



HUBBARD PARK FORESTRY PROJECT

Montpelier, Vermont

Hubbard Park North End Project

FOREST MANAGEMENT PLAN TO IMPROVE WILDLIFE HABITAT AND FOREST HEALTH

Ryan Prepared November, 2018

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Hubbard Park – North End Montpelier, Vermont



Stand 1	Mixed Wood	10 Acres
Stand 2	No. Hardwood	10 Acres
Stand 3	Mixed Wood	4 Acres
Project	North End	24 Acres

Phase one of a wildlife enhancement and forest harvest project:

- Delineate and Inventory the forest stands to be affected with guidance by the park staff.
- Formulate a report and presentation on the current condition of the delineated stands and define the need for a forestry operation. In other words, generate a forest management plan for a portion of the park.
- Include an estimate of the value of the timber and a range of revenue that may be obtained when implementing a prescription.
- Describe the format for procuring a logging contractor and implementing the operation.
- Meet with Staff and Park Commission to deliver the report for discussion and action.

Stand 1- Mixed Wood 10 Acres

This stand is located along the Eastern property line along the lower elevations of the property. It is a mature, fully stocked mixed wood stand. Based on sampling data collection, the stand is dominated (63% of the basal area) with eastern hemlock. Associated tree species include sugar maple (16%), red maple (11%), white ash (5%) and yellow birch (5%). Smaller numbers (2% and less) includes white pine, eastern hop horn beam, black cherry and American beech. White pine trees are found in a small cluster concentrated in the north end of the stand nearby the trail end to the stump dump. White ash is also found in some concentrated pockets in a couple areas of the stand. Yellow birch pockets are found with mostly smaller sapling (stems 2-4" diameters) and pole size stems (diameters 4-8" DBH). Species mix is more evenly allocated among the trees with smaller pole size diameters. Stem diameter distribution include 16% pole sized (stems 4-8"), 49% small sawlog (stems 10-14") and 35% large sawlog sizes (16" and larger stem diameters). Stocking is considered over-stocked or crowded. Tree crowding reduces growth rates, suppresses smaller trees beneath the upper canopy and depresses regeneration.

Timber quality is fair to good with relatively tall and straight stems on most of the trees. Hemlock stems display average timber quality, larger diameters are showing some signs of ring shake (a defect that reduces value and in many cases volume). White ash stems are of fair to good timber quality. White pine trees are all larger trees towering in the overstory with straight good timber quality. Beech are all showing advance stages of the beech scale disease and are in rapid decline. Red and Sugar maple trees are generally average in tree vigor and stem quality for sawtimber.

Regeneration is sparse to non-existent in crowded areas. Some more adequate numbers of seedlings and well-established saplings are found in small more open areas. Tree species include yellow birch, beech, red maple, hemlock, striped maple and red spruce. Yellow birch trees display excellent future potential for high quality timber.

Access to this stand is mostly easy from the stump dump as it is the stand nearest the trail head. The terrain is sloped, facing east, steep in most areas with some ledge areas found throughout the stand. Equipment maneuverability should not be too difficult in most areas.

Stand Data

Acres 10 **Site Class** II
Site Class Determination site index: Eastern Hemlock - 58
Forest Type Hemlock– Mixed wood **Age Class Determination** Even aged
Major Species Hemlock, Sugar Maple, Red maple, Yellow Birch
Stocking Level Fully stocked **Condition** Fair **M.S.D** 13.8"
Stand History/Age Stand is mature, perhaps more than 130 years old. There are no signs of any recent logging activity.
Basal Area / Acre 163
Acceptable Growing Stock B.A. / Acre 155
Sampling Data: 5 plots with #10 prism
Advanced Regeneration Varied - sparse to adequate in openings
Regeneration Sampling Data: 5- 1/100 acre plots

