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**MARSH-BILLINGS NATIONAL HISTORICAL PARK
FOREST MANAGEMENT & ECOLOGICAL INVENTORY REPORT**

Prepared for National Park Service

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The 555 acre parcel known as Marsh-Billings National Historical Park is located in Woodstock, Vermont on a tract of land locally referred to as Mount Tom. The elevation in The Park ranges from approximately 700 to 1450 feet above sea level. Average rainfall amounts to approximately 40 inches per year which is evenly spaced throughout. Snow generally covers the ground from mid-December through March. Average summer temperatures are 70° F. with highs reaching into the 90's. Typical frost free period is from late May to mid-September. Sub-zero temperatures are common in winter with most winters experiencing extremes of -20° F. or below.

Vegetation. The natural cover on Mount Tom is the Northern Hardwood Forest type; it being a component of the Eastern Deciduous Forest. Due to human activity, Mount Tom displays a broad diversity in vegetation. While there is some old growth on Mount Tom, most of the woodlands represent successional stages of regeneration from earlier agricultural activity, typical of most of Vermont's woodlands. However there are trees and small stands that remain from the original forest and there are fields still in agriculture. While much of the forested acreage represents natural regeneration, added diversity and interest is created by the numerous plantations scattered throughout. Some of these plantations are Vermont's earliest and remain from the early planting efforts of Frederick Billings. There are several small swamps and a small mountain lake known as "The Pogue." There is a rich herbaceous understory with some rare and endangered species.

Much of the uniqueness of Mount Tom is a result of and is evident in its long history of forest management. In part, this is what the Park is to commemorate. Early efforts at land conservation and scientific forest management began with Frederick Billings in 1880 when some of the first plantations were set out on the mountain. Some of his plantings involved tree stock of European origin and in such represent early experiments with exotic

species. Reports of plantings of European mountain ash and European birch, both of which are no longer present, represent plantings that were not successful. Certain mixed plantings were also tried, some with more success than others. However, it must be remembered that early trial and error techniques represent ground breaking experiments in any discipline. What was experimental in Billings' day, has developed in part by his example into the accepted scientific discipline of today. Some plantings remain today on Mount Tom as wonderful old forest stands that bear testimony to this early vision.

Planting of forest stands continued until the 1950's by which time some of the earlier plantations were benefitting from commercial thinning. Meanwhile, natural stands seeded in elsewhere. Today these stands form the background on which the tapestry of the fields and plantations are interspersed. Thinnings of both natural stands and plantations began side-by-side in the early 1970's and continue to this day.

The forests on Mount Tom are part of the National Tree Farm system, a program which recognizes and publicizes sound forest management. The National Park property is the first property in Vermont so recognized as a Tree Farm, the certification having originally been issued to a former owner, Billings Farm, Inc. The Tree Farm system is monitored by the American Forestry Foundation from Washington, D.C., The Vermont chapter is overseen by the Vermont Woodland Owners Association. The Mount Tom property had also been enrolled in the State of Vermont's Current use Assessment program.

Current management practices on Mount Tom have served the multiple uses of providing for both private and public education, recreation, and enjoyment; for wildlife and watershed values; and for the harvest of forest and agricultural products. There has been no compelling reason to harvest trees at economic maturity as would be more typical in an industrial forest. The forest has, however, been put "to work", has yielded repeated harvests, yet the earnings by harvest have not been maximized at the expense of other benefits. Atypical as well of many National Park properties, the natural vegetation here represents a cultural forest and not merely a preserve where natural systems are allowed to proceed largely undirected.

Visitors to Mount Tom are struck favorably with its managed natural beauty. Sound forest management coincides with aesthetic appeal. If visitors are to be told the local and national story of conservation, they have to first like what they see. Education on what they see can influence these aesthetic perceptions as well.

On Mount Tom, the long history of land management has served to create a pleasing landscape. There are conscious management practices that have contributed to this. The private ownership goals of the Billings and Rockefeller families have allowed for the creation of this landscape which can only assist in telling the conservation story in the Marsh-Billings National Historical Park. In the future, as in the the past, the management of the visual resource need best be viewed as a critical function and not merely as an incidental consideration of any silvicultural activity. It is the pleasing appearance of this forested property that is its biggest resource.

AESTHETIC CONSIDERATIONS

Most all forests are viewed upon as pleasing, but certainly some are more so. While unmanaged natural stands can be the most pleasing, such consensus is usually reserved for old growth, which is rare in The East. Properly managed younger stands are viewed as more attractive than would be those left unmanaged. However, care in management is critical. Caring woodland management under most silvicultural prescriptions would result in a landscape that the consensus would judge as pleasing, therefore right and desirable.

It is easier to come to a consensus on what is not liked, and in the treatment of our forested landscapes this displeasure most often results from a lack of care, sensitivity and follow through, from waste, or from a lack of action that would seem to be worth taking. Most all recognize the environmental degradation and eyesores that result from sloppy forestry practice. However, beyond lack of such discordant elements the components of what make up a pleasing woodland are harder to qualify. They can result from mere chance or purposeful action.

Favorable comments about the vegetated landscape on Mount Tom result from a long history of caring for a property that has inherent natural beauty. Mount Tom's diversity of land forms, while lacking certain features and ruggedness of our more spectacular national treasures, is still notable through some significant virtues. The variety in its slopes, ravines and rock outcrops adds interest, as do several swamps, a mountain lake and stream. Upon this is built a more notable diversity in vegetation. As an ecological precept, diversity adds stability to any natural community. It also lends aesthetic appeal, as long as there are no unpleasant surprises. Diversity should also make some logical sense.

In the management of a forest, diversity can be achieved through the manipulation of several variables on which discussion will follow. Diversity can be achieved within a given stand or by considering the entire forest as a whole. In plantations, it is notable that uniformity has its own appeal.

The forest stands on Mount Tom are connected by a trail system that crosses several ownerships; some public, some private and some part of the former Billings Estate that have been given over to a town park. Some significant features in the overall diversity of Mount Tom are on this trail system off NPS property and in the town park, and while stand prescriptions will not cover these areas, it is important to note their presence and their interconnectedness to NPS lands. Cooperation between adjacent owners is logical and should be easily achieved.

Diversity in the vegetation has been achieved by the following practices:

Maintenance of woods and open areas. Fields, lakes and the open vistas they provide tend to break up a potential monotony of constant woodlands. The NPS property has open terrain in the lake (Stand #47), the pasture (#48), and the fields (#49 and #50). Vistas and the proximity to Billings Farm offer contrasting open areas, as do pastures on the adjacent Vermont Land Trust property whose continued openness is assured by conditions in a deed. The edges of fields should be crisp.

A mix of Plantations and Natural Stands. Both are pleasing and a mix only heightens it. Most of the property is covered by a natural forest which adds heightened interest to each plantation. Plantations in themselves bear reference to purposeful management consistent with conservation themes, especially those first espoused by Marsh and Billings. The oldest plantations on Mount Tom were planted in Billings' lifetime under his direction making them some of the earliest examples of forest management in the vicinity. They should be nurtured into old age. Creating new plantations in the future should be considered, but not at the expense of planting out open areas. Plantations are present as shown on the map in plot numbers 1, 2, 3, 4, 12, 13, 15, 16, 17, 18, 22, 25, 26, 27 28, 35, 40, 41, 42, 43, 44, 45 and 46. Most plantations on the property are comprised of single species of evergreens. While uniformity in a natural stand is not often viewed positively, it is expected and accepted in a plantation. Plantations of mixed species, when they work, are especially appealing. Most plantations, especially young ones, display the geometric spacing of the original planting scheme which, while row like and unnatural, is not perceived by most to be offensive.

In the presence of a seed source, thinnings within a plantation tend to let enough light in so to encourage hardwood regeneration in the understory. Such understory is often perceived as weeds which would advise against heavy infrequent thinnings in favor of more frequent light ones. Thinnings should be heavy enough however, so not to contribute to stagnation of the overstory plantation. Weeding out of the weed understory may be advisable as would a removal of seed source of these trees. Understory regeneration of evergreens is visually more appealing. Yet be it evergreen or deciduous, the understory may be thinned to encourage future crop trees and an uneven age mix.

Plantations were often set out amongst old pasture trees which remain as monarchs within the newer stand. These add interest as islands within the stand but tend to be a source of weed tree seeds. We have consciously left these older monarch trees.

A mixture of cultural treatments. Whether stands are plantations or natural, there is a mix of cultural treatments that serve specific functions and which add a diversity to the landscape. The schedules and degree of thinnings, prunings and harvest present a range of husbandry from the subtle to the intense.

The general thinning prescription on Mount Tom, whether pre-commercial or commercial, has been on the single tree selection format, although row thinnings in younger plantations and salvage cuts have been performed. Small clear-cuts may be adviseable as would seed tree cuts at some future time. While thinnings have been conducted for a variety of purposes including aesthetics, they are generally performed to improve the vigor of the residual stand and to harvest products.

