seed production. In general, the more diverse the flora (vegetation) in an area is in species and richness, the healthier and more diverse in fauna (wildlife) it will be.

Perhaps the most significant feature of the property concerning wildlife is its adjacency to large un-fragmented and conserved forest blocks. The property sits within a large forest block totaling more than 5,000 acres which is un-fragmented by a class 1-3 road. It is also in a transition zone from Champlain Valley Biophysical region to the green Mountain Biophysical region. The wetland system cuts through the property increasing this juxtaposition of regions. Because of its connection to much larger forest systems, the potential species diversity on this property is much greater than adjacent parcels fragmented by development. One of the most destructive development practices to affect wildlife habitat is the fragmentation of the forest. Wilderness loving species such as bear, lynx, bobcat, moose, fisher, otter, and even the catamount (puma) need very large areas to thrive. This property has the potential to support fisher, otter, bobcat, moose, and black bear. All of these animals or their tracks have been observed on the property. Several wildlife biologists and naturalist have visited the property for observation including Robert Long with his dog trained to track large focal species including bear, fisher, and bobcat; Susan Morse of Keeping track Inc. who identified signs of several species including otter, bear, and moose; and Bridget Butler whose work in songbird identification list is found later in the document.

The property has a number of other habitat characteristics that are beneficial to several wildlife species. There are abundant hard and soft mast species found on the property including a American beech, serviceberry, hop hornbeam, black cherry and yellow birch. There is also one nut producing Northern Red oak. Several red oak seedlings have become established from the seed of this one tree. Also noted during the inventory were numerous wild apple trees, found in the greatest number in three locations, in the open area adjacent to stand 1, and Stand 7. These trees are potentially used by many game species, including white-tailed deer, fox, fisher, porcupine, ruffed grouse, snowshoe hare, cottontail rabbit and grey squirrel. Apple trees also provide good habitat for woodcock and many song birds including blue birds, fly catchers, robins and orioles. Ensuring that a tree gets direct sunlight is the most effective way to enhance its productivity. In order to maintain the health of these trees periodic re-evaluation and thinning from overhead competition should be carried out. Pruning of all dead and diseased branches should also be a priority. The best time of year to prune fruit trees is in March or April, after the damage of severe cold has passed, but before the tree blooms. Funding assistance for this work is available through EQIP (the *Environmental Quality Incentives Program*) administered by the *Natural Resource Conservation Service* (NRCS) to assist (*Upland Wildlife Habitat Management, Apple Tree Release 645, Tree and Shrub Pruning 660*). Additional apple tree management information is found in the appendix to this plan.

The large Beaver Ponds and adjacent wetlands that transect the property from North to south are a major attraction for a variety of wildlife species. Several years ago a Heron rookery was found at the southern

part of the property. This rookery is currently not active. An additional list of bird species observed is provided in the next section. Reptiles and amphibians observed include painted turtle, snapping turtle, garter snake, red-bellied snake, wood frog, leopard frog, peeper, green frog, spotted salamander, two-lined salamander, red backed salamander, and eastern spotted newt.

In addition to creating important habitat, beavers activities such as rooting, feeding, and digging help to circulate nutrients within the flowage, and the dams they build help to reduce flooding and erosion. Typically a beaver colony will utilize an area until their food runs out, at which time they will move up or downstream to where food is available. After a time the abandoned dam will break releasing the impounded water allowing a sedge meadow to emerge. Eventually this sedge meadow will become re-established with woody plants and the beaver will return. This natural cycle is important to the health of the beaver and all the animals that are associated with beaver ponds. Artificially impounding a beaver pond will not allow the cycle to run its course and the health of the ecosystem will be diminished. The pond will eventually start to fill in and become stagnant. Many of the wildlife species that utilized the beaver impoundment would no longer find the pond as beneficial.

There are several large diameter trees that for one reason or another were left during previous harvesting activities. A particularly large number of these old trees are found along the eastern edge of stand 3 and include large beech, sugar maple, red maple, yellow birch, and basswood. These trees will be left to live out their biological life span, provide potential den and cavity nesting sites, and eventually provide very large coarse wood material.

Neo-Tropical Songbird Habitat

Songbird habitat is discussed separately from the general wildlife habitat in an attempt to highlight its special nature. Some neo-tropical songbirds are currently in decline for a variety of reasons, some due to habitat loss in the breeding territory and some due to habitat loss in wintering grounds. Northern Vermont is breeding habitat for these songbirds. Providing optimum breeding habitat will go a long way in allowing long term success for these species. The following songbirds are the species considered “responsibility birds” by Audubon Vermont (The Birder’s Dozen): American woodcock, yellow-bellied sapsucker, eastern wood-pewee, blue-headed vireo (stable), veery, wood thrush, chestnut-sided warbler, black-throated blue warbler (stable), black-throated green warbler, canada warbler, white throated sparrow, and scarlet tanager (stable).

The following management practices may be implemented to maintain and improve habitat for these at risk songbirds. It is important to understand that not all practices can be implemented on every property. Specific management practices will be highlighted in each stand description where applicable.

- 1) Create and enhance vertical structure; one way to accomplish this is to manage using single tree and small group selection silviculture, and to create small gap openings in the forest canopy.
- 2) Limit management activities to late summer, fall or winter, to minimize impact on nesting birds.
- 3) Keep forest buffers along streams.
- 4) Retain a percentage of fruit bearing overstory trees when harvesting, including beech, oak and black cherry, as well as mid layer trees such as serviceberry and apple where present.
- 5) Retain deadwood including standing snags and downed trees. Dead or dying trees will provide roosting, perching, foraging and nesting sites for roughly 40 bird species.
- 6) Soften edges between habitats. Negative edge effects caused by predation and nest parasitism can be minimized by feathering the edge, or developing irregular shaped edges.

7) Maximize forest interior. Forest blocks greater than 50 acres will increase the diversity of birds your woodlot can support. Forest interior is defined as habitat that occurs in unbroken forest at least 200-300 feet from the habitat edge. This is important for species such as scarlet tanager, black-throated green and black-throated blue warbler, and eastern wood-pewee.

8) Conversely, retain early-successional forest habitat. Early-successional habitat may be accomplished through patch cutting or managing abandoned agricultural land. Patch cuts may be created for early successional bird species such as chestnut-sided warbler, veery, and woodcock. The woodcock needs specialized habitat and where applicable will be discussed in detail in the stand descriptions.

The inventory methods used on this property include interior forest bird songbird habitat assessment which include in the inventory a qualitative analysis of Leaf litter, understory, midstory, Coarse woody material, fine woody material and crown closure. Habitat development for both early successional and interior songbird is planned for this property. Funding assistance for this work is available through EQIP (the *Environmental Quality Incentives Program*) administered by the *Natural Resource Conservation Service* (NRCS) to assist (*Forest Bird Initiative forest improvement 666*), and (*Early Successional Habitat Improvement 666*).

As a note of interest included here is a list of Bird species identified with the help of Bridget Butler on a bird walk in May 2012. These bird species include interior forest songbirds, early successional songbirds, wetland birds and birds of prey.