Desired Diameter 18-26" **Volume / Acre** 7-9 MBF

Even / Uneven Aged: even
Rotation Age: 130-150 Years

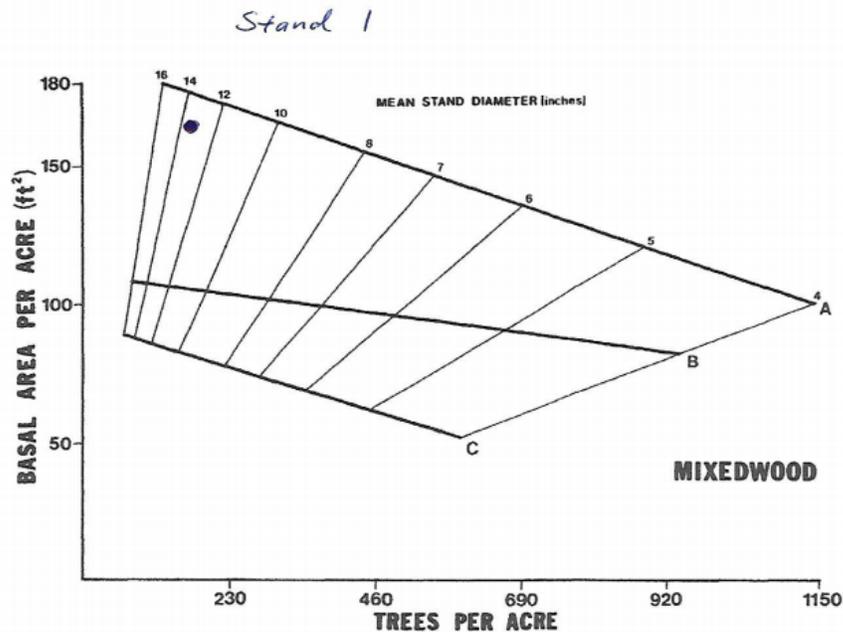


Figure 7.—Stocking guide for main crown canopy of mixedwood stands (25 to 65 percent softwoods) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual

Prescription:

The primary goal for this stand is to maintain and enhance habitat for native wildlife species. This area is also a mapped deer yard established by the state Fish and Wildlife Dept. The following recommended treatment is intended to provide adequate cover for deer wintering and create new regeneration plots for food and edge habitat, desired by most all native wildlife species. A thinning in many portions would restore vigor to remaining trees and stimulate regeneration. Using single tree and small group selection methods, harvest in a range from 20-33% of the trees. Areas with mostly hemlock trees will be mostly left alone to maintain a closed canopy for winter cover. Some hardwood trees may be removed from hemlock pockets to restore vigor in remaining hemlock trees. Areas with ash and maple concentrations will be thinned more aggressively to stimulate regeneration and enhance growth on trees with sapling and small pole stems. Harvest trees shading and competing with yellow birch that are found in concentrated pockets to release them and enhance vigorous growth. Create 2-3 small openings that are not larger than the average height of the dominant trees. (50-70 foot diameters). Leave standing trees of good stem quality for timber and with good seed potential. Residual stocking should remain no lower than 80 sq. ft. per acre in areas with mostly hardwood tree species and 100 Sq. Ft. per acre in areas dominated with softwood trees.

Stand 2 - Northern Hardwood 10 Acres

This stand is located in the center of the project area on sloped, ledge filled land. It is a mature northern hardwood stand. Dominant trees species include sugar maple (47%), white ash (24%), red maple (17%). Associated tree species include hemlock (9%), yellow birch (3%) and 2% or less of large tooth and small tooth aspen, white birch, beech and eastern hop horn beam. Among the smaller trees with pole size stems, sugar maple is most prevalent with 61% of the trees counted. Tree species distribution is fairly widespread with no highly visible concentrations of a specific tree species in any one area of the stand. Stem diameter distribution include 24% with pole sized stems, 45% small sawlog and 31% large sawlog stem sizes. Stocking is considered over-stocked affecting vigor and regeneration. Some blow downs have occurred due to weakened vigor on some mature trees in more vulnerable situations. White ash is most vulnerable to wind throw due to their position in the overstory.

Sawtimber quality is generally good to very good. Sugar maple trees display average stem quality and tree heights. Many show signs of past attacks by a sugar maple borer insect that attacks pole size trees at about 4 feet off the ground causing a defect that can remain a defect throughout the life of the tree. White ash are generally the tallest trees in the stand dominating the overstory in most areas. Stems are generally straight and free of defects and of very high value. Red maple are generally sound straight and display fair to good quality timber potential. Yellow birch is also showing good quality stems for timber. White birch, aspen are mostly overmature and in decline. Hemlock has fair to good stems for timber. Beech is in decline due to the beech scale disease.

Regeneration is spotty, sparse in most areas. Small numbers of seedlings are found consisting mostly of beech, yellow birch, red maple, sugar maple and white ash. Fewer numbers of white pine, red spruce and black cherry seedlings are found near the edges of the stand. Most sapling sized trees are suppressed in the understory.

The walking trail passes through the northern portion of the stand. The terrain is sloped, steep in most portions with a few level areas found in a step type mode. Soils are fertile but shallow in most places due to the amount of ledge found throughout the stand. Access is not difficult from the stump dump. Equipment maneuverability will be challenged limiting the type of operation that would be best suited for this property.

