Forest Management Plan

for the lands of:

Friends of Hildene, Inc.

Manchester, Vermont

Prepared by:

C·A·L·F·E·E
CONSULTING

specializing in the practice of sustainable forestry
planning · marketing · analysis

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The Forest Management Process

This management plan describes the parcel as it exists today, and to assure improved resource quality it specifies activities for the next ten to twenty years. This temporal perspective recognizes that active forest management requires a long term perspective tempered with careful seasonal and annual evaluations. Active, yet conservative management guarantees that the assets this property contains will increase in value. On this property, the assets are the natural resources, represented by their benefit to the landowner and the environment. The tangible assets represented by **forest products** (e.g., veneer, sawlogs, pulpwood, syrup and firewood) offer a source of monetary revenue which can be carefully managed to offset costs of ownership. The less tangible natural resource assets include **ecosystem services** (e.g., ground water filtration) **wildlife habitats, historic sites, scenic views** and **recreational opportunities**; each of these add to the overall value.

The forest management process involves three crucial phases, ensuring prudent, balanced management practices which will benefit the land and the landowners into perpetuity. These three phases are:

1. Development of landowner objectives - defining why the land was acquired and what uses or values are important to the landowners.

2. Careful assessment of the resources on the parcel - their location, quality, abundance and

interrelation to each other and the level (and effect) of human use.
3. Establishment of professionally designed management goals developed with careful consideration of the objectives and the resource assessment.

The final phase, establishing management goals, is affected not only by landowner objectives and the present resources, but also by the passage of time. Management goals must be established with consideration for the evolution of a forest, with regard for the varying life span of tree species and forest types. Many factors will change over the course of implementing this management plan. A conservative approach will ensure that all resources will not be negatively impacted by uses or activities.

Introduction

The Hildene property is unique because it contains over 200 acres of, largely contiguous, forestland in the bottom of the valley in the Manchester area. There are very few pieces of forestland of any considerable size in this area because of the pressure from development, especially in the last few decades. Although this land currently contains a large block of forest, this has not always been the case. Based on the species composition and age structure of the today's forest, it is evident that some of the land was cleared in the past and probably used for agriculture. Some of what is now forested was cleared less than 50 years ago. Conversely, there are other areas where the history is harder to determine. The forest on some areas are more developed, suggesting these areas either avoided complete clearing or were cleared longer ago, maybe back to the early to mid 1800's.

The land at Hildene has not only been used for agricultural use. The forests have produced wood for both local and commercial use. Firewood was most likely harvested from various parts of the land since settlement times and continued for heating of the buildings associated with the Hildene Estate until other heat sources were installed. Commercial timber sales have taken place with several recorded harvests occurring in the 1980's. More recently, white pine was harvested in 2006, both salvaged from recently blown-over trees as well as standing trees, to construct a new post and beam style building on the property. In the future more wood will be harvested for local-use with the installation of a new wood-fired central heating boiler and the purchase of a portable sawmill that will be used to mill wood for construction purposes. In addition to this, a non-timber related resource, maple sap is harvested from one area for the production of maple sugar.

There is an incredible range of forest types at Hildene, including young and old white pine, mixed hardwood, and almost pure stands of sugar maple and red oak. Included in the forested area are about 35 acres of forested wetlands that also contain a great amount of diversity. Based on species composition and forest structure, nine different stands (or areas) were identified. These stands will be used for management and planning purposes.

To meet the needs of the variety of species composition and structure, a range of management activities will be used to meet the needs and objectives of Hildene. The overarching management focus, however, is the control of the exotic, invasive plants that are prevalent though a majority of the property. Over the past few decades Hildene has become the repository of a number of invasive species, most of which are species that were (and in some cases still are) intentionally planted. The most established of the invasive plants observed are all woody shrubs, Japanese barberry, honeysuckle, and glossy buckthorn being the three worst. Common buckthorn, multi-flora rose, and burning bush are also present and have the potential to increase in severity. The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem

change and a much more difficult task of controlling in the future.

Hildene is truly a multiple use property. Beyond resource utilization the land serves as a base for educational opportunities, recreational activities, and a picturesque setting for the buildings and gardens. It is important that all these aspects are kept in mind when planning and executing forest management activities. The intent of this forest management plan is to outline the objectives for the forestland and a schedule and details of activities that will be carried out to meet these objectives. Although the focus of this specific plan is only 10 years, it is part of the forest management process that stretches decades into the future. This planning process is important because it puts the long-term good of the forest and the land-owner ahead of any short-term gains that can jeopardize the value (economical as well as ecological) of the forest.

Landowner Objectives

Taken directly from the Vermont Landowner Forest Stewardship Assessment form, the objectives of the landowner are outlined below.

"Hildene is committed to preserving its 412 acres so that it can be enjoyed by the surrounding community and visitors to the area for educational and recreational purposes. In a time when the Vermont landscape is changing quickly we feel it is important to be active stewards working to preserve this green space for future generations. Our long term goals include establishing ourselves as a resource for showcasing appropriate forestry management implementation on relatively small parcels of land; to utilize the property to its greatest potential for educational, recreational and agricultural purposes; and to preserve the property's history through the preservation/protection of physical remains such as stonewalls, foundations, and buildings. The woodland and wetland areas which make up a large percentage of the 412 acres have been neglected over the past 100 years. We want to move forward in addressing the needs of our woodland areas to insure that they are healthy and stronger moving into the future. By actively caring for our wooded landscape we can continue to be home to native wildlife and provide a rich outdoor classroom for the community and visitors to Southern Vermont."

Honeysuckle dominates the understory below the canopy of white pine and black cherry in Area 1, out-competing native species and future regeneration of desirable tree species.

Area 1

Area 1 is dominated by white pine and black cherry, combining for over 90% of the basal area. White pine and black cherry are two "early successional" species that commonly originate following major disturbances. In this case, the disturbance was most likely agricultural use in the 1800's. The pine and cherry took advantage of the conditions following agricultural abandonment, colonized the site, and have held on to control the site since. In general, the white pine is large and some of the trees have reached their maximum economic value.

This area was logged at least once since the stand established, taking place in the winter of 1978/79. The logging activity is most likely responsible for allowing the establishment of the scattered mixed hardwood and white pine saplings that are currently found in the understory. The more important situation in the understory, however, is the prominence of the well established population of invasive species, particularly honeysuckle. Honeysuckle, reaching heights over eight feet, dominates the area and is restricting the growth of desirable (and native) species. Logging in the future will only cause the invasive problem to worsen (by providing my light to the understory), therefore it is necessary to control (ideally eradicate) the invasive population prior to any major activity.

Area 1 – Description[1]

Acres: 11.9

Forest Type: white pine and black cherry

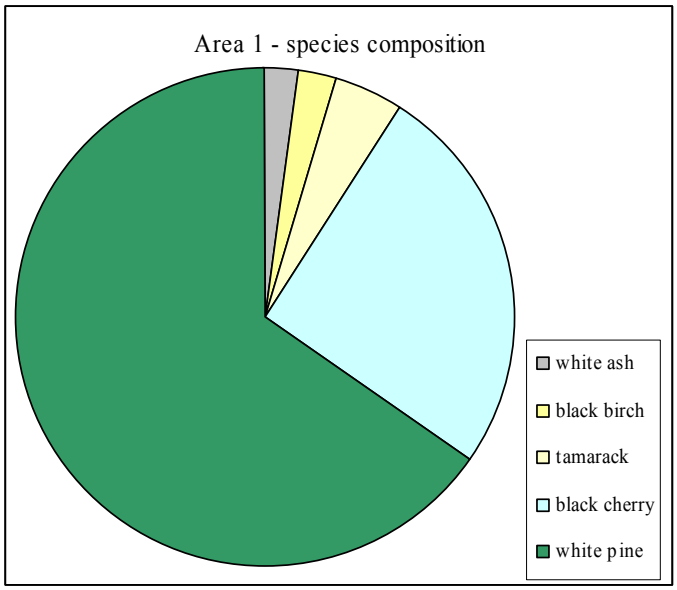
Composition: white pine (65%), black cherry (26%), tamarack (5%) (top three species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: good

Site Class: I (determined using the Bennington County Soil Survey)

Access distance: less than 0.5 miles



Stand History: The dominance of early successional trees (pine and cherry) suggests that this site was once cleared and was probably used for agriculture. Based on the size of the trees, this land was abandoned over 100 years ago. This area was logged at least once since agricultural abandonment; in the winter of 1978/79 78,000 board feet and 25 cords of pulp was cut from Area 1 and adjacent Area 2. White pine was the major species removed in this harvest. Marking and administration was done by Jim White, the Bennington County Forester and cutting was done by Scotty Mayer.

