



*Silviculture Prescription
York Lake South*

*Massachusetts Department of Conservation and Recreation
Bureau of Forestry*

*Southern Berkshire District
Sandisfield State Forest
New Marlborough and Sandisfield, MA*

Prepared by:

*Conrad Ohman – Management Forester – Southern Berkshire District
Massachusetts Department of Conservation and Recreation
PO Box 1433, Pittsfield - MA 01202
cmohman@state.ma.us – 413 442-8928 x124*

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Approved by:

Management Forestry
Program Supervisor

William N. Hill, CF

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This document will describe the conditions of, and proposed treatment on the 190 acre York Lake South timber sale. (See map 1) This is the first of two planned sales described in the York Lake Forest Management Proposal.



Map 1: York Lake South Timber Sale

1. SITE DESCRIPTION:

a. Climate:

Precipitation- the nearest weather station to this site, located in Norfolk CT, records an annual average nearly 54 inches of precipitation. The West Otis station records a normal total precipitation of nearly 47 inches and a mean winter/spring snowfall of 57.7 inches with maximum of 160 inches recorded.

Extreme weather events- Seven tornadoes have been documented since 1955 in that part of Berkshire County lying south of the turnpike. These events resulted in multiple areas of severe damage ranging from several to hundreds of acres. One of these crossed the nearby Cookson SF and ended approximately 2 miles from this site. Within that timeframe severe wind events such as undocumented tornados or tornado-like events have created openings ranging from 1 to 10 acres. While hurricanes do not historically track directly through Berkshire County, damage due to heavy rain and high winds associated with storms tracking to the east have resulted in gaps ranging from individual trees to large groups. More common is the creation of gaps, generally less than ½ acre, resulting from thunderstorms. Ice damage to trees is common in the area and occasional ice storms such as that occurring in 2008 have resulted in severe damage to large areas of the forest.

While evidence of severe storms, other than the 2008 ice storm is not evident in the current timber sale area, the proximity of such evidence shows that stand initiating disturbance is historically a part of the southern Berkshire forest system.

b. Geology

Parent material: Berkshire County lies wholly within the glaciated part of North America. Soils on this forest are derived from glacial till derived from metamorphic bedrock.

- **Topography:** The topography is generally flat to gently sloping with elevation range of 1440 – 1550 feet. The proposed treatment area is bisected by York Lake road. The southern forest stands run from the road to the lake and wetland. Total elevation change is approximately 150 feet and average slope is 6 percent. The northern forest stands run both west and east of the road. Stands to the west have an average slope of 5 percent with minimal elevation change run either to a wetland or a more recent timber harvest which will not be entered. Stands to the east of the road average 6-8% slope with an elevation change of 75 feet and run to an extensive beaver wetland and stream.

c. Soils:

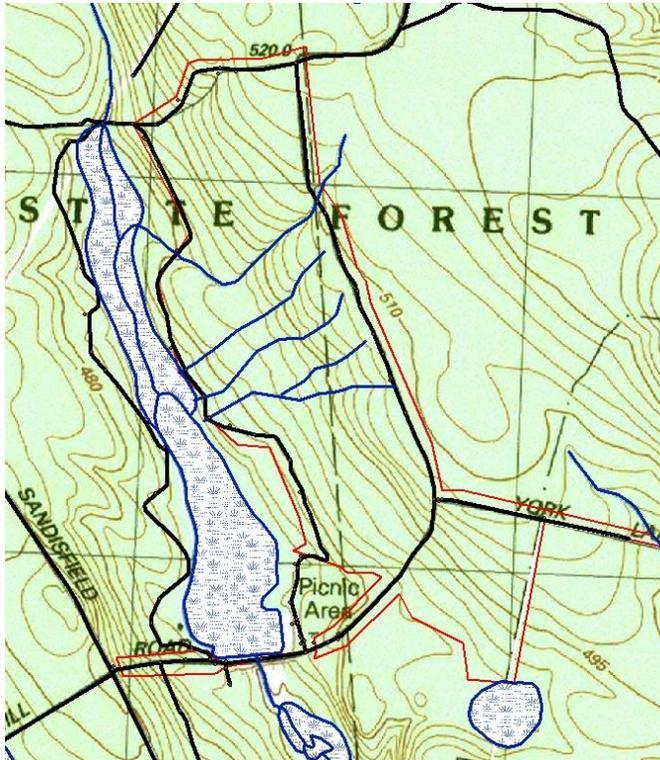
According to the Soil Survey of Berkshire County produced by NRCS in 1988, this harvest area contains two soil associations.

PmC-Peru Marlow association: this association consists of very deep, moderately well drained Peru soils and very deep well drained Marlow soils. Peru soils are typically found on the lower parts of the slopes and Marlow on the upper slopes. On this proposal site the main soil type is Peru.

BmE- Berkshire Marlow association: this association is found in a band mid slope between the road and wetland. It consists of very deep, well drained Marlow soils.

Both Peru and Marlow soils are rated as having moderate risk of windthrow. Peru is more likely to have a seasonally high water table

d. **Hydrology:**



Wetlands: (map 3)

Wetlands within the harvest area include one permanent stream and a network of small intermittent streams. Vegetated wetlands of varying width occur along the intermittent streams, particularly on the lower slopes of stand 1. All wetlands will be clearly marked prior to the start of harvest activities. Skid roads will avoid stream crossings where possible and where necessary will be bridged.

e. **Vegetation:**

Historic Species composition:

According to data gathered by the Harvard Forest witness tree study (Hall et al 2003), the pre-colonial forest of the hill towns of Sandisfield, New Marlborough and Monterey was primarily northern hardwood and hemlock. This inventory suggests that approximately 20% of the trees in the town were hemlock, and 36% were beech. Maple and birch (presumably sugar maple and yellow birch) made up 10 and 5% of the trees. Species of intermediate tolerance (ash, pine, oak/chestnut) made up 7% of the trees with all other species making up the remaining 7%.

Previous silvicultural treatments: Since 1957 there have been five timber harvests covering parts of the property included in the York Lake South Timber Sale. These harvests were a variety of thinnings and small group harvests designed to decrease the percentage of beech, salvage dying ash, create a diversity of age classes and grow an extended rotation stand of large, high quality hardwoods.

Forest types:

The 2003 Sewall forest type map project has classified the overstory into broad types shown in map 4. Areas designated BB (beech, birch, maple) are typically dominated by northern hardwood species such as sugar maple, beech and yellow birch. OH (oak/hardwood) designation indicates that oak is the dominant species in association with other hardwoods. WH (pine/hardwood) indicates that white pine is the dominant species in association with the various hardwoods found on the site.

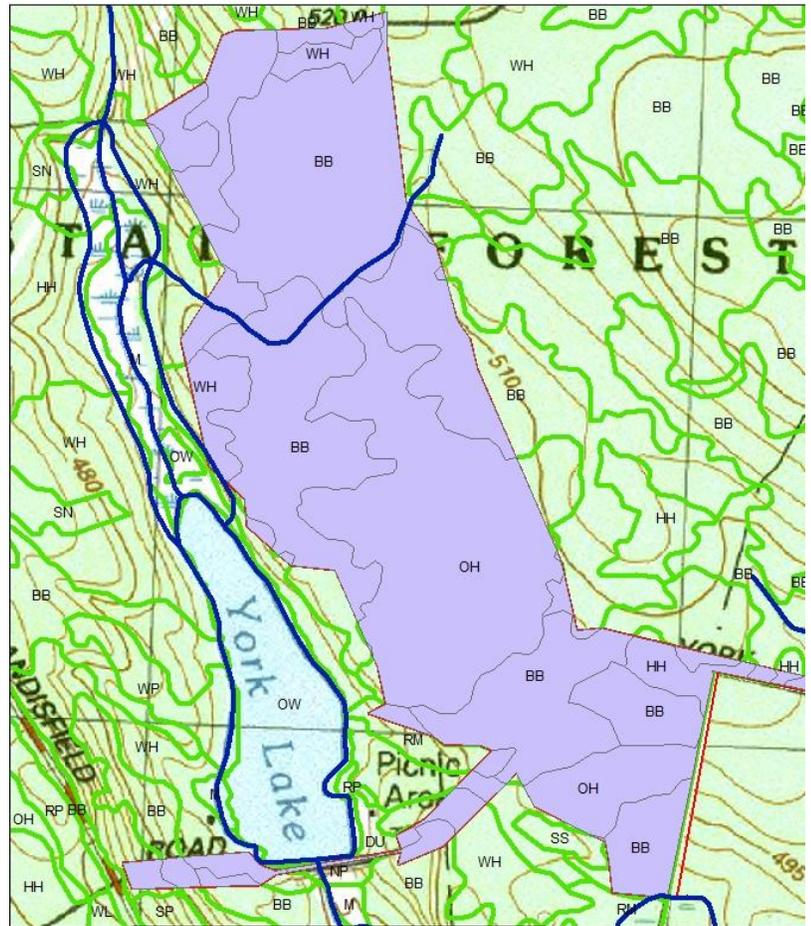
Current species composition:

Main overstory species are sugar maple (*Acer saccharum*) and red oak (*Quercus rubra*), beech, (*Fagus grandifolia*), white ash (*Fraxinus Americana*), black cherry (*Prunus serotina*), Other species present include yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*) with some eastern hemlock (*Tsuga Canadensis*) and white pine (*Pinus strobus*).

The shrub/small tree understory is made up of the above tree species along with patches of hobblebush (*Viburnum alnifolium*), striped maple (*Acer pennsylvanicum*), blueberry and huckleberry (*Vaccinium* spp. And *Gaylussacia* sp.) and witch hazel (*Hamamelis virginiana*) in wetter areas. The herbaceous layer is dominated by variable densities of fern, including hay-scented fern (*Dennstaedtia punctilobula*), wood fern (*Dryopteris* spp.), Christmas fern (*Polystichum acrostichoides*) and cinnamon fern (*Osmunda cinnamomomea*). Typical populations of spring ephemerals including trout lily and red trillium (*trillium erectum*) spring beauty (*Claytonia virginica*) are commonly found in the northern hardwood stands. Some of the more mesic (moister) soils in the northern hardwood stands support populations of blue cohosh (*Caulophyllum thalictroides*), leeks (*Allium tricoccum*) and bloodroot (*Sanguinaria Canadensis*). Beech sprouts are prolific throughout much of the forest understory.

Ages and size classes present:

Due to the above described variety of also variable land use patterns this harvest area contains a range of species mix, size classes and ages. Tree sizes range from seedling to very large mature trees. The larger trees present are representatives of the forest existing near the turn of the century and are at least 100 years old. In general, the stands are even aged but those with recent silvicultural treatments tend to have more varied size classes present.