Stand Data

Acres 10 Site Class II

Site Class Determination Site Index: White Ash -70

Forest Type Northern Hardwood Age Class Determination Even Aged

Major Species Sugar Maple, Red Maple, White Ash

Stocking Level Full Condition Fair to Good M.S.D 12.7"

Stand History/Age Stand is about 80 years old. Some cutting took place about 25-30 years ago.

Basal Area / Acre 138 Acceptable Growing Stock B.A. / Acre 125

Sampling Data: 10 plots with #10 prism

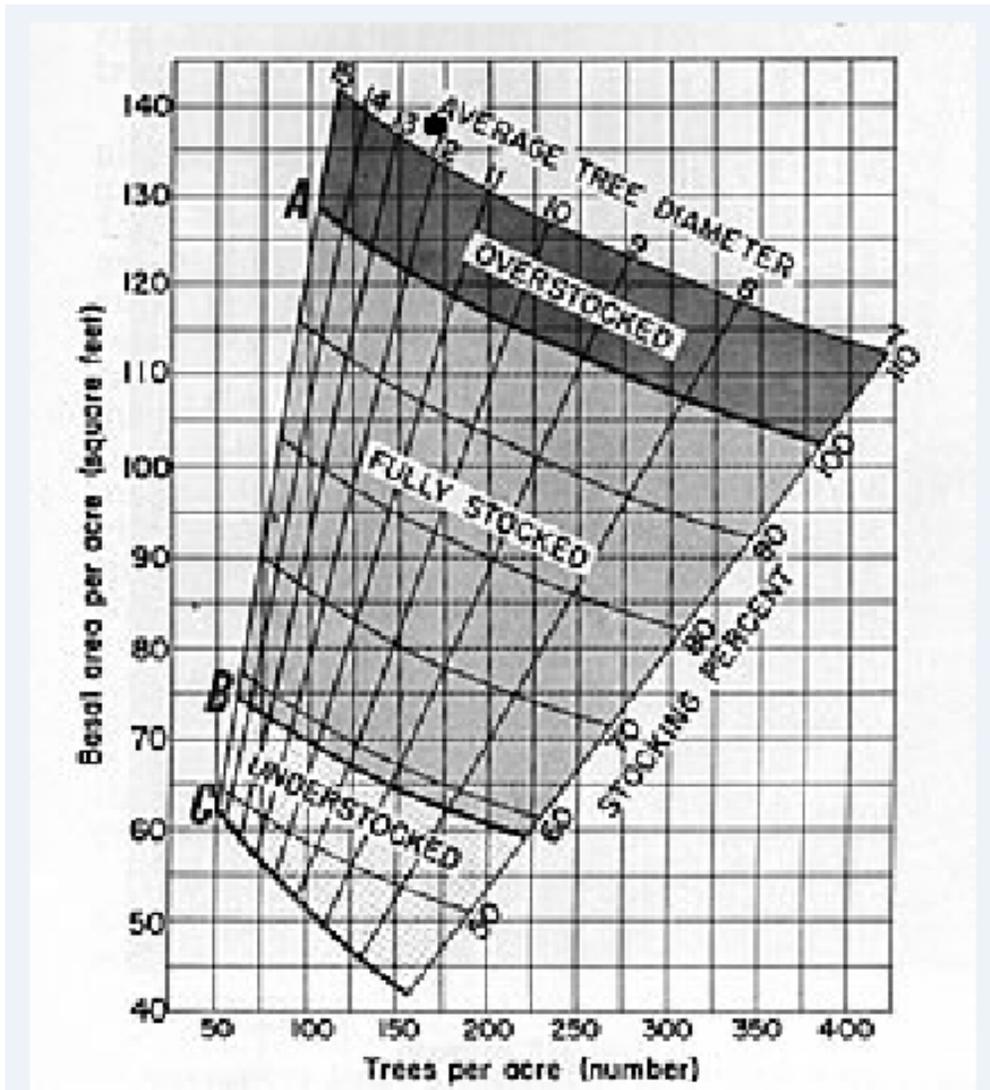
Advanced Regeneration Varied, mostly sparse

Regeneration Sampling Data: 8- 1/100 acre plots

Desired Diameter 20-24" Volume / Acre 5-7 MBF

Even / Uneven Aged: uneven

Cutting Cycle: 30-40 Years



Prescription - Stand 2:

Wildlife will generally use this stand primarily as a food supply. To enhance food sources, a thinning is needed to reduce crowding, promote vigor on remaining trees and stimulate regeneration. White ash trees are mostly fully mature and occupy the overstory. The ash trees are beginning to show decline and some blowdowns have occurred recently. Using single tree selection method, remove mature ash and overmature white birch and aspen trees. Remove other tree species when needed in areas to reduce crowding and improve spacing for optimum growth. Leave standing, most maples, cherry, yellow birch and some beech that display enough vigor to survive the Beech Scale Disease for several more years. A few ash trees will remain standing to provide seed for ash regeneration. Reduce stocking by no more than 30% to a Basal Area of 85-90 square feet per acre.