Age Structure: two-aged

Stocking Level: 113 trees/acre (dominant and codominant) (between the A and B lines)

Mean Stand Diameter: 13.3 (Quadratic mean diameter)

Total BA: 143 ft^2/acre **AGS BA:** 130 ft^2/acre **UGS BA:** 13 ft^2/acre **CULL:** 3 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 16,760 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 20 cords/acre
Primary species of acceptable growing stock: white pine (14,200 bf/ac) and black cherry (2,070 bf/ac)

Insect, Disease, or Pest Problems: No insect or disease problems were noted on the tree species at the time of the inventory. However, the large size of the pine suggests that some may contain red rot, a fungus that decays the trunk of white pine. A more serious concern is the well established and high population of the invasive, exotic plants in the understory of this stand. Of the exotics present honeysuckle is the most prevalent with almost complete coverage of the area, reaching heights of over eight feet. Common buckthorn and burning bush are also present, but at much lower densities.

[1] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 3 randomly located plots. Sampling was conducted in May, 2006, using 10 factor prism and NED-1 inventory procedures.

Area 1 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to a hardwood stand over the course of 2 to 3 rotations. Favor the growth of hardwoods, but maintain a population of softwoods to improve diversity. Establish multiple age cohorts through multiple entries and increase the number of hardwood species present. Promote high-quality sawlogs and veneer. Additionally, eradicate exotic, invasive species.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2012 Area 1 – Single tree and small group selection to release pine crop trees and hardwood regeneration.

Prescription: Focus single tree selection on unacceptable growing stock (UGS) and mature and at-risk acceptable growing stock (AGS) with maximum diameter goals of 22" for pine. Benefit crop trees and advanced regeneration with release during single tree selection. Girdle large, cull pine to favor surrounding trees.

Small-groups should be placed and shaped in a manner to favor the advanced regeneration or encourage regeneration of desired species in a particular area. Groups should have a high area to border ratio (e.g., circles) to increase light for germination and growth. Group openings should be ¼ acre in size and approximately 1 acre should be regenerated in groups in each entry based on a 15 year cutting cycle and a 150 year rotation period.

Reduce stand basal area to 100 ft^2/ac while maintaining a low q-factor (<1.2).

Remove as many individuals of undesirable species in the understory (e.g., hop hornbeam) as financially possible.

2016 All Areas – **Update Management Plan**

2027 Area 1 – Single tree – small group selection if conditions are adequate. Base prescription on stand conditions.

Area 1 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: No significant wildlife features were observed in Area 1 during the inventory.

Important Recreational Features: Recreational trails loop through this area. These trails see little summer-time use and are most actively used for cross-country skiing when conditions allow.

Other Significant Features: No other significant features were noted during the 2006 inventory.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Deer populations appear to be moderately in the area and this has the potential to inhibit the regeneration of desirable tree species. Harvesting activity will increase the food supply for the deer and the harvest layout should reflect this. Additionally, tops should be left on the forest floor with no treatment (no lopping) to serve as protection for future regeneration.

Recreation Considerations: The recreational (skiing) trails are an important attraction for Hildene and if used in management activities (as skid trails), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: There is a small stream that runs through a wet area to the west of, and adjacent to Area 1. Activity along the western boundary should take these features into consideration.

A large stump is evidence of a previous harvest in this stand of mixed hardwoods species and white pine.

Area 2

Area 2 is composed of two discrete units of land, one in the north-central part of the property, and one in the south-west. Although these units are not connected, the forest composition and structure are similar enough that they can grouped into one stand type. Area 2 is a mix of hardwood species with white pine scattered throughout. The main hardwoods are white ash and sugar maple but white birch, black birch, black ash and others are present at lower densities. Some regeneration, mostly in the form of small to medium saplings is present and generally resembles the overstory in species composition (white ash, white pine, sugar maple).

As there is a mixture of tree species, there is also a mixture of ground conditions, ranging from dry, upland conditions to wet, near saturated conditions (at least during parts of the year). Although these conditions are very patchy throughout, overall the area has more damp than dry ground. For this reason, sensitive and cinnamon fern are common in the herb layer.

There is a fence-line in the southern part of the area so it is apparent that at least a portion of this stand was used for agriculture. The current composition (i.e., the prevalence of hardwoods) suggests that the area was not used as intensively for agriculture as Area 1, most likely because of the dampness of the site.

Area 2 – Description[2]

Acres: 22.6

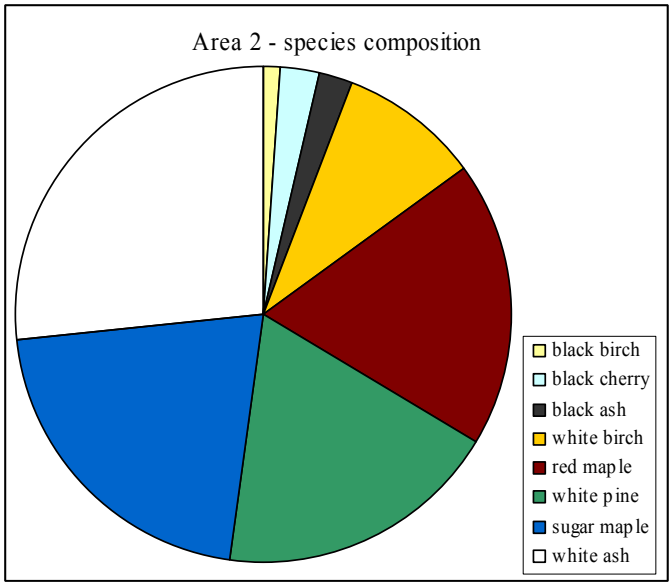
Forest Type: mixed hardwoods and white pine

Composition: white ash (28%), sugar maple (21%), red maple (19%), white pine (19%) (top four species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: good

Site Class: I (determined using the Bennington County Soil Survey)



Access distance: less than ¼ mile

Stand History: A fence-line in the southern part of the stand indicates that at least some of this area was used for agriculture, but in general it appears as though it was never cleared as intensely as Area 1, probably due to the dampness of the ground. Along with Area 1, Area 2 was logged in the winter of 1978/79. Approximately 78,000 board feet of timber and 25 cords of pulp were removed from the two areas, with white pine being the primary species removed. Marking and administration was done by Jim White, the Bennington County Forester and cutting was done by Scotty Mayer.

Age Structure: two-aged

Stocking Level: 107 trees/acre (dominant and codominant) (between the A and B lines)

Mean Stand Diameter: 8.4 (Quadratic mean diameter)

Total BA: 86 ft^2/acre **AGS BA:** 65 ft^2/acre **UGS BA:** 21 ft^2/acre **CULL:** 1 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 5,520 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 12 cords/acre
Primary species of acceptable growing stock: white pine (1,920 bf/ac) and white ash (1,740 bf/ac)

Insect, Disease, or Pest Problems: Invasive species, including honeysuckle, barberry, common buckthorn, and burning bush, are found throughout Area 2. In some areas, the honeysuckle and barberry populations are very high. These invasive plants compete with the regeneration desired tree species as well as native shrubs and herbs.

[2] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 10 randomly located plots. Sampling was conducted in May and June, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 2 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Conversion to uneven-aged structure through the use of small-group and single-tree selection systems and a 15 year cutting cycle. Favor the growth of sugar maple, white ash while maintaining the diversity of hardwood species. Retain some large white pine trees, release some white pine advanced regeneration and establish new white pine to maintain white pine as a component of this stand. Produce high quality sawtimber and veneer. Keep invasive plant species populations low to non-existent.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2006 Area 2 – The conditions in this area do not currently warrant any commercial action. Prescription E from Silvicultural Guide for Northern Hardwood Types in the Northeast (revised). Prescription E states: "This stand has suitable quality and structure to implement uneven-aged management. But stand density is not critically high. Reexamine in 10 to 20 years, unless the possible loss of valuable high-risk trees warrants immediate harvest cut by selection or group-selection methods."

2016 All Areas – **Update Management Plan**

2016 Area 2 – Single tree– small group selection harvest if conditions are adequate. Base prescription on stand conditions.

Area 2 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: A small stream runs through and adjacent to the western edge of the southern parcel of Area 2. Together with dampness of the area, the stream and wet areas in this stand offer habitat for amphibians. The stream also offers a water source for other animals and may also be used as a habitat for mammals, such as weasels.

Important Recreational Features: Recreational trails loop through this area. These trails see little summer-time use and are most actively used for cross-country skiing when conditions allow.

Other Significant Features: The stream in the southwest section is the most apparent significant feature (see "Significant Wildlife Features" above).

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Deer populations appear to be moderately high in the area and this has the potential to inhibit the regeneration of desirable tree species. Harvesting activity will increase the food supply for the deer and the harvest layout should reflect this. Additionally, tops should be left on the forest floor with no treatment (no lopping) to serve as protection for future regeneration.

Recreation Considerations: The recreational (skiing) trails are an important attraction for Hildene and if used in management activities (as skid trails), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: There is a small stream that runs through and adjacent to the west of, and adjacent to Area 2. Additionally, there are portions of the stand that are relatively damp and areas adjacent to Area 2 (west and north) that are considerably wetter. Activity along the stream should be done with this feature in mind and activity in general should be restricted to dry periods (late summer months) or in winter during frozen ground conditions.

White pine will be retained on a portion of Area 3 for diversity, a relic to past landuse and as a source of lumber.

Area 3

Like Area 2, Area 3 is composed of two spatially discrete units of similar composition and structure on opposite ends of the property. Area 3 is largely composed of relatively large and generally lower quality pine and mixed hardwoods. Sugar maple, black cherry, and white ash are the main hardwood species but others are present at lower densities. Some of the largest trees are open-grown, meaning they developed in situations where there was little competition, thus favoring crown spread over tree height. The presence of these open grown or "wolf-trees" as they are also known, indicate the area was mostly cleared at one time, except for a few scattered trees. These conditions suggest the area was used as pasture, with the animals keeping the area between the trees open. Following agricultural abandonment, the remaining area reverted to forest.

There are a few small portions of Area 3 that do not exactly fit the general description of the area but are too small to form stands of their own. The first is the north portion of the south unit of Area 3 (just south of the house opening). This is a small pocket of younger white pine that is similar to the conditions found in Area 7. Abandonment of this area, either from agricultural or cultural use, occurred more recently than the rest of Area 3. The trees in this area are considerably smaller and the stocking higher. The other unique area is along the northwest corner of the northern unit. This is a north-south band of considerably wet ground that includes a small pond, and the species composition reflects this with red maple, tamarack, alder, and black ash.

Area 3 – Description[3]

Acres: 22.6

Forest Type: white pine and mixed hardwoods

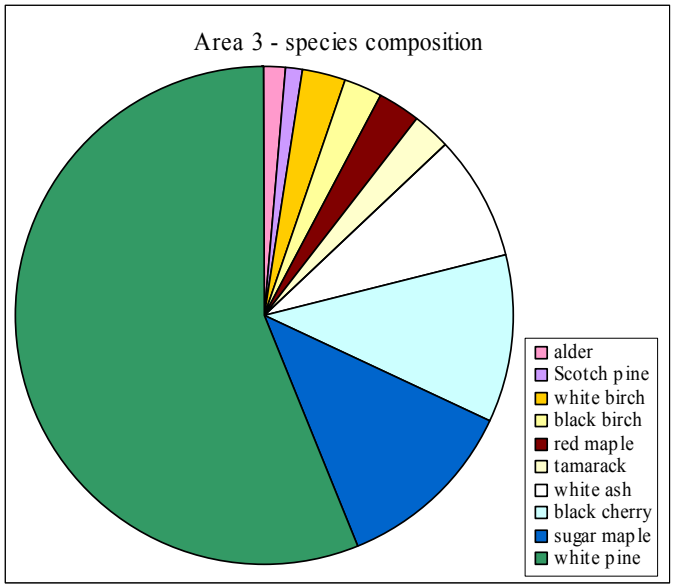
Composition: white pine (56%), sugar maple (12%), black cherry (11%) (top three species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: fair

Site Class: I (determined using the Bennington County Soil Survey)

Access distance: less than 0.5 miles



Stand History: The presence of open grown trees indicates the area was mostly cleared at one time, except for a few scattered trees. These conditions suggest the area was used as pasture, with the animals keeping the area between the trees open. Following agricultural abandonment, the remaining area reverted to forest with both the hardwoods and pine establishing at roughly the same time.

Age Structure: two-aged

Stocking Level: 117 trees/acre (dominant and codominant) (between the A and B lines)

Mean Stand Diameter: 10.8 (Quadratic mean diameter)

Total BA: 107 ft^2/acre **AGS BA:** 69 ft^2/acre **UGS BA:** 38 ft^2/acre **CULL:** 11 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 6,220 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 17 cords/acre
Primary species of acceptable growing stock: white pine (4,670 bf/ac) and white ash (370 bf/ac)

Insect, Disease, or Pest Problems: Light to moderate defoliation by forest tent caterpillar was occurring to the hardwoods in the stand during the 2006 inventory. This is part of a larger outbreak in southern Vermont that began in 2004 and has the potential to last for 3 to 7 years. If defoliation occurs in subsequent years logging activity should delayed, as added stresses can cause to tree decline and death.

Invasive species, including honeysuckle, barberry, and common buckthorn, are found throughout Area 3. In some areas, the honeysuckle and barberry populations are very high. These invasive plants compete with the regeneration desired tree species as well as native shrubs and herbs.

[3] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 5 randomly located plots. Sampling was conducted in May and June, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 3 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Maintain a mix of white pine and a various hardwood species in the north. Gradually convert south to a hardwood stand. Favor a diversity of hardwood species. Increase stand quality and promote large trees and high quality sawtimber and veneer. Keep invasive plant species populations low to non-existent.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2007 Area 3 south – Apple tree release and pruning

Prescription: Release 2 to 3 wild apple trees. Remove surrounding trees whose canopies fall within 15' of the crown of the apple tree. Prune dead wood from the apple tree.

2007 Area 3 north and south – Invasive plant control along with Area 6.

Prescription: Using basal or foliar application techniques, control invasive plants in the area to be harvested.

2007 Area 3 north – First entry (prep/seed cut) of a ten to 15 acre, two-cut shelterwood harvest along with a single tree selection harvest

Prescription: Shelterwood - plan activity to occur during a good seed year and carry out cut during the summer months to increase scarification. Place shelterwood harvest in an area of low-quality growing stock. Reduce basal area to 40-50 ft^2/ac. Focus removal on non-vigorous overstory and all understory trees. The most vigorous canopy trees should be retained for seed production and these should be evenly spaced through the harvest area. A ring of buffer trees should be left along the western and southern edge of the stand in order to improve wind-firmness of the retained trees.