Canada Goose (*Branta canadensis*)
Ruffed Grouse (*Bonasa umbellus*)
American Bittern (*Botaurus lentiginosus*)
Mourning Dove (*Zenaidura macroura*)
Ruby-throated Hummingbird (*Archilochus colubris*)
Downy Woodpecker (*Picoides pubescens*)
Least Flycatcher (*Empidonax minimus*)
Eastern Phoebe (*Sayornis phoebe*)
Great Crested Flycatcher (*Myiarchus crinitus*)
Blue-headed Vireo (*Vireo solitarius*)
Warbling Vireo (*Vireo gilvus*)
Blue Jay (*Cyanocitta cristata*)
American Crow (*Corvus brachyrhynchos*)
Tree Swallow (*Tachycineta bicolor*)
Black-capped Chickadee (*Poecile atricapillus*)
White-breasted Nuthatch (*Sitta carolinensis*)
Brown Creeper (*Certhia americana*)
Winter Wren (*Troglodytes hiemalis*)
Veery (*Catharus fuscescens*)
Wood Thrush (*Hylocichla mustelina*)
American Robin (*Turdus migratorius*)
Ovenbird (*Seiurus aurocapilla*)
Black-and-white Warbler (*Mniotilta varia*)
Common Yellowthroat (*Geothlypis trichas*)
American Redstart (*Setophaga ruticilla*)
Magnolia Warbler (*Setophaga magnolia*)
Bay-breasted Warbler (*Setophaga castanea*)
Blackburnian Warbler (*Setophaga fusca*)
Yellow Warbler (*Setophaga petechia*)
Chestnut-sided Warbler (*Setophaga pensylvanica*)

Black-throated Blue Warbler (*Setophaga caerulescens*)
Black-throated Green Warbler (*Setophaga virens*)
Canada Warbler (*Cardellina canadensis*)
Song Sparrow (*Melospiza melodia*)
Swamp Sparrow (*Melospiza georgiana*)
White-throated Sparrow (*Zonotrichia albicollis*)
Scarlet Tanager (*Piranga olivacea*)
Rose-breasted Grosbeak (*Pheucticus ludovicianus*)
Red-winged Blackbird (*Agelaius phoeniceus*)
Common Grackle (*Quiscalus quiscula*)
Baltimore Oriole (*Icterus galbula*)
American Goldfinch (*Spinus tristis*)

Other species identified over the years include Great Blue Heron, Bald Eagle, Osprey, Broad-winged hawk, Red-tailed hawk, Barred owl, Northern Parula, Eastern Wood Peewee, Red Eyed Vireo, and Kingfisher.

Rare, Threatened or Endangered Species

A rare species is one that has only a few populations in the state and that faces threats to its continued existence in Vermont. Rare species face threats from development of their habitat, harassment, collection, and suppression of natural processes, such as fire. The Vermont Fish and Wildlife Department uses a ranking scheme that describes the rarity of species in Vermont. The range is from S1 (very rare) to S5 (common and widespread). Species are assigned a rank based on the number of known occurrences, the population size, and the degree to which the populations are threatened. For example, creeping juniper and lake sturgeon are S1 species, whereas sugar maple and raccoons are S5 species. Using this system, biologists and other experts assign an S1 rank to a species when it may occur in five or fewer populations in the state and/or when the species is threatened with extinction. Rare species with six to 20 populations are given an S2 rank; threats are also considered. Species with 21 to 100 populations are assigned a S3 rank and are generally considered to be uncommon or a watch-list species. The Vermont Non-game and Natural Heritage program (NNHP) part of the VT Fish and Wildlife Departments Wildlife division, maintains an inventory of Rare, Threatened and Endangered (RTE) species in Vermont. No occurrence of RTE species has been noted on the Patch/Conneely property.

Aesthetics and Cultural Resources

Aesthetics is a factor that should be taken into account while completing any type of project on the property, whether it is forestry, wildlife or recreation-related. Aesthetically important areas should be maintained and enhanced. Unique natural features such as unusually large and unique trees and shrubs should be preserved in their natural state. Individual large trees may be identified as "Legacy Trees" that will remain in the stand throughout all harvesting operations. These trees should be retained for aesthetics, as seed trees, and as future den and cavity trees for wildlife use. Unique cultural resources on the property such as stone walls should also be maintained and protected during any work in adjacent areas following identification.

Recreation and Forest Roads

Current recreational resources on the property center around a well-developed woods road/trail network that accesses almost all portions of the parcel. These trails provide opportunity for activities such as walking, wildlife viewing, snow shoeing, in addition to aiding in any future harvest or sugaring operations. Woods roads and trails may be kept clear by hand, or cleared and stumped using a dozer or excavator as needed. Trail improvements may be made at any time, and future harvest operations should require upgrades. All future treatments on the property should seek to maintain points of interest along these trails such as stone walls and specimen trees.

Forest Health

While a number of forest pathogens/pests were noted on the property, there were no overtly significant forest health issues noted at the time of the inventory. Most pests are associated with over-mature trees and the defect inherent in old timber. As harvesting activities periodically remove defective trees, the opportunity for disease infection and insect attack on residual timber is decreased. Future management for insect and disease control will focus on the timely removal of mature and over-mature trees not retained as legacies to maintain the population of insect and disease organisms to a tolerable level. No forest health issues were noted at levels of concern during the present inventory, however six of the specific diseases/pests noted on the property at present include:

Sugar maple borer

This insect infects pole-sized sugar maple trees that are stressed from overcrowding or suppression in the understory. Damage is caused by the larvae of the insect that feeds under the bark, creating a ridged wound across the main stem. While rarely killing the trees, this severely damages timber quality and overall value of the tree. The best defense against the pest is to remove infected trees during associated work, and maintaining stocking levels that allow for optimum growth and increased vigor. With sound forest management the likelihood of an infestation of this pest is unlikely.

Euytepella canker

This canker is associated with a fungus that attacks pole and sawtimber sized maples. All maples are affected, though sugar maple is the most common host. Once infected, the pathogen remains in the tree for many years, developing a large concentric, calloused canker and severely deforms the tree, often giving the affected portion of the stem a humped or cobra head looking form. The canker not only reduces timber quality, but creates a weak point often leading to stem breakage. The most effective control of this pathogen is removing infected trees from the stand to remove the source of inoculum and limiting spread of the disease. As with most pathogens, the best defense is also to practice sound management that maintains a vigorous stand.

Beech bark disease

This disease is an insect/fungal association. The beech is first infected by a very small scale insect that exudes a white waxy substance that covers the insect and is readily visible to the naked eye on the tree. Usually in a few years the fungal associate of this disease complex enters the tree through the feeding wounds the insect has created. This fungus produces small red fruiting bodies that mature in the fall and become readily visible on affected trees. Over time a pocked mark appearance develops on the stem where callus tissue is produced to wall off the points of infection as the fungus spreads. Mortality in the tree usually takes several years as the fungus spreads and eventually disrupts the vascular system of the tree, as well as making it susceptible to attack from other diseases or forest pests. Some research indicates that extreme cold will kill the scale insect, which may explain why disease-free beech can be found in colder pockets. No control measure for this disease is known at this time. Diseased beech may be removed from the stand during associated treatments. Clean, healthy beech should be retained to the greatest extent possible.