Prunings have also been conducted, and while this presents a technique to produce clear lumber, here our reasons have largely been aesthetic. Prunings have mostly been conducted in the evergreens that do not self-prune, and at that have largely been done along trailsides and vistas.

Girdling young stands and thinning from below and weeding out sapling stands to release final crop trees have also been conducted. Girdling has been confined to a few back areas away from public view, and understory thinning has largely been conducted along the trail edge in stands where views under the canopy want to be enhanced. Herbicide treatments have not been used, even though it may be more effective in limiting suckering of unwanted understory hardwoods.

A byproduct of all this activity is slash. We have a general policy of removing slash near the roadside, and often this is done by chipping it and either removing it or blowing it back into the woods. On occasion it is piled. Often as is standard cultural practice it is merely lopped low to hasten its decay. Slash along the road is less noticeable if thinning occurs when leaves are off the trees.

Displeasing forest scenes most often are the result of careless cultural practices. High slash, leaning or hung up trees, scars on trunks or the ground, high or ragged stumps, careless pruning, uprooted trees, wasted products, or half finished work all tend to detract more than anything else in a forest landscape. The chance to view tidy forestry activity and the stockpiling of forest products for future use tend to add interest.

A mix of evergreens and hardwoods. The natural forest type of hemlock and hardwood and successional white pine offer a pleasing mix and evergreen plantations only add to it. Especially in winter, scattered evergreens within hardwoods stand out, as do of course the pure stands of evergreens. In addition, the symmetry of individual evergreens adds interest as compared to hardwoods. The difference of textures, colors, light and understory as influenced by the two plant types adds an appealing diversity as well.

Species mix. Regardless of leaf or needle character stands that are made of mixes add interest; although, if pure stands are the exception or create a unique character they should be encouraged. Besides aesthetic concerns, various species have different functions within the forest or as products which relate to additional management choices.

Distribution of Ages. Old growth stands and large trees have heightened appeal. While none of the stands on Mount Tom have the stature as do some of the sacred groves of national significance, they are old still and have been managed longer than most.

On Mount Tom some old trees from the original pre-white contact era are still found, and some hemlocks and large oaks are 300 to 400 years old. Old trees should not be cut, old stands that have been left uncut might remain uncut, and some old managed stands might be nurtured well beyond economic maturity to old age and stand senescence. The question whether accessible dying or dead trees in old growth should be removed for useable product or not should be answered.

The majority of stands are from 80 to 110 years of age, with plantations ranging from 41 to 113 years of age. Some natural stands are little beyond the sapling stage now getting thinned for the first time.

With a general prescription of growing trees on long rotations, much of the forest will take on the look of old age. While this is appealing, the forest will become less diverse and appear less managed because of it. The forest will eventually benefit from rejuvenation in some areas, although even immediate rejuvenation by setting out new plantations would in the long run pay off. While some attempt has been made to identify such areas, the decision may well be made for us as a result of a devastating hurricane or other natural catastrophe that tends to occur on the average of once per century.

Variety of Understory. The understory is made up of tree regeneration, herbaceous plants and the forest litter and ground itself. The length of view into the understory is a variable that can be managed. An overly dense understory thicket that hampers the view or ease of travel limits appeal. A dense and low woody understory also tends to choke out the herbaceous layer that forms a ground cover. A ground cover can offer as much variety in plants, spacing and texture as does the overstory itself, and through flowering and fruiting, offers additional splashes of color. The density of some stands such as old growth hemlock and other evergreens with a high basal area or young age often preclude any ground cover. An open understory whose ground is covered only by needles presents a pleasant variety worthy of maintenance. Ground cover in the fields is of further value for its summer flowers. Rare flora in the herbaceous layer should not be jeopardized by cultural activities that endanger these plants. Endangered species include the following:

<u>Species</u>	<u>Comments</u>
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Moonwort	Historic location rediscovered around 1980 in stand #31 near grassey summit.
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✓ Male Fern	Species found in flora exhibition stand #43.
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✓ Goldie's Fern	Found in several locations including stands 24, 32, 36 and 43.
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Narrow Leaved Glade Fern	Found in stand 32 and 36, transplanted to stand 43.
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✓ Autumn Coral-root	Once found in stand 39 approximately 1980.
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Fish and Wildlife. Fish and wildlife are always appreciated as are other ephemeral features such as running water, flowers and autumn foliage. There is nothing highly unique about wildlife populations on Mount Tom. Some activities in woodland management have encouraged certain wildlife while some have limited it. Hunting and fishing have been allowed.

Some stands have been managed for their food and cover value to wildlife. Maintenance of plant diversity and evergreen cover, the release of food trees, the timing of thinnings, and the retention of den trees and old stands contribute to wildlife values.

In addition to the smaller squirrels, moles, rodents and shrews Mount Tom has the following mammal residents: white tailed deer, red fox, fischer, skunk, mink, longtailed weasel, raccoon, snowshoe hare and porcupine. In addition, black bear, moose, coyote, grey fox, bobcat, beaver and muskrat have been seen from time to time. Only beaver have been discouraged.

Bird life is not overly visible. Upland game birds include wild turkey, ruffed grouse and woodcock. Some waterfowl use the Pogue, and other large birds include hawks, owls, ravens and pileated woodpeckers.

Fisheries are limited to The Pogue with a resident population of horned pout, yellow perch and large mouthed bass, the latter introduced in 1974. Some shiners have recently been introduced as food fish for the bass.

Not in park according to Kyle Jones

Meleagris gallopavo
Bombyx mori
Dipodomys deserti
Dryocopus pileatus

What about
hawks, owls,
ravens?

ACCESS

One of the key features of the Mount Tom woodlands are the access roads and trails throughout it. They provide access for land management activities and provide a route for visitors to enjoy the property. The trail system extends beyond the National Park boundaries and utilizes ten other ownerships. This cooperative arrangement has proceeded through the years with a minimum of conflict to the mutual benefit of various owners. Three of the owners in addition to the NPS are public or quasi-public agencies, one is a private corporation (The Woodstock Resort Corporation), and the rest are private landowners. Permission to use the lands held by private individuals has been for cross country skiing use by the Woodstock Resort Corporation.

The major routes throughout the property are the carriage roads constructed during the lifetime of Frederick Billings. They provide the main access for maintenance vehicles onto the property and support even large logging trucks. The carriage road system extends onto the Town of Woodstock's Billings Park property at the summit and on River Street. All comprise part of the mapped cross country trail system used by the Woodstock Resort Corporation. These ski trails are shown on the forest stand map and are easement right-of-ways held by the Woodstock Resort Corporation.

In addition to the carriage roads there are other cross country ski trails that were constructed over the past 15 years. Many can be driven on by four wheel drive maintenance vehicles. These are not considered as through routes for vehicles and are driven on only for occasional management of the adjacent areas. As with the major carriage roads, hikers use these trails as well, but to a much lesser extent. Mountain bikers, though uninvited, use all trails and seem to make some of their own.

There is also a network of skid roads and narrower hiking trails. Skid roads do not form part of a recreational trail system and are used only to haul logs from the forest. The hiking trails either exist as short trails around the Mansion that have been used by the Rockefeller family, or as trails that loop off Billings park property onto that owned by the NPS. There are a few old trails once used, now barely visible, which are maintained on an occasional basis.

Maintenance on the carriage roads requires annual grading in certain areas, annual ditch and culvert cleaning, and annual clearing of vegetation that encroaches into the trail. Additional gravel is brought to the site on occasion and waterbars are renewed numerous times a summer. Maintenance vehicle use is kept to a minimum during "mud season" and heavy downpours require immediate response to be sure the ditches, waterbars and culverts continue to function. Culverts are replaced from time to time and there is an effort to hide any evidence of metal culverts. Many of the old stone culverts have collapsed and have been replaced.

Maintenance on the other cross country ski trails requires an annual cutting back of brush and review of drainage and bridges. On occasion trails have been leveled by grading or by the spreading of wood chips. Hiking trails have been checked annually for brush removal and fallen trees and branches. Skid roads are removed with a brush hog approximately every third year. Ski trails are marked in winter and the signs have been removed each spring. Hiking trails have been marked in the town park. Maps are available for both of these uses.