Single tree selection – Focus single tree selection on unacceptable growing stock (UGS) and mature and at-risk acceptable growing stock (AGS) with maximum diameter goals of 24" for pine and 24" for hardwoods. Benefit crop trees and advanced regeneration with release during single tree selection. Reduce basal area of single tree selection area to 95-100 ft^2/ac.

Area 3 – **Management** (continued)

2007 Area 3 south – Single tree – small group selection harvest during winter or a period of low visitor activity.

Prescription: Focus single tree selection on unacceptable growing stock (UGS) and mature and at-risk acceptable growing stock (AGS) with maximum diameter goals of 24" for pine and 24" for hardwoods. Benefit crop trees and advanced regeneration with release during single tree selection.

Small-groups should be placed and shaped in a manner to favor the regeneration of the desired species in a particular area. Groups should have a high area to border ratio (e.g., circles) to increase light for germination and growth. Group openings should be ¼ acre in size and approximately 0.75 acres should be regenerated in groups in each entry based on a 15 year cutting cycle and a 150 year rotation period.

Reduce stand basal area to 80-90 ft^2/ac while maintaining a low q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems less than 6" in diameter. Maintain a population of mature, seed-producing individuals of all species where applicable.

2009 and every-other year following Apple tree pruning of previously released trees

Prescription: Lightly prune live and dead branches to open up the crown of the tree and encourage growth. Use acceptable pruning practices for fruit trees.

2016 All Areas - **Management Plan Update**

2017 Area 3 north – Second entry (removal) of a shelterwood harvest

Prescription: If regeneration stock is adequate and during the summer months of a good seed year, remove overstory trees. Plan entry and removal of overstory to minimize damage to the regeneration.

2023 Area 3 south – Single tree– small group selection harvest if conditions are adequate. Base prescription on stand conditions.

Area 3 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: The wet area on the western border of the northern unit contains a very small pond that is most likely used by amphibians and probably by mammals as well. There are several seeps in the north unit of Area 3. Seeps offer important habitat to various amphibians.

Important Recreational Features: Recreational trails loop through both the north and south units of this area. Some of these trails are used for walking in the summer while others see little summer-time use and are most actively used for cross-country skiing when conditions allow.

Other Significant Features: At one of the seeps in the north unit, there is an old, built-up stone catchment basin about 3 feet in diameter and 4 feet deep.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: The seeps located in the north unit are sensitive. Seeps should not be entered by machinery during harvest operations.

Recreation Considerations: The recreational (walking and skiing) trails are an important attraction for Hildene and if used in management activities (as skid trails), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: As mentioned above, avoid the seeps during management activity.

Large white pine are scattered through Area 4 and add to the aesthetic quality of the woods surrounding the entrance road.

Area 4

Like Area 2, Area 4 is composed of mixed hardwoods and white pine. The ground in Area 4, except along the western and northeastern borders of the unit, however, is much drier than Area 2. The hardwood composition is not consistent throughout and there are localized patches that where sugar maple, white birch, or red oak are dominant. Likewise, the white pine is not found evenly throughout, but rather is located in a few localize patches. There is one small section of Area 4 that does not fit structurally or compositionally with the rest of the unit. This section, located in the northeast corner of the unit, is a wet hillside that includes wet-site tree species such as tamarack, red maple, and at least one northern white cedar and herb species such as cinnamon and sensitive fern.

Most of the area has probably been continuously wooded at least back to the mid-1800's. The visibility of this area from both the north entrance road and the main house make it important that management activities retain this mature forest look for aesthetics purposes. This is not to say logging can not go on in this here. In 2006, white pine was cut from Area 4 for the construction of a new building on the grounds.

Area 4 – Description[4]

Acres: 35.4

Forest Type: mixed hardwoods and white pine

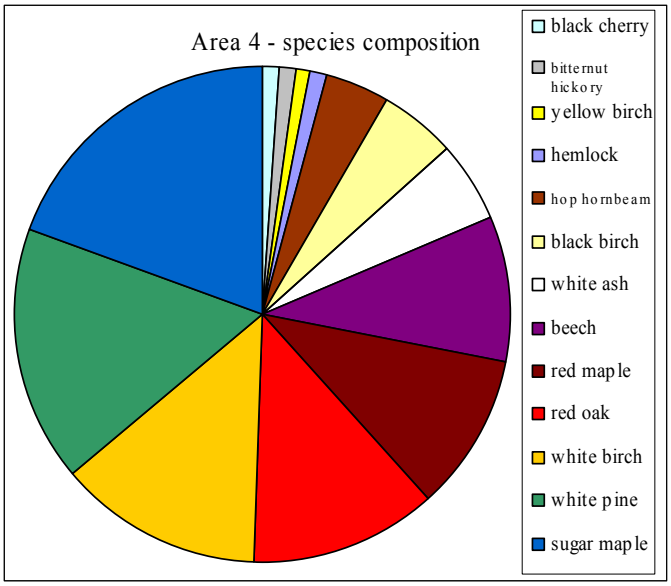
Composition: sugar maple (20%), white pine (17%), white birch (14%) (top three species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: good

Site Class: I (determined using the Bennington County Soil Survey)

Access distance: less than 0.5 miles



Stand History: Although some sections may have been cleared in the 1800's, it is most likely that most of this section was continuously wooded. Logging has occurred at multiple times, mostly in the north and east of the area. The first recorded entry was made in the winter of 1980, in which roughly 55,000 board feet of sawtimber and 20 cords of pulp were removed from Area 4 and adjacent Area 6. White pine and white birch were the main species removed. Marking and administration was done by Jim White, the Bennington County Forester, and cutting was done by Roger Secoy and Richard Sweeney (for Scotty Mayer). In 1982 an improvement cut, also marked by Jim White occurred in Areas 4 and 6 east of the narrow meadow. A smaller timber sale was carried out in the far northeast corner of the property approximately 15 years ago but there are no records of this sale. Finally, a small timber sale occurred in 2006, just prior to the forest inventory, to produce white pine beams and boards for a new building on the property. Several thousand board-feet were salvaged from recently blown-over trees while remainder of the roughly 20,000 board feet was cut from the area east of the narrow meadow. The standing trees for harvest were marked by Alan Calfee and the harvest was carried out by Gabe Russo, using a forwarder. Some pulp-grade material was also removed in this entry.

Age Structure: two-aged

Stocking Level: 153 trees/acre (dominant and codominant) (A-line)

Mean Stand Diameter: 9.9 (Quadratic mean diameter)

Total BA: 121 ft^2/acre **AGS BA:** 75 ft^2/acre **UGS BA:** 46 ft^2/acre **CULL:** 5 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 8,340 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 17 cords/acre
Primary species of acceptable growing stock: white pine (3,580 bf/ac) and red oak (1,490 bf/ac) 4

Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 8 randomly located plots. Sampling was conducted in May and June, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 4 – Description (continued)

Insect, Disease, or Pest Problems: Light to moderate defoliation by forest tent caterpillar was occurring during the 2006 inventory. It is believed that this was the first year that this specific area was impacted by caterpillars, although they have caused serious defoliation in other areas of Manchester and throughout southern Vermont in previous years. The current outbreak of forest tent caterpillars has been occurring since 2004 and has the potential to last 3-7 years. These pests rarely cause direct death to the trees, but the stress of the attack (especially in sequential years) coupled with other stresses such as drought or logging activity can lead to mortality. To reduce the introduction of additional stresses, the Department of Forests, Parks and Recreation recommends that harvest operations be carried out no sooner than three years following the last year of defoliation.

There are some invasive species, mainly barberry and honeysuckle found in Area 4. Currently, the invasive population is not at a level of concern but based on the seriousness of invasions in other parts of the property the threat of the existing population to expand should not be taken lightly.