Map 4 – Sewall Stand Type Project

Stand and tree vigor:

Beech bark disease has infected most beech trees, with only an occasional one not showing signs of infestation. Ash has been steadily declining and is now faced with almost certain infestation with emerald ash borer. Many trees were impacted by the recent ice storm. Cherry was particularly impacted by ice damage. Many of the cherries have sprouted new crowns, but experience has shown that this species rots quickly from broken crowns. In general though, these are vigorous stands. Past management has insured that sufficient vigorous trees are present to replace those lost due to natural forces, non native insects or diseases, or timber harvest. However, it is predictable that without further natural or manmade intervention, in the long run, the stand will succeed to diseased beech and hemlock.

f. Site productivity

The DCR Management Guidelines of 2012 stated that forest stands will be “classed . . . and considered for silvicultural treatments that generally fit their productivity, structural complexity (or potential thereof) and diversity”. An analysis of site history (land use; agriculture/logging) and conditions (soil types, productivity; vegetation cover) suggest that the majority of these stands described above have a high soil productivity and forest complexity indicating that uneven age or multiage methods of forest management are appropriate in the stands present in the project area.(Goodwin, D.W. and W.N. Hill. 2012)

Site index:

The majority of this sale area has site indices ranging from 55-60 for sugar maple and 65-70 for red oak.

Prime soils:

According to the prime land analysis approximately 15 % of the sale area has been classified as having statewide significance and the remainder of the area is approximately evenly divided into prime 1 and prime 2.



g. Cultural and Archeological Features

Cultural Resources:

Stone walls and field stone piles on the property indicate former agricultural use. A small larch/red pine plantation and remnants of a cellar hole indicating the former Leonard house site as well as a one stone cemetery are located just north of Dodd Rd extension and will be included in the 100 foot roadside safety strip. These and any other small cultural artifacts will be noted on the ground and avoided during harvest as set forth in the “Bureau of Forestry- Cultural Resource Management and Protection Standards and Guidelines.” Where possible, crossing of stone walls will be limited to existing bar ways or breaks in the wall. If dismantling of a portion of stone wall is required for a temporary crossing, the wall will be restored at the completion of harvesting.

Archeologist review: The DCR archeologist has reviewed the proposal for this site and noted that there are no “pre-Contact” sites within a mile of the sale and that no limitations other than the above standard guidelines and the protection of the Smith cemetery are required.

h. Wildlife habitat conditions:

Wildlife found on this forest is typical of species normally found in southern Berkshire County. There are no rare species nor unusual species or features associated with the sale area or the immediate vicinity. The variable topography and species composition of the forest, together with the past harvest history has resulted in a variety of wildlife habitats and therefore potential species. The proposed harvest will not significantly adversely affect habitat for most species. The Division of Fish and Wildlife has commented that this proposed irregular shelterwood harvest is unlikely to have any substantial impacts on wildlife in the short run. Wildlife species associated with mature forest habitat will likely continue to use these stands, and some will likely benefit from the food and cover resources provided in regenerating patches after cutting. As harvesting proceeds over time, the forest will include more young trees, but at the same time this forest will produce more mast (beechnuts, cherries, etc.) as crowns of released trees expand. And these stands will remain structurally diverse through retention of wildlife trees and woody debris. While the irregular shelterwood harvesting planned for these stands will not create extensive patches of young forest



habitat that are preferred by declining shrubland and young forest birds, these stands will still provide vibrant and relatively consistent wildlife habitat over time.

Past management has resulted in an abundance of large cavity trees which will remain for many years. Mortality resulting from natural events will continue to add to the number of available cavity trees.

Where available, 1 or 2 legacy trees/acre will be retained. These are typically old, large crowned trees of long lived species such as sugar maple or red oak and where possible associated with streams, stone walls or other protected features.

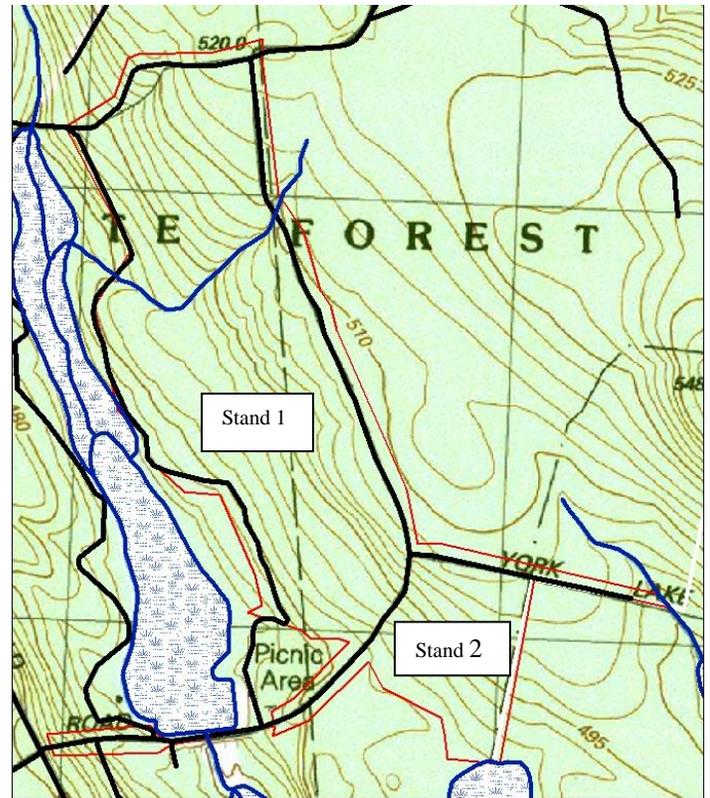
2. STAND DATA

For purposes of this project, the York Lake South timber sale has been divided into two stands. Tree species, size and stand density varies within each stand. Rather than attempt to treat each small area as an individual unit this project will recognize the inherent variation and dynamic nature of the forest and manage the stand to maintain a variety of different species and structures in order to enhance diversity within the stand.(O'HARA AND NAGEL)

Stand1 is a 150 acre oak/northern hardwood stand, Stand2 is a 40 acre northern hardwood stand.