Pine Weevil

This a common pest in old field situations which have regenerated in pine. The adult weevil lay its eggs in the top leader of an overstory white pine, usually during the younger stages of the trees development. When the larvae emerge they feed on the leader and kill it. The branches in the next whorl then compete for dominance, which leaves the tree with multiple stems or a very crooked stem. Where appropriate, these trees may be retained as legacies to enhance stand structure and provide habitat features.

Red Rot

Also known as red ring decay this disease attacks the heartwood of living conifers, usually targeting older trees. Infection by the fungal pathogen *Phellinus pini* occurs primarily through dead branch stubs, though sometimes open wounds provide a point of entry. Decay appears as discoloration of the heartwood (typically a reddish color), severely degrading the lignin (essentially what holds the cells together). Advanced decay appears as elongated white pockets parallel to grain the separated by apparently sound wood, eventually merging into a mass of white fibers. Sometimes bell or hoof-shaped conks appear on the main stem. No effective control strategy is known for infected individuals. Trees exhibiting symptoms should be harvested to prevent further reduction in value. This disease typically appears in multiple trees in one area, so group selection is recommended.

Butternut Canker

Butternut canker is a highly virulent disease that is putting the species at risk of extinction in Vermont. There were several butternut found throughout the eastern portion of the property during the present inventory that appear to be in excellent health. One recommendation to the landowner is to consider opening areas around healthy butternut on the property to allow for greater crown expansion and the establishment of butternut seedlings, as they need direct sunlight to germinate and become established. The maturing forests of Vermont, along the prevalence of butternut canker, are limiting the future of this species in our region. Making larger openings around butternut on the property will give them a greater chance of survival.

Invasive Species

Another potential threat to forest health comes from the presence of invasive species noted on adjacent lands in the area, primarily honeysuckle, but also Phragmites. Spotted knapweed is also present in several of the open areas. These are highly invasive species that can take over portions of the understory from native plants (greatly limiting long term development of the stand), and thrive in open sunlight common to stand openings and edges. Invasives should be cut and/or excavated if they are encountered in the woods or open portions in the future. Herbicide control is also an option. Invasive species control can be costly in both time and expense, however tackling the problem when populations are relatively low will make their eventual eradication possible, treating a defined portion of the property annually as feasible. Monitoring is most important in open areas and along wooded edges.

The landowners and neighbors do an annual monitoring and pull to keep the honeysuckle from spreading and to eventually eradicate the honeysuckle.

Logging Practices

A portion of the harvesting on the property over the next planning cycle may be carried out by the landowner, and activities are scheduled to allow for annual activity on the property if this is the case. In order that these objectives are met a clear understanding of stand treatment is necessary, and the selection and marking of trees for removal may be required. Care should be exercised to minimize residual stand damage, maintain pleasing aesthetics, and work in accordance with Vermont water resource protection and general forestry regulations. The most important components of forest management and timber extraction include the sustainable management of the timber resource. This is best accomplished by hiring a forester with knowledge of the land and a clear understanding of both the owner's wishes and the proper silvicultural techniques to meet those goals. The second most important component of a logging operation is the amount of residual damage to the stand. Careful road layout, the right equipment for the job, and the ability of a skilled logger to economically perform the job in a careful manner will result in less damage

and higher future value of the timber. The third critical component is the condition of the roads and landing during and at the end of the job. Water quality standards should be strictly kept, and the erosion controls properly placed to last until at least the next cutting cycle. That being said, the landowner has done an excellent job operating on the property in the past and there is no doubt the high caliber of the work will continue in the future.

The landowners do their own logging.

Boundary Maintenance

Boundary line review and painting should be carried out on a periodic basis. Usually seven to ten years between paintings will suffice. Painting the boundary lines helps to insure that no violation of timber rights will occur from adjoining lands. Well-maintained boundary lines also reduce the necessity for future re-survey of specific boundary lines, or the entire property. Boundary line condition is good. All boundaries are marked by either boundary paint, stone walls and barbed wire, or some combination of these three.

To prevent confusion over line location, it is recommended that all wooded lines be painted with good quality boundary paint on a ten year cycle. In addition, all corners should be located and painted. To prevent confusion over boundary line location it is recommended that the landowner complete a boundary line review every three or four years. During the review, note areas that require additional painting to ensure the integrity of the boundary lines.

VI. Stand Analysis

For management purposes, forestland is divided into stands, which are defined as areas of relative similarity (such as age, species, topography, etc.), and can be treated uniformly. Stands are identified on the Forest Stand Map located at the end of this report. The Stand Analysis for each unit is included in this section and contains a description, acreage, management objectives and recommendations. Stand analysis data, collected in the field cruise, is included to quantify the unit characteristics and monitor changes associated with future growth. The estimated sawtimber volume and cordwood volume is indicated. A total of 39 inventory plots were taken on the property, with a relative density of about one plot for every four to five managed forest acres.

This update has modified the stand numbers from the previous plans. Stand numbers were added as the property was added on to. In addition past management activities have altered some of the stand structure as the stands have developed over time. The UVA program has changed to allow for areas that are particularly fragile to be enrolled as ESTAs or Ecologically Significant Treatment Areas, and finally some stands have been consolidated to conform to management objectives.

It should be noted that stocking levels referring to the A, B, or C-line are given for every stand as a point of reference. These stocking levels are based on guides developed for even-aged stands and used for even-aged management. Recommended residual (post-treatment) basal areas and size distribution curves are used as a guideline for all-age forest management. The residual basal area for all-aged hardwood stands is recommended to be 65-75 ft²/acre; for stands with 25-65% softwood the residual basal area is recommended to be 80-120 ft²/acre. Management recommendations in this plan will utilize both even-aged and all-aged silviculture methods.

Stands are separated in part due to past logging history, but also due to soils, and the Natural Community Type that is prevalent in that stand. Natural Communities are distinguished from Stands as the stand type may be the result of human influence. Natural communities are a result of soils, weather, moisture, and glacial action and characterized as the interacting assemblage of organisms, their physical environment, and the natural processes that affect them. Stands are a result of past cutting history, age and species composition. Natural community types will be listed for each Stand where they can be determined, and are our best attempt at defining how different forest types exist naturally. Many natural resource managers are attempting to manage lands according to the natural community type and the natural disturbance regimes that affect them. Natural Community identification and descriptions are based on the book Wetland, Woodland, Wildland, A Guide to the Natural Communities of Vermont, by Elizabeth Thompson and Eric Sorenson.

Soils are one of the most important characteristics of forest ecology as the soils determine species, composition, growth rate and management strategies. There are 4 site productivity classes (rated by number I to IV, ranging from high to non-productive), which indicate the growth in volume per acre per year.

CURRENT STAND DESCRIPTION

Stand Number: 1

Acres: 48

Stand Cover Type: Mixed wood (Red maple 22%, Yellow birch 16%, Red spruce 15%, White ash 15% White pine 12%, and sugar maple 11%) Other species present include black cherry, hemlock, paper birch, elm, and hop hornbeam.