FOREST HEALTH

While the forests on Mount Tom are in relatively good health, many species have been damaged from time to time by certain insects and diseases. In addition, site factors such as drought or wetness, late frosts, cold open winters and acid rain cause decline as well. Severe storms with either strong winds or ice build-up also cause damage. Fire, while always a threat, is infrequent and more easily controlled here than in drier parts of the country. Currently there is dieback in several species which is believed to be caused by several years of summer drought, as well as by snowless winters that lack the insulation to help ward off damage from cold. The more notable or prevalent disease and insect problems are listed on the following pages:

<u>Insect or Disease</u>	<u>Tree Species</u>	<u>Comments</u>
Dutch Elm Disease	American Elm ✓ <i>Ulmus americana</i>	Dutch Elm Disease has killed most elm on Mount Tom with most trees dieing in the 1960's to 1980's.
Beech Bark Disease	American Beech ✓ <i>Fagus grandifolia</i>	Some areas have experienced moderate to heavy mortality while the disease is almost absent in other areas.
Ash Yellows and Ash Dieback	White Ash ✓ <i>Fraxinus americana</i>	Dieback and mortality has been seen in ash, especially those that grow more with a southern exposure. Vermont is currently plotting ash dieback which seems to be a problem in 1993. A monitoring program by the State that focuses on ash dieback has a plot on the property.
Armellaria mellea	Various hardwoods & softwoods	Also known as shoestring root rot, scattered trees have died due to it
Melanconis juglandis	Butternut ✓ <i>Juglans cinerea</i>	Branch dieback and eventual mortaility is a common problem in butternut throughout the region.
White Pine Blister Rust	White Pine ✓ <i>Pinus strobus</i>	Mortality in scattered trees is present but does not represent a threat to overall delcine through-out the forest.
Red Rot (Fomes pini)	White Pine	In some stands there is a signifi- cant presence which effects timber value and makes the tree more susceptable to wind damage. Red rot may become more of a problem as stands age.
Chestnut Blight	American Chestnut ✓ <i>Castanea dentata</i>	The chestnut blight has killed most trees in the region. On Mount Tom several individuals continue to survive as shrubs by root suckering.
Various Cankers	Sugar Maple, Birches and Aspens	Cankers are present in numerous species and their presence in these species causes moderate levels of mortality.

<u>Insect or Disease</u>	<u>Tree Species</u>	<u>Comments</u>
White Pine Weevil	White Pine and Norway Spruce ✓ Picea abies	Young white pine grown in full sun are certain to get weeviled. Though not the preferred host, Norway spruce is susceptible as well.
Pear Thrips	Sugar Maple and Beech	In 1990 weather conditions in spring were such that a severe outbreak of pear thrips caused extensive foliage damage which has been limited in the following years.
Maple Leaf Cutter	Sugar Maple Acer saccharum	Damage in late summer causes little stress to the tree but impacts the intensity of the colors in foliage season.
Birch Leaf Miner	White Birch Betula papyrifera	Damage increases through summer as many birch leaves are progressively skeletonized on some trees.

STAND NO. 1

*Larix
decidua*

NUMBER OF ACRES: 6

SPECIES:

✓ European larch with high understory of red oak, white ash, sugar maple.

AGE:

Larch planted in 1887. Hardwood species seeded in on own at later date.

SIZE:

Mean stand diameter of larch 12" to 14" with largest being 32". Basal area of larch at 140. Mean stand diameter of hardwoods at 6" with basal area at 60.

FOREST HEALTH:

Little mortality in larch. Natural mortality in subdominant hardwood due to shading in understory.

MANAGEMENT PRACTICES:

Goal here is to maintain dominance of larch stand planted in Frederick Billings' lifetime. Importance of stand recognized also in that this is only larch stand on property and one of a relative advanced age. The uniqueness of this stand adds diversity to overall property.

Larch was harvested for sawlogs in 1985 and since then there have been several light cuttings of understory hardwoods for firewood.

Larch thinned in 1912 and not again until 1985, therefore they grew with little taper. Since thinning done in 1985 crowns have reclosed but little as twig ends tend to break off as spindly trees blow in the wind. As long as this continues and crowns remain open it is recommended that additional cutting of larch be delayed until crowns close, and then only a light thinning is recommended. If understory hardwoods begin to overtop the larches it may be advisable to thin them so to favor larch. Meanwhile light thinning of hardwoods should continued.

VISTA MANAGEMENT:

There are no vistas outward from the larch stand. However, within the stand the understory is very open allowing good views below the canopy. This should be maintained. Any thinning should be light enough so as not to allow too much sunlight to reach the forest floor. Trail through larches takes on totally different character as it enters adjacent stand (#2) which adds heightened interest to those visiting area.

UNIQUE FEATURES/COMMENTS:

1. The species itself, it being a deciduous needleleaf tree.
2. Light green foliage, golden needles at end of foliage season.
3. Open forest floor in distinct contrast to adjacent Stand #2.
4. Understory hardwoods with oaks of good form.
5. Slash remains as a negative element - the result of a contract logging operation that was unsatisfactory
6. Winding trail part of X-C ski network. Hiking trail that connects to Rose Hill, a public road off property.

STAND NO: 2

NUMBER OF ACRES: 12

SPECIES: White pine, European ash with pine being dominant species. Norway Spruce and mixed hardwood in understory.

AGE: European Ash planted in 1887. White pine planted amongst ash in 1910-11.

SIZE: Mean stand diameter of white pine is 20" with basal area of 110 to 130. Larger pine reach 36". European ash have diameter of 12" with a basal area (combined with other hardwoods) of 30 to 50.

FOREST HEALTH:

I understand that the European ash never did well from the start, that is perhaps why the pine were planted at a later date. Currently the ash are experiencing moderate mortality and, too, this species of ash is a more crooked and less desired tree than our native white ash. The pine are relatively free of pine weevil damage, but do succumb to blister rust from time to time. The pine also have red rot, especially in some of the more slower growing trees.

MANAGEMENT PRACTICES:

White pine harvested in mid-1980's with second light thinning in 1992. Several cord of ash and other hardwood have been removed for firewood nearly every year.

Goal here is to maintain the white pine stand as well as a scattering of the better formed European ash. The pine thinning has encouraged a vigorous hardwood understory and has also opened up more light for Norway spruce already present in the understory. The understory Norway spruce are favored by removing competition from understory hardwoods as well as the excess overstocking of spruce.

Future action should wait until crowns close on the white pine prior to any further thinning of them. Declining European ash should continue to be harvested.

VISTA MANAGEMENT:

There are no vistas out from the stand. However, it would be desirable to manage the understory regeneration so to maintain a depth of view from the trail within the stand. Understory spruces that are favored should allow room for views between individuals or patches of trees. A mix of evergreen and deciduous trees are also desirable to be maintained.

UNIQUE FEATURES/COMMENTS:

1. European ash as a unique experimental species from Billings era.
2. Old, large, open white pine.
3. Norway spruce in understory in sharpe contrast to adjacent stand.
4. Winding trail crosses through stand.
5. Dense understory hardwood on north side of stand restricts view.

STAND NO: 3

NUMBER OF ACRES: 3

SPECIES: Norway Spruce

AGE: Planted in 1887

SIZE: Mean stand diameter 20" with largest specimen at 48". Linear stand, therefore no basal area measurement. Small area of spruce regeneration adjacent to Stand No. 4 with diameter of 6".

FOREST HEALTH:

Trees remain healthy and are vigorous producers of cones.

MANAGEMENT PRACTICES:

These are either trees planted with a wide spacing, or trees forming a canopy and planted in rows over a lane. Little thinning has been performed in recent years. Trees were pruned in area near Stand No. 2 in 1992 and area of spruce regeneration was thinned near Stand No. 4 in 1993.

Goal in this stand is to allow trees to remain without thinning as long as they remain healthy. Individual trees would be salvaged should they die or become overly senescent. Area of spruce regeneration should be thinned lightly every ten years.

VISTA MANAGEMENT:

Two vistas should be maintained from the edge of the stand where they overlook the field with short views to the west and longer views to the south. Maintenance of these vistas will be a matter of mowing and occasional branch and sapling removal. Other management would entail cleanup of any dying spruce along the trail which these trees border.

UNIQUE FEATURES/COMMENTS:

1. Large and old planted trees with pruned stems, reddish bark, pendulous branching.
2. Dark lane with no understory due to darkness. Lane accesses French homesite. Very attractive feature.
3. Open roadside woods along main carriage roads.
4. Several open grown large specimen trees, with largest perhaps being Vermont's largest. Old record from landscaped grounds also on this property.
5. Stone wall along spruce lane with narrow hiking path behind it.
6. Slash allowed to remain in younger regeneration area, otherwise it has been removed.

STAND NO: 4

NUMBER OF ACRES: 14

SPECIES: Red Pine

*Pinus
resinosa*

AGE: Planted in 1952

SIZE: Mean stand diameter 10" to 12". Basal area at 150.

FOREST HEALTH:

Trees are healthy

MANAGEMENT PRACTICES:

Goal here is to grow pine on long rotations and to keep crown closed through frequent light thinnings which will help to keep understory open. Large scattered sugar maple remain in stand from earlier time when site was a pasture with scattered shade trees. While these trees are a source of understory seedlings, keeping to light thinnings in pine should serve to keep this regeneration down.

Previously thinned in 1984 and 1992, a light thinning can be conducted every five years. White pine that invaded stand at time of planting have been weeded out by girdling or cutting. Young hardwoods of same age have been removed.

VISTA MANAGEMENT:

A vista south to Mount Ascutney and west to the larch plantation (Stand No. 1) is maintained by annual mowing and by less frequent cutting back of trees beyond the mowing area.

Long views within the stand over the carpet of pine needles add a pleasant and cool feel within this stand. Maintaining dense shade and minimizing seed sources should perpetuate this openness below the canopy.