The tables below provide a summary of the stands. However the 100 foot strip along the roads differs from the interior sections due to the lack of previous harvests. This strip contains a heavier percentage of beech and/or ash than is shown in the tables and covers approximately 20% of the total project area.

Tables found in the appendix provide a great deal of additional information about the existing stands.



Summary of stand 1

This oak northern hardwoods stand is dominated by sugar maple (*Acer saccharum*), northern red oak (*Quercus rubra*) and red maple (*Acer rubrum*), which together comprise 62.3 percent of the basal area. The species most common in the midstory are American beech (*Fagus grandifolia*) and red maple (*Acer rubrum*), as these species comprise 59.7 percent of the sapling- and pole-sized trees. The total stems per unit area for the stand (not including seedlings) is 181.2 stems per acre.

While the basal area per sample point is relatively uniform with most plots within 20 feet of the average basal area per acre, the specific mix of species and tree size varies throughout the stand. Of the 18 sample points taken, only one is classified as pole size. 70 percent of the plots sampled had at least one sugar maple, 55 percent had at least one red oak, and 55 percent had red maple. Ash and beech were found on 45 percent of the plots.

75% of the overstory basal area is acceptable growing stock.

The understory is composed almost entirely of shade tolerant species. Approximately 90 percent of the basal area and 90 percent of the tallied stems are hemlock, beech or sugar maple.

Tree species composition of the ground layer differs from the other layers. Red oak and beech are the most common species with both occurring on greater than 60 percent of the tallied plots. Red maple,

striped maple and sugar maple are each found on more than 33 percent of the plots. Ash was not present in the sampled plots.

This stand averages 935 cubic feet (7.5 cords) of coarse woody debris and 3.3 dead trees per acre. The majority of these dead trees are in the greater than 12” diameter range which provides preferred habitat for the widest variety of cavity nesting birds and mammals. In addition there are approximately 25 live cavity trees/acre including nearly 5 per acre which are greater than 20” dbh. These numbers exceed minimum suggested retention guidelines. (Tubbs, DeGraff et al, 1987; DeGraff, Shigo, 1985, Forest Guild, 2010)

STAND 1:

Table 1: stand 1 Overstory only

	All species	Sugar maple	northern red oak	red maple	White ash	American beech	yellow birch	eastern white pine	Eastern hemlock	Black cherry	Paper birch	American basswood	
Basal Area (square feet)	144.4	38.9	28.9	22.2	16.7	16.7	8.9	4.4	2.2	2.2	2.2	1.1	
Percentage of stand basal area (%)	100.0	26.9	20.0	15.4	11.5	11.5	6.2	3.1	1.5	1.5	1.5	0.8	
Stems Per Unit Area (stems per acre)	181.2	44.3	27.1	40.2	9.8	40.0	11.3	1.6	3.1	1.0	2.5	0.5	
Relative density	118	32.06	25.23	14.86	5.55	26.82	7.67	1.39	1.01	1.04	2.09	0.58	
AGS Relative Density		23.7	24.25	6.8	5.22	22.11	4.12	1.01	0.51	1.04	2.09	0.58	
Quadratic mean dbh	12.1	12.7	14.0	10.1	17.6	8.7	12.0	22.7	11.5	20.0	12.9	20.0	
Frequency		72%	56%	56%	44%	44%	22%	6%	11%	11%	11%	6%	

Calculations based on live trees greater than or equal to 5' dbh

Table 2: stand 1 Understory only

	All species	American beech	sugar maple	Red maple	Yellow birch	Eastern hemlock
Basal Area (square feet)	11.0	9.1	0.9	0.8	0.2	0.0
Percentage of stand basal area (%)	100.0	83.4	7.8	7.4	1.4	0.0
Per Unit Area (stems per acre)	611.1	509.3	18.5	18.5	1.4	27.8
frequency						

Basal area calculations only include observations where the DBH is greater than or equal to 1 inch. Stems per unit area calculations include observations where DBH is less than 1 inch.

Table 3: stand 1 Ground cover only

Ground Species Occurrence and Abundance

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
unidentified fern	287.04	12.25	88.89	14.81	2.97	57.84	28.30