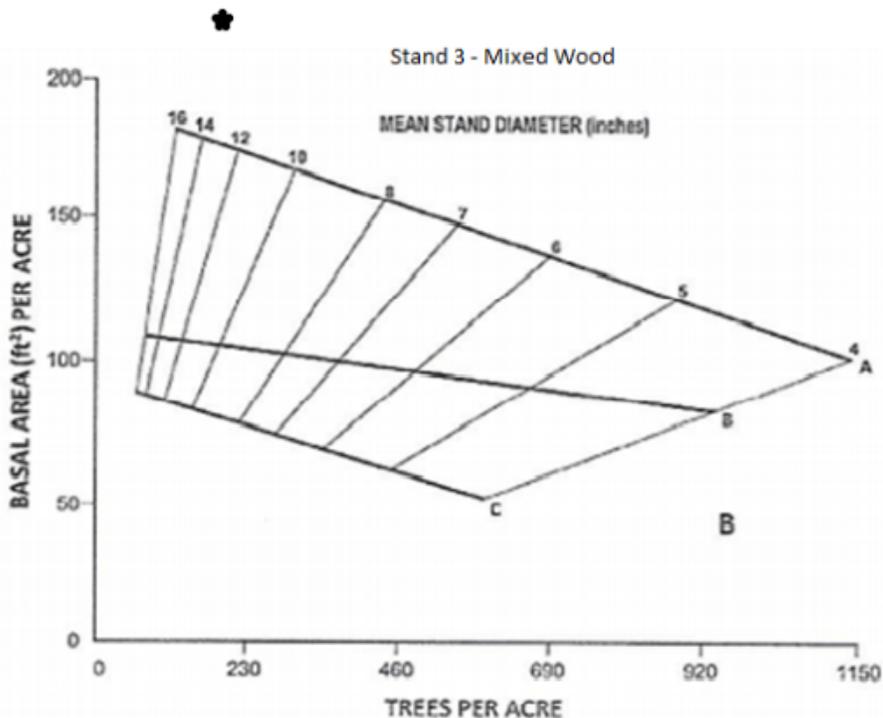
Stand 3 – Mixed Wood 4 Acres

This stand is located along the north and eastern sides of the parcel in the highest elevation of the project area. It is a mixed wood stand of mature softwood and hardwood tree species. Dominant tree species include hemlock (45%), yellow birch (23%), beech (13%), red maple (10%) and sugar maple (6%) of the number of trees based on basal area sample plots. Associated tree species include a few balsam fir, red spruce and eastern hop horn beam trees. Species dispersal is fairly consistent throughout the stand. Stem diameter distribution include 26% with pole sized stems, 51% small sawlog and 21% large sawlog stem sizes. Stocking is considered over-stocked affecting vigor and regeneration.

Trees with sawlog sized stems display fair to good timber quality. Many pole sized stems show very good timber quality potential. Beech scale disease is advanced and most beech trees are in decline. Hemlock, yellow birch and red maple trees generally have stems with good timber quality. The entire stand is very crowded and trees are showing signs of stress. Live crown ratios are shrinking causing loss of vigor, crowns begin to shrink with increasing amount of dead wood is found in tree tops. Currently the crown is 95-100% closed causing little to sunlight onto the forest floor and into lower portions of the stand.

Regeneration is sparse, almost non-existent. A few beech, red maple and hemlock seedlings are found in very small pockets in a couple areas. No invasive shrubs were noticed during the field survey. A few saplings, mostly beech are suppressed in the understory.

The terrain in this stand is more moderate and contains less ledge than stands 1 and 2. Access can be found from stand 2 and the neighboring parcel to the north.



Prescription:

The primary goal for this stand is to maintain and enhance habitat for native wildlife species. This area is also a mapped deer yard established by the state Fish and Wildlife Dept. The following recommended treatment is intended to provide adequate cover for deer wintering and create new regeneration plots for food and edge habitat, desired by most all native wildlife species. A thinning in many portions would restore vigor to remaining trees and stimulate regeneration. Using single tree and small group selection methods, harvest in a range from 20-33% of the trees. Lighter thinning can be done in the area containing mostly hemlock trees to reduce over-crowding and attempt to regenerate more hemlock trees. In these hemlock areas, do not open the canopