

USE VALUE APPRAISAL CONSERVATION MANAGEMENT PLAN

Meltzer Property, Lowell, VT
The Green Mountain Club, Inc.
For the 10 years beginning April 1, 2012

PREPARED BY:
Harris Roen
Long Meadow Resource Management
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(802) 658-2368 LM@roen.net



FOREST MANAGEMENT PLAN

USE VALUE APPRAISAL

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FOR

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I (we) certify that my (our) forest land, exclusive of any housesite or other developed portion, is at least 25 acres in size and is under active long-term forest management for the purpose of growing and harvesting repeated forest crops in accordance with minimum acceptable standards for forest management. These management standards include following the practices outlined in the booklet "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont" in order to control stream siltation and soil erosion.

By signing below, I understand I am signing my forest management plan and by doing so I agree to manage according to the current approved plan.

Will Wiquist

Will Wiquist, Executive Director
Green Mountain Club
6/12/13
Date

Harris Roen

Harris Roen, Consulting Forester
6/19/13
Date

Approved for Use Value Appraisal by *Ginger Anderson* 7-9-13

Ginger Anderson, Vermont Forest, Parks and Rec. Date
Chief of Forest Resource Management

Cover photo: Looking northeast from the Belvedere Mountain lookout tower into Stand 2.

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I. PROPERTY INFORMATION

CONTACT

Name: Green Mountain Club, Inc. **Address:** 4715 Waterbury-Stowe Road
 Waterbury Center, VT 05677
Contact: Pete Antos-Ketcham **Phone:** (802) 244-7037
 Director of Operations **E-mail:** gmc@greenmountainclub.org

CHART OF ACREAGE ADJUSTMENTS

Landowner: Green Mountain Club Inc.

Town: Lowell

Orthophoto #: 148256, 148252, 144252

SPAN 360-111-10236

- | | |
|---|---------|
| 1. Total Grand List acres in parcel | 1,870.0 |
| 2. Actual acres to be excluded as measured on orthophoto | 2.0 |
| 3. Acres to be enrolled (line 1 minus line 2) | 1,868.0 |
| 4. Acres to be enrolled according to map calculations | 1,868.0 |
| 5. Factor to prorate (adjust) acres (line 3 divided by 4) | n/a |

| Area | Type (crop/pasture) | Map Acres (measured) | x | Factor | = | Prorated Acres | |
|--------------|------------------------|-------------------------|---|--------|------------|----------------|-------|
| | | | | | | <1 Mi | >1 Mi |
| Active ag | | | | | | | |
| Open/Idle ag | | | | | | | |
| | | Subtotal = | | | Subtotal = | 0.0 | 0.0 |

| Productive Forest Land | | (forest type) | | | | | |
|------------------------|---|-------------------------|---------|--|------------|-------|-------|
| Stand | 1 | Northern hardwoods | 71.9 | | | 71.9 | 0.0 |
| Stand | 2 | Northern hardwoods | 695.9 | | | 268.2 | 427.7 |
| Stand | 3 | Northern hardwoods | 208.7 | | | 0.0 | 208.7 |
| Stand | 4 | Rich northern hardwoods | 127.6 | | | 0.0 | 127.6 |
| Stand | 6 | Montain spruce/fir | 69.9 | | | 0.0 | 69.9 |
| Stand | 7 | Hemlock hardwood | 25.3 | | | 25.3 | 0.0 |
| | | Subtotal = | 1,199.4 | | Subtotal = | 365.4 | 833.9 |

| Non-productive Land/Site IV (determined by the 20% rule) | | | | | | | |
|--|---|------------|-------|--|------------|-----|-------|
| (wetland/ledge/non-recreational pond < 20 acres) | | | | | | | |
| Stand | 5 | Mixedwood | 670.6 | | | 0.0 | 670.6 |
| | | Subtotal = | 670.6 | | Subtotal = | 0.0 | 670.6 |

II. PARCEL RESOURCE INFORMATION

OVERVIEW

This +/- 1,846 acre forested upland property runs along the spine of the northern Green Mountains. It is located entirely in the town of Lowell, approximately 5 miles west of the village center. The property encompasses a good portion of the eastern facing bowl formed along the ridge from Belvedere Mountain to Tillotson Peak, including the summits of those two mountains.



Figure 1. View north from Belvedere Mountain

The eastern most arm of the property extends to, and includes a trailhead at the end of Tillotson Road. The trailhead is the starting point for the Frank Post Trail and Forester's Trail, side trails off the Long Trail (LT) System. Approximately 2.5 miles of the LT are contained in the property, along with the entirety of the Frank Post Trail (2 miles) and most of the Forester's Trail (1.6 miles).

The land is owned entirely in fee by the Green Mountain Club (GMC). It was purchased in 1988 from The Nature Conservancy (TNC) with assistance from the Vermont Housing and Conservation Board (VHCB). There are, however, restrictions that were placed in the Limited Warranty Deed upon transfer through a grant agreement with VHCB. Restrictions that relate to the management of the property are:

- a) Adequately protect the Long Trail and trails connecting to it.
- b) Require that forestry practices of the property be acceptable to the Vermont Department of Forests, Parks and Recreation.
- c) Assure that the headwaters of Lockwood Brook are protected from activities which might cause water pollution or contamination.

This plan is being submitted as a ten year update in order to maintain enrollment of the entire property in the Conservation category of the Vermont Use Value Appraisal program. This will allow GMC to manage areas where the primary goal is passive recreation, conservation of fragile areas and protection of significant wildlife habitat, particularly the upper elevations of the property. The Club will also have the flexibility to conduct forestry operations where appropriate in order to enhance conservation values while generating income for conservation programs.

HISTORY

It is likely that the most of the hardwood forest was previously low quality upland pasture in the 19th century. There is evidence of agricultural stone piles in Stands 1 and 7. After grazing was abandoned and the forests returned, periodic logging took place. It appears that much of this historic logging activity focused on removing the highest quality trees, or "highgrading".

The ice storm in January 1998 dramatically changed the nature of this forest. Much of the property was impacted, at elevations of about 1,900 feet and higher. While many of the crowns were damaged, most trees survived and are in adequate health. Much of the timber quality in damaged trees, though, is of reduced quality due to increased opportunity of entry by pathogens. A beneficial effect of the damage, however, is that it has significantly opened up the crowns, allowing a much greater amounts of light onto forest floor. This has created extremely favorable conditions for regeneration, enhancing seedling establishment where none existed, and accelerating seedling and sapling growth where it was already established. The result is a dense, multilayered forest with a well developed ground and shrub layer.

1,692 acres of this property was enrolled in the Use Value Appraisal (UVA) program in 1987, with a Forest Management Plan written by Forest Resource Associates for 1,917 acres of ownership. 254 upper elevation acres were excluded due to the program's requirement that no more than 20% of enrolled lands can be categorized as non-productive forest lands. A Forest Stewardship Management Plan was submitted in 1992 by Roger Sternberg. Under this plan improvement cuts were carried out in 1994 in Stand 4 and 1996 in Stand 1. 100 acres of the ownership just south of Haystack Mountain were conveyed to the State of Vermont in April 2002.

Timber sales have been carried out on the property each winter from the winter of 2009/2010 until the present in accordance to the 2003 Conservation Management Plan and the 2011 Conservation Management Plan amendment. Management has primarily taken place in Stand 2, with a some activity in Stands 3 and 4.

The property has a long history of pedestrian recreational use, with hikers enjoying the LT for the past century. Accordingly, trail construction and maintenance activities have been carried out on the LT, Frank Post and Forester's Trails periodically over this time. In the summer of 1995 the Forester's Trail was reconstructed and relocated in order to utilize the current trailhead location at the end of Tillotson Road on GMC property.



Fig. 2. Residual stand after 2011 harvest, winter and spring conditions.

SOILS

There are several different soil types according to the Natural Resources Conservation Service (see Appendix C). The primary soil types are:

| | |
|----------------------------|-----------------------------|
| Dixfield sandy loam | Hogback-Rawsonville complex |
| Tunbridge-Dixfield complex | Colonel-Cabot complex |

112E Hogback-Rawsonville complex comprises the bulk of the upper elevations of the property. Exceptions are the area around Lockwood Pond that are not so steep, classified as 112D, and the area around the summit of Belvedere Mountain which is 210E. These soils have moderate to severe land use and woodland management limitations due to slope and physical attributes. The remaining soil types in the lower elevations of the property are better suited to forest management.

NATURAL RESOURCES

Biophysical Region: Northern Green Mountains

Table 1. Natural communities found on the property.

| Natural Community Type | Significant Resource | Stand |
|----------------------------------|---|-------|
| Northern Hardwood Forest | Beech stand | 1, 2 |
| Rich Northern Hardwood Forest | High quality trees, rich herbaceous layer | 2, 4 |
| Montane Yellow Birch-Red Spruce | Upper elevation wet meadows | 3, 6 |
| Montane Spruce-Fir Forest | Ridgetop ponds | 5 |
| Subalpine Krummholz | Bicknell's Thrush habitat | 5 |
| Northern Hardwood Talus Woodland | Crevices (wildlife habitat) | 5 |
| Boreal Talus Woodland | Crevices (wildlife habitat) | 5 |
| Hemlock-Northern Hardwood Forest | Forest openings | 7 |
| Seep | Wetland functions | All |

Virtually 100% of this property is forested. There are some open areas on the property - a few scattered grassy openings in the lower elevations less than an acre in size, several wet meadows in the mid and upper elevations, and some exposed rock outcrops on the mountain tops. There are also two ridgetop ponds, Lockwood Pond and Tillotson Pond.

Elevations for the property range from 1,344 feet at the lowest point of Lockwood Brook to 3,360 feet at the summit of Belvidere Mountain. Most of the property is moderately sloped, ranging from 5 to 20%. The upper reaches of the property, however, contain areas that are quite steep, and contain talus slopes. In fact, a landslide in 2012 exposed a new +/-2 acre area of bedrock just below the summit of Belvedere on the east facing slope.

A notable characteristic of this site is the prevalence of wetland features distributed throughout the property. There are numerous seeps from boundary to boundary, many brooks and rivulets, several wet meadows, a cluster of vernal pools, and the two upper elevation ponds. This abundance of wet areas is likely due to a hardpan layer in the soils, and the shallow to bedrock soils that exist throughout the site.

The property is entirely in the Lake Champlain watershed. The vast majority of the outflow is a complex of brooks that drain generally southeast into Lockwood Brook, a major feature of the property, which ultimately flows into the Missisquoi River and into Lake Champlain. The small portion of the property west and south of the summits flows into either the Lamoille River, or the Missisquoi. Of note are the two high elevation beaver ponds on the property, Lockwood Pond at 2,650 feet and Tillotson Pond at 2,640 feet.

There is an area mapped on the summit of Belvedere as a "Rare, Threatened or Endangered Species or Significant Natural Community" by the Vermont Fish and Wildlife Natural Heritage Program. This refers to the Bicknell's thrush (*Catharus bicknelli*), considered uncommon and of special concern in the state. The upper elevations are mapped as Class A (1) Ecological Waters. The map shows no deer wintering areas, and the only wetlands mapped are Tillotson Pond and Lockwood Pond.

| Table 2. Significant resources found on the property. | |
|--|---------------|
| Resource | Stand |
| 2.5 miles of LT | 5 |
| Forester's Trail | 5, 2 |
| Frank Post Trail | 1, 2, 4, 5 |
| Trailhead parking area | 1 |
| Tillotson camp (LT shelter) | 5 |
| Black bear habitat | 2 |
| Belvedere, Tillotson Peaks | 5 |
| Lockwood Brook | 1, 2, 4, 5, 7 |
| Lockwood Pond, Tillotson Pond wetland complexes | 5 |
| Bicknell's Thrush habitat | 5 |
| Smallflowered woodrush habitat | 5 |
| Serpentine outcrops | 5 |

RECREATIONAL RESOURCES

Approximately 2.5 miles of the LT is located on the property along the ridgeline mainly between Belvedere Mountain and Tillotson Peak. This section of the LT has largely been in its original location since construction.

Two designated Long Trail System side trails are located almost completely on the property – 1.6 miles of the Forester's Trail and the entire 2.0 mile Frank Post Trail. The Forester's Trail leads directly to the summit of Belvedere Mountain. The lower portion of this trail was relocated onto the Meltzer Tract in 1995. The Frank Post Trail leads to Tillotson Camp and the LT, approximately 2.8 miles north of the Belvedere Mountain summit. Both trails are accessed from the trailhead parking area on the property.

Tillotson Camp, one of only two structures on the property, is a LT shelter originally built by Red Tillotson in 1929. Red maintained Belvedere tower in 1927. The original Tillotson Camp was torn down in 1939 after it had succumbed to time and the elements. The current camp was designed and built by Roy Buchanan in 1939. GMC undertook an historic reconstruction of Tillitson Camp around 2009.

The Belvedere tower, originally constructed in for the purpose of monitoring fires, was rebuilt by the GMC. The tower affords excellent views of the surrounding area.

INVENTORY METHODS

The inventory for the property was coordinated by Harris Roen, with the extensive help of UVM student volunteer interns Alexandra Marcucci and Zachary Schaab, and Audubon Vermont Conservation Biologist Steve Hagenbuch. GMC Corridor Monitor Mark Hadley offered invaluable assistance in boundary delineation.

Sampling methods were a combination of plot samples and reconnaissance data gathering. Plots were collected in stands where forest management is more likely to occur, in Stands 1, 2, 3, 4 and 7. Reconnaissance analysis was used where tree volume data was not critical, in Stands 5 and 6.

Point sampling was used to measure trees using a 10 basal area factor prism. Data was gathered at each plot center to measure regeneration, herbaceous species, shrub layer, ground cover, aquatic features, geology, unique features, and wildlife signs. Particular attention was paid to measuring avian habitat by assessing the quality of mid and understory vegetation, and snag and cavity trees. Dead and down material and notable features were recorded along cruise lines. Data was gathered and analyzed using NED-2 software developed by the USDA Forest Service Northeast Experiment Station. The inventory was conducted in May and June of 2012.

BOUNDARY

All of the boundaries have found in the field, and are either flagged or painted. All corners have been cataloged on GPS, which were used to create the attached property map.

There are discrepancies along the west boundaries of the property when compared to town and county lines from other maps. The John A. Marsh survey dated 5/20/1970 (revised October 1973) shows this line running along the town line of Lowell and Eden, then Lowell and Montgomery (which is also the line between Orleans and Franklin Counties). When mapped, however, the boundary falls short of the town line by as much as 1,000 feet. It is most likely that the error is from USGS data and not the survey. No ownership of the property is recorded in any other town than Lowell.

III. MANAGEMENT GOALS AND OBJECTIVES

FOREST MANAGEMENT GUIDELINES

1. Primary Management Goals:

- a) Protection and enhancement of the recreational experience of users of the Long Trail System, in a manner consistent with the Long Trail Management Plan.
- b) Conservation, protection and enhancement of significant natural resources and natural communities, including the designation of late successional forest/mixed successional natural area reserve.

2. Secondary Management Goals

- a) Targeted timber harvesting compatible with the Primary Management Goals for the purpose of improving forest health and vigor, generating income for GMC operations and programs, and to contribute to the local forest based economy.
- b) Construction of additional recreational trails and opportunities consistent with the primary management goals.
- c) Enhancement of native wildlife habitat.

3. Other acceptable Forest Management Practices

- a) Maple sugar production.

The overall forest management goal is to utilize targeted harvesting for the purpose of growing high quality sawlogs on selected sites. Forest management objectives are to concentrate any logging activities on the best sites, where improvement cuts will be the most productive. Elsewhere, in areas of lower stem quality, light firewood and/or improvement cuts may be employed. Acceptable Management Practices will be followed in all timber management (VT Dept. For. Parks & Rec., 1987).

Any management activities should be carried out in a way that minimizes the impact to recreational uses of the property. The following management guidelines will be followed:

- a) A 1000-foot wide corridor centered on the Long Trail shall not be used for commercial timber production.
- b) Retention of visual and scenic vistas of unfragmented forest as seen from the Belvidere tower

- c) 200-foot no cut buffer zone on both sides of all hiking trails and the shelter, including outhouse and water source, except for trail management, safety, emergency or forest health purposes.
- d) 50-foot no-cut buffer zone on both sides of Lockwood Brook and any other perennial streams.
- e) 50-foot no-cut buffer zone around any other water bodies including ponds, wetlands, springs and seeps.
- f) Skidding logs is prohibited along hiking trails unless no other practicable alternative exists, and then only in winter after freeze-up.
- g) Skid trails should cross hiking trails in a perpendicular direction whenever possible, and the number of skid trails should be kept to a minimum.
- h) Completely remove tops and slash within 50 feet of hiking trails.
- i) Use existing woods road whenever possible in order to limit construction of new skid/haul roads.
- j) Herbicides or insecticides will be not be used except for emergency or safety reasons.
- k) Precautions to ensure public safety will be taken when landing and processing logs at the trailhead parking area. For example, processing should only occur on weekdays.

RECREATION MANAGEMENT GUIDELINES

The Long Trail System, including the LT, side trails and shelter, shall be managed in accordance with the Long Trail System Management Plan (March 2002). In keeping with the goals of continuing to offer high quality pedestrian recreation on the property, the following guidelines should be used:

- a) Keep the property open for pedestrian recreation including, hiking, snowshoeing, backcountry skiing, hunting, fishing, photography, etc.
- b) Prohibit motorized recreation and limit motorized access and use for management and emergency purposes only.
- c) Maintain and enhance the Long Trail System.
- d) Plow the road and trailhead parking area to accommodate the increasing winter use of the trails.
- e) Maintain the lookout tower on Belvedere Mountain.
- f) Maintain Tillotson Camp in its present location.
- g) No new trail construction above 2500 feet, except for relocations of the existing trails.
- h) Potential for a Nordic trail connecting the side trails along the boundary if Stand 2 and Stands 3/4.
- i) Construct a spur trail off Frank Post Trail to view cascades on Lockwood Brook.

IV. STAND DESCRIPTION & TREATMENT PLAN

CURRENT PROPERTY CONDITIONS

The land is delineated into seven stands or management units (see enclosed map) based on species composition, tree density, location, accessibility and other factors. The majority of the property is a Northern Hardwood community, with smaller areas of mixed wood in Stands 7 and 6, and some montane Spruce/Fir in the upper elevations. Stocking density in virtually all of the hardwoods is high, with almost all areas over 100 square feet of basal area.

The property has also been classified into two habitat units for the Forest Bird Habitat Assessment (See Appendix B). Unit 1 contains 1,519 acres of lower elevation hardwoods and mixed forest. Unit 2 includes 252 acres of high elevation montane spruce/fir forest.

Access

Recreational access to the property is excellent, with the Frank Post Trail and Forester's Trail leading to the Long Trail in the upper reaches of the property.

Equipment access for resource management is variable. Stand 1 and the lower elevations of Stand 2 have good access from a landing near the Frank Post trailhead at the end of Tillitson Road. A temporary logging bridge has been utilized to cross Lockwood Brook for recent timber sales with excellent results. There is an existing woods road network in most of Stands 2, 3 and 4, which has been utilized and augmented in order to gain access from the recent timber sales. While these roads afford good access to these stands, it is a long distance from the landing. Though many of the old skid roads are rutted, they are stabilized and show no imminent signs of erosion potential.

The upper elevation areas of Stand 4 and Stand 2 that are north of Lockwood Brook are best access from the abutting landowner landing at the end of Potter Road. Permission has been obtained for use of the landing and ROW from David McMath of M.D. Forestland Consulting, Hardwick. There are two options to access lower elevation of Stand 2 that are north of Lockwood Brook. The first is from the current landing near the trailhead, deploying a second temporary bridge to re-cross Lockwood Brook. The second is obtaining a ROW from the abutter to the north, following the boundary for about half a mile, then crossing back onto GMC property above the junction of the Frank Post Trail and Foresters Trail.

Lockwood Brook is very wide where Stand 7 abuts Tillotson Road, which is a significant barrier. Entry is better gained through permission of the abutting landowner in the western portion of the stand.

Much of the property, and some of the target harvest areas, are above 2,500 feet in elevation. These areas would require an Act 250 permit prior to logging activities. Because timber quality decreases in these upper elevation areas, and the ecology is more sensitive, no logging will take place above 2,400 feet.

Wildlife

The property has excellent wildlife potential due to its large size, proximity to significant tracts of uninterrupted forest, plentiful water resources, and diversity of tree species and size classes. It

is situated in an area adjacent to large, upper elevation forested tracts mixed with open agricultural lands in the basins, which creates a healthy diversity of habitat types.

The Forest Bird Habitat Assessment describes the property as having “extremely high forest bird conservation value” due to a significant amount of interior forest, and its proximity to large protected forest areas.

Forest structure

The stands inventoried had basal areas from 99 to 114 ft²/ac, with an area-weighted average around 95 ft²/ac. These are relatively high stocking levels, especially considering the consistency of well stocked areas throughout the property. As seen in Table 1, the vast majority of trees in stands inventoried are deciduous, with 92% of basal area in hardwood species. Sugar maples make up almost half the hardwoods.

Overall the property has good structural diversity, with a well established regeneration and midstory layer. This is especially true considering the high stocking levels in much of the property. This is likely due to increased light entering through the canopy due to crown openings created from the ice storm of 1998.

Some areas have decent quality stems, but most of the stands are lower quality hardwoods due to either highgrading practices in the past, ice storm damage, or both. Diameters and stem quality generally decrease as elevation increases.

| Table 3. Percent overall species composition for Stands 1, 2, 3, 4, 7. | | |
|---|------------------------------|-------------------------|
| Species | Percent of Basal Area | Relative Density |
| sugar maple | 44.2% | 34.0 |
| yellow birch | 23.0% | 17.1 |
| paper birch | 12.3% | 10.5 |
| American beech | 8.0% | 7.1 |
| balsam fir | 6.0% | 4.2 |
| red maple | 2.3% | 1.5 |
| red spruce | 1.3% | 0.6 |
| striped maple | 1.3% | 1.4 |
| eastern hemlock | 0.9% | 0.4 |
| white ash | 0.3% | 0.2 |
| American mountain ash | 0.1% | 0.1 |
| unidentified non-comm hardwood | 0.1% | 0.1 |
| quaking aspen | 0.1% | <0.1 |
| mountain maple | <0.1% | 0.1 |
| chokecherry | <0.1% | <0.1 |
| Total | 100.0 | 77.5 |

EXISTING STAND DESCRIPTION

Stand Number: 1

Acres: 71.9

Stand Cover Type: Northern hardwoods

Age Class Structure: UNEVEN

Site Class: II

Site Index or Soil Series: 56

Significant Wildlife Habitat or Special Places and Sensitive Sites Description: A cluster of vernal pools was found in the western part of the stand, from water that was dammed up behind large root masses as a result of blowdowns.

Wildlife: Stand 1 rates high for forest bird habitat. Moose scat is prevalent in the stand, as well as a moderate amount of deer and moose browse. A small amount of beech had bear signs in the southwestern part of the stand. There are also dirt cliffs associated with streambank cuts from Lockwood Brook. These cliffs could be potential nesting sites for kingfisher.

Stand History: This stand was last treated was 1996. An improvement cut was employed which increased the residual stand quality by removing lower quality stems and opening up the crown to allow growth to occur on the best quality, healthiest trees.

Stand Health: There is some blowdown in the stand, particularly in northeast section

Stand Description: This 72 acre stand comprises the eastern arm of the property. It is a northern hardwood stand dominated by sugar and red maple, which together comprise two thirds of the basal area. Associated species include American beech and yellow birch. The stand is bisected by Lockwood Brook, as well as several intermittent streams. The Frank Post Trail also bisects the stand near the northern boundary.

The entirety of this stand is a Northern Hardwood Forest natural community type. It is possible that areas of the stand are a Sugar Maple-White Ash-Jack-in the Pulpit Northern Hardwood Forest variant, particularly in the richer parts of the stands.

The species most common in the midstory are American beech and balsam fir, comprising over 60% of the sapling- and pole-sized trees.

The shrub layer is mainly deciduous, with an average of 33% cover.

Sampling Date: 6/1/2012

Number Points/Plots: 5

BAF/Plot Size: 10

Stems per acre: 334

Quadratic Mean Stand Diameter (inches): 7.7

Basal Area (ft²/acre):

Total: 101.7

Acceptable Growing Stock: 86.0

Unacceptable Growing Stock: 15.7

Stocking level: Mid B-A on Northern hardwood stocking guide Stocking Guide

Regeneration Data: Adequately stocked mix of hardwoods and softwoods in the sapling size class throughout. Species include hemlock, yellow birch sugar maple, striped maple, black cherry, beech, red maple and white ash.

DESIRED FUTURE STAND CONDITION

- Stand Goals:**
- a) Protection and management of the Long Trail System for pedestrian recreational use.
 - b) Timber management to improve stand health and quality for sustained production of high quality hardwoods, as consistent with recreation and bear management guidelines.

Long Range Silvicultural Objectives: Uneven-age Management

Treatment: Single Tree and Group Selection Harvest

Cutting Cycle: 20 years **Treatment Year:** 2017

Residual Basal Area: 70 **Species favored for retention and regeneration:** Sugar maple, yellow birch

Q Factor **Current Q:** 1.23 **Target Q:** 1.3

Diameter Distribution

| Diameter Range (2-inch D. classes) | Current Total Basal Area (ft ² /acre) | Current Acceptable Basal Area (ft ² /acre) | Target Total Residual Basal Area (ft ² /acre) |
|---------------------------------------|---|--|---|
| 6-10 inch | 22 | 12 | 21 |
| 12-14 inch | 48 | 42 | 20 |
| 16 inch plus | 26 | 24 | 29 |

Management Recommendations: Trees should be selected from a range of diameter classes with a bias toward removing 12-14 inch diameter trees where possible. The goal is to continue to move the stand into an uneven-aged composition.

Select one of two groups to create half acre (or smaller) openings. This will increase species diversity by encouraging early successional habitat formation.

Retain yellow birch across all size classes to encourage preferential forage for insect eating birds.

When entry does occur, special attention should be paid to protecting any bear beech by not cutting or damaging scarred trees, and opening up the crown from competition where possible.

Stand Cover Type: Northern hardwoods

Age Class Structure: UNEVEN

Site Class: II

Site Index or Soil Series: 53

Wildlife: Stand 2 rates medium to high for forest bird habitat. There are a large amount of moose signs, including scat, rubbings and antlers (of note was a knoll in the southeast portion of the stand, where slopes were steeper and large amounts of antler rubbing and moose scat were seen). Bear scarred beech are prevalent, particularly in the 10-18 inch size class. Several bear “nests” were found in the upper elevations of the stand, where the bear accumulate beech branches into one spot of the crown for feeding. There are a large amount of hardwood snags, averaging over 20 per acre, predominantly in the 6-18 inch size classes.

Stand History: This stand has been harvest historically, as evidenced by the extensive existing woods road system. More recently it has been treated during the winters from 2009 to present.

Stand Health: Many of the crowns have been damaged form the ice storm of 1999. This does not seem to have caused any mortality, but has reduced stem quality and tree vigor. There is a moderate amount of blowdown in the eastern part of the stand from a strong north wind.

Stand Description: Stand 2 makes up the bulk of the hardwoods on the property. It is a 696 acre northern hardwood stand comprising the mid section of the mountainside. The stand is bisected by many intermittent and perennial streams, the largest of which is Lockwood Brook, which bifricates upstream into several large tributaries. Some areas of Lockwood Brook have steep banks forming a deep ravine. Within some of these ravines are small though noteworthy waterfalls. There are also many seeps present in the stand.

The stand is characterized by its multi-layered, multi-aged structure, much of it having a dense seedling layer under abundant advanced saplings covered by a canopy. Most of the stand is considered to be a *Northern Hardwood Forest* natural community, though some areas may be a *Yellow Birch Northern Hardwood Forest* variant. Also, the northern part of Stand 2, blending into Stand 4, there are areas of *Rich Northern Hardwood* community. These areas are characterized by rich site indicator species and tall healthy trees.

Sugar maple makes up over half of basal area. Asssoicated species include yellow birch, American beech red maple and striped maple, with a small component of spruce, fir, hemlock, white ash and basswood. Stem quality has improved since the last inventory due to the removal of many of the lower quality stems during recent harvests. Currently 70% of basal are is in acceptable growing stock, as compared to about 50% in 2003.



Figure 3. Bear “nest” and snag

Sampling Method: Point Sampling

Sampling Date: 6/1/2012 **Number Points/Plots:** 52 **BAF/Plot Size:** 10

Stems per acre: 212 **Quadratic Mean Stand Diameter (inches):** 7.5

Basal Area (ft²/acre):

Total: 105.5 **Acceptable Growing Stock:** 72.9 **Unacceptable Growing Stock:** 32.6

Stocking level: Mid B-A on Northern hardwood stocking guide Stocking Guide

Regeneration Data: Regeneration species include sugar maple, American beech, red maple, yellow birch, paper birch, and patches of red spruce and balsam fir. Much of the regeneration is in the advanced stage. Many areas of the stand are thick to beech saplings. Parts of the stand have hobble bush, mountain ash and/or have a moderate incidence of striped maple.

DESIRED FUTURE STAND CONDITION

Stand Goals: a) Bear habitat conservation.

b) High quality pedestrian recreation experiences along the Frank Post and Forester's Trail.

c) Targeted timber management to improve stand health and quality.

Long Range Silvicultural Objectives: Uneven-age Management

Treatment: Single Tree and Group Selection Harvest

Cutting Cycle: 20 years **Treatment Year:** 2017

Residual Basal Area: 70 **Species favored for retention and regeneration:** Sugar maple, yellow birch

Q Factor **Current Q:** 1.31 **Target Q:** 1.3

Diameter Distribution

| Diameter Range (2-inch D. classes) | Current Total Basal Area (ft ² /acre) | Current Acceptable Basal Area (ft ² /acre) | Target Total Residual Basal Area (ft ² /acre) |
|---------------------------------------|---|--|---|
| 6-10 inch | 24 | 17 | 21 |
| 12-14 inch | 32 | 24 | 20 |
| 16 inch plus | 33 | 22 | 29 |

Management Recommendations: Continue management in Stand 2, focusing on areas north of Lockwood Brook. Trees should be selected more or less evenly through diameter classes to have a similar size distribution after harvest as occurred before. This will preserve the q value at desirable levels, and continue to maintain the stand into an uneven-aged composition.

Select several groups to create half acre (or smaller) openings. This will increase species diversity by encouraging early successional habitat formation. Openings in total should not exceed 1% of the area of the stand.

Retain yellow birch across all size classes to encourage preferential forage for insect eating birds.

When entry does occur, special attention should be paid to protecting any bear beech by not cutting or damaging scarred trees, and opening up the crown from competition where possible.

Stand Cover Type: Northern hardwoods

Age Class Structure: EVEN

Site Class: II

Site Index or Soil Series: 47

Wildlife: Stand 3 rates high for forest bird habitat. Heavy moose browse exists some areas of thick hobble bush. A grouse nest was found.

Stand History: The stand seems to have been highgraded several times, so overall stem quality is low. Areas of the stand below 2,400 feet in elevation were thinned in the winters of 2011/12 and 2012/13.

Stand Health: There is a prevalence of crown damage from the 1999 ice storm.

Stand Description: Stand 3 is a well stocked birch stand that forms a transition between the mid slope and upper elevations of the southern part of the property. It is around 2,300-2,600 feet in elevation, and has variable slopes ranging from 0 to 40%. There are several intermittent and perennial streams traversing the stand. The central part of the stand has a concentration of wet seeps. This stand is considered a *Montane Yellow Birch-Red Spruce* natural community type. Southern areas of the stand afford excellent views to the north and east into Canada.

Yellow birch and paper birch make up around half of the basal area and relative density. Due to the higher elevation, diameters are smaller than Stand 1 and 2, with over half the basal area in trees between 8 and 14 inches.

The canopy is fairly open, with about 60 percent overall canopy closure. A deciduous shrub layer is well established, covering over 80% of the stand.

Sampling Method: Point Sampling

Sampling Date: 6/1/2012

Number Points/Plots: 20

BAF/Plot Size: 10

Stems per acre: 205

Quadratic Mean Stand Diameter (inches): 6.0

Basal Area (ft²/acre):

Total: 101.0

Acceptable Growing Stock: 69.0

Unacceptable Growing Stock: 32.0

Stocking level: Mid B-A on Northern hardwood stocking guide Stocking Guide

Regeneration Data: Regeneration is good to excellent due to the high amounts of light reaching the forest floor. Many areas are blanketed with thick sugar maple seedlings. Other regeneration includes yellow birch, red maple and balsam fir. In some areas thick mats of hobble bush are inhibiting the establishment of timber seedlings.

DESIRED FUTURE STAND CONDITION

Stand Goals: a) Protection of upper elevation areas to allow for natural succession stages to occur.
b) Timber management in areas below 2,400 feet

Long Range Silvicultural Objectives: Uneven-age Management

Treatment: Single Tree and Group Selection Harvest

Cutting Cycle: 20 years **Treatment Year:** 2023

Management Recommendations: No management is recommend for this plan cycle, in order to allow the stand to fill in as a result of recent harvests.

Stand Cover Type: Northern hardwoods and rich northern hardwoods

Age Class Structure: EVEN

Site Class: I

Site Index or Soil Series: 62

Wildlife: Stand 4 rates medium to high for forest bird habitat. A small amount of bear scarring was noted. Heavy moose browse is common, particularly in the center of the southern portion of the stand.

Stand History: The northeast part of Stand 4 was thinned in 1995. Otherwise, the stand has been historically harvested, the last entry being more than 40 years ago.

Stand Health: Much of the stand has ice storm damage, but otherwise no undue health issues are evident.

Stand Description: Stand 4 lies in the mid to upper elevations of the north-central part of the property. It is primarily a maple stand, which makes up almost three quarters of the basal area. Yellow birch is an associated species, with smaller amounts of beech, paper birch, spruce, fir, mountain ash and mountain maple. The stand is a *Northern Hardwood Forest* natural community, with pockets of *Rich Northern Hardwood Forest* in the northeast part of the stand. These rich sites occur at the base of a steep slope, where nutrients have been able to accumulate over the millennia. Lockwood Brook flows through the center of the stand, and many seeps are distributed along the slope. The Frank Post trail also bisects the stand.

The stand is at about 2,400 feet in elevation, and has moderate to steep terrain, 10% - 30% slopes. Less than half of the trees are acceptable growing stock, indicating an overall low stem quality in the stand.

Sampling Method: Point Sampling

Sampling Date: 6/1/2012

Number Points/Plots: 21

BAF/Plot Size: 10

Stems per acre: 228

Quadratic Mean Stand Diameter (inches): 4.3

Basal Area (ft²/acre):

Total: 99.0

Acceptable Growing Stock: 41.4

Unacceptable Growing Stock: 57.6

Stocking level: Mid B-A on Northern hardwood stocking guide Stocking Guide

Regeneration Data: Hardwood regeneration is well distributed, with some areas having small amounts of red spruce regeneration. Regeneration species include thick areas of sugar maple, white ash, yellow birch, red maple and American beech.

DESIRED FUTURE STAND CONDITION

- Stand Goals:** a) Timber management to improve stand health and quality for sustained production of high quality hardwoods, as consistent with recreation guidelines in the northeast section of the stand (NE of the Frank Post Trail).
 b) Protection and management of the Long Trail System for dispersed pedestrian recreational use.

Treatment: Single Tree and Group Selection Harvest

Cutting Cycle: 20 years **Treatment Year:** 2017

Residual Basal Area: 65 **Species favored for retention and regeneration:** Sugar maple, yellow birch

Q Factor **Current Q:** 1.29 **Target Q:** 1.3

Diameter Distribution

| Diameter Range (2-inch D. classes) | Current Total Basal Area (ft ² /acre) | Current Acceptable Basal Area (ft ² /acre) | Target Total Residual Basal Area (ft ² /acre) |
|---------------------------------------|---|--|---|
| 6-10 inch | 19 | 6 | 20 |
| 12-14 inch | 28 | 11 | 19 |
| 16 inch plus | 21 | 8 | 27 |

Management Recommendations: Trees should be favored in the 12-14” size class for removal. This will preserve the q value at desirable levels, and continue to move the stand into an uneven-aged composition.

Create 4 or 5 small group openings to create half acre (or smaller) openings. This will increase species diversity by encouraging early successional habitat formation. Openings in total should not exceed 1% of the area of the stand.

Retain yellow birch across all size classes to encourage preferential forage for insect eating birds.

Stand Cover Type: Mixedwood

Age Class Structure: EVEN

Site Class: III

Site Index or Soil Series: 40

Significant Wildlife Habitat or Special Places and Sensitive Sites Description: The entire length of the LT that passes through the property is in Stand 5. There are two structures significant to this section of the LT, an overnight shelter just below Lockwood Pond, and a lookout tower on the top of Belvedere Mountain.

Two upper elevation open water/wetland complexes are within Stand 5 at around 2,650 feet. Lockwood Pond and Tillotson Pond form the headwaters of Lockwood Brook and the Burgess Branch. These ponds have been enhanced by beaver activity, unusual in Vermont at this high an elevation.

This area has sporadic occurrences of ultramafic, serpentine outcrops. These outcrops are present just south of Tillotson Pond, and to the south and east of Belvedere summit. In areas off the property to the north near Hazens Notch, these outcrops have been known to maintain populations of rare plants.

There are two rare and uncommon plants in Stand 5 found during the 2003 inventory. Smallflowered woodrush (*Luzula parviflora*) is rated S2S3 by the State of Vermont. This is considered rare to uncommon, generally 20 to 80 occurrences believed to be extant and/or some factor or factors making it vulnerable to extirpation.

The second plant is Wild millet (*Milium effusum*), located just below the property corner in the east-central part of the stand. It is rated S3S4 by the State of Vermont, considered relatively uncommon plant with specific habitat of higher elevation seepage or rich woods.



Figure 4. Tillotson Pond

On the summit of Belvedere Mountain there is a population of Bicknell's thrush (*Catharus bicknelli*). They have a state rank of S2B, meaning they are rare and have breeding status. They are also considered "Special Concern", which means their status should be watched. They have a global rank of G4, meaning they are apparently secure globally, though perhaps locally rare.

Stand Health: There is a moderate amount of spruce/fir dieback. This is not uncommon in upper elevation montane spruce/fir stand in Vermont, and is likely the result of acid precipitation.

Stand Description: Stand 5 comprises 662 acres of the upper elevations of the property. The unique ecology of this area includes slow growing alpine forests, talus slopes, elevated wetland communities, and upland ponds. Areas of Stand 5 have ancient talus slopes made up of large boulders. The areas below 2,500 feet are a *Northern Hardwood Talus Woodland* natural community, while the high elevations sites are *Boreal Talus Woodland*.

In addition to Lockwood Pond and Tillotson Pond, there is a +/- 3 acre wet meadow just east of Tillotson Peak, enhanced as a result of beaver activity. Herbaceous species associated with the opening are sensitive fern, blue jointgrass, white bog-orchid (*Platanthera dilatata*), pink lady's slipper (*Cypripedium acaule*), false hellebore, asters, sedges, white turtlehead (*Chelone glabra*) and joe pyeweed (*Eupatorium maculatum*).

Sampling Method: Reconnaissance inventory

Sampling Date: June 2012

DESIRED FUTURE STAND CONDITION

Stand Goals:

- a) Protection and management of the Long Trail System for pedestrian recreational use.
- b) Forest reserve area.
- c) Protection of rare species and important wildlife habitat.

Management Recommendations: Monitor populations of smallflowered woodrush along LT to ensure their continued survival. They tend to grow on the disturbed, steep areas which often means right in the middle of the trail, where they can be easily trampled. Re-routing the trail may be considered in areas where the plant is being excessively walked over.

Monitor and prevent ATV use so as to limit trail degradation, and preserve a high quality backcountry experience, particularly on Belvedere summit. Specific attentions should be paid to Bicknell's thrush breeding habitat.

Commercial treatment of this stand is not possible due to the fragility of alpine ecosystems in the area, access constraints, low quality timber, and recreation priorities.

Stand Cover Type: Montain spruce/fir

Age Class Structure: EVEN

Site Class: III

Stand History: The stand was heavily cut around 1980 leaving predominantly low quality trees.

Stand Health: Much of the stand has ice storm damage, but otherwise no undue health issues are evident.

Stand Description: This is an even-aged mixedwood stand in the northeast part of the property at around 2,300 feet elevation. Primary tree species are paper birch, yellow birch, red maple red spruce and balsam fir. This stand is fairly wet, there are many seeps and intermittent streams. The natural community for the site is *Montane Yellow Birch - Red Spruce forest*.

This stand is geographically cut off from the bulk of the property since there is a steep elevation drop and ravine crossing from adjacent areas of Stand 5 to the south. The stand is bisected by two brooks that eventually flow off the property into a wetland complex that drains into the Burgess Branch and into the Missisquoi River.

This is primarily a pole sized stand, with a mean stand diameter around 11 inches. Understory species are mostly mixed hardwoods with a predominance of yellow birch. There are also areas of red spruce regeneration mixed in.

There are no recreational trails that go through this stand. The stand is, however, within the viewshed of many parts of the LT.

Sampling Method: Reconnaissance inventory

Sampling Date: June 2012

DESIRED FUTURE STAND CONDITION

Stand Goals: Forest reserve area.

Management Recommendations: No active management needed at this time. Monitor site for off-road vehicle usage.

Stand Cover Type: Hemlock hardwood

Age Class Structure: EVEN

Site Class: II

Site Index or Soil Series: 56

Wildlife: Stand 7 rates medium for forest bird habitat. Moose scat and browse are present in the stand.

Stand History: This area was likely pasture that reverted to forest over 100 years ago.

Stand Health: No undue health impacts found.

Stand Description: Located in the lower elevations of the eastern most part of the property, this area is a *Hemlock-Northern Hardwood* natural community. Areas in the southern and eastern part of the stand have poorly drained to inundated soils.

The stand features several +/- quarter acre grassy openings in the forest. Herbaceous species in these small openings contain sun loving plants as well as wet indicator species, include sensitive fern, sedges (*Carex sp.*), horsetail, false hellebore, interrupted fern (*Osmunda claytoniana*), ostrich fern (*Matteuccia struthiopteris*) and jewelweed (*Impatiens capensis*). Soils in this area are rich and dark.

Lockwood Brook runs through this area between the stand and Tillotson Road. It takes on a more bottomland stream structure with wide reaches and gravel deposits.

Hemlock makes up about a third of the basal area. Principle associated species are yellow birch, sugar maple and white ash. There are smaller amounts of balsam fir, red maple, red spruce, eastern hophornbeam, ironwood, gray birch, American basswood, American beech, paper birch, American elm and quaking aspen.

There is an old dump site containing cars, bottles, etc. in the eastern part of the stand.

Sampling Method: Point Sampling

Sampling Date: 6/1/2012

Number Points/Plots: 5

BAF/Plot Size: 10

Stems per acre: 270

Quadratic Mean Stand Diameter (inches): 8.83

Basal Area (ft²/acre):

Total: 114.0

Acceptable Growing Stock: 80.0

Unacceptable Growing Stock: 34.0

Stocking level: B on Hemlock hardwood stocking guide Stocking Guide

Regeneration Data: Variable, from understocked to adequate, mostly in the sapling size class. Some areas have sparse regeneration due to thick crown cover or inundated soils. Species include eastern hemlock, sugar maple, yellow birch, striped maple, white ash and American beech. There are also spruce and fir seedlings scattered throughout the stand.

DESIRED FUTURE STAND CONDITION

- Stand Goals:**
- a) Timber management to improve stand health and quality, for sustained production of high quality softwoods and hardwoods.
 - b) Clean-up of old dump areas.

Long Range Silvicultural Objectives: Even-age Management

Present Stand Age: 80

Rotation Age: 20

PLANNED TREATMENTS

Treatment Year: 2016

Treatment: Intermediate thinning

Cutting Cycle: 20 years **Treatment Year:** 2017

Residual Basal Area: 90

Species favored for retention and regeneration: Eastern hemlock, yellow birch, spruce and fir.

V. MANAGEMENT SCHEDULE

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

| Treatment Year | Stand # | Management Activity | Silvicultural Guide or Tech. Reference, Prescription # or Letter, if appropriate |
|-----------------------|----------------|-------------------------------------|---|
| 2015 | 2 | Individual tree and group selection | RP NE-603; Perc. D |
| 2015 | 3 | Individual tree and group selection | RP NE-603; Perc. D |
| 2015 | 4 | Individual tree and group selection | RP NE-603; Perc. D |
| 2016 | 7 | Intermediate thinning | |
| 2017 | 1 | Individual tree and group selection | RP NE-603; Perc. D |

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