Table 3: stand 1 Ground cover only

Ground Species Occurrence and Abundance

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
American beech	527.78	22.53	66.67	11.11	0.00	0.00	11.21
northern red oak	342.59	14.62	77.78	12.96	0.00	0.00	9.20
striped maple	138.89	5.93	44.44	7.41	0.42	8.11	7.15
red maple	259.26	11.07	44.44	7.41	0.00	0.00	6.16
unidentified species	64.81	2.77	27.78	4.63	0.56	10.81	6.07
sugar maple	240.74	10.28	33.33	5.56	0.00	0.00	5.28
yellow birch	92.59	3.95	27.78	4.63	0.00	0.00	2.86
hobblebush	18.52	0.79	11.11	1.85	0.25	4.86	2.50
serviceberry	74.07	3.16	22.22	3.70	0.00	0.00	2.29
wild leek	27.78	1.19	11.11	1.85	0.19	3.78	2.27
Indian cucumber	37.04	1.58	16.67	2.78	0.11	2.16	2.17
lowbush blueberry	46.30	1.98	16.67	2.78	0.08	1.62	2.13
wild sarsaparilla	27.78	1.19	16.67	2.78	0.11	2.16	2.04
trillium	27.78	1.19	16.67	2.78	0.08	1.62	1.86
hornbeam	18.52	0.79	11.11	1.85	0.11	2.16	1.60
hophornbean	18.52	0.79	11.11	1.85	0.11	2.16	1.60
eastern hemlock	27.78	1.19	16.67	2.78	0.00	0.00	1.32
Canada mayflower	18.52	0.79	11.11	1.85	0.06	1.08	1.24
eastern white pine	18.52	0.79	11.11	1.85	0.00	0.00	0.88
witchhazel	9.26	0.40	5.56	0.93	0.03	0.54	0.62
partridgeberry	9.26	0.40	5.56	0.93	0.03	0.54	0.62
Indianpipe	9.26	0.40	5.56	0.93	0.03	0.54	0.62

Summary of stand 2:

This northern hardwood stand is dominated by sugar maple (*Acer saccharum*) and white ash (*Fraxinus americana*), which together comprise 58.9 percent of the basal area. The species most common in the midstory is sugar maple which comprises 61.2 percent of the sapling- and pole-sized trees. The total stems per unit area for the stand (not including seedlings) is 215.5 stems per acre.

While the overstory basal area per plot and species distribution is relatively uniform, stems per acre, relative density, and AGS/UGS ratio varies across the stand. Approximately 60 percent of the overstory is acceptable growing stock (AGS) with the majority of the red maple, white pine and black cherry being classified as UGS.

The understory is dominated by striped maple and beech which make up more than 80% of the individual stems in this layer. One or both of these species was recorded on more than 60% of the plots. While making up only 12 % of the stems, sugar maple accounts for 45% of the basal area of the layer, indicating that the larger stems are likely to be sugar maple.

As in stand 1, the ground layer is different that the understory. Here, sugar maple, red oak and cherry are each found on 75% to 85% of the plots. Beech is still found on 50%.

This stand averages 2575 cubic ft (20 cords) of coarse woody debris, 2 dead trees per acre and 30 live cavity trees. 13 of these are greater than 12”diameter

STAND 2:

Table 4: stand 2 Overstory only

	All species	Sugar maple	White ash	Black cherry	Red maple	Eastern white pine	Northern red oak	American beech
Basal Area (square feet)	140.0	45	37.5	25.0	17.5	7.5	5.0	2.5
Percentage of stand basal area (%)	100.0	32.1	26.8	17.9	12.5	5.4	3.6	1.8
Stems per acre	215.5	110.3	32.7	27.8	15.7	2.5	13.9	12.7
Relative Density	108	52.68	13.75	14.42	9.67	2.34	6.56	7.06
AGS Relative Density		48.79	8.03	3.79	3.33	0	6.56	7.06
Quadratic mean dbh	10.9	8.7	14.5	12.8	14.3	23.6	8.1	6.0
Frequency		62.5	87.5	50	50	25	25	12.5

Calculations based on live trees greater than or equal to 5” dbh

Table 5: stand 2 Understory only

	All species	Sugar maple	Striped maple	Sweet birch	Yellow birch	American beech	Eastern hemlock
Basal Area (square feet)	3.9	1.7	1.1	0.4	0.4	0.1	0.0
Percentage of stand basal area (%)	100.0	45.1	29.6	11.3	11.3	2.8	0.0
Stems Per Unit Area (stems per acre)	660.	20.0	320.0	40.0	20.0	220.0	40.0
frequency		20%	60%	40%	20%	80%	40%

Table 7: stand 2 ground cover only

Species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
unidentified fern	229.17	6.79	100.00	11.27	8.25	51.76	23.27
white ash	791.67	23.46	62.50	7.04	0.00	0.00	10.17
sugar maple	520.83	15.43	87.50	9.86	0.00	0.00	8.43
black cherry	458.33	13.58	75.00	8.45	0.00	0.00	7.34
northern red oak	395.83	11.73	87.50	9.86	0.00	0.00	7.20
unidentified species	41.67	1.23	62.50	7.04	1.94	12.16	6.81
wild leek	62.50	1.85	37.50	4.23	1.56	9.80	5.29
serviceberry	208.33	6.17	62.50	7.04	0.13	0.78	4.67
red maple	229.17	6.79	62.50	7.04	0.00	0.00	4.61
lowbush blueberry	20.83	0.62	12.50	1.41	1.88	11.76	4.60
American beech	145.83	4.32	50.00	5.63	0.00	0.00	3.32
blackberry	41.67	1.23	37.50	4.23	0.69	4.31	3.26
chokecherry	41.67	1.23	25.00	2.82	0.63	3.92	2.66
eastern white pine	62.50	1.85	25.00	2.82	0.00	0.00	1.56
trillium	20.83	0.62	25.00	2.82	0.13	0.78	1.41
Solomon's seal	20.83	0.62	12.50	1.41	0.31	1.96	1.33
hophornbean	20.83	0.62	12.50	1.41	0.31	1.96	1.33
yellow birch	41.67	1.23	12.50	1.41	0.00	0.00	0.88
mapleleaf viburnum	20.83	0.62	12.50	1.41	0.00	0.00	0.68
wild sarsaparilla	0.00	0.00	12.50	1.41	0.06	0.39	0.60
striped maple	0.00	0.00	12.50	1.41	0.06	0.39	0.60

Silviculture:

Project Goals and objectives:

- Reduce the number of hazard trees within the roadside corridor.
- Maintain a varied and complex forest capable of buffering future disturbance, providing a variety of wildlife habitats, and maintaining and/or increasing the current species, size and genetic diversity.
- Demonstrate a system which can obtain these goals.
- Support local wood products industry
- Salvage the value of damaged and diseased trees.
- Provide income to the town and to the general fund.
- Reduce the number of large ash to slow the spread of EIB.
- Establish of ash regeneration which might survive the expected borer infestation and provide seeds for a future population.
- Maintain significant levels of coarse woody debris.
- Perform needed grading and ditch repair on State Forest roads.

Short and long term expected conditions:

Both the short and long term desired condition is a forest composed of a variety of tree, shrub and herbaceous species, size classes and overstory densities. This forest will continue to have a component of very large trees (26+” diameter) and will primarily be composed of medium to large trees (16-26” diameter). Reduction of the beech understory will allow smaller trees, seedlings and saplings of other species to successfully compete. These smaller trees which will be found distributed throughout the understory and concentrated in scattered small patches will provide a varied level of vertical structure. The expected species mix is one with a substantially smaller percentage of beech and ash.

Silvicultural methods used to accomplish these goals:

The main method to be used in both stands is the continuation of variants of an irregular shelterwood system. Practices include thinning to promote very large trees; creation of small group harvests centered on mature or declining trees and expansion of existing openings where adequate regeneration has developed. (Raymond, Bedard et al 2009) The harvest will be highly variable and specific techniques will be dictated by local tree size, species and quality. Using the following marking instructions the average basal area of both stands will be reduced to approximately 90 feet/ acre. This should result in reduction of the relative density to 60 or 65% and should allow for the continuation of the existing stand and for regeneration of trees of intermediate tolerance. In stand one approximately 60% of the basal area removed will be ash or beech, with the remainder a primarily sugar maple and very large oak. In stand 2 nearly 75% of the removal will be ash with most of the remainder being a mix of sugar maple and large cherry.

Within the roadside strip, the harvest will be primarily a salvage cut to remove all beech, ash and any additional hazard tree. It will also include limited thinning to promote large crowned shade trees along the road. This is intended to provide, where possible, an aesthetically pleasing canopy over the road.. While it is not anticipated that this prescription will result in openings greater than 1/3 acre, it will result in areas of heavy harvest directly adjacent to the road.

Marking instructions:

In general, within the confines of no opening greater than one third acre allowed:

- Where hemlock is a significant component of the midstory, maintain a large percentage of this species.
- Where overstory is primarily small trees, thin from below while removing larger interfering trees within and adjacent to the group.
- Where overstory is primarily large trees, continue the practice of thinning to promote trees in all size classes and species and the creation of gaps. Location of gaps will primarily be dictated by specific local conditions based on the following rules.
- Where mature red oak comprises a significant portion of the overstory, in addition to creating small openings and reducing canopy density, remove mid story competition to encourage development of red oak seedlings.

Rules of thumb:

Within the roadside strip:

1. Remove all beech and ash greater than 5". Exception – an occasional tree determined to be too short to fall into the road may be retained.
2. Remove all trees of any species which are determined to constitute a significant safety hazard.
3. Where appropriate, thin roadside trees to develop aesthetically pleasing, healthy, large crowned stems.

Outside the roadside strip:

1. Remove all beech greater than 5 “ Exception - leave some trees which appear to be immune to beech bark disease- leave significant cavity trees
2. Remove all ash Exception- where available, leave 1 or 2 healthy ash/acre (less than 10” dbh)– leave severely declining, unmerchantable trees.
3. Remove all cherry greater than 24 inches and smaller trees which were severely impacted by the ice storm Exception- leave unmerchantable trees not interfering with the main overstory – leave some cavity trees – where appropriate occasional healthy large trees may be left as potential seed source or wildlife tree.
4. Remove all oak and sugar maple greater than 28 inch dbh Exception– an occasional healthy, exceptional, very large tree may be left for another cutting cycle – where available leave up to 2 trees/acre to serve as a permanent legacy trees.
5. Remove all hemlock greater than 24 inches Exception- leave cavity or unmerchantable trees which are not adversely impacting the residual stand.
6. Remove all trees of other species greater than 22 inches Exception –if any, leave all basswood, butternut or other unusual tree – leave trees having high wildlife value – white pine of any diameter may be left.
7. Leave all snags. Exception: operators will be authorized to cut any snag which might create a safety hazard.

Treatment of beech:

Chemical treatment will be necessary to retard the expansion of beech. A variety of techniques, including cut stump/spray, girdle, and/or foliar broadcast spray using registered herbicides such as glyphosate, triclopyr and amzapyr may be used.

In order to promote beech bark disease resistant genotypes of beech, no trees adjacent to those showing signs of immunity will be treated.

Projected stand in 2034:

The following is an approximation of what the overstory of the stands will look like immediately after this harvest and in 2034, in the absence of significant natural disturbance. This description is based on data derived from US Forest Service program Northeast Decision Model (NED) (Twery, M et al 2011).

Stand 1 overstory only

	Basal Area	Stems per acre	Relative density	Quad mean diameter
Pre harvest	144	181	118	12.1
Post harvest	91	110	67	12.2
2034	109	104	79	13.9

Stand 2 overstory only

	Basal Area	Stems per acre	Relative density	Quad mean diameter
Pre harvest	140	215	108	10.9
Post harvest	92	166	64	10.1
2034	116	157	108	11.7

Sale Layout and Harvesting Limitations:

Wetlands:

Designated wetlands (see map 3) and small forest seeps and any areas of hydric soil will be excluded from the harvest. Harvesting within 50 feet of any wetland (vegetated or stream) will be limited to 50% of the basal area. Stream crossings are limited to those indicated on the cutting plan.

Landings and skid roads:

Multiple landings will be designated and skid trails located to minimize or eliminate stream crossings.(see map 5) Any stone wall crossing shall follow the recommendations in section g- “Cultural and Archeological” features of this document.

Equipment restrictions:

Restrictions on types of equipment used are not anticipated provided that equipment does not exceed 6 pounds per inch ground pressure. The lot is probably best suited to a combination of cable skidder and forwarder but a mechanical harvester would be suitable on much of the area.

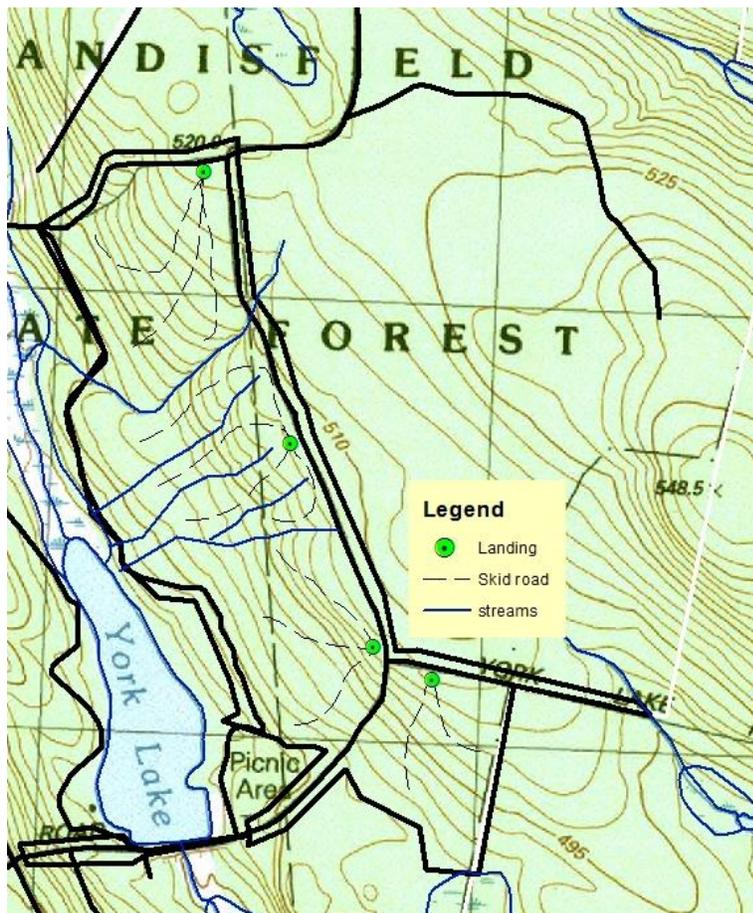
Utilization:

Tops and limbs shall be left in place and treated according to the terms of the timber sale permit. The entire merchantable portion of the main stem(s) may be removed, but as much as practical, any unmerchantable portion should be cut out before removal to the landing and left in place. Unless specifically tallied and designated for removal any down material shall not be removed. Snags cut for safety reasons must be left in place on the ground.

Guidelines for Delineation of sale attributes:

The following directions will apply for delineating all stand prescription attributes throughout the Egg Shell lot.

1. All wetlands and associated buffers filter strips, and streams will be flagged (pink wetlands) and painted with two orange diagonal lines. In some areas this line is also the sale boundary. No mechanized equipment will be allowed beyond this double diagonal orange line.
2. The project area boundary will be marked with two orange diagonal lines and flagged blue.
3. The skid trail network will be flagged out in red first, and marked in red paint upon completion of tree marking in order to finalize trail adjustments.
4. All cut trees over 5 inches will be butt marked in blue paint and marked at dbh, or higher, according to the following protocols:
 - Saw logs (11" and up dbh) will be marked with horizontal blue line
 - Pulp/Cord wood will be marked with a vertical blue line
 - Cull trees to be felled are marked with a blue X



Map 5 Preliminary skid trail and landing locations

Appendix 1

stems/acre stand 1

Overstory vegetation (live stems per acre)

Species	saplings	poles	small sawtimber	med sawtimber	large sawtimber	Total
sugar maple	0.0	22.5	14.1	6.8	0.9	44.3
red maple	8.1	21.8	7.5	2.4	0.4	40.2
American beech	0.0	33.8	5.0	1.1	0.0	40.0
northern red oak	0.0	11.3	7.5	6.8	1.4	27.1
yellow birch	0.0	7.3	3.7	0.4	0.0	11.3
white ash	0.0	0.0	5.6	3.1	1.1	9.8
eastern hemlock	0.0	2.0	1.0	0.0	0.0	3.1
paper birch	0.0	0.0	2.5	0.0	0.0	2.5
eastern white pine	0.0	0.0	0.8	0.0	0.8	1.6
black cherry	0.0	0.0	0.0	1.0	0.0	1.0
American basswood	0.0	0.0	0.0	0.5	0.0	0.5
Total	8.1	98.6	47.8	22.1	4.5	181.2

cell values are number of stems per acre.

stems/acre stand 2

Overstory vegetation (stems per acre)

Species	saplings	poles	small sawtimber	med sawtimber	large sawtimber	Total
sugar maple	0.0	95.9	12.0	2.4	0.0	110.3
white ash	0.0	16.3	6.5	7.5	2.4	32.7
black cherry	0.0	11.7	13.2	2.8	0.0	27.8
red maple	0.0	7.2	2.3	5.4	0.8	15.7
northern red oak	0.0	12.7	0.0	1.1	0.0	13.9

Overstory vegetation (stems per acre)

Species	saplings	poles	small sawtimber	med sawtimber	large sawtimber	Total
American beech	0.0	12.7	0.0	0.0	0.0	12.7
eastern white pine	0.0	0.0	0.0	1.9	0.6	2.5
Total	0.0	156.6	34.0	21.1	3.8	215.5

cell values are number of stems per acre.

Appendix 2

Volumes stand 1

Dead observations were ignored when calculating values in this report. Overstory only

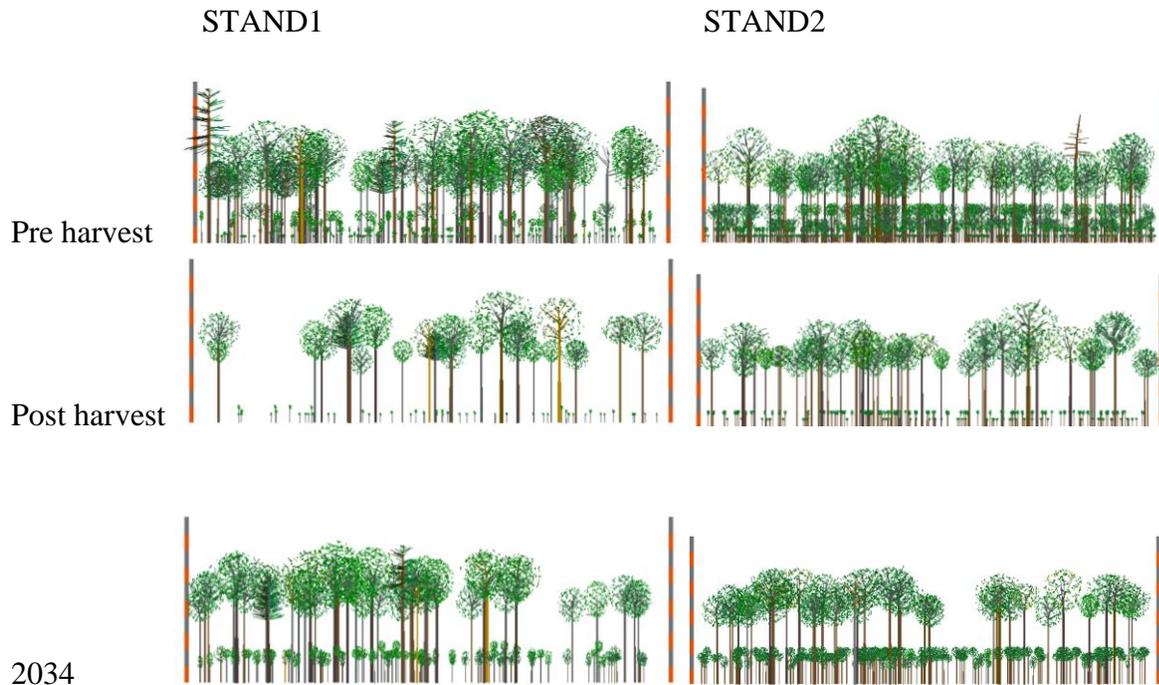
	All species	sugar maple	northern red oak	red maple	white ash	American beech	yellow birch	eastern white pine	eastern hemlock	black cherry	paper birch	American basswood
Sawtimber	15,154	3,751	3,870	1,783	2,899	761	583	672	82	377	188	189
Sawtimber net total (board feet/acre)	15,154	3,751	3,870	1,783	2,899	761	583	672	82	377	188	189
Pulpwood gross total (cubic feet/acre)	1,578	408	261	265	116	271	113	63	39	13	18	11
Pulpwood net total (cubic feet/acre)	1,263	326	209	212	93	217	90	50	31	11	15	9
Gross total (cubic feet/acre)	3,989	1,054	860	561	543	386	209	154	55	70	59	38
Net total (cubic feet/acre)	3,192	843	688	449	435	309	168	123	44	56	47	31

Volumes stand 2

	All species	sugar maple	white ash	black cherry	red maple	eastern white pine	northern red oak	American beech
Sawtimber gross total (board feet/acre)	10,582	1,902	4,230	1,882	1,276	867	424	0
Sawtimber net total (board feet/acre)	10,582	1,902	4,230	1,882	1,276	867	424	0
Pulpwood gross total (cubic feet/acre)	1,936	765	488	332	143	115	68	25
Pulpwood net total (cubic feet/acre)	1,549	612	391	266	114	92	54	20
Gross total (cubic feet/acre)	3,596	1,079	1,108	654	359	242	129	25
Net total (cubic feet/acre)	2,877	863	886	523	287	194	103	20

Appendix 3

The following diagrams generated by the Stand Visualization System (SVS) (McGaughey, R.J. 1997) using data from the NED program are an approximation of the appearance of the forest in 2014 pre harvest; after harvest and in 2034 after harvest and 20 years growth.



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