

FOREST MANAGEMENT PLAN

FOR

PROPERTY OF

**SAINT ALBANS TOWN
(French Hill Forest)**

**SAINT ALBANS
VERMONT**

APRIL 2010

Stand 1 AMENDED October 2012

Prepared by:

Nancy Patch **Date**
Franklin-Grand Isle County Forester
278 South Main St.
St. Albans, VT 05478
802-524-6501

By signing below, I understand I am signing my forest management plan.

William Nihan **Date**
Selectboard Chair
Town of St. Albans
P.O. Box 37
St. Albans Bay, VT 05481
802-527-8346

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I. PROPERTY DATA SUMMARY:

Prepared For: Saint Albans Town

Address: William Nihan
P.O.Box 37
St. Albans Bay, VT 05481

Town Where Land Is Located: Saint Albans, Franklin County

Grand List Acreage: 162.09 acres: 162.09 productive forest,

Ortho Photo Number: 108256; Series 5000, 1995

Sampling Method: variable plot sampling 10 baf

II. INTRODUCTION:

This Forest Management Plan for the Saint Albans Town Forest is designed to serve several functions. These are as follows:

- *to analyze* the natural resources on the property
- *to make* recommendations to improve recreation potential.
- *to make* recommendations for any timber stand improvements that may be possible in light of current stand conditions.
- *to make* recommendations for wildlife habitat enhancement
- *to outline* a comprehensive Schedule of Management Activities for plan implementation

III. GENERAL DESCRIPTION: The Saint Albans Town Forest Property is located in the town of Saint Albans just south of the Swanton/Saint Albans town line, at the end of Forest Drive, which is off of French Hill Road. The property includes a Grand List acreage of 162.09 acres, with 162.09 acres of productive forest. Access throughout the property is good with a main road into the property through a gate where a small parking lot is located. A woods trail network exists as a result from recent logging, but which could be improved and in some cases re-routed to avoid seeps and vernal pools.

The property is located in the **Champlain Valley Biophysical Region**. 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. Following the retreat of the glaciers 13,500 years ago, the Champlain Valley was filled with fresh water from Lake Vermont, and later with salt water from the smaller Champlain Sea. The flooding of the basin and the movement of sediment into and within the basin, determine the soil composition.

The forest soils are primarily comprised of Woodstock rock Outcrop, with a very small inclusion of Cabot soil in a stream drainage east of the Beaver Pond. **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. **(This local enrichment is especially pronounced in Stand 3. The stand is defined by the eastern aspect and slope where colluvial deposits and leaching of the nutrients from the rock outcrop has resulted in a very rich site. The parent material of the rock outcrop that divides Stand 3 from Stands 1 and 2 to the west, must have a high calcium/magnesium content.)** The bedrock on in this soil series 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.

IV. GENERAL LAND MANAGEMENT OBSERVATIONS & RECOMMENDATIONS:

Recreation and Aesthetics –The property has in recent years been used for hunting, walking, and riding all terrain vehicles. During the field work there was no recent ATV use on the trails that could be observed. The roads that exist could be improved for enhanced recreation use of the property. It is recommended that trail be identified on a trails map using GPS and areas that could use improvement be identified on this map. This work could be conducted with assistance from the County Forester and volunteers. There is a strong interest from St. Albans citizens to develop walking trails on the property.

This forest has also been traditionally uses for hunting and this practice should continue though signs at the entrance may be necessary to remind users during specific hunting seasons such as deer hunting and bird hunting.

Aesthetics is a factor that should be taken into account while completing any type of project on the site. 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. Unique areas on this property include the Beaver Pond and the exceptionally rich soils that are found in Stand 3. These soils provide the medium for a large number of high site quality indicator plants that would interest the amateur and professional botanist alike.

Cultural resources: Based on records in the county forester’s office the property was purchased by the town in 1953 from two separate ownerships. These records also suggest that more than 35,000 trees planted were between 1909 and 1953, but this may have been transcribed in error. The Saint Albans City Reservoir forest shows several areas of plantations with closed canopies in 1962, and was in the City ownership during those years. It is likely that the records from those plantings were wrongly included in the French Hill Forest. There is no existing evidence of tree planting and the 1962 photos show a fully forested area comprised of Northern Hardwood.