Area 4 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Continue conversion to uneven-aged structure through the use of single-tree selection systems and a 15 year cutting cycle. Favor desirable hardwood species where they are established but maintain white pine in areas that have no potential hardwood crop trees or regeneration. Promote high-quality sawlogs and veneer. Maintain the mature forest look along the north entrance road. Keep invasive plant species populations low to non-existent.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2014 Area 4 – Single-tree selection harvest.

Prescription: Focus single-tree selection on unacceptable growing stock (UGS) and mature and at-risk acceptable growing stock (AGS) with maximum diameter goals of 26" for pine and 24" for hardwoods. Benefit crop trees and advanced regeneration with release during single tree selection.

Reduce stand basal area to 80-90 ft^2/ac while maintaining a low q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems in the mid and understory, especially hop hornbeam and beech. Maintain a population of mature, seed-producing individuals of all species when possible.

2016 All Areas – **Update Management Plan**

2029 Area 4 – Single-tree selection harvest. Base prescription on stand conditions.

Area 4 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: There is a small pond on the western edge of the unit (along the Farm Loop Trail) that is most likely used by amphibians and probably by mammals and birds as well.

Important Recreational Features: The Farm Loop Trail traverses the entire length of Area 4 and was recently upgraded to allow better travel in the non-winter months. This trail is part of the nature trail system (with informative signs) and is used for wagon rides in the summer and skiing in the winter.

Other Significant Features: The ground in the northeastern portion of this stand is wet and the vegetation reflects this. There are red maple, tamarack and even at least one white cedar (of unknown origin). A good portion of this area is visible from the house or north entrance road.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Deer populations appear to be moderately high in the area and this has the potential to inhibit the regeneration of desirable tree species. Harvesting activity will increase the food supply for the deer and the harvest layout should reflect this. Additionally, tops should be left on the forest floor with no treatment (no lopping) to serve as protection for future regeneration.

Recreation Considerations: The recreational (walking and skiing) trails are an important attraction for Hildene and if used in management activities (as skid trails), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: A good portion of the Area 4 is visible from the north access road and aesthetics need to be considered during management.

Area 5 is located on a ridge and is the driest site on the property.

Area 5

The driest region on the otherwise, generally damp to wet property is Area 5. Located on top of the north-south ridge that runs north from the main house, Area 5 is shallow to bedrock and supports a large population of dry-site loving red oak. In the pockets where the soil is deeper, sugar maple and white ash are more common. Also included in Area 5 are a few interesting natural features. Throughout this area and along the eastern edge are outcroppings of the dolostone bedrock. And the eastern edge of Area 5 offers observation points of the cliffs of dolostone that are located on the western edge of Area 6. Additionally, in the small saddle toward the north of the ridge is what appears to be a vernal pool that is perched on top of the shallow bedrock.

This patch of forest is quite visible from the house and the lawn north of the house and is therefore important to the aesthetics of the grounds. For this reason, the area probably experienced little direct management activity in the past century.

Area 5 – Description[5]

Acres: 7.6

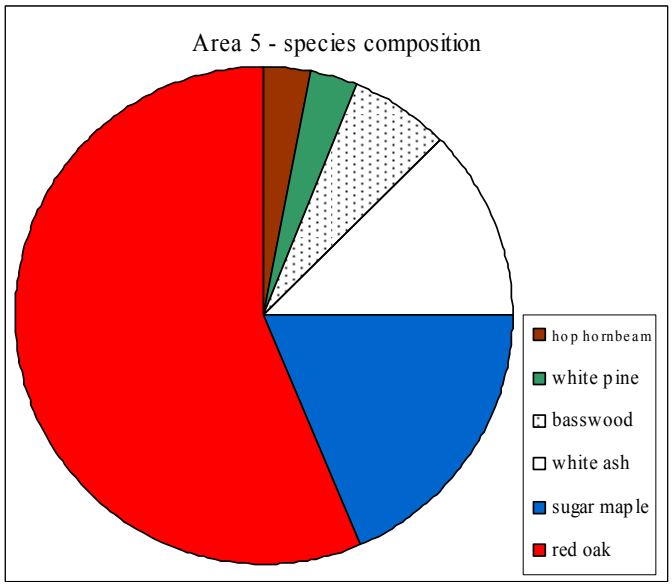
Forest Type: red oak and mixed hardwoods

Composition: red oak (56%), sugar maple (19%), white ash (12%) (top three species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)
Stand Quality: good

Site Class: I (determined using the Bennington County Soil Survey)

Access distance: less than 0.5 miles



Stand History: It appears that this site has been continuously wooded well back into the 1800's. Given the visibility of this area from the house and lawn, it is unlikely that much direct management occurred in the past century.

Age Structure: two-aged

Stocking Level: 106 trees/acre (dominant and codominant) (between the A and B lines)

Mean Stand Diameter: 9.4 (Quadratic mean diameter)

Total BA: 106 ft^2/acre **AGS BA:** 80 ft^2/acre **UGS BA:** 26 ft^2/acre **CULL:** 20 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 6,570 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 6 cords/acre
Primary species of acceptable growing stock: red oak (4,680 bf/ac) and sugar maple (880 bf/ac)

Insect, Disease, or Pest Problems: Moderate defoliation by forest tent caterpillar was occurring during the 2006 inventory. It is believed that this was the first year that this specific area was impacted by caterpillars. The current outbreak of forest tent caterpillars has been occurring since 2004 (in southern Vermont) and has the potential to last 3-7 years. These pests rarely cause direct death to the trees, but the stress of the attack (especially in sequential years) coupled with other stresses such as drought or logging activity can lead to mortality. To reduce the introduction of additional stresses, the Department of Forests, Parks and Recreation recommends that harvest operations be carried out no sooner than three years following the last year of defoliation.

There is some invasive species, mainly barberry and honeysuckle, found in Area 5. Currently, the invasive population is not at a level of concern but based on the seriousness of invasions in other parts of the property the threat of the existing population to expand should not be taken lightly.

5 Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 3 randomly located plots. Sampling was conducted in May, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 5 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Conversion to uneven-aged structure through the use of single-tree selection systems and a 15 year cutting cycle. Favor desirable hardwood species where they are established but maintain white pine in areas that have no potential hardwood crop trees or regeneration. Retain all large, decadent oaks for viewing pleasure and seed production. Promote high-quality sawlogs and veneer. Maintain the mature forest look throughout the area. Keep invasive plant species populations low to non-existent.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2007 Area 5 – Woodscaping/Glading in central part of stand.

Prescription: Thin stand to improve aesthetic quality and visual dimension of the stand. Reduce basal area to 30-50 ft^2/ac by removing mid and understory trees as well as a portion of the overstory trees. Retain vigorous, attractive specimen trees. Create a meandering edge to the treated area to blend the area with the surrounding untreated forest. Also remove smaller trees and brush along the western edge of the stand along the lawn.

2014 Area 5 – Single-tree selection harvest.

Prescription: Focus single-tree selection on unacceptable growing stock (UGS) and mature and at-risk acceptable growing stock (AGS) with maximum diameter goals of 24" for hardwoods. Benefit crop trees and advanced regeneration with release during single tree selection.

Reduce stand basal area to 80-90 ft^2/ac while maintaining a low q-factor (<1.2).

Remove a portion of the suppressed shade tolerant stems in the mid and understory, especially hop hornbeam and beech. Maintain a population of mature, seed-producing individuals of all species when possible.

2016 All Areas - **Management Plan Update**

2029 Area 5 – Single-tree selection harvest. Base prescription on stand conditions.

Area 5 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: In the small saddle toward the north of the ridge is what appears to be a vernal pool that is perched on top of the shallow bedrock. If this is a functional vernal pool, it is probably used by various amphibian species.

Important Recreational Features: Two trails that are part of the nature trail system (with informative signs) traverse Area 5.

Other Significant Features: This area is very visible from the house and grounds.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Deer populations appear to be moderately high in the area and this has the potential to inhibit the regeneration of desirable tree species. Harvesting activity will increase the food supply for the deer and the harvest layout should reflect this. Additionally, tops should be left on the forest floor with no treatment (no lopping) to serve as protection for future regeneration.

Recreation Considerations: The recreational (walking and skiing) trails are an important attraction for Hildene and if used in management activities (for access), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: A good portion of the Area 5 is visible from the main house and north lawn, thus aesthetics need to be considered during management.

Severe defoliation by forest tent caterpillars occurred in Area 6 during early summer 2006.

Area 6

Area 6 is a band of sugar maple and mixed hardwoods that runs north-south on the hillside to the east of the house. Sugar maple is the most dominant species, with 60% of the basal area, while white ash and beech each account for 10%. A mix of other hardwood species including black birch, red oak, hop hornbeam and others make up the remainder. The cliffs that one stands upon in Area 5 run the western edge of some of Area 6.

Although the species present are desirable, the quality of the area is quite low. There are a relatively large number of open-grown sugar maples, hence the cull basal area of 26 ft^2/ac is quite high. Even the smaller size classes (small sawtimber and pole size) have a high amount of unacceptable growing stock. The general low quality of the stand is also evident in the sawlog volume. Despite sugar maple making up 60% and white ash only 11% of the basal area, there is more sawlog volume of ash than maple.

The presence of these open-grown maples indicates that some sections of this area were used as pasture for agriculture. On the border with Area 7 there is a built-up stone spring that was at one point protected by a fence from wandering herds. The animals certainly used Area 7 and probably spent time in some Area 6 as well. Currently Area 6 is being used for maple sap production and an extensive system of tubing is in place.

Area 6 – Description[6]

Acres: 34.2

Forest Type: sugar maple and mixed hardwoods

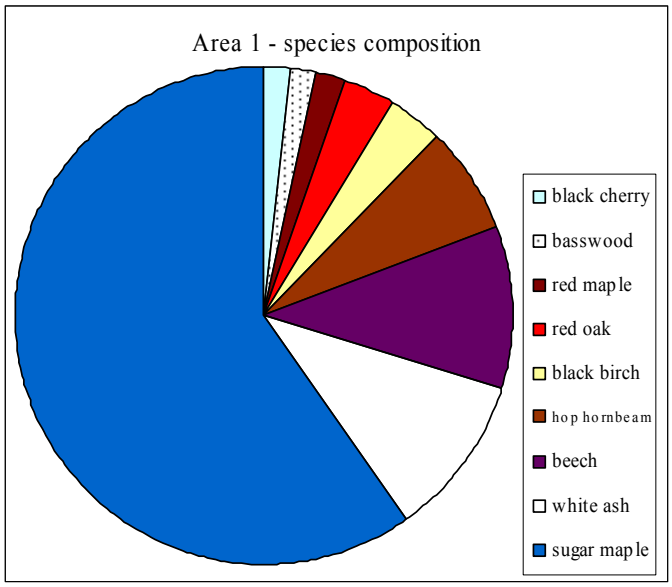
Composition: sugar maple (60%), white ash (11%), beech (10%) (top three species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: low

Site Class: I (determined using the Bennington County Soil Survey)

Access distance: less than 0.5 miles



Stand History: The large wolf trees indicate that some areas were at least partially open, probably for use as pasture. A few management activities have occurred in the last few decades. The first recorded entry was made in the winter of 1980, in which roughly 55,000 board feet of sawtimber and 20 cords of pulp were removed from the northern section of Area 6 and adjacent Area 4. White pine and white birch were the main species removed. Marking and administration was done by Jim White, the Bennington County Forester and cutting was done by Roger Secoy and Richard Sweeney (for Scotty Mayer). In 1982 an improvement cut, also marked by Jim White occurred in Areas 4 and 6 east of the narrow meadow.

Age Structure: two-aged

Stocking Level: 88 trees/acre (dominant and codominant) (adequate – between the A and B lines)

Mean Stand Diameter: 8.3 (Quadratic mean diameter)

Total BA: 81 ft^2/acre **AGS BA:** 34 ft^2/acre **UGS BA:** 47 ft^2/acre **CULL:** 26 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 2,290 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 9 cords/acre
Primary species of acceptable growing stock: white ash (760 bf/ac) and sugar maple (620 bf/ac)

[6] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 7 randomly located plots. Sampling was conducted in May, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 6 – Description (continued)

Insect, Disease, or Pest Problems: Severe defoliation by forest tent caterpillar was occurred in 2006. It is believed that this was the first year that this specific area was impacted by caterpillars, although they have caused serious defoliation in other areas of Manchester and throughout southern Vermont in previous years. The current outbreak of forest tent caterpillars has been occurring since 2004 and has the potential to last 3-7 years. These pests rarely cause direct death to the trees, but the stress of the attack (especially in sequential years) coupled with other stresses such as drought or logging activity can lead to mortality. To reduce the introduction of additional stresses, the Department of Forests, Parks and Recreation recommends that harvest operations be carried out no sooner than three years following the last year of defoliation.

There is a well established and high population of the invasive, exotic plants in the understory of this stand. Of the exotics present, barberry is the most prevalent with almost complete coverage in some sections of the stand. Honeysuckle, common buckthorn and burning bush are also present, but at much lower densities.

Area 6 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Convert to uneven age structure through the use of single tree and small group selection systems. Control invasive plant populations. Increase the proportion of acceptable to unacceptable growing stock. Produce sap for maple syrup production and promote high quality sawlogs and veneer grade material.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

Yearly — Area 6 – Maple sap harvest. The Maple Tapping Guidelines developed by the Vermont Department of Forest, Parks, and Recreation should be followed for number and placement of taps and other considerations (see Appendix).

2008 — Area 6 – Invasive plant control along with Area 3 north.

Prescription: Using basal or foliar application techniques, control invasive plants in the most heavily infested area, located to the east of the main house.

2008 — Area 6 – ½ acre patch-cut.

Prescription: Locate patch along ridge in an area that lacks regeneration and will provide views for visitors to the east from the top of the ridge. Maximize area to border ratio to increase amount of sunlight for hardwood regeneration. Cut all stems 1" and greater. Remove all invasive plants prior to harvest.

2010 — Area 6 – Invasive plant control follow up. Treat surviving or newly arrived plants in the area treated in 2008 as necessary.

Area 6 – **Management** (continued)

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2030 Area 6 – Single-tree selection harvest. Base prescription on stand conditions.

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: There are several small seeps that are scattered across the slope that offer habitat to various amphibians.

Important Recreational Features: A recreational trail cuts through the southern section of this area. These trails are used for walking in the summer and cross-country skiing in winter, when conditions allow.

Other Significant Features: There are band of small cliffs/rock outcroppings along the western border of the Area. Also, at one of the seeps there is a built-up stone catchment basin about 3 feet in diameter and 7 feet deep.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Deer populations appear to be moderately high in the area and this has the potential to inhibit the regeneration of desirable tree species. Harvesting activity will increase the food supply for the deer and the harvest layout should reflect this. Additionally, tops should be left on the forest floor with no treatment (no lopping) to serve as protection for future regeneration.

Recreation Considerations: The recreational (walking and skiing) trails are an important attraction for Hildene and if used in management activities (for access), these trails should be closed out appropriately to allow for future recreational use.

Areas of Special Concern: The seeps located in the north unit are sensitive. Seeps should not be entered by machinery during harvest operations.

Area 7

Area 7 is similar to Area 3 in composition, but it is younger and thus less developed. Overall, this area is the youngest forestland on the property and was probably the last currently forested area to experience agricultural use. Except for a small section bordering River Road, most of this area was probably used exclusively for pasture. This section by River Road (south of the north house) was completely cleared more recently than the other sections and probably used more intensively for hay production or possibly pasture.

The distribution of the pine and hardwoods is not even throughout the area. There are patches that are almost exclusively white pine and areas that are almost exclusively hardwood. The youngest sections are along River Road (the most recently abandoned area) where there are a mix of hardwood species, many of which are not found in the other portions of Area 7. Also scattered throughout are large, open-grown sugar maple and white pine, most likely the seed source for most of the smaller trees.

Although not found throughout, there is nice sugar maple regeneration in patches in Area 7. This regeneration ranges in size from medium to large saplings (1-6" dbh) and may be of similar age to the much larger white pine.

Area 7 – Description[7]

Acres: 31.3

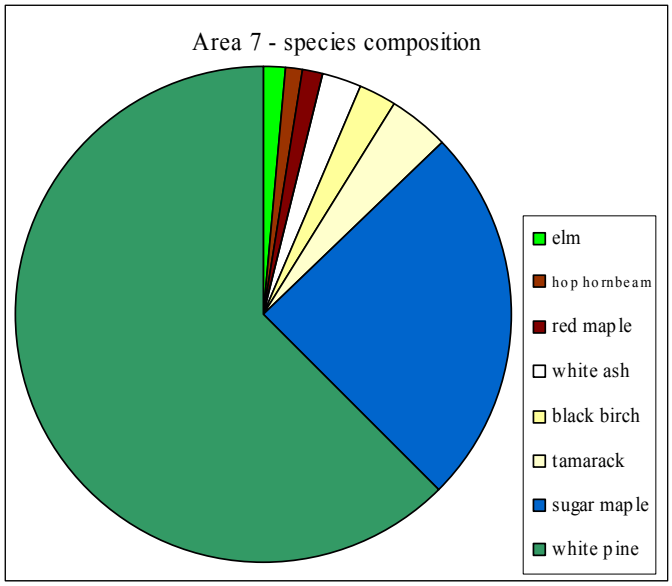
Forest Type: white pine and mixed hardwoods

Composition: white pine (62%), sugar maple (25%), tamarack (4%) (top three species by basal area of canopy trees)

Size Class: poles (4-10" dbh) - sawtimber (≥11" dbh)

Stand Quality: fair

Site Class: I (determined using the Bennington County Soil Survey)



Access distance: less than 0.5 miles

Stand History: This area is the youngest forestland on the property and was probably the last currently forested area to experience agricultural use. The pine and hardwoods (mostly sugar maple) established at the same time following abandonment. Except for a small section bordering River Road, most of this area was probably used exclusively for pasture. This section by River Road (south of the north house) was completely cleared more recently than the other sections and probably used more intensively for hay or possibly pasture. There is no evidence of any past forest management.

Age Structure: two-aged

Stocking Level: 193 trees/acre (dominant and codominant) (between B and C lines)

Mean Stand Diameter: 7.8 (Quadratic mean diameter)

Total BA: 110 ft^2/acre **AGS BA:** 62 ft^2/acre **UGS BA:** 48 ft^2/acre **CULL:** 14 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 3,110 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 18 cords/acre
Primary species of acceptable growing stock: white pine (2,600 bf/ac) and tamarack (222 bf/ac)

Insect, Disease, or Pest Problems: Light to moderate defoliation by forest tent caterpillar was occurring in the hardwoods during the 2006 inventory. It is believed that this was the first year that this specific area was impacted by caterpillars, although they have caused serious defoliation in other areas of Manchester and throughout southern Vermont in previous years. The current outbreak of forest tent

[7] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 9 randomly located plots. Sampling was conducted in May, 2006 using 10 factor prism and NED-1 inventory procedures.

Area 7 – Description (continued)

caterpillars has been occurring since 2004 and has the potential to last 3-7 years. These pests rarely cause direct death to the trees, but the stress of the attack (especially in sequential years) coupled with other stresses such as drought or logging activity can lead to mortality. To reduce the introduction of additional stresses, the Department of Forests, Parks and Recreation recommends that harvest operations be carried out no sooner than three years following the last year of defoliation.

Invasive species, including barberry and honeysuckle are found throughout Area 7. In some areas, the both barberry and honeysuckle populations are quite high. These invasive plants compete with the regeneration desired tree species as well as native shrubs and herbs.

Area 7 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Improve stand quality using timber stand improvement cuts including crop tree release and cleaning or weeding cuts (UGS removal). Conversion to uneven-aged structure through the use of small-group and single-tree selection systems and a 15 year cutting cycle. Favor desirable hardwood species where they are established but maintain white pine in areas that have no potential hardwood crop trees or regeneration. Increase hardwood diversity. Promote high-quality sawlogs and veneer. Eradicate invasive plant species.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2008 Area 7 – 10 acres of timber stand improvement using the crop tree release and cleaning-cut methods. Aim to release 15 trees per acre by opening up the canopy 10' on three sides of the crop tree. Additionally, remove unacceptable growing stock in areas that do not fit the 10' from the drip-line envelope for crop trees.

2010 Area 7 – 10 acres of timber stand improvement using the crop tree release and cleaning-cut methods. Aim to release 15 trees per acre by opening up the canopy 10' on three sides of the crop tree. Additionally, remove unacceptable growing stock in areas that do not fit the 10' from the drip-line envelope for crop trees.

2012 Area 7 – 10 acres of timber stand improvement using the crop tree release and cleaning-cut methods. Aim to release 15 trees per acre by opening up the canopy 10' on three sides of the crop tree. Additionally, remove unacceptable growing stock in areas that do not fit the 10' from the drip-line envelope for crop trees.

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2025 Area 7 – Single-tree selection harvest if stand conditions are adequate.

Area 7 – Management (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: No significant wildlife features were noted during the 2006 inventory.

Important Recreational Features: There is an archery course located west of the south farmhouse, consisting of trails and multiple targets.

Other Significant Features: No other significant features were observed during the 2006 inventory.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: There are no known wildlife features that require special considerations.

Recreation Considerations: Maintain trails and targets for archery course.

Areas of Special Concern: No other significant features were observed during the 2006 inventory.

Poorly formed white pine with an understory of glossy buckthorn (an invasive) dominate most of Area 8.

Area 8

Area 8 is a small piece of forest to the northeast of the meadowlands and is disconnected from the other forested lands in Areas 1-7. There are two main sections of Area 8, a block of land in the north and a sliver of forest that runs south between the Meadowlands and the wetland. The main section of Area 8 is dominated by white pine while the sliver in the south contains a mix of white pine and hardwood species including red maple, sugar maple, black cherry, and others. In general, the quality of trees in Area 8 is very poor, and over half the basal area is of unacceptable growing stock. The pines were hit hard by white pine weevil early in their life and many are now multi-stemmed and poorly formed.

There is very little desirable regeneration and the understory is dominated by glossy and common buckthorn and honeysuckle, all exotic, invasive shrubs.

Area 8 – Description[8]

Acres: 11

Forest Type: white pine

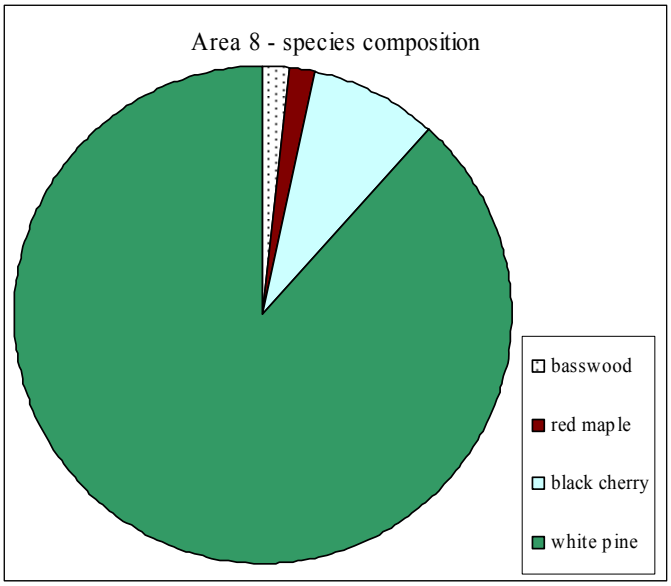
Composition: white pine (88%), black cherry (8%), red maple (2%), basswood (2%) (top four species by basal area of canopy trees)

Size Class: sawtimber (≥11" dbh)

Stand Quality: fair

Site Class: IV (determined using the Bennington County Soil Survey)

Access distance: less than 0.25 miles



Stand History: The area was cleared at one time and probably used in agriculture in the 1800's. The pine established following abandonment and has dominated the site since. Early on in stand development, white pine weevil caused damage to a considerable amount of stems and today there are many multi and poorly formed stems. There is no evidence of any forest management in the stand.