Shrub and Herbaceous Plants: Rubus sp., Hay-scented fern, New York fern, Intermediate wood fern, Lady fern, Christmas fern, jewelweed, Canada mayflower.

Description: This stand is found on the eastern side of the property and is comprised of Stands previously labeled as Stands 8, 9, 10 and 11. This section of the property was the last added in 2005 when the Earnhart property was purchased. It is a variable stand at present due to past history but is expected to develop naturally into a more homogenous stand over time. One management objective will be to retain some of the diversity that currently exists. One particular characteristic of this stand is the many large and important seeps that are found here. These seeps are important for the overall water quality of Beaver Meadow Brook which flows into the Tyler Branch. Two open areas are located within this stand. The small open area adjacent to the Woodward Road is pastured while the open area along the Beaulieu road is brush-hogged annually to control the spotted Knapweed.

Natural Community: Somewhat unclear, but the stand will likely develop into a Northern Hardwood variant (see Stand 1 for description) or *Red spruce-Northern Hardwood*: This is a variable community where softwoods and hardwoods occur in mixed stands and persist over time. They occur on locally shallow soils or on especially moist soils. They are found in the coldest regions of Vermont and located on either well-drained Knolls, or on moderately well-drained glacial till soils with a hardpan at 18-24 inches. The hardpan accounts for an increased moisture content. The species composition is typically red spruce, beech, yellow birch, and sugar maple, with white ash on richer sites, and red maple in younger stands.

Seep: A common but small community occurring on slopes or at the base of slopes, in coves or on benches. Groundwater discharge is evident at the margin of the seep. Hardpan or bedrock is a common impediment to downflow of water causing the groundwater to flow horizontally discharge at the surface. Seeps are often the headwaters of perennial streams and have often been used as sites for spring boxes that supply water to homesteads. Groundwater temperature in this region is usually within a few degrees of 47 degrees Fahrenheit. The flow of these warmer waters to the surface results in earlier spring growth and a winter water source. These sites are important for many species of wildlife. Characteristic amphibians include Spring Salamander, Northern Dusky Salamander, and Two-lined Salamander. The rare petalwing dragonfly is associated with seeps, and seeps are very important sites for Black Bear to feed in the early spring. Wild Turkey also frequent these through the winter to graze on forbs that may persist near the warmer water.

Age Class Structure: Even-aged, **Size class:** poles to medium sawtimber (stratified by species)

Site Class: II **Soil Series:** Woodstock rock outcrop, Peru, Cabot, Stowe

Slope: 15-25%

Wildlife Habitat: This stand is being managed for timber with birds in mind both for interior songbirds. Some areas will also be maintained as early successional habitat.

Stand History: This stand was open field approximately 60 years ago. A timber stand improvement harvest was implemented in the western part of the stand in 2006, and salvage of the pine and spruce was completed in 2011 following the 2010 December wind event.

Stand Health: No significant problems noted. No Invasive Species present in the woods. Spotted knapweed is present in the open areas.

Sampling Method: Point sampling

Sampling Date: 7/21/2012 **Number Points:** 9 **BAF:** 10

Quadratic Mean Stand Diameter (inches): 9.5

Trees per acre: 238

Basal Area (ft²/acre):

Total: 117 **Acceptable Growing Stock(AGS):** 90 **Unacceptable Growing Stock (UGS):** 27

Regeneration Data: Regeneration is spotty with sugar maple and red spruce being the most abundant species. Other species observed include yellow birch, beech, ash, and hop hornbeam.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Approximately 60% of the stand has a Low ranking, and 40% has a medium to high ranking. Cover in this layer is necessary for nesting habitat for black throated blue, wood thrush and veery.

Midstory vegetation (6-30 feet): approximately 90% of the stand has a medium to high ranking in this vertical layer. The majority of the Vermont Responsibility birds nest and forage in the 1-30 foot layer of the forest.

Coarse woody material: (perching, foraging and courtship) Approximately 50% of the stand is ranked high, primarily due to the windstorm from 2010 which blew over several large pine trees.

Fine woody material: (nesting substrate), abundant fine woody material on 50% of the stand, ranked High

Snags and cavity trees: several snag trees were inventoried accounting for approximate 4-5 ft of basal area per acre. All snags tallied were greater than 12 inches dbh.

Deciduous leaf litter: variable, lacking under the pine component

Canopy Height: 70 feet. Maintaining much of the canopy at this height will continue to provide habitat for blackburniun warbler, scarlet tanager, and wood thrush.

Canopy closure: closed > 80%. This crown closure provides habitat for scarlet tanager, blue-headed vireo, and blackburniun warbler. To increase the habitat for Black Throated Blue warbler, veery, and American redstart the canopy should be more open but no lower than 30% . The goal for this stand is to maintain habitat for all bird species in the Intermediate and closed canopy conditions and a canopy closure of 70% would be ideal.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management

Cutting Cycle: 15 years

Diameter Objective for Principal Species: 22 inches

PLANNED TREATMENTS

Treatment: 1) early successional habitat development on two acres adjacent to the open land. This treatment is to be implemented in 2012. Approximately 10% crown cover will be left standing. The trees to be retained include scattered white pine to act as a seed source and perching habitat, scattered black cherry, apple, serviceberry and Mountain ash which provide high quality soft mast.

2) Crop Tree Release with canopy gap formation; WHIP Forest Bird Initiative; this treatment will be located on about 5 acres of the stand along southern edge of the stand, and will be implemented sometime between 2018- 2023.

Crop Trees/Acre: 30-40 trees per acre with 6-7 small 1/5 to 1/4 acre canopy gaps

Crop Trees Description: Crop trees should be unsuppressed stems above 5" in diameter that are well formed of a desirable species. Desirable species are mast trees, commercial species or otherwise well adapted to the site and mature forest conditions. The crop tree species may include, but are not limited to sugar maple, black cherry, and yellow birch. Crop trees should be released on 2 -3 sides.

The places where no appropriate crop trees exist, pose an opportunity to develop the structural diversity in the stand. Small openings of up to 1/5 acre may be created through the removal of small groups. No more than 1% of the stand area should be harvested in groups/year, allowing 1.5 acres in groups.

The residual basal area in the stand should not be reduced below 80 ft.²/acre.

The remainder of the stand will not receive any treatments during the next ten years due to the recent salvage operation.

CURRENT STAND DESCRIPTION

Stand Number: 2

Acres: 11

Stand Cover Type: Transition Northern Hardwood (Black cherry 32%, sugar maple 27%, red maple 9%, white ash 9%) Other species include hop hornbeam, hemlock, aspen, yellow birch, and white pine.

Description: This stand is found in adjacent to the house opening and was once pastureland that reverted to forest approximately 70 years ago. It is comprised primarily of hardwood poles and small sawtimber with an occasional white pine or hemlock in the overstory. Management activities over the last several years have created started the transition from an even-aged forest structure to uneven-aged structure. Future management treatments will continue to develop structure in the stand. This stand was formerly labeled as stand 1.

Natural Community: *Northern Hardwood:* This is Vermont's most abundant forest community. The main tree species are sugar maple, yellow birch, and beech. Other common species include red maple, white ash, white pine, black cherry, basswood, hemlock, and red spruce. This community may have several variations depending on the differences in slope, elevation, landscape position, and soil type. Natural disturbances include small single tree gaps to large gaps caused by wind events.

Age Class Structure: Even-aged

Size class: poles to small sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop, Stowe, Cabot

Slope: 15-25%

Wildlife Habitat: This stand is being managed for timber with birds in mind. The goal is to promote songbird habitat for interior bird species including but not limited to Eastern wood peewee, black-throated blue warbler, Canada warbler, Veery, and Wood thrush.

Stand History: This stand was open field approximately 60 years ago. In the last 15 years the stand has been treated twice, once with a pre-commercial thinning in 1997 and again in 2004 using crop tree release methods.

Stand Health: No significant problems noted. No Invasive Species present.

Sampling Method: Point sampling

Sampling Date:

9/25/2011

Number Points: 4

BAF: 10

Quadratic Mean Stand Diameter (inches): 10.7

Trees per acre: 175

Basal Area (ft²/acre):

Total: 110

AGS: 57.5

UGS: 52.5

Regeneration Data: Occasional pockets of abundant sugar maple. Other species present include white ash, beech, yellow birch, hophornbeam, and striped maple. Some sections are dominated by fern species including hay-scented and New York fern along with interrupted fern, cinnamon fern and sensitive fern. The abundance of fern is diminishing over time.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Approximately 50% of the stand has a Low ranking, and 50% has a medium ranking. Cover in this layer is necessary for nesting habitat for black throated blue, wood thrush and veery.

Midstory vegetation (6-30 feet): approximately 50% of the stand has a medium ranking and 50% has a high ranking in this vertical layer. The majority of the Vermont Responsibility birds nest and forage in the 1-30 foot layer of the forest.

Coarse woody material: very low amounts of CWD (perching. Foraging and courtship)

Fine woody material: Abundant FWD (nesting substrate), ranked High

Snags and cavity trees: very few snags or cavity trees, only one large snag noted. Two large diameter aspen trees, two large diameter hemlock trees and one pine will be recruited for future snags

Deciduous leaf litter: abundant with thick layer

Canopy Height: 70 feet. Maintaining much of the canopy at this height will continue to provide habitat for blackburnian warbler and wood thrush.

Canopy closure: closed > 80%. This crown closure provides habitat for scarlet tanager, blue-headed vireo, and blackburnian warbler. To increase the habitat for Black Throated Blue warbler, veery, and American redstart the canopy should be more open but no lower than 30% . The goal for this stand is to maintain habitat for all bird species in the Intermediate and closed canopy conditions and a canopy closure of 70% would be ideal.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management

Cutting Cycle: 15 years

Diameter Objective for Principal Species: 22 inches

PLANNED TREATMENTS

Treatment: Crop Tree Release with canopy gap formation; WHIP Forest Bird Initiative

Crop Trees/Acre: 30-40 trees per acre with 6-7 small 1/5 to 1/4 acre canopy gaps

Crop Trees Description: Crop trees should be unsuppressed stems above 5" in diameter that are well formed of a desirable species. Desirable species are mast trees, commercial species or otherwise well adapted to the site and mature forest conditions. The crop tree species may include, but are not limited to sugar maple, black cherry, and yellow birch. Crop trees should be released on 2 -3 sides.

The places where no appropriate crop trees exist, pose an opportunity to develop the structural diversity in the stand. Small openings of up to 1/5 acre may be created through the removal of small groups. No more than 1% of the stand area should be harvested in groups/year, allowing 1.5 acres in groups. In addition several trees snags will be recruited by girdling a few larger diameter stems.

The residual basal area in the stand should not be reduced below 80 ft.²/acre.

CURRENT STAND DESCRIPTION

Stand Number: 3

Acres: 23

Stand Cover Type: Northern Hardwood (Sugar maple 64%, beech 12%) Other species include hop hornbeam, white ash, yellow birch, red maple, hemlock, butternut, and basswood.

Shrub and Herbaceous Plants: Striped maple, Silvery glade fern, Lady fern, maidenhair fern, seersucker sedge, blue cohosh, wild leek, jack-in-the-pulpit, and lowbush blueberry.

Description: This stand is located in the southeast corner of the property. This stand is comprised of the former Stand 2 and 3. These two stands were combined because of the small acreage of the former Stand 2. Stand 2 was more a transition zone than a separate stand. The species is comprised of tolerant species with a varied species composition and has a complex structural development. A unique feature of this stand is at the southwest corner where the terrain falls away from a cliff edge where ravens and Herons have historically nested, and where bobcat, bear and fisher sign is abundant. A small patch of lowbush blueberry is found on the cliff edge. No other blueberries have been noted in this section of Enosburgh.

Natural Community: *Rich Northern Hardwood:* (High site quality indicators plants are present on approximately 40% of the stand.) This variant of the Northern Hardwood forest is characterized by moist rich soil. The enrichment of the soil may derive from calcareous parent material or by colluvial accumulation of nutrients from the surrounding area. Colluvial accumulation often occurs on lower slopes and coves. The understory vegetation is rich in high site quality herbaceous plants, and the trees grow straight and tall. Sugar maple is the dominant tree.

Age Class Structure: Uneven-aged

Size class: poles to large sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop

Slope: 25-45%

Wildlife Habitat: This stand is being managed for timber with birds in mind. The goal is to promote songbird habitat for interior bird species including but not limited to Eastern wood peewee, black-throated blue warbler, Canada warbler, Veery, and Wood thrush.

Stand History: This stand was once part of a sugarbush that was cut off in the early 60's. There is evidence of a sugarhouse foundation and scattered buckets throughout the stand. Few if any of the original sugarbush trees are left. A harvest was conducted in 1992 under the previous ownership. This harvest resulted in a very high amount of residual damage. An improvement cut was implemented in 1997 which targeted the removal of many of these damaged trees. One load of logs was also harvested in 2004.

Stand Health: No significant problems noted. No Invasive Species present.

Sampling Method: Point sampling

Sampling Date: 7/21/2012 **Number Points:** 9 **BAF:** 10

Quadratic Mean Stand Diameter (inches): 11.4

Trees per acre: 167

Basal Area (ft²/acre):

Total: 118 **Acceptable Growing Stock:** 92 **Unacceptable Growing Stock:** 22

Regeneration Data: abundant sugar maple. Other species present include white ash, beech, yellow birch, hophornbeam, and striped maple.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Approximately 80% of the stand has a medium to high ranking

Midstory vegetation (6-30 feet): approximately 90% of the stand has a high ranking

Coarse woody material: (perching. Foraging and courtship) very low amounts of Coarse wood material

Fine woody material: (nesting substrate), low ranking of fine woody material

Snags and cavity trees: very few snags but several den trees and future snag trees have been identified

Deciduous leaf litter: abundant with thick layer

Canopy Height: 70 feet.