There were no cultural artifacts observed in the field work except barbed wire fence along the boundary lines.

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. The boundary lines on this property are in good condition, with the majority of the lines defined by blazes and red or orange paint. The west and east lines should both be upgraded in the near future.

Ecology and Biodiversity – The forest is primarily comprised of Northern Hardwood but at varying age classes and composition. Stand 1 appears to have a lower nutrient content in the soil resulting in Red maple and Beech being the dominant species both in the overstory and the understory. The soils here are shallow to bedrock, well-drained to excessively drained resulting in dry soil conditions. Stands 2 and 4 both have a higher percentage of sugar maple and white ash and less beech in the overstory, indicating a richer soil composition. Stand 3 is a very rich site with abundant sugar maple regeneration and a wide variety and quantity of rich site indicator species including seersucker sedge, wild ramp, blue cohosh, maidenhair fern, dutchman’s breeches, hepatica and Virginia waterleaf. Stand 5 is also unique in its composition of red oak and beech. This is a dry knob where oak and beech have a competitive edge. The beech here is also healthy and much of it free of beech-bark disease, with perhaps some resistance to this ubiquitous disease. The small beaver pond long the north boundary line provides a break in the forested cover and provides habitat for waterfowl, songbirds, and amphibians.

It is also important to mention here that this property is part of an area that contains the largest unfragmented forest in Saint Albans which continues into Swanton and Fairfield to Fairfield Pond. This forest block is characterized by a relative large number of small wetlands. It is also separated from the Fairfield Swamp Wildlife Management Area by only a short distance and one paved road. This larger forest block covers approximately 8,000 acres over three towns, including St. Albans, Swanton and Fairfield. One of the most significant characteristics of the property for wildlife habitat is this vicinity to other large properties and this large and relatively unbroken expanse of wilderness. 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, and even the catamount (puma) need very large areas to thrive. About 20% of this forest block is owned by the Vermont State fish and Wildlife department and is permanently protected from development.

No invasive species were observed during the field inventory. This is most likely due to the fact that this forest has been little disturbed in recent years as the invasive species have spread. It will be important in the future to monitor for these plants as they are prevalent in the area.

No **Rare, Threatened, or Endangered Species** have been identified on this property.

Water Quality – 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. There are numerous seeps and potential vernal pools on this property. Several streams originate on this property at the many seeps which form their headwaters. The logging that occurred in the last 5 years did not take into consideration these seeps and ephemeral streams, but rather many of the roads were placed in these areas. The harvesting occurred primarily in the winter when ground conditions could be frozen and so only light and occasionally moderate impacts to these wetlands were observed. There is also a small beaver pond along the northern border. In all future operations Acceptable Management Practices (AMP’s) will be in place to prevent erosion and/or discharge into water bodies or sources.

Access System: There is a landing area just as you enter the property from Forest drive. The road continues north to an area near the Beaver pond and a former camp which has fallen in over time. There are skid roads found throughout the property that are in poor condition, and in some cases should be moved to avoid impact to seeps and vernal pools. A walking trail could be developed that could also be used for future logging. Roads should be kept to a minimum and could be designed for multiple use functions.

Wildlife Habitat: There are several large diameter trees found throughout the property that have the potential to develop into den or cavity trees. Some of these trees should be retained as future snag trees. These “Legacy Trees are intentionally retained in the forest until they reach their biological life span, and will become wildlife snag trees in the future. Snag trees are important because as they decay, cavities are created inside them that can be used as den sites for many species such as owls, woodpeckers, flycatchers, tree swallows, and chickadees. They also provide an important food source for woodpeckers that feed on the insects inhabiting them. These trees are also important for hunting perch sites and tree top nesters such including ravens and hawks. Approximately 6 future snag trees per acre could be identified and retained during harvesting operations. Groups of snags may be desirable where 18 -30 trees can be identified that will account for 3-5 acres. Snags eventually become coarse woody debris which is important for grouse and turkey nesting, habitat for mole salamanders and a variety of invertebrates, all of which provide a food source for animals up the food chain. At least 2 down trees per acre greater than 14 inches dbh are desired for quality wildlife habitat. There have been a few tip ups after the last logging, resulting in what will develop into coarse woody debris. These tip ups and the existence of large trees on the ground are not consistent nor do the numbers reach the goal of two per acre greater than 14 inches. All trees greater than 25 inches in diameter should also be left as “Legacy Trees”. Currently, this is a small component of the existing forest, as only 4 trees were tallied in the inventory that had a diameter of 25 inches or more. These included two Big tooth aspen, one Basswood, and one Red maple.

The most significant characteristic for wildlife habitat is the connectivity available for wide ranging species across this property and the several other large properties making up this forest block of 4,000 acres and connecting to another 4,000 acres to the south as described above in the section on ecology and biodiversity. Another significant characteristic of the property for wildlife habitat is its high percentage of hard mast bearing trees. There is a significant quantity of red oak and beech, found throughout the property. These mast trees provide a food source for a wide variety of wildlife species, including turkey, deer, grouse, black bear, fox, and rodents such as squirrels and chipmunks. Some of the smaller mammals and birds are prey for fox, bobcat, hawks, owls, and coyote. The scarlet tanager is a deep woods bird that favors oak stands.

There are no **deer wintering areas** on the property.

Neo-Tropical Songbird Habitat- A Forest Bird Assessment was conducted with Audubon staff on May 13th, 2010. 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 opening in the forest canopy. (To be implemented)
- 2) Limit management activities to late summer, fall or winter, to minimize impact on nesting birds. (To be implemented)
- 3) Keep forest buffers along streams and wetlands. (To be implemented)
- 4) Retain a percentage of fruit bearing overstory trees when harvesting including beech, oak, black cherry, as well as mid layer trees such as serviceberry and apple where present. (To be implemented)
- 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.(To be implemented)
- 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. (Not applicable to this property)
- 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. (To be implemented)
- 8) Conversely, retain early successional forest habitat. Early successional habitat may be accomplished through patch cutting or managing abandoned agricultural land. Patch cuts 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. (Not applicable to this property).

Forestry - A specific description and recommendation for individual areas follows in Section VI. The property will be managed using both all-aged and even-aged silvicultural systems.

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 system the overstory is eventually removed. A delayed shelterwood could retain a component of the overstory. A modification of the shelterwood system is an irregular shelterwood which is a hybrid between an even-aged and an uneven-aged forest. The age class distribution is unbalanced and can at times include only two distinct age cohorts. In this plan the irregular shelterwood method is described with a goal to develop a multi-aged forest with more than two age cohorts. Structural diversity and continuous cover are goals of these treatments.

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 balanced 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.

Management goals on this property will focus on low impact harvests. Income from timber harvesting will be secondary to structure and diversity.

Logging Practices - Landowner objectives identify recreation, forest aesthetics and maintenance of healthy wildlife habitat as complementary uses with timber management. Although timber management is a lower priority than the other goals, the revenue derived from selling timber products can be re-invested in the property and its other goals.

In order that these objectives are met, the use of experienced and capable logging contractors is essential. A clear understanding of stand treatment, and the selection and marking of trees for removal is 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 marking of the trees to be removed is a critical component. Even the best loggers have an inherent conflict in deciding which trees to cut. For the logger economics is a priority. In the same vein, it is important to make sure that the forester is working with the landowner's best interest. The marking and administration of the job should not be related to volume or value of the timber that is cut. 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.

V. STAND ANALYSIS:

For management purposes, the forestland has been divided into stands, which are defined as areas of relative similarity (such as age, species, topography, etc.), and can be treated uniformly. The 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 for each stand.

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 are to use a combination of even-aged and all-age silviculture methods.

Stands have been separated in part due to past logging and agricultural history, but also due to soils, and the Forest Community Type that is prevalent in that stand. Forest Communities are distinguished from Stands as the stand type may be the result of human influence. Forest communities are a result of soils, weather, moisture, and glacier action. Stands are a result of past cutting history, age, and species composition. Forest community types will be listed for each Stand when they can be determined. Natural Forest 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 (high, medium, low, and non-productive), which indicate the growth in volume per acre per year.

STAND ANALYSIS

Map Area 1

Acres: 51

Stand Type: Beech-Red maple (transition hardwood)

Data Points: 11

Overstory Composition: (beech 35%, red maple 26%, sugar maple 18%, black cherry 9%) Other species include paper birch, white ash, basswood, and big tooth aspen.

Regeneration: The dominant species is beech with a very minor component of sugar maple and yellow birch. Abundant beech stems were observed at each data point.

Shrubs and herbaceous Plants: Shrubs: striped maple; Herbaceous: shining clubmoss (*L. lucidulum*), intermediate woodfern

Natural Community Classification: 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.

Stand History: There was some minor harvesting in this stand in the last timber sale in 2004. The trees harvested were the large diameter stems.

Forest Health: Beech bark disease is common throughout this stand and may have contributed to the high incidence of beech regeneration as the overstory beech declines the trees will root sucker developing clones of the parent tree. Approximately half of the beech in this stand is considered unacceptable growing stock.

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. Research shows that some trees have varying levels of resistance to the disease. 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 whenever possible.

Access distance: less than 1 mile

Approximate Stand Age: 60-80 years

Age Structure: even-aged

Stocking: Overstocked

Size Class: small/medium sawtimber

Acceptable Basal Area/acre: 92 ft²

Total Basal Area/acre: 134 ft²

Stems/acre: 218

Mean Stand Diameter: 10.6 inches

Slope: 8-25 %

Aspect: east

Site Class: II

Site Index: by soils

Soils: Woodstock rock outcrop

Management Objective: Manage using an unbalanced multi-aged silvicultural system to develop a higher quality forest, to maintain wildlife habitat, to enhance biodiversity, and protect water quality. The management is considered unbalanced as the age cohorts (sapling, pole, small, medium and large sawtimber) may not be equally represented.

Silvicultural Prescription: An Expanding Gap Shelterwood is recommended to restore the forest to a higher quality, more diverse forest stand. The initial treatment would create gaps in the overstory to encourage regeneration other than beech and red maple, including yellow birch, white ash, black cherry and sugar maple. The best way to compete with the dense beech understory is to open the canopy sufficiently to allow other species an opportunity for establishment. This treatment will also greatly enhance the songbird habitat potential of this forest.

It is recommended that five to seven patch cuts ($\frac{1}{4}$ to $\frac{1}{2}$ acre in size) be established to encourage regeneration other than beech. The existing beech regeneration within these patch cuts will be cut. Retention trees along the edges and occasionally within the patch cut would include large crowned black cherry, sugar maple, white ash, and red oak if any occur in this stand. Approximately 50 feet beyond the edge of the patch cut will be thinned to a shelterwood stage leaving the largest and highest quality stems. The residual basal area in this shelterwood will be approximately 60-70 ft²/acre. Area treated at each gap is approximately $\frac{1}{2}$ to 1 acre in size.

In the subsequent four treatments over a 60 year period the lower quality stems and some mature sawtimber may be harvested outside the gaps, while approximate 1 acre shelterwood gap expansions would be implemented in areas where advanced regeneration of desired species and quality have become established. The gaps therefore may expand in varying configurations and not necessarily in concentric circles. If desired regeneration has not become established additional small patch cuts may be warranted. Quality poles and small sawtimber will be retained to grow to maturity; the poorer quality overstory is to be removed as gaps are expanded to release quality regeneration. By the fourth treatment the gaps will be overlapped and the last treatment will be a less defined area.

Patch cuts will not be implemented in the areas where seeps or streams occur, which would include approximately 6 acres of the stand area. Only light harvesting would occur in these areas throughout the rotation.

Wood Product: hardwood logs, firewood

Rotation age: 150 years, with 15 year treatment intervals

Sawtimber Volume/acre: 4,881 bd.ft.

Cordwood Volume/acre: 18.7 cords

Additional Management Recommendations: There is an abundance of mast trees in this stand. Beech is a dominant species in this stand and while treatment is planned to develop diversity towards species other than beech, the healthy beech component should be retained. All clean, free of disease, beech trees should be retained and the goal should be to retain at least 20% beech in the overstory. The beech provides an excellent hard mast food source for several wildlife species including turkey, grouse, deer, black bear, and some songbirds.

The patch cuts recommended would greatly enhance the habitat for interior forest gap dependent songbirds such as Veery, Wood thrush, Black Throated Blue Warbler and eastern wood peewee. Many of these birds are showing signs of declining in numbers in Vermont and forest songbird management could improve their status. Perch trees in and along the edge of patch cuts will enhance habitat for eastern wood peewee. The retention of overstory and development of the understory throughout the rotation also adds to structure for black-throated blue warbler, ovenbird, and wood thrush.

This would also improve habitat for ruffed grouse, and perhaps temporarily for some more early successional birds such chestnut-sided warbler and white throated sparrow. White-tailed deer also utilize young brushy areas for feeding and hiding from predators.

The many seeps found throughout this stand and the property overall provide good habitat for woodcock.

Trail development could be established to move from patch cut to patch cut along the edges to assist in bird watching and hunting activities.

STAND ANALYSIS

Map Area 2

Acres: 24

Stand Type: Northern Hardwood

Data Points: 4

Overstory Composition: (sugar maple 77%, white ash 9%, red maple 9%, beech 5%)

Regeneration: Beech was observed at every point, yellow birch and sugar maple were present at half the points. Hophornbeam and hemlock were also observed in lesser quantities.

Shrubs and herbaceous Plants: Shrub: striped maple, hobblebush, and elderberry; herbaceous: shining clubmoss, intermediate woodfern, and Christmas fern

Natural Community Classification: Northern Hardwood

Stand History: This stand was harvested in 2004 removing approximately 25% of the overstory. The trees harvested were the largest diameter.

Access distance: less than 1 mile

Forest Health: No significant health problems observed. This stand has deeper soils and more colluvial deposits than Stand 1 and therefore has better growing conditions. There are however no rich site indicator plants and sufficient sugar maple is lacking.

Age Structure: multi-aged

Approximate Stand Age: 30-80 years

Stocking: Adequately stocked, within the recommended residual stocking range for an uneven-aged hardwood wood forest.

Size Class: poles-medium sawtimber

Acceptable Basal Area/acre: 90 ft²

Total Basal Area/acre: 108 ft²

Stems/acre: 165

Mean Stand Diameter: 11 inches

Slope: 8-25%

Aspect: northeast

Site Class: II

Site Index: by soils

Soils: Woodstock rock outcrop

Management Objective: Manage using multi-aged silvicultural system to improve the quality of the growing stock and maintain or enhance structural diversity within the stand, and to maintain or improve wildlife habitat.

Silvicultural Prescription: No treatment is recommended at this time due to the recent harvest. The stand should be re-inventoried in 10 years at which time a light single tree and small group selection harvest may be implemented. Group selection could be implemented where quality regeneration has become established.

Wood Product: hardwood sawtimber and firewood

Cutting cycle: 15 years

Diameter objectives: 22 inches hardwood

Sawtimber Volume/acre: 6,490 bd.ft.

Cordwood Volume/acre: 10 cords

Additional Management Recommendations: The lack of adequate coarse woody debris and potential snag trees should be addressed in future treatments. Based on the inventory data there is only one down tree per 2 acres greater than 14 inches. It is recommended that potential 6 snag trees per acre be identified as Legacy Trees. In some cases trees could be girdled to accelerate the recruitment of snags.

STAND ANALYSIS

Map Area 3

Acres: 24

Stand Type: Rich Northern Hardwood

Data Points: 4

Overstory Composition: (sugar maple 85%) Other species include white ash, basswood, butternut, red maple and paper birch

Regeneration: Dense sugar maple regeneration is present throughout the stand. Other species observed include minor amounts of yellow birch, hophornbeam and beech

Shrubs and herbaceous Plants: woody plants: Striped maple, elderberry, raspberry; Herbaceous: Rich Site Indicator plants are abundant and include wild leeks, maiden hair fern, hepatica, blue cohosh, seersucker sedge, Virginia waterleaf, toothwort, and dutchman's breeches. Other plants include shining clubmoss, Christmas fern, and intermediate woodfern

Natural Community Classification: Rich Northern Hardwood (High site quality indicators plants are present on 100% of data points.) 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. This stand is located on a eastern slope starting at the ridgeline and including the small stream valley. The soil type changes as the slope changes to west aspect. The understory vegetation is rich in high site quality herbaceous plants, and the trees grow straight and tall. Sugar maple is the dominant tree.

Stand History: The last harvest in 2004 was heavy, removing 50% of the overstory and the largest diameter and/or most valuable trees. This harvest was either by design or default a shelterwood, which left sufficient shade from the overstory to encourage the relatively shade tolerant sugar maple regeneration to become established at high numbers. The high quality soil makes sugar maple establishment much easier than in adjoining stands with less soil enrichment. As a shelterwood this last harvest was very successful.

Access distance: less than 1 mile

Forest Health: No significant problems noted. The former skid roads need some improvement and possible re-routing to avoid seeps and potential vernal pools.

Age Structure: even-aged (two-aged)

Approximate Stand Age: 80 years

Stocking: Adequately stocked, above the recommended residual stocking for an even-aged hardwood forest.

Size Class: medium sawtimber

Acceptable Basal Area/acre: 70 ft²

Total Basal Area/acre: 83 ft²

Stems/acre: 92

Mean Stand Diameter: 11.5 inches

Slope: 15-25 %

Aspect: east

Site Class: II

Site Index: by soils

Soils: Woodstock rock outcrop

Management Objective: Manage using an unbalanced multi-aged silvicultural system to grow the highest quality sawtimber, to develop structural and biological diversity, to protect water quality, and to maintain wildlife habitat. The management is considered unbalanced as the age cohorts (sapling, pole, small, medium and large sawtimber) may not be equally represented.

Silvicultural Prescription: No treatment is recommended at this time. The stand should be re-inventoried in ten years. The next treatment is proposed in 20 years or more. The silviculture method used in the future will use a continuous cover irregular shelterwood. This prescription takes what was a two-stage shelterwood (implemented in 2004) and converts to an irregular shelterwood in order to maintain the aesthetics and develop structural diversity. This structural diversity will be developed with a partial cutting of the overstory and a thinning in the younger age class. Final overstory removal is not required in this method.

Note: If the two-stage shelterwood was to be continued the remaining overstory should be removed in the next year or two as regeneration has become established.

All trees greater than 25 inches will be left to live out their natural life cycles, while providing den and mast trees, and coarse woody debris.

Wood Product: hardwood sawtimber, firewood

Rotation age: 120 years, variable treatment intervals

Sawtimber Volume/acre: 4,275 bd.ft.

Cordwood Volume/acre: 7 cords

Additional Management Recommendations: Identification of potential snag trees should be part of the next treatment. The existing conditions will favor songbirds such as black throated blue warbler, veery, wood thrush, and ovenbird.

This stand is particularly interesting for the amateur botanist and wildflower enthusiasts. The spring ephemerals are abundant and hiking and bird watching in this stand can be enhanced by improving the road system.

STAND ANALYSIS

Map Area 4

Acres: 38

Stand Type: Northern Hardwood

Data Points: 15

Overstory Composition: (sugar maple 68%, red maple 10%, beech 7%) Other species include yellow birch, black cherry, red oak, paper birch, big tooth aspen, basswood, white ash, hophornbeam, and hemlock.

Regeneration: Beech and sugar maple occur in almost equal and abundant concentrations. Yellow birch, hophornbeam and hemlock, are also present either throughout the stand or in isolated pockets.

Shrubs and herbaceous Plants: woody plants: striped maple, raspberry; Herbaceous: shining clubmoss (*L. lucidulum*), intermediate woodfern, Christmas fern, hay-scented fern. Highsite quality indicator plants were observed on 20% of the data points. These species include seersucker sedge, wild leek, blue cohosh, and Dutchman's breeches..

Natural Community Classification: 1) Northern Hardwood: see Stand 1 for description, and/or 2) Rich Northern Hardwood: see Stand 3

Stand History: This stand was harvested in 2004 removing approximately 40% of the overstory. The largest and many of the most valuable trees were harvested.

Access distance: less than 1 mile

Forest Health: No significant problems noted.

Age Structure: even-aged

Approximate Stand Age: 80 years

Stocking: Adequately stocked, above the recommended residual stocking for an even-aged mixed wood forest.

Size Class: medium sawtimber

Acceptable Basal Area/acre: 68 ft²

Total Basal Area/acre: 83 ft²

Stems/acre: 124

Mean Stand Diameter: 11.1 inches

Slope: 15-60 %

Aspect: east

Site Class: II

Site Index: by soils

Soils: Woodstock rock outcrop

Management Objective: Manage using a multi-aged silvicultural system to develop a structurally diverse forest with high quality hardwood sawtimber, to maintain wildlife habitat, and protect water quality.

Silvicultural Prescription: No treatment is recommended at this time. The stand should be re-inventoried in ten years.

A single tree selection harvest will be implemented in the next treatment. As the quality medium sawtimber grows into the larger diameter sawtimber class, the stand structure can be adjusted to a more equal diameter distribution.

Wood Product: hardwood sawtimber, firewood

Cutting Cycle: 15 years

Desired diameter: 22 inches hardwood

Sawtimber Volume/acre: 4,384 bd.ft.

Cordwood Volume/acre: 9.6 cords

Additional Management Recommendations: All bigtooth aspen, basswood, red oak, and white ash overstory trees will be retained as future snag and wildlife trees. This equals approximately 5 snag and wildlife trees per acre, some in groups of several trees.

Trail development can be improved for greater access and recreational use of this part of the property.

STAND ANALYSIS

Map Area 5

Acres: 10

Stand Type: Red oak-Northern Hardwood

Data Points: 3

Overstory Composition: (beech 35%, red maple 33%, red oak 15%, sugar maple 7%)
Other species white ash, and aspen.

Regeneration: Beech is the dominant species in the sapling class.

Shrubs and herbaceous Plants: occasional beech drops and intermediate woodfern.
Almost non-existent herbaceous layer

Natural Community Classification: Red oak-Northern Hardwood:

Stand History: Only minor harvesting occurred in this stand. The largest diameter oak were cut.

Access distance: less than 1 mile

Forest Health: No significant problems noted. There are several beech in this stand that appear free of beech bark disease.

Age Structure: even-aged

Approximate Stand Age: 60 years

Stocking: Adequately stocked, above the recommended residual stocking for an even-aged mixed wood forest.

Size Class: medium sawtimber

Acceptable Basal Area/acre: 120 ft²

Total Basal Area/acre: 153 ft²

Stems/acre: 268

Mean Stand Diameter: 10.2 inches

Slope: 8-60 %

Aspect: variable

Site Class: II

Site Index: by soils

Soils: Woodstock rock outcrop

Management Objective: Manage using an unbalanced multi-aged silvicultural system to develop a higher quality forest, to maintain wildlife habitat, to enhance biodiversity, and protect water quality. The management is considered unbalanced as the age cohorts (sapling, pole, small, medium and large sawtimber) may not be equally represented, and at some point in the rotation may include only two age classes which described an even-aged system.

Silvicultural Prescription: An irregular shelterwood harvest is recommended to encourage red oak regeneration where overstory oak is present, which is on about one third of the stand. The oak occurs at the height of land and as it matures will be a seed source for the area. A continuous cover shelterwood is recommended. The first treatment will focus on removing the competing red maple and poor quality beech. Future treatments will continue to harvest some overstory trees while thinning the younger age class. The western edge of this stand has been included here because of the scattered oak present, though the soil conditions more closely resemble Stand 1. This small section is separated from Stand 1 and was therefore included in this stand. In this western section a small 1 acre patch cut may be implemented with oak retained on the edge and/or within the patch cut. The proposed residual basal area across the stand is 90 ft²/acre.

Wood Product: hardwood sawtimber, firewood

Rotation age: 150 years

Sawtimber Volume/acre: 4,741 bd.ft.

Cordwood Volume/acre: 20 cords

Additional Management Recommendations: The retention of the oak and healthy beech will ensure an abundant crop of hard mast species that will benefit a large number of wildlife species including turkey, deer, black bear, grouse, rodents and their predators.

All aspen in the overstory will be left as snag trees. Some of the oak may be designated as Legacy Trees and be retained in the stand to live out their biological life span, providing structural diversity, aesthetic interest, wildlife den and snag trees and eventual coarse woody debris.

The retention of the oak in the overstory will be beneficial for Scarlet tanager. This species is area sensitive and the large block of forest in this part of St. Albans is critical for this bird. Much of the adjoining land is being managed as sugarbush that will retain a high closed canopy and interior forest conditions. Other birds that benefit from these habitat conditions include Eastern wood peewee, Wood thrush, and Yellow-bellied sapsucker.

STAND ANALYSIS

Map Area 6

Acres: 15.09

Stand Type: Hemlock-Northern Hardwood

Data Points: 15

Overstory Composition: (beech 27%, aspen 20%, sugar maple 18%, red maple 15%, hemlock 14%) Other species include yellow birch, and red oak.

Regeneration: Beech and sugar maple occur in almost equal and abundant concentrations. Yellow birch, hophornbeam and hemlock, are also present either throughout the stand or in isolated pockets.

Shrubs and herbaceous Plants: Herbaceous: shining clubmoss (L. lucidulum), intermediate woodfern.

Natural Community Classification: 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 further studied to determine long term successional trends

Stand History: Only light harvesting along the edges of Stand 5 and 6 occurred in the 2004 harvest. At the top of the ridge evidence of a small wind event is seen with a pocket of aspen with a sugar maple understory. The overstory at this point is approximately 40-50 years old and is a result of a probably windthrow.

Access distance: less than 1 mile

Forest Health: No significant problems noted.

Age Structure: uneven-aged

Approximate Stand Age: variable to 80 years

Stocking: Adequately stocked, at the recommended residual stocking for an uneven-aged mixed wood forest.

Size Class: poles to medium sawtimber

Acceptable Basal Area/acre: 70 ft²

Total Basal Area/acre: 110 ft²

Stems/acre: 272

Mean Stand Diameter: 10.9 inches

Slope: 15-60 % **Aspect:** east **Site Class:** II **Site Index:** by soils

Soils: Woodstock rock outcrop, small inclusion of Cabot Soil along stream valley

Management Objective: Manage using a multi-aged silvicultural system to develop a structurally diverse forest with high quality hardwood sawtimber, to maintain wildlife habitat, and protect water quality.

Silvicultural Prescription: No treatment is recommended at this time. The stand should be re-inventoried in ten years.

A single tree selection harvest will be implemented in the next treatment.

Wood Product: hardwood sawtimber, firewood

Cutting Cycle: 15 years

Desired diameter: 20 inches hardwood, 18 inches hemlock

Sawtimber Volume/acre: 1,290 bd.ft. **Cordwood Volume/acre:** 10.9 cords

Additional Management Recommendations: All aspen overstory trees will be retained as future snag and wildlife trees. This equals approximately 6 snag and wildlife trees per acre, some in groups of several trees, which is an adequate number of snag trees for this stand.

Trail development can be improved for greater access and recreational use of this part of the property.

SECTION VI. SCHEDULE OF MANAGEMENT ACTIVITIES

<u>Area</u>	<u>Year</u>	<u>Management Activity</u>
All	2011	Locate and upgrade boundary lines where needed
1	2014	Expanding Gap Shelterwood Residual Basal Area=80 ft ² /acre
2	2024	Single Tree Selection
3	2030	Continuous Cover Shelterwood
4	2024	Single tree and small group selection
5	2014	Continuous Cover Shelterwood Residual Basal Area=90 ft ² /acre
6	2024	Single Tree Selection
All	2020	Re-evaluate and update management plan

Note: Management recommendations allow for carrying out the individual prescribed activity within three years, before and after the recommended date.