Age Structure: even-aged

Stocking Level: 163 trees/acre (dominant and codominant) (between the A and B lines)

Mean Stand Diameter: 15 (Quadratic mean diameter)

Total BA: 200 ft^2/acre **AGS BA:** 93 ft^2/acre **UGS BA:** 107 ft^2/acre **CULL:** 37 ft^2/acre

Merchantable Volumes:
Sawtimber grade material volume: 7,370 board feet/acre (bf/ac)
Pulp/firewood grade material volume: 45 cords/acre
Primary species of acceptable growing stock: white pine (6,880 bf/ac) and black cherry (485 bf/ac)

Insect, Disease, or Pest Problems: White pine weevil in early stand development lead to many poorly formed stems. No current insect or disease problems were noted.

Glossy and common buckthorn and honeysuckle, all invasives, are present in varying, but generally high densities throughout the area.

[8] Note: Random point sampling was used to conduct forest inventory. Transects were established to provide for 3 randomly located plots. Sampling was conducted in June, 2006, using 10 factor prism and NED-1 inventory procedures.

Area 8 – Management

LONG-RANGE OBJECTIVE AND SCHEDULED TREATMENT

Long-Range Objectives: Increase proportion of AGS to UGS. Maintain the north section as a white pine stand by regenerating the species through a shelterwood harvest. Favor hardwood species in the south. Produce high quality sawlogs.

Special Note: The invasive plant population must be controlled prior to any harvest activity or it will become more established, risking further ecosystem change and a much more difficult task of controlling in the future.

Scheduled Treatment:

2010 Area 8 north (main pine section) – First entry (prep/seed cut) of a two cut shelterwood harvest in the main section of pine in the north

Prescription: Plan activity to occur during a good seed year and carry out cut during the summer months to increase scarification. Reduce basal area to 40-50 ft^2/ac. Focus removal on non-vigorous overstory and all understory trees. The most vigorous canopy trees should be retained for seed production and these should be evenly spaced through the harvest area. A ring of buffer trees should be left along the western and southern edge of the stand in order to improve wind-firmness of the retained trees.

2010 Area 8 sliver – Single tree selection thinning

Prescription: Remove a portion of the unacceptable growing stock while favoring crop trees with the goal of gradually improving stand quality while retaining a forested buffer along the wetland. Reduce basal area to roughly 100 ft^2/ac.

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2020 Area 8 – Second entry (overstory removal) of a shelterwood harvest

Prescription: If regeneration stock is adequate and during the summer months of a good seed year, remove overstory trees. Plan entry and removal of overstory to minimize damage to the regeneration.

Area 8 – **Management** (continued)

NON-TIMBER-RELATED FEATURES

Significant Wildlife Features: This stand, especially the southern sliver offers habitat to beavers that periodically reside in the wetland.

Important Recreational Features: A new trail is currently being constructed to access the boardwalk that will eventually be built out into the wetland.

Other Significant Features: Area 8 borders a large wetland complex associated with the Battenkill River.

ADDITIONAL MANAGEMENT CONSIDERATIONS

Wildlife Considerations: Beavers will kill many hardwood species. Choice trees should be protected from the beavers using fencing.

Recreation Considerations: The trail should be protected during harvest so that it is open and passable following the harvests.

Areas of Special Concern: Activity should be limited in the western section of this area because of the adjoining wetland complex. No equipment should enter a 25 foot buffer around the wetland.

Wetlands

There are approximately 115 acres of wetlands on the property and there is an incredible diversity within these 115 acres. A large portion of the wetlands (79 acres) is found along the Battenkill River and this is the wettest of the wetlands. During the summer of 2006, a large portion of the northern section along the Battenkill was flooded to the point that it was largely open water. This flooding was probably a result of beaver damming, but no recent beaver activity was noted. The remainder of the section along the Battenkill ranges from wet meadow to shrubby wetland.

The remaining 40 acres of wetlands are located to the west of the main house, in the small valley that runs north-south through, and adjacent to the property. Even among these 35 acres there is a large amount of diversity in wetland characteristics. Based on the degree of soil saturation and the vegetation composition and structure, six discrete types were classified. But despite the diversity among these six types, there is at least one common characteristic, all the areas contain trees, even though there is large variations in the spacing and size of the trees.

The main characteristics of the six forested wetland areas are outlined below. These characteristics are based on a walk-through of each area and not on a technical wetland assessment. It is likely that some of the differences between these sites are due to differences in the past land use.

Area A – Shrubby/semi-open area of varying wetness along a small stream (against western border by exit road)

- some saturated and some moist area, with a small stream
- generally open with patches of trees and shrubs
- some trees (mainly tamarack), but few, found in patches, and generally small (<6" diameter)
- tall willow shrubs and some black ash saplings
- heavy fern layer

Area B – Larger, widely spaced trees with dense understory on moist ground (between the two Area 2 units)

- black ash, white ash, and tamarack trees up to 10-12" in diameter, but widely spaced
- moist ground
- thick and continuous midstory of alder, musclewood, and black ash

Area C – Dense saplings on moist ground (area surrounding exit road and access road to maintenance area and south of Orbmsby trail)

- mostly saplings, mainly alder and black ash, highly stocked
- moist ground with patchy herb layer

Area D – Semi-wet: transition between dry and saturated (area northwest and adjacent to parking lot)

- trees include white pine, black ash, and some tamarac, mostly-open
- alder saplings
- ferns layer is heavy

Wetlands (continued)

Area E – Semi-wet: transition between dry and saturated

- trees dominated by black ash but also some white pine and even some hop hornbeam and hemlock in the drier areas
- low sedge, not a dense understory
- honeysuckle scattered by not bad

Area F - Standing water, trees on hummocks

- tree species include black ash, white oak, white pine, red maple, tamarack, alder, and yellow birch
- trees are scattered
- alder, musclewood, willow shrub layer
- cattails, blueberry, royal, sensitive, and cinnamon ferns
- honeysuckle, glossy buckthorn, and barberry are scattered but not bad
- wettest of the six forested areas

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COMPOSITE SCHEDULE OF FOREST MANAGEMENT ACTIVITIES

Year	Area	Activity
2007	3	Apple tree release
2007	5	Woodscaping – Glading in center of stand.
2007	3 and 6	Invasive plant control
2007	3 north	Shelterwood – single tree selection harvest
2007	3 south	Single tree and small group selection harvest (winter or visitor off-season)
2008	7	Crop tree release on 10 acres
2009	3	Apple tree pruning
2010	8	Shelterwood – single tree selection harvest
2010	7	Crop tree release on 10 acres
2011	3	Apple tree pruning
2012	1	Single tree and small group selection harvest
2012	7	Crop tree release on 10 acres
2013	3	Apple tree pruning
2014	4 and 5	Single tree selection harvest
2015	3	Apple tree pruning
2016	2	Single tree and small group selection harvest if conditions are adequate
2016	**All Areas**	**Management Update**
2018	3 north	Second cut of the shelterwood harvest
2020	8	Second cut of the shelterwood harvest
2023	3 south	Single tree and small group selection in south
2025	7	Single tree and small group selection harvest if conditions are adequate
2025	1	Single tree and small group selection harvest if conditions are adequate
2029	4 and 5	Single tree selection harvest
2030	6	Single tree selection harvest