Canopy closure: closed > 80%.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management

Cutting Cycle: 15 years

Diameter Objective for Principal Species: 22 inches

PLANNED TREATMENTS

Treatment: Single tree and small group selection to be implemented in 2012-13

A single tree/small group selection treatment is recommended for the stand to further transition the stand toward an uneven-aged condition, capture the value in a portion of the declining or at risk sugar maple in the overstory, and accelerate growth rates in quality stems in the intermediate canopy classes and understory. The next treatment will focus removals on the 12-14" diameter class to release the highest quality stems from competition, remove suppressed or trees with defect, and/or to release quality regeneration. High quality stems with growth potential in this diameter cohort will not be harvested. Only at risk stems in the 16"+ class should be harvested. Approximately 4-5 small gaps, ¼ acre or less in size, will be created in areas where advance regeneration is present and the overstory is of lower quality. The residual stocking level in the stand should be no lower than 80 ft²/acre. The projected diameter distribution following the next treatment is described in the chart below. A concentration of Legacy trees is located along the western boundary of the stand. Large diameter beech, and sugar maple will be retained in this area to live out their biological life span.

Diameter Class	Present Acceptable Basal Area	Present Total Basal Area	Target Residual Basal Area
6-10"	20	34	30
12-14"	42	46	20
16-20"	25	26	20
22 " plus	6	12	10

The amounts of both coarse and fine woody material will be enhanced during the next harvest. All tops will be left unlopped during the harvest so as to retain the fine woody material for a longer time span. Some tree section that have rot and any hollow trees will be left in the woods as coarse woody material. Legacy trees will also in the future add to both coarse and fine woody material.

CURRENT STAND DESCRIPTION

Stand Number: 4

Acres: 17

Stand Cover Type: Hemlock-Hardwood (Hemlock 38%, Yellow birch 38%, Red maple 7%) Other species present include black cherry, white ash, sugar maple, bigtooth aspen, red spruce, white pine, and beech.

Shrub and Herbaceous Plants: Beaked hazelnut, rubus, sensitive fern, intermediate woodfern, interrupted fern, goldthread, pink lady slipper, clintonia

Natural Community: *Hemlock-Northern Hardwood:* This forest community has a mix of species with 25-75% hardwood. It is more often found where the soils have a lower nutrient content. Soils are also usually well-drained to excessively drained. Species found in this forest community include red maple, beech, red pine, white pine, paper birch, red spruce, and in some climates red oak. The disturbance regime is similar to Northern Hardwood forest. This community needs to be further studied to determine long term successional trends.

Age Class Structure: Uneven-aged,

Size class: poles to medium sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop,

Slope: 25-45%

Wildlife Habitat: A vernal pool is located within this stand which will be discussed in a separate section. A coyote den was along the southern border has been used in the past. The stand also appears to be used as a deer yard though it is not a state mapped deer yard. Owls frequently hunt the adjacent wetland and can be heard calling on a regular basis. Black bear sign is also frequently seen in this area as is fisher.

Stand History: Portions of this stand were pastured 80 years ago. Remnant barbed wire indicates where the pasture stopped and the terrain starts to pitch toward the wetland. A timber stand improvement harvest was implemented in 2001 releasing the quality yellow birch poles.

Stand Health: No significant problems noted. No Invasive Species present in the woods.

Sampling Method: Point sampling

Sampling Date:

7/21/2012

Number Points: 7

BAF: 10

Quadratic Mean Stand Diameter (inches): 10.5

Trees per acre: 234

Basal Area (ft²/acre):

Total: 139

Acceptable Growing Stock: 110

Unacceptable Growing Stock: 29

Regeneration Data: Regeneration is spotty with yellow birch, beech, sugar maple and red spruce being the most abundant species. Hemlock is conspicuously absent.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Approximately 85% of the stand has a medium to high ranking,

Midstory vegetation (6-30 feet): high ranking in this vertical layer.

Coarse woody material: (perching, foraging and courtship) Low-medium.

Fine woody material: (nesting substrate), low to medium

Snags and cavity trees: abundant, several snag trees were inventoried accounting for approximately 17 ft of basal area per acre. Most snags tallied were greater than 12 inches dbh.

Deciduous leaf litter: variable, lacking under the hemlock component

Canopy Height: 70 feet.

Canopy closure: closed > 80%.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management

Cutting Cycle: 15 years

Diameter Objective for Principal Species: 22 inches

PLANNED TREATMENTS

Treatment: No treatment is recommended at this time. Stocking levels are adequate.

CURRENT STAND DESCRIPTION

Stand Number: 5

Acres: 15

Stand Cover Type: Hemlock-Hardwood (Hemlock 55%, Yellow birch 23%) Other species present include red maple, red spruce, black cherry, sugar maple, paper birch, white ash, and hop hornbeam.

Shrub and Herbaceous Plants: Intermediate woodfern, lady fern, cinnamon fern, sensitive fern, goldthread, jewelweed, starflower, wood sora, goldthread, jack-in-the-pulpit

Description: This stand is found along the western side of the Beaver Meadow Brook. It is characterized by very shallow to bedrock soils with numerous ledge outcroppings. Disturbance is common in this stand with evidence of several wind events over the last several decades.

Natural Community: *Hemlock-Northern Hardwood:* This forest community has a mix of species with 25-75% hardwood. It is more often found where the soils have a lower nutrient content. Soils are also usually well-drained to excessively drained. Species found in this forest community include red maple, beech, red pine, white pine, paper birch, red spruce, and in some climates red oak. The disturbance regime is similar to Northern Hardwood forest. This community needs to be further studied to determine long term successional trends.

Age Class Structure: Uneven-aged,

Size class: poles to large sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop, Westbury

Slope: 25-60%

Wildlife Habitat: A series of vernal pools are located within this stand which will be discussed in a separate section. The recent widespread blowdown in this stand will result in enhanced wildlife habitat. A decision was made to not salvage the hemlock blowdown due to the value of the material, the risk in harvesting, and the desire to allow a small part of the property to have an undisrupted natural disturbance event. One immediate response to the tip ups is an increase in winter wren population in this area. Other bird species that will benefit include Canada warbler. There are also now abundant den sites for both coyote and black bear.

Stand History: It is likely that some portions of this stand were former pasture (80-100 years ago), while the steeper or more rocky areas have always been maintained as forest. An access road was built in 2004, and a single tree selection harvest was implemented in 2006. The December 2010 windstorm caused considerable blowdown throughout the stand.

Stand Health: No significant problems noted. No Invasive Species present in the woods.

Sampling Method: Point sampling

Sampling Date: 7/21/2012

Number Points: 6

BAF: 10

Quadratic Mean Stand Diameter (inches): 11.7

Trees per acre: 161

Basal Area (ft²/acre):

Total: 145

Acceptable Growing Stock: 108

Unacceptable Growing Stock: 37

Regeneration Data: Very little regeneration, recent disturbance will change this.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Low ranking,

Midstory vegetation (6-30 feet): medium to high ranking in this vertical layer.

Coarse woody material: (perching, foraging and courtship) Very high.

Fine woody material: (nesting substrate), High

Snags and cavity trees: abundant, several snag trees were inventoried accounting for approximately 5 ft of basal area per acre. All snags tallied were greater than 12 inches dbh.

Deciduous leaf litter: variable, lacking under the hemlock component

Canopy Height: 70 feet.

Canopy closure: intermediate 70%.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management

Cutting Cycle: 15 years

Diameter Objective for Principal Species: 22 inches

PLANNED TREATMENTS

Treatment: No treatment is recommended at this time, due to the significant blowdown from the December 2010 wind storm.

CURRENT STAND DESCRIPTION

Stand Number: 6

Acres: 12

Stand Cover Type: Spruce-Northern hardwood (Red maple 36%, hemlock 26%, Red spruce 22%, black cherry 10%, and yellow birch 5%).

Shrub and Herbaceous Plants: Dense Rubus (Blackberry and raspberry), striped maple, hay-scented fern, cinnamon fern, jewelweed, intermediate woodfern

Description: This stand is located along the western side of property. It is an open canopy stand with two age classes.

Natural Community: *Hemlock-Northern Hardwood*: This forest community has a mix of species with 25-75% hardwood. It is more often found where the soils have a lower nutrient content. Soils are also usually well-drained to excessively drained. Species found in this forest community include red maple, beech, red pine, white pine, paper birch, red spruce, and in some climates red oak. The disturbance regime is similar to Northern Hardwood forest. This community needs to be further studied to determine long term successional trends.

Age Class Structure: Even-aged,

Size class: poles to small sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop, Westbury and Cabot

Slope: 8-15%

Wildlife Habitat: Black bear use this area extensively for summer foraging.

Stand History: The stand was dominated by red spruce that had occupied the site after pasture abandonment in the 30's. This spruce had stagnated and a salvage operation was implemented in 2006 to capture the value of the spruce before it all snapped and blew over. At the same time the poor quality red maple and at risk cherry were harvested. Some spruce and cherry were left as seed sources and structure

Stand Health: No significant problems noted. No Invasive Species present in the woods.

Sampling Method: Point sampling

Sampling Date:

7/21/2012

Number Points: 4

BAF: 10

Quadratic Mean Stand Diameter (inches): 9.6

Trees per acre: 161

Basal Area (ft²/acre):

Total: 103

Acceptable Growing Stock: 78

Unacceptable Growing Stock: 25

Regeneration Data: Very little regeneration, mostly rubus at this time. There is some scattered yellow birch, cherry and gray birch saplings.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): Low-medium ranking,

Midstory vegetation (6-30 feet): medium to high ranking in this vertical layer.

Coarse woody material: (perching, foraging and courtship) Very high.

Fine woody material: (nesting substrate), Very High

Snags and cavity trees: low

Deciduous leaf litter: low

Canopy Height: 70 feet.

Canopy closure: intermediate 60%.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Even-age Management

Rotation age: 100 years

PLANNED TREATMENTS

Treatment: No treatment is recommended at this time, due to the recent salvage. The overstory will be removed once the next stand has become established. This may take several years as the Rubus component declines.

CURRENT STAND DESCRIPTION

Stand Number: 7

Acres: 26

Stand Cover Type: Early successional (red maple 42%, black cherry 42%). Other species present include hemlock, white ash, sugar maple, white pine, red spruce, elm, and apple.

Shrub and Herbaceous Plants: Serviceberry, rubus, hay-scented fern, interrupted fern, sensitive fern, cinnamon fern, jewelweed, intermediate woodfern

Natural community: Unknown, but probably Northern hardwood

Description: The stand is old pasture that has reverted to forest. It is however still interspersed with open areas that have been reclaimed to grass, forbs and mast producing trees. The stand composition has a high number of mast producing trees and shrubs. The timber productivity in this stand is low, with soils that have a combination of ledge and high water table in various section of the stand. Approximately 3 acres of the stand is currently being managed to retain early successional habitat.

Age Class Structure: Even-aged

Size class: poles to small sawtimber

Site Class: II

Soil Series: Woodstock rock outcrop, Westbury stony fine sandy loam, Peru **Slope:** 8-25%

Wildlife Habitat: A variety of wildlife species will use this area for foraging. There is an abundance of wildlife food.

Songbird Habitat Assessment:

Understory vegetation (0-5 feet): This layer is variable in ranking from Low to High. More than half of the stand has a low ranking but pockets of rubus and one patch of sugar maple regeneration provides a medium to high ranking in about a third of the stand.

Midstory vegetation (6-30 feet): The ranking here is medium throughout. The majority of the Vermont Responsibility birds nest and forage in the 1-30 foot layer of the forest.

Coarse woody material: none very low amounts of CWD (perching. Foraging and courtship)

Fine woody material: Low ranking of FWD (nesting substrate)

Snags and cavity trees: very few snags or cavity trees, only one large snag noted.

Deciduous leaf litter: moderate, hayscented fern and rubus are abundant in the understory

Canopy Height: 70 feet. Maintaining much of the canopy at this height will continue to provide habitat for Blackburnian warbler and wood thrush.

Canopy closure: intermediate 60-80%.

Stand History: This stand was open field approximately 60 years ago. Crop tree release of apples and cherries were implemented through NRCS funding in 2004. In 2008 a 1 acre patch of aspen was clearcut to coppice regenerate the aspen for grouse and songbird habitat.

Stand Health: No significant problems noted. No Invasive Species present.

Sampling Method: Point sampling

Sampling Date: 7/21/2012, and 9/25/2012 **Number Points:** 7 **BAF:** 10

Quadratic Mean Stand Diameter (inches): 9.7 **Trees per acre:** 40

Basal Area (ft²/acre): Total: 71 **AGS:** 26 **UGS:** 45

Regeneration Data: patchy red spruce, sugar maple, yellow birch, beech, and a pocket of red oak saplings adjacent to one nut bearing oak on the property.

DESIRED FUTURE STAND CONDITION

Long Range Silvicultural Objectives: Uneven-age Management through irregular shelterwood.

Rotation age: 100 years

Species objectives: cherry, red oak, yellow birch, white ash, white pine, sugar maple

PLANNED TREATMENTS

Treatment: Continuous cover irregular shelterwood

Residual Basal area: 60 ft²/acre

Percent of stand in Overstory removal where advanced regeneration exists: 5%

Percent of stand in Overstory removal prescribed to establish regeneration: 5%

Periodicity of treatments: 10 years

Diameter Class	Present Acceptable Basal Area	Present Total Basal Area	Target Residual Basal Area
6-10"	11	34	30
12-14"	7	21	16
16-22"	7	16	14

Gap Description: Gaps range from ¼ acre to 3 acres. Two ¼ acre gaps and a two acre gap will be established in the next treatment. The two acre early successional cut expands on the 1 acre established in 2008. This three acre gap is intended to encourage intolerant regeneration, including aspen resprouts where feasible, and to release mast bearing trees and shrubs. The smaller gaps are intended to encourage more tolerant regeneration over time. Approximately 2 acres every 10-15 years will be harvested to maintain some early successional habitat within the stand.

Crop Trees Description: Crop tree release may be implemented in five years throughout the matrix of the stand. Mast trees will be the priority, specifically cherry and apple. High quality timber trees will also be released on 2 sides.