UNIQUE FEATURES/COMMENTS:

1. Young plantation with row by row appearance.
2. Long views underneath stand and large sections of stand with needle carpet and no ground cover.
3. Large sugar maple in stand remains as remnant of former pasture.
4. Large hemlock specimen in stand.
5. Two looping ski trails through stand with open vista to south. Hiking trail that connects to Stand No. 3.
6. Stone wall along edge of field.

STAND NO: 5

NUMBER OF ACRES: 8

SPECIES:

Sugar maple and other hardwoods

AGE:

Old field succession that has seeded in gradually since 1950's.

SIZE:

Range of young sapling sizes. Some regeneration is very dense and some areas are still in field.

FOREST HEALTH:

Healthy and typical early succession stage of stand development.

MANAGEMENT PRACTICES:

Steep slopes. No management recommended until trees become pole sized. Other option would be to plant red pine in most open areas where there is the least regeneration. This would be first plantation set out in 40 years and would be valuable for this reason alone. Stand would need to be weeded of hardwoods periodically.

VISTA MANAGEMENT:

Vista from edge of Stand No. 4 utilizes overlook over steep slopes.

UNIQUE FEATURES/COMMENTS:

1. Easiest option to begin small plantation.
2. Hiking trail that connects onto Stand No. 3 and No. 4.
3. Steep slopes.

STAND NO: 6

NUMBER OF ACRES: 4

SPECIES:

White pine and miscellaneous hardwoods.

AGE:

Natural stand seeded in in 1940's.

SIZE:

12" to 14"

FOREST HEALTH:

Pines are badly deformed by white pine weevil.

MANAGEMENT PRACTICES:

First thinned in 1993 to remove trees of poorest form without overly opening up stand. Goal is to let pines and scattered hardwoods mature, regardless of form. However, branches have also been pruned to open view into stand. Slash has been left to decompose. No further activity should be required for next twenty years.

VISTA MANAGEMENT:

None needed. 1993 thinning has opened up view into previous dense woodlands.

UNIQUE FEATURES/COMMENTS:

1. Excessive weeviling distorting most pine trees.
2. Several large sugar maples along trail.
3. Sinuous cross country ski trail with long views under canopy. Trail exits property to continue on that owned by Vermont Land Trust.
4. Heavy slash over entire floor of stand.

STAND NO: 7

NUMBER OF ACRES: 1

SPECIES:

Hemlock

Tsuga canadensis

AGE:

80 Years

SIZE:

Mean stand diameter 12" to 14". No basal area measurement due to linear nature of stand.

FOREST HEALTH:

Overstocked.

MANAGEMENT PRACTICES:

This stand grew up along the fence line that constitutes the property boundary. No management is advised, although hemlock could serve as source of lumber.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Dark, dense, overstocked stand.
2. Cross Country Ski Trail along stand exits property onto Vermont Land Trust property.

STAND NO: 8

NUMBER OF ACRES: 13

SPECIES:

White pine, mixed hardwoods

AGE:

Natural stands seeded in in 1940's.

SIZE:

Mean stand diameter 6" to 8".. Basal area 140-180.

FOREST HEALTH:

Pines are badly weeviled by white pine weevil. Overstocked.
Stand beginning to stagnate.

MANAGEMENT PRACTICES:

Retain pine and hardwood mix. Cut or girdle poorly formed pine and subdominants favoring straight pine, sugar maple and white ash. Perform initial thinning in mid 1990's, repeating at ten year intervals.

Other option would be to allow this to remain unmanaged, in which case stagnation would serve as example in comparison to managed stands elsewhere. This is one of few remaining areas in need of management where none has been done.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Back, out of view area.
2. Suitable site for exhibit noting lack of management.

STAND NO: 9

NUMBER OF ACRES: 4

SPECIES:

Sugar maple and other hardwoods.

AGE:

Old field succession beginning in 1940's and 1950's.

SIZE:

Sapling to small pole timber

FOREST HEALTH:

Overstocked

MANAGEMENT PRACTICES:

Goal to grow hardwoods of good form. Thin removing 60%-70% of stems from subdominants in 1990's and thin at ten year intervals with precommercial cuts.

VISTA MANAGEMENT:

Maintain vista to south and to Mount Ascutney by clipping back regeneration every several years.

UNIQUE FEATURES/COMMENTS:

1. Vista to south from cross country ski trail that exits property onto private land.

STAND NO: 10

NUMBER OF ACRES: 8

SPECIES:

Sugar maple, white ash, ironwood.

AGE:

Old field succession from 1940's and 1950's.

SIZE:

Pole sized timber 4"-8". Several large sugar maple that were previous pasture shade trees.

FOREST HEALTH:

Trees in relatively good health.

MANAGEMENT PRACTICES:

Goal is to grow saw timber similar to Stand No. 9. Here, however, stand has undergone first thinning in early 1990's. Repeat every 8-10 years with precommercial cuts. Slash to remain visible from trail.

VISTA MANAGEMENT:

As much of stand is visible from trail, thinnings should be lopped low to ground.

UNIQUE FEATURES/COMMENTS:

1. Several large old pasture trees.
2. Dense pole sized regeneration recently thinned for first time.
3. Current thick slash layer.
4. Moderately steep slopes.

STAND NO: 11

NUMBER OF ACRES: 3

SPECIES:

Ironwood and sugar maple

AGE:

Maples are from 1890's or before, ironwood from 1940's.

SIZE:

Mean diameter of ironwood is 6", sugar maple is 24"

FOREST HEALTH:

Trees are in relatively good health

MANAGEMENT PRACTICES:

Leave alone to perpetuate current open feeling under canopy

VISTA MANAGEMENT:

Open woods view under canopy and to rock outcrops in adjacent stand to north should be maintained.

UNIQUE FEATURES/COMMENTS:

1. Open understory under many ironwood
2. View to rock formation in adjacent Stand No. 30
3. Cross country ski trail exits property from stand

STAND NO: 12

NUMBER OF ACRES: 2

SPECIES:

Malus
pumila
Apple, white pine, mixed hardwoods.

AGE:

Apple remains from orchard from 1890's and earlier.
Pine and hardwood from 1940's to present.

SIZE:

Apples are large standard sized trees of various old varieties.

FOREST HEALTH:

Dieback in apple, pine are malformed by weevil damage.

MANAGEMENT PRACTICES:

Goal is to maintain apples and pine mix for wildlife value.
Apples are released from competition every five to eight years.
Thicket away from apples can remain dense with value as wildlife cover.

VISTA MANAGEMENT:

Small vista to south should be maintained.

UNIQUE FEATURES/COMMENTS:

1. Old apple orchard thinned for wildlife value for ruffed grouse and deer.

STAND NO: 13

NUMBER OF ACRES: 3

SPECIES:

Norway spruce

AGE:

Planted in 1950

SIZE:

Mean stand diameter 10"-12". Basal area at 160.

FOREST HEALTH:

White pine weevil damage has occurred in stand.

MANAGEMENT PRACTICES:

Goal is to grow spruce on long rotations and to prune lower branches for open view under stand. Stand thinned in 1978, 1987 and 1993, and pruned in the late 1980's. Black locust weeded from stand at same time.

Light commercial cut should occur prior to year 2010 and should repeat on several ten and fifteen year intervals.

VISTA MANAGEMENT:

Maintain view under stand by removing lower dead branches. Thinnings should leave tops low to the ground to help hasten decay, otherwise it is apt to be slow.

UNIQUE FEATURES/COMMENTS:

1. Dark, dense stand recently thinned and pruned. No ground cover in stand.
2. Open view through stand above heavy slash layer and below canopy.
3. Cross country ski trail through stand.

STAND NO: 14

SPECIES: *Robina pseudacacia* *Prunus serotina*
Black locust, black cherry, white ash, white birch,
aspen and sugar maple

AGE:
1920

SIZE:
Mean stand diameter 10" - 12", basal area 110

FOREST HEALTH:

Armellaria mellea has killed several trees.

MANAGEMENT PRACTICES:

Goal is to maintain hardwood stand of unique mix by back entrance to property. Allow large trees with open crowns to mature. Thin dense understory of sugar maple every 5-10 years. Previous thinnings of locust and other hardwoods conducted in 1970's and 1980's

VISTA MANAGEMENT:

Allow views up into open locust and cherry crowns as seen from trail

UNIQUE FEATURES/COMMENTS:

1. Species mix, especially black locust overstory with lacy leaves and black cherry with dark bark.
2. Old foundations from former McKenzie farm.

STAND NO: 15

NUMBER OF ACRES: 3

SPECIES:
White pine

AGE:
1930's

SIZE:
Mean stand diameter 10"-12". Basal area 120.

FOREST HEALTH:
Moderate weevil damage.

MANAGEMENT PRACTICES:

Goal is to grow straight white pine. Previously thinned in mid 1980's, also pruned at that time. Next thinning in mid 1990's to remove final pines of poor form. Thinning in future to remain light to limit excess white ash regeneration in understory. Retain dense understory along public road to serve as a screen.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Cross country ski trail to parking lot.

STAND NO: 16

NUMBER OF ACRES: 2

SPECIES:

Scots pine, sugar maple in understory.

AGE:

Planted 1917.

SIZE:

Mean stand diameter 10"-12", largest up to 22".
Basal area 120

FOREST HEALTH:

Some individuals uncharacteristically of good form for
scots pine.

MANAGEMENT PRACTICES:

Goal is to grow large straight pine. Stand was thinned in
mid 1980's. Understory to be thinned when it attains pole
size.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Straight trees, uncommon of most in Northeast.
2. Parking lot.

STAND NO: 17

NUMBER OF ACRES: 23

SPECIES:

Red pine

AGE:

Planted 1917

SIZE:

Mean stand diameter 14". Basal area 130.

FOREST HEALTH:

Some trees dying in wet areas near parking lot.

MANAGEMENT PRACTICES:

Goal is to grow large red pine on long rotations. Past thinning each decade since the 1950's. Future light thinnings should keep crowns dense to help limit under canopy growth. Currently dense under canopy of white pine and sugar maple.

Favor white pine for next rotation.

VISTA MANAGEMENT:

Roadside white pine regeneration is thinned every few years to maintain view (and improve vigor of white pine) into stand.

UNIQUE FEATURES/COMMENTS:

1. General appeal of distinct tall and straight pines.
2. Roadside white pine understory.

STAND NO: 18

NUMBER OF ACRES: 14

SPECIES:

White pine with vigorous white pine understory.

AGE:

1905

SIZE:

Mean stand diameter 20"-22". Basal area 130.

FOREST HEALTH:

White pine blister rust kills trees on occasion.
No weevil damage.

MANAGEMENT PRACTICES:

Goal is to grow tall straight pine on long rotations. Past thinnings were conducted every decade since 1950's. Crowns should be allowed to close prior to next thinning. Understory white pine to become next rotation.

VISTA MANAGEMENT:

Dense white pine understory is thinned along roadside every few years.

UNIQUE FEATURES/COMMENTS:

1. Open stand with heavy white pine understory.
2. Cross country ski trail loops within stand and onto adjacent private property.

STAND NO: 19

NUMBER OF ACRES: 4

SPECIES:

Sugar maple, mixed hardwoods

AGE:

Natural stand from around 1900.

SIZE:

Mean stand diameter 12" to 14". Basal area 80 to 100.

FOREST HEALTH:

Stand in good condition

MANAGEMENT PRACTICES:

Goal is to grow clear hardwood sawtimber on long rotations. Last cut around 1980 using aerial logging method. No cutting needed for several decades.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Site of aerial logging experiment with U. S. Forest Service

STAND NO: 20

NUMBER OF ACRES: 4

SPECIES:

Mixed hardwoods

AGE:

Natural stands from around 1900

SIZE:

Mean stand diameter 10" to 12"
Basal area 120 to 130

FOREST HEALTH:

Stand is in good health

MANAGEMENT PRACTICES:

Goal is to grow sawlogs on long rotations.
Much of area is easily accessible to carriage roads.
Past cutting has favored white ash and sugar maple.
Future work over next few decades will consist mainly of single tree selection, removing subdominant trees yet being careful not to open canopy too much which would encourage excessive understory regeneration.

VISTA MANAGEMENT:

Vista from carriage road views north up the Route 12 valley toward Barnard. Understory views to be maintained by slash removal along roadways.

UNIQUE FEATURES/COMMENTS:

1. Vista

STAND NO: 21

NUMBER OF ACRES: 32

SPECIES:

Hemlock and mixed hardwoods

AGE:

Various ages with trees from late 1800's along brook and north border to 1920's in southern and eastern sections of stand.

SIZE:

Mean stand diameter 12" to 14" in older part of stand
Basal area up to 160

FOREST HEALTH:

Beech bark scale caused mortality in beeches. Wet areas of poor drainage has caused additional dieback.

MANAGEMENT PRACTICES:

Goal is to grow sawlogs on long rotations.
Low priority area due to more difficult access.
Previous light harvest conducted in mid 1970's.
Precommercial thinning to release crop trees from overstocked areas recommended in late 1990's, being careful to lop slash low near trails.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Out of view area
2. Headwaters of small brook

STAND NO: 22

NUMBER OF ACRES: 3

SPECIES:

Scots Pine

AGE:

Plantation set out in early 1930's

SIZE:

Mean stand diameter 12" to 14"
Basal area 120 to 130

FOREST HEALTH:

Trees are of relatively good form

MANAGEMENT PRACTICES:

Goal is to grow sawlogs on long rotations.
Previously thinned in the early 1980's and no activity is
scheduled in near future.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Straight trees compared to many others of species grown in region.
2. Cross country ski trail exits property from this stand.

STAND NO: 23

NUMBER OF ACRES: 1

SPECIES:

Big Tooth Aspen

Populus grandidentata

AGE:

Natural stand from approximately 1930

SIZE:

Mean stand diameter 14"

Basal area 120-140

FOREST HEALTH:

Stem cankers typical of mature aspen are in most trees.

Stand should decline rapidly in near future.

MANAGEMENT PRACTICES:

No activity is scheduled. Trees will decline and be replaced by more shade tolerant species. In the meantime this far corner of the property is of interest only for its species diversity, although few but skiers will pass by this stand.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Big tooth aspen is an uncommon local species.

STAND NO: 24

NUMBER OF ACRES: 30

SPECIES:

Sugar maple, white ash, mixed hardwoods

AGE:

Mixed ages from 1920 and older

SIZE:

Mean stand diameter 12" to 14"
Basal area 130 to 140

FOREST HEALTH:

Most elms died in last 15 years due to Dutch elm disease.
Several beech have died from beech bark disease.

MANAGEMENT PRACTICES:

Goal is to grow sawlogs on long rotations and to maintain open view into woods from carriage road. Thinnings in 1970's and 1980's were based on single tree selection to remove subdominant or cull trees. Trees will continue to be lightly thinned every few years, being careful not to open up light excessively onto forest floor

VISTA MANAGEMENT:

Two vistas overlooking the valley along Route 12 should be maintained by cutting every five years. General thinning of stand should allow view through woods from carriage road to edge of property or to adjacent and nearby ridge.

UNIQUE FEATURES/COMMENTS:

1. Vistas
2. Ridgetop carriage road that runs through stand
3. Some uncommon ferns (see Stand No. 32)

STAND NO: 25

NUMBER OF ACRES: 2

SPECIES:

Mix of red pine, Scots pine and white pine plantings with scattered naturally regenerated hardwoods. Norway spruce in understory.

AGE:

1917

SIZE:

Mean stand diameter 10" to 12"
Basal area 120-140

FOREST HEALTH:

Trees are in good condition

MANAGEMENT PRACTICES:

Goal is to continue softwood mix with hardwoods also present in overstory. Light thinning in 1990's will release dense understory where also additional understory thinning will be conducted to favor Norway spruce.

VISTA MANAGEMENT:

Under canopy view into stand should be maintained in conjunction with stands No. 26 and No. 27.

UNIQUE FEATURES/COMMENTS:

1. Mixed species plantation

STAND NO: 26

NUMBER OF ACRES: 4

SPECIES:

Red Pine

AGE:

Planted in 1917

SIZE:

Mean stand diameter 14"
Basal area 120

FOREST HEALTH:

Stand is in healthy condition

MANAGEMENT PRACTICES:

Goal is to grow poles and sawlogs on long rotations. Stand thinned once during each of past four decades with post, pole and sawlog harvest. Thinning has encouraged regeneration of white pine, Norway spruce and miscellaneous hardwoods. Understory thinning has been conducted every few years to minimize hardwood regeneration and favor a spacing of white pine, Norway spruce and hemlock seedlings throughout understory. Light thinning of red pine recommended approximately year 2005-2010.

VISTA MANAGEMENT:

Understory view into stand from roads is very attractive and should be maintained allowing only a scattered understory to develop. This requires understory thinning every few years so as to maintain this view. Overstory pines should be allowed to close canopies and future thinnings should be light carrying red pine stand at least to age 140.

UNIQUE FEATURES/COMMENTS:

1. Open woodland of tall straight trees.
2. Areas of understory with pleasantly appearing scattered evergreen understory.
3. Carriage road through stand.

STAND NO: 27

NUMBER OF ACRES: 3

SPECIES:

Evergreen and hardwood mix. White pine and Norway spruce planted in 1896 with hemlock and hardwoods of same age also in stand. Understory spruce and hardwoods also in stand.

AGE:

Planted in 1896. Natural stand of all ages down to sapling size.

SIZE:

Plantation trees with mean stand diameter of 22", otherwise naturally regenerated trees of all sizes.

FOREST HEALTH:

Armellaria mellea present in stand has killed some trees.

MANAGEMENT PRACTICES:

Goal is to allow pine and spruce to attain large size and to allow a continued mix of hardwood and softwood species in a range of age classes. Past work included light thinning in 1970's and again in 1980's, as well as pruning of lower branches and understory thinning conducted every five years. Scheduled treatment calls for frequent light thinnings every five years and pruning of lower dead branches on evergreens. Understory regeneration will be thinned to favor spruce and hemlock.

VISTA MANAGEMENT:

Under canopy view through woodland is important to maintain. Thinnings and prunings should be repeated and slash should be removed where close to trails. Small circle of carriage road that is not part of easement should be maintained as trail.

UNIQUE FEATURES/COMMENTS:

1. Evergreen mixed plantation with self seeded hemlock and hardwoods. Evergreens all pruned to 16 feet.
2. Open understory.
3. Carriage road loop (not shown on map). Loop was former vista to Pogue.

STAND NO: 28

NUMBER OF ACRES: 2

SPECIES:

Norway spruce

AGE:

Plantation set out in 1913

SIZE:

Mean stand diameter 12" to 14"
Basal area 130-140

FOREST HEALTH:

Some armellaria mellea evident in stand

MANAGEMENT PRACTICES:

Goal is to grow spruce on long rotations. Past activity has included a thinning in 1974 and 1962. In addition, trees have been pruned up 16 feet and understory has been thinned once of excess ash tree regeneration. Future thinning will be light so to maintain crown closure and limit excessive regeneration. It is recommended that understory regeneration continue to be thinned as well.

VISTA MANAGEMENT:

The understory vista through the stand and out onto the Pogue should be maintained through understory thinning every three years. Thinning will also need be conducted in Stand No. 29 as appropriate so to maintain this vista.

UNIQUE FEATURES/COMMENTS:

1. Vista through stand to Pogue

STAND NO: 29

NUMBER OF ACRES: 4

SPECIES:

Hemlock and mixed hardwoods

AGE:

Natural stand from approximately 1890 with some older trees.

SIZE:

Mean stand diameter 12"

FOREST HEALTH:

Some lakeside trees are experiencing dieback due to minor water level changes experienced because of dam repairs on lake.

MANAGEMENT PRACTICES:

Management here has a goal of maintaining a clean lakeside edge and trailside view to it from adjacent trail. Past activity has removed hazard trees from near trail and has thinned out vistas across lake. This activity should continue and light annual activity is recommended. No woody vegetation should be allowed to grow on earthen dam.

VISTA MANAGEMENT:

The four vistas shown across lake should be maintained by removing trees and individual branches that grow into view. Open views across the water on east side of lake shall be maintained open by maintaining view under branches or by removing most regeneration located between the roadway and lake.

UNIQUE FEATURES/COMMENTS:

1. Lakeside location with vistas across lake
2. Trail around lake
3. Earthen dam

STAND NO: 30

NUMBER OF ACRES: 16

SPECIES:

Mixed hardwoods

AGE:

Mixed ages with some areas of old growth in more inaccessible areas.

SIZE:

Mean stand diameter 10" to 12"
Basal area 120-140

FOREST HEALTH:

Steep slopes and areas of shallow soils make access difficult and leaves stand vulnerable to soil slumping and wind damage

MANAGEMENT PRACTICES:

Goal is to allow stand to age with little intervention due to access difficulties and erosion potential. Trees that have blown over and are visible from the trails should be cut low to ground and removed where possible.

VISTA MANAGEMENT:

High vista overlooking the Pogue needs to be maintained every ten years.

UNIQUE FEATURES/COMMENTS:

1. Steep slopes limiting logging activity
2. Vista over Pogue. Elevation 1450' (highest on property)
3. Reported historic location of Miss Billings Fern
(form of maidenhair fern)

STAND NO: 31

NUMBER OF ACRES: 15

SPECIES:

Hemlock and mixed hardwood

AGE:

While there are some older trees, many areas of the stand got their start late in the last century.

SIZE:

Mean stand diameter 12" to 14"
Basal area 120 to 160

FOREST HEALTH:

Some dieback in white ash

MANAGEMENT PRACTICES:

Goal is to perpetuate a hemlock and hardwood mix favoring white ash, sugar maple and butternut among the hardwoods. Understory and other subdominant trees have been thinned over the past fifteen years. Due to access and longer skids in tree removal, little work has been done in upper portions of this stand. It is recommended that some back areas have additional cull trees cut and left in place where uneconomical to remove them.

VISTA MANAGEMENT:

Vistas from summit over Pogue should be maintained (see Stand #30)

UNIQUE FEATURES/COMMENTS:

1. Moonwort, threatened fern species located near ridge.
2. Possible Celtic standing stone located on ridge.
3. Ski trail to summit

STAND NO: 32

NUMBER OF ACRES: 3

SPECIES:
Mixed hardwoods

AGE:
Over 100 years

SIZE:
Mean stand diameter 12" to 14" with some trees to 36"
Basal area 120

FOREST HEALTH:
Dutch elm disease has killed most elms that were a significant component in stand.

MANAGEMENT PRACTICES:
Upland cove with rich soils. Goal is to disturb site but little except to remove some dying trees near carriage road. Rare ferns form ground cover that should not be disturbed (narrow-leaved glade fern and Goldie's fern)

VISTA MANAGEMENT:
Maintain open view from carriage road down into this hollow.

UNIQUE FEATURES/COMMENTS:
1. Rich upland cove forest
2. Understory with rare or uncommon ferns (narrow-leaved glade fern, Goldie's Fern, Braun's Holly fern)

STAND NO: 33

NUMBER OF ACRES: 13

SPECIES:

Beech, birch, sugar maple, with some old growth hemlock

AGE:

Stand naturally seeded from late 1800's

SIZE:

Mean stand diameter 14" to 16" with some trees to 40". Basal area 120 to 140

FOREST HEALTH:

Beech scale disease present in many beeches

MANAGEMENT PRACTICES:

Goal is to grow sawlogs on long rotations and to favor other species rather than beech. Past activity has involved harvest of beech and other cull trees. Single tree selection should remain as harvest system with the removal of cull trees every few years.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Several large, old growth hemlocks along carriage trail.
2. It may be advisable to conduct a salvage cut amongst the beech trees.

STAND NO: 34

NUMBER OF ACRES: 30

SPECIES:

Hemlock, mixed hardwood

AGE:

These are natural stands from the late 1800's

SIZE:

Mean stand diameter 12" to 14"
Basal area 120 to 140

FOREST HEALTH:

Beech scale, some decline in white ash.

MANAGEMENT PRACTICES:

The goal here is to maintain a deciduous and evergreen mix and to grow large trees on long rotations. Cosmetic activity involving light single tree harvests, evergreen pruning and slash removal should continue.

VISTA MANAGEMENT:

The views in this stand from the carriage roads are varied as they open up onto brooks, swampland, lake and pasture. These understory views should be maintained with understory thinning and prudent removal of overstory so as not to encourage excess regrowth in the understory.

UNIQUE FEATURES/COMMENTS:

1. Small brook
2. Horse watering troughs
3. Several large, old growth hemlocks along trail

STAND NO: 35

NUMBER OF ACRES: 5

SPECIES:

White pine

AGE:

Planted 1911

SIZE:

Mean stand diameter 18" to 20"
Basal area 80-100

FOREST HEALTH:

Red rot is found in many trees. Trees susceptible to blister rust.

MANAGEMENT PRACTICES:

Goal is to grow pines on long rotations. Previously harvested in 1975 and 1983. Red rot in stand may lend stand susceptible to wind damage and salvage cut may be required. Otherwise no thinning necessary until crowns close. Understory is of sugar maple and hemlock with areas of dense fern. Thinning in understory recommended just to open up crop trees that will become next generation on site.

VISTA MANAGEMENT:

Understory thinning in vicinity of trail should allow continued view down ravine to brook.

UNIQUE FEATURES/COMMENTS:

1. Dense fern understory in parts of stand

STAND NO: 36

NUMBER OF ACRES: 2

SPECIES:

Swamps with red maple, hemlock, brown ash

AGE:

All ages

SIZE:

Sapling to 12"

FOREST HEALTH:

Wet soils cause site difficulties for tree species.

MANAGEMENT PRACTICES:

Do not cut with the exception of removing some blowdowns that present tangled appearance.

VISTA MANAGEMENT:

These swamplands are open with only moderate tree density. View into swamp best maintained by managing vegetation in adjacent areas.

UNIQUE FEATURES/COMMENTS:

1. Swampy ground with diverse flora in understory

STAND NO: 37

NUMBER OF ACRES: 7

SPECIES:

Hemlock and northern hardwood

AGE:

100 years plus

SIZE:

Mean stand diameter 14" to 16"
Basal area 140-160

FOREST HEALTH:

Occassional blowdowns of old trees. Extreme age produces additional mortality.

MANAGEMENT PRACTICES:

This stand is on steep slopes and on the uplands adjacent to the Billings Park owned by the Town of Woodstock. The town park bears a character of old growth with hemlock and hardwood and this offers a key component in the overall diversity of Mt. Tom. The town has assumed a no harvest management scheme in this section with the exception of removing hazard trees from the trailsides. It is recommended that cutting be so limited in this stand as well.

VISTA MANAGEMENT:

The old and open woods with rock outcrops is maintaining itself as an attractive woodland with long views under the canopy. No work is needed to assist at this maintenance in an old growth woodland.

UNIQUE FEATURES/COMMENTS:

1. Steep or rocky slopes
2. Large trees with old growth open appearance of woodlands
3. Hiking trails connecting to those in Billings Park

STAND NO: 38

NUMBER OF ACRES: 9

SPECIES:

Hemlock

AGE:

Age 100 plus

SIZE:

Mean stand diameter 10" to 12"
Basal area 160 to 200.

FOREST HEALTH:

Site factors involved in wet and steep banks down to a brook cause soil slumping which uproots trees as they slide down a small ravine.

MANAGEMENT PRACTICES:

Due to the instability of the site, no harvest on the steeper sections is recommended. The stand is overstocked and stagnant in its growth. Where the slope gradients are gentle and the trees of youngest age, there has been past thinning in an effort to create an open and clean wood adjacent to the trails. This thinning is recommended to continue with a light single tree selection every ten years.

VISTA MANAGEMENT:

An open understory down to the ravine adds interest to the view into this old and dark looking stand. The combination of the old dense growth, the ravine and the brook makes this stand unique within the park and this uniqueness should be preserved.

UNIQUE FEATURES/COMMENTS:

1. Pure hemlock stand
2. Small brook and steep ravine down to it
3. Open views through section of woods down to ravine
4. Wet, erodable areas, often with raw banks or mossy ground cover
5. Cross country ski trail along section of ravine.

STAND NO: 39

NUMBER OF ACRES: 86

SPECIES:

Hemlock and northern hardwood

AGE:

Eighty years and older

SIZE:

Mean stand diameter 12" to 14" with some large trees to 40"
Basal area 100 to 120

FOREST HEALTH:

Areas of dieback in beech, white ash and sugar maple. Some of this is caused by site factors associated with wet soils. Beech bark scale, and ash yellows and ash dieback are evident here. State of Vermont is monitoring ash dieback in stand.

MANAGEMENT PRACTICES:

Goal is to maintain hemlock and hardwood mix and to grow trees on long rotations. Single tree selection will be used to remove a few trees every year. Hemlock along carriage roads will continue to get pruned of dead branches up to sixteen feet.

VISTA MANAGEMENT:

Light understory thinning along carriage roads will continue to allow views into forest and will serve to help maintain younger trees for later release.

UNIQUE FEATURES/COMMENTS:

1. Open roadside views into woods
2. Some large specimen trees
3. Irrigation line from Pogue to Mansion

STAND NO: 40

NUMBER OF ACRES: 6

SPECIES:

Mix of large white pine and sugar maple and younger hardwoods, hemlock and some Norway spruce

AGE:

White pine and sugar maple planted in 1897. Younger hemlock, spruce and hardwoods are also present with all but spruce being natural regeneration.

SIZE:

White pine diameter 26"-28", sugar maple 14" to 16", other trees 6" to 10". Basal area at 140 to 160.

FOREST HEALTH:

Dieback in maple is widespread. Experimental mixed planting has resulted in maples of open branched form.

MANAGEMENT PRACTICES:

Goal is to grow scattered large white pine and to allow maple to decline. Maple are generally of poor form. Harvest of maple recommended where practical for its firewood value. Second thinning of younger stock recommended to further release crop trees. Scattered oak, ash and yellow birch should be favored as should an evergreen and hardwood mix. Thinning recommended in 1990's.

VISTA MANAGEMENT:

None

UNIQUE FEATURES/COMMENTS:

1. Large widely scattered white pine trees
2. Girdled hemlocks remain standing dead amongst released residual understory.

STAND NO: 41

NUMBER OF ACRES: 5

SPECIES:

White pine and sugar maple plantation

AGE:

1911

SIZE:

Mean stand diameter of white pine 20" to 22", sugar maple 12" to 14". Basal area 120 to 140.

FOREST HEALTH:

Dieback in sugar maple. Occassional blister rust in pine

MANAGEMENT PRACTICES:

Goal is to allow open view into woods to be visible from Route 12. Past logging in 1970's and 1980's has removed both pine and maple. Understory has been thinned to reveal view through woods. Maple, while of poor form, have been allowed to remain so as to maintain evergreen and hardwood mix and to limit excessive light onto the forest floor. Understory will continue to undergo light thinning and scattered maple will be removed to open up room for pine.

VISTA MANAGEMENT:

View through stand as seen from trail and from road on Route 12 should be maintained. Brush should be mowed back to maintain view to roadside stonewall and woody vegetation should not be allowed to weaken wall. Periodic mowing and clipping on and by wall should be performed.

UNIQUE FEATURES/COMMENTS:

1. Roadside plantation visible from state highway.
2. Attractive stone wall along road.
3. Cross country ski trail connecting to parking area off property

STAND NO: 42

NUMBER OF ACRES: 3

SPECIES:
Norway spruce

AGE:
Planted in 1882

SIZE:
Mean stand diameter 16" to 18"

FOREST HEALTH:
Some trees have died from *Armellaria mellea*

MANAGEMENT PRACTICES:

These are some of the earliest plantings in The Park. They should be removed only for salvage, otherwise they should be left. Roadside trees are overstocked but thinning is difficult. Past activity has involved pruning back lower dead branches, thinning out other species that had seeded in, and in removing an occasional dying tree. Understory tree removal in the hemlocks should continue so that the understory does not overly shade itself.

VISTA MANAGEMENT:

Roadside plantings close to the estate and at the entrance to the Park serve as a key welcome to those arriving. Understory views into the stand and up the trunks of the spruces should be maintained. Slash should be removed.

UNIQUE FEATURES/COMMENTS:

1. Large roadside trees
2. Early plantation of newly introduced species
3. Attractive stonewall
4. Proximity to Park entrance
5. Footpaths

STAND NO: 43

NUMBER OF ACRES: 4

SPECIES:

Mixed wood. European larch and evergreens were planted.
Natural regeneration of hardwoods.

AGE:

1880's

SIZE:

All sizes up to 36"

FOREST HEALTH:

Areas of overstocking cause stagnation and mortality.

MANAGEMENT PRACTICES:

Past management has been for the purpose of offering guided tours of an exhibit of Vermont woodland plants. Woods have been thinned and pruned and slash has been removed. Trails have been laid out and continue to be maintained. Goal is to continue to maintain trails and woodlands to decide at a later date whether a flora exhibit should continue. Diverse mix of overstory species should be maintained.

VISTA MANAGEMENT:

The maintenance of views through this thinned woodland will require some understory thinning on a periodic basis. Overstory thinning should be limited to hazard trees in the vicinity of the paths.

UNIQUE FEATURES/COMMENTS:

1. Flora exhibit with some rare plants
2. Network of chip covered footpaths
3. Diverse species mix in overstory and in herbaceous layer
4. Proximity to Park entrance
5. Attractive stonewall

STAND NO: 44

NUMBER OF ACRES: 26

SPECIES:
Northern hardwoods

AGE:
100 years and older

SIZE:
Mean stand diameter 14" to 16"
Basal area 120-140

FOREST HEALTH:
Some dieback in maple and ash due to canker, Armellaria, ash yellows and beech bark scale. State of Vermont is monitoring ash dieback in stand.

MANAGEMENT PRACTICES:

Goal is to maintain a species mix, to remove dying trees in vicinity of paths, and to grow larger trees on long rotations. Stand is near landscaped grounds and aesthetic concerns are important. Past management has involved single tree removal to remove cull wood and to make room for trees that are to be retained. Area is reviewed every year with several trees being removed annually. Future activity calls for similar annual review.

VISTA MANAGEMENT:

Vistas by Bungalow are pruned back every four years and ground cover is nipped or mowed annually. Vistas reveal hillside across Route 12 to north and east. Foreground of vista maintains small evergreens which either get topped or removed as part of periodic maintenance. Besides vista maintenance, roadside areas of stand remain open for view into woods and slash is removed.

UNIQUE FEATURES/COMMENTS:

1. Mixed hardwoods of large size along carriage roads. Large oaks in mix.
2. Roadwide presence of rhododendron
3. Small organic dump.
4. Irrigation line to Pogue and well head with line controls
5. Vistas

STAND NO: 45

NUMBER OF ACRES: 16

SPECIES:

Mix of evergreens and hardwoods, plantations and natural stands.

AGE:

White pine and Norway spruce planted in 1880, with natural seeding from these plantings in adjacent areas. Amongst scattered old plantings are a mix of hardwoods and hemlock.

SIZE:

Mean stand diameter of older pine 30" to 31" with largest to 50"
Basal area ranges up from 120

FOREST HEALTH:

Occassional blister rust in some pine, dieback in maple and ash and white birch. Some areas of excessive soil wetness is causing mortality.

MANAGEMENT PRACTICES:

Goal is to maintain some of the oldest plantation trees in the state and the oldest on the property. Goal is also to maintain diverse species and age mix and to keep, as long as possible, a closed or nearly closed overstory to lend the appearance of an old wood with interesting and long views underneath. Recent activity has included pruning of lower branches of certain evergreens, thinning of declining hardwoods, thinning of secondary growth in pole size white pine, as well as removal of scattered understory trees.

VISTA MANAGEMENT:

Roadside thinnings open up views into the woods which, coupled with slash removal, have served to maintain a tidy appearance to sections of this stand. Sections of old growth in this stand and in adjacent town park woodlands and footpaths that link the two add a heightened interest to this area near the property entrance. A dense screen to the village homes and streets should be maintained along the south border of the property.

UNIQUE FEATURES/COMMENTS:

1. Large white pines and Norway spruce in old plantation.
2. Mixed aged stand
3. Footpaths connecting Mansion area to Billings Park trails.
4. Proximity to Mansion.

STAND NO: 46

NUMBER OF ACRES: 4

SPECIES:

White pine plantation with additional plantings of scattered Norway spruce, European larch, Scots pine and natural growth of hemlock and mixed hardwoods.

AGE:

Planted trees set out in 1880

SIZE:

Mean stand diameter in the white pine is 22" to 24" with some trees to 40". Basal area ranges from 120 to 170.

FOREST HEALTH:

White pine, as usual, is susceptible to occasional mortality due to blister rust.

MANAGEMENT PRACTICES:

Due to proximity to Mansion and gardens and due to network of footpaths, this woodland has been intensively managed. Old growth trees planted during Frederick Billings' lifetime should be retained. An open understory should be retained except where certain denser areas are advised as a screen. Overstory and understory trees have been pruned, hazard trees removed and vistas maintained. Footpaths are tended annually.

VISTA MANAGEMENT:

This area combines forestry activities with more intense landscape and gardening functions, especially on the east slope adjacent to the Mansion grounds. Interior views, and intense vegetation management to include the herbaceous layer are conducted on this east slope. The edge of this stand offers vistas noted in Stand #44.

UNIQUE FEATURES/COMMENTS:

1. Intensely managed mixed wood with a variety of old plantation trees and natural growth. Oldest plantation on property.
2. Proximity to Mansion.
3. Footpaths and woodland garden in section of stand.
4. Visual backdrop to Bungalow, Mansion grounds and woodland garden.
5. Vistas by Bungalow and views through understory.

STAND NO: 47

NUMBER OF ACRES: 14

SPECIES: 14 Acre pond (The Pogue) of shallow depth with scattered floating mats of water lily and bullhead lily, with submerged pondweed and emergent iris and cattail.

AGE:

Pond previously a bog, dammed in 1890. Dam rebuilt in 1991.

SIZE:

FOREST HEALTH:

pH of water tested over 7.0 in mid-1970's.

MANAGEMENT PRACTICES:

Goal is to maintain pond in present condition which is to include vistas across it. Little work is required but for dam maintenance and removal of occasional blowdowns along the edge. Depth to 14 feet with shallower areas partially covered with floating vegetation which has not required control. Largemouth bass were introduced into pond in 1975. Yellow perch and catfish also present. Some shiners introduced as baitfish in 1992. Irrigation line from Pogue serves Mansion and Billings Farm.

VISTA MANAGEMENT:

Shoreline vistas noted in Stand #27

UNIQUE FEATURES/COMMENTS:

1. Only body of water on property.
2. New dam and irrigation outlets.
3. Warm water fishery.

STAND NO: 48

NUMBER OF ACRES: 9

SPECIES:

Upland pasture

AGE:

SIZE:

FOREST HEALTH:

MANAGEMENT PRACTICES:

Billings Farm grazes heifers in pasture, maintains fence and mows as needed to help maintain grasses

VISTA MANAGEMENT:

Open, non-forested areas on Mount Tom help to break up the wooded landscape, provide views, and add diversity to the overall property. They should be maintained. The summit of this open pasture provides a secluded and pleasant long range view, currently best enjoyed when heifers are not in the field. Trees browsed to uniform height by cattle on the pasture edge are an attractive feature.

UNIQUE FEATURES/COMMENTS:

1. Active pasture
2. Grassy knoll with pleasant views

STAND NO: 49

NUMBER OF ACRES: 33

SPECIES:

Hayland, grasses, clovers and other wildflowers

AGE:

SIZE:

FOREST HEALTH:

MANAGEMENT PRACTICES:

These haylands are mowed annually and should be kept open. The woods edge is trimmed so mowing is manageable up to the field edge and the stonewall needs occasional tending to keep stones from the field. Fertilizer will be needed if fields are to attain their productive potential as a hay crop.

VISTA MANAGEMENT:

Vistas to the south and west should be maintained along the trail edge in the southern field. Mowing under the maples on the field edge serves to keep the southern vista open.

UNIQUE FEATURES/COMMENTS:

1. Large upland open expanse of undulating hayfields.
2. Summer field flowers.
3. Carriage road with roadside trees through fields.

STAND NO: 50

NUMBER OF ACRES: 4

SPECIES:

Open fields

AGE:

SIZE:

FOREST HEALTH:

MANAGEMENT PRACTICES:

These two small fields near the landscaped grounds are mowed just to be kept open. Mowing is frequent enough to keep taller seed stalks from forming and to maintain a green and high lawn appearance.

VISTA MANAGEMENT:

UNIQUE FEATURES/COMMENTS:

1. Flat open space near Mansion

APPENDIX I

This list shows the amount of labor in days to perform the recommended work in each of the stands. Work would be performed to current standards. Work does not include additional time spent on trail and road maintenance. Some work is conducted annually and some is shown as periodic repeat activity. Work schedule does not project much beyond next ten years. Time estimates include harvest of materials that have commercial value, yet there is no attempt here to indicate such value or its relation to cost in retrieving it.

<u>Stand No.</u>	<u>Labor Required</u> (Day represents one man day)
1	Four days per year to remove subdominant hardwood understory. Future larch or hardwood harvest (should hardwood compete with larch overstory) would be additional.
2	Five days per year to remove cull hardwoods from stand and to continue thinning of understory. Future pine harvest would be additional.
3	Two days per year to continue thinning in spruce regeneration area and maintaining small vistas. Removal of old overstory trees would be additional.
4	Three days per year to remove competing and invading hardwoods. Twelve days every five years to conduct light harvest in red pine.
5	One day every five years to maintain vista. No activity otherwise needed for many years unless old field hardwood succession is planted to an evergreen plantation.
6	Minimal activity needed for several decades.
7	No activity needed.
8	If management is to conduct initial thinning twenty days labor would be required, then fifteen days every ten years thereafter.
9	One day every three years to maintain vista, ten days initially to conduct first precommercial thinning, then eight days every ten years thereafter.
10	Ten days every ten years for precommercial thinnings.
11	Minimal activity needed.
12	Two days every five years to keep vegetation balance between apples and invading trees.
13	Five days every ten years to conduct light harvest of spruce.
14	Four days every five to eight years to conduct light overstory cut and to thin understory.
15	Two days every five years to remove final cull trees and to thin understory.
16	Minimal activity needed.

<u>Stand No.</u>	<u>Labor Required</u>
17	No overstory thinning needed in near future. Roadside understory thinning to extend back into stand would require one day per year.
18	No harvest scheduled in near future. Four days per year to harvest scattered diseased trees and to thin understory back into stand from roadside.
19	Minimal activity needed.
20	Four days per year to harvest cull trees and to maintain vista.
21	Four days per year to harvest cull trees. This is low priority, out of way area. Low priority has kept us from doing some thinning that would benefit stand.
22	Minimal activity needed.
23	Minimal activity needed.
24	Six days per year to maintain vistas and to conduct single tree selection of cull trees.
25	Two days per year every three years to thin understory and remove cull trees.
26	Two days per year to weed understory vegetation. Three days every ten years to conduct light harvest.
27	Four days per year to thin understory, prune evergreens and to conduct light thinning.
28	One day per year to perform light understory thinning. Two days every ten years to harvest spruce.
29	Three days every year to maintain vistas, edge of Pogue and to remove cull trees.
30	Minimal activity needed.
31	Four days every five years to girdle or cut cull trees.
32	Minimal activity needed.
33	Six days every year to remove diseased beech.
34	Six days every year to prune evergreens and remove cull trees along roadside.

<u>Stand No.</u>	<u>Labor Required</u>
35	Two days every five years to thin understory.
36	Minimal activity needed.
37	Minimal activity needed.
38	Four days every three years to maintain open vista to ravine and through woods and to remove cull trees.
39	Eight days every year to remove trees in single tree selection.
40	Ten days recommended to harvest cull maples every ten years. Four days every five years to open dense understory regeneration.
41	Two days every year to allow open understory and to remove occassional diseased tree.
42	One day every year to thin understory and remove occassional diseased tree.
43	Area has been maintained as a guided flora exhibit that has been discontinued in recent years. Work schedule dependent on whether this exhibit has value, otherwise two days per year for cull thinning.
44	Eight days per year to harvest hardwoods and to maintain open understory.
45	Four days per year to harvest scattered trees and to thin understory.
46	Two days per year to remove occassional tree and to open understory. Additional landscape function may be conducted by other staff in this area.
47	Minimal activity needed.
48	One day required to mow after heifers leave pasture.
49	Four days required to mow fields.
50	One day per year.