Map Area: Riparian ESTA

Acreage: 15

Description: Riparian ESTA (*Ecologically Significant Treatment Areas*) has been designated on the property and are delineated on the forest stand map. While most riparian areas are well suited for active forest management, some have characteristics making them ecologically inappropriate for timber harvesting and may be enrolled in UVA as ESTAs. The lands adjacent to streams, rivers, lakes, and ponds are specialized ecological areas that provide numerous functions, including protecting water quality and aquatic habitat, providing terrestrial wildlife travel corridors, supporting significant natural communities and adjacent wetlands, and protecting channel-forming processes and channel stability. Riparian areas are generally managed according to Acceptable Management Practices (AMPs) to protect surface waters from harmful discharges, but these riparian zones on the property deserve special treatment to protect riparian functions.

The area designated as a Riparian ESTA is found along Beaver Meadow Brook. This area consists of a series of steep east facing slopes that terminate at or near the stream bank. Given the stream channel size and character, as well as the steepness of adjacent slopes and soil character, this area will be managed as an ESTA to reduce the potential for sedimentation into the brook that any potential harvest activity might cause.

Management Recommendations: No treatment is recommended for this area (managed as no-cut zones).

Map Area: Vernal pool ESTAS

Acreage: 3

Description: There are four vernal pools located on the property with egg masses observed with photo records. Wood frogs eggs, and spotted salamander eggs were counted and recorded. In addition each Vernal pool and vernal pool buffer zone has been sketched showing locations of large woody material, as well as the size and shape of the pool.

Definition

Vernal Pools are small (generally less than one acre), ephemeral pools that occur in natural basins within upland forests. Vernal pools typically have no permanent inlet or outlet streams and have very small watersheds. These temporary pools generally last only a few months and then disappear by the end of summer, although some pools may persist in wet years.

During their dry period, vernal pool depressions may be recognized by the sparse vegetation and by stained leaves marked by seasonal high water. Vernal pools typically lack trees but are shaded by trees growing in the surrounding upland forest. The vegetation that grows in vernal pools is highly variable in composition and abundance.

Importance

Vernal, or temporary, pools are perhaps best known as breeding habitat for amphibians. Typical Vermont species that rely on vernal pools for reproduction include the mole salamanders (spotted salamander, blue-spotted salamander, and Jefferson salamander), eastern four-toed salamander, and wood frog. All of these species may breed in other wetlands, including man-made pools and ponds, but rely heavily on vernal pools to maintain their populations. For vernal pools to be effective breeding habitats for amphibian populations, they must retain water for at least three months during the spring and summer breeding season in most years so that amphibians can complete their larval stage.

The periodic drying of a vernal pool excludes populations of predatory fish and diving beetles that prey on amphibian larvae. Other animals use pools as well, such as fairy shrimp, fingernail clams, snails, eastern newts, green frogs, American toads, spring peepers, and a diversity of aquatic insects. Fairy shrimp are thought to be restricted to these temporary pools. The amphibians and invertebrates found in vernal pools constitute a rich source of food for various species of birds, mammals, and reptiles that may be attracted to the pools. Wood ducks, mallards, black ducks, and great blue herons are occasionally known to feed at these pools. Despite their small size and temporary nature, vernal pools are highly productive ecosystems.

Threats

Vernal pools and the organisms that depend on them are threatened by activities that alter pool hydrology and substrate, as well as by significant alteration of the surrounding forest. Construction of roads and other development in the upland forests around vernal pools can negatively affect salamander migration and increase mortality. If not properly planned, timber harvesting can have significant effects on vernal pools, including alteration of the vernal pool depression, changes in the amount of sunlight, leaf fall, and coarse woody debris in the pool, and disruption of amphibian migration routes by the creation of deep ruts. Even when the pool is dry, alteration of the depression substrate may affect its ability to hold water and may disrupt the eggs and other drought-resistant stages of invertebrate life that form the base of the vernal pool food chain.

Management Recommendations

Management of a vernal pool that protects populations of pool-specialist amphibians recognizes the importance of their upland habitat as well as the breeding pool. The area used by a population can be represented by three management zones: the breeding pool, a 100-foot zone around the pool, and a third zone that extends an additional 500 feet (600 feet from the pool edge).

Breeding Pool

This area includes the pool depression measured at spring high water. It is important to note that the pool may not be entirely full or may even be completely dry during part of the year. At such times, the high water mark must be determined using such evidence as water marks on trees within the depression, water-stained or silted leaves, or an obvious change in topography at the pool edge.

Leave breeding pools undisturbed, with no cutting, heavy equipment, skidding, storage of slash or other woody debris, or sedimentation within these depressions during any season.

100-foot Zone

No land clearing or permanent development including roads and driveways, changes in water quality or hydrology (including use of pesticides), and barriers to amphibian movement.

No cutting will be implemented in the 100 foot buffer zone.

Important Note: There are three quality black cherry trees within the 100 foot buffer of Vernal pool #1, imbedded in Stand 4. These trees will reach maturity at varying times and the right to harvest these trees over the next 20 years is reserved.

100 to 600-foot Zone

Practice uneven-aged forest management to provide adequate amphibian habitat and canopy cover. Leaving some large, mature hardwoods is especially helpful for protecting and enhancing habitat. To provide adequate shading a minimum of 60% of the canopy cover composed of trees at least 25 feet tall should remain intact. Effort should be made to maintain a moist forest floor with deep leaf litter and abundant coarse woody debris. Timber harvesting should happen outside of the amphibian movement period during early spring and preferably should be done on frozen ground. Harvesting within this area should only occur on frozen ground and end prior to March 1.

Other general consideration: Avoid creating ruts and other artificial depressions that hold water, as these may attract breeding amphibians but do not provide suitable habitat for developing larvae. Avoid clearing steep slopes that contribute runoff into breeding habitat. Avoid using pesticides within 600 feet of a breeding pool. Avoid any activities that direct water away from a breeding pool, as this reduces the amount of water held in the depression and increases the chance that the pool will dry before amphibian larvae complete their development. Do not direct additional runoff into a breeding pool from outside its natural basin. This can change the hydrology of the pool and introduce pollutants and sediments, both of which can kill eggs and developing larvae.

CURRENT STAND DESCRIPTION

Stand Number: Openland

Acres: 9

Description: The open land areas are scattered in 6 distinct areas throughout the property. The two pastures adjacent to The Woodward Road are used as pasture for the neighbor's Angus cattle. The remainder of the open areas are managed for wildlife habitat and as landing locations. Apple trees can be found in all the openings. These trees have been released over the years as the small fields were reclaimed as open land, and trees and shrubs were removed. The open area on the eastern part of the property is mowed early to control the spotted knapweed. The rest of the openings are brush-hogged late in the year. Mast trees including cherry, service berry, as well as hawthorn and apple are maintained in the openings and along the edges. Rubus is allowed to grow forming small islands around the mast trees.

Management Schedule

Management standards allow for carrying out prescribed activities within three years of the treatment year.

Treatment Year	Stand #	Management Activity	Silvicultural Guide or Tech. reference. Prescription # or Letter, if appropriate
2012	1	ES Patch cut on two acres	N/A
2012	7	ES Patch cut on two acres	N/A
2012	2	Crop Tree Release with canopy Gap	FFtB/NA-TP-19-93
2014	3	Single Tree selection	NE-603
2021	1	Crop tree release of timber on five acres	
2021	7	Mast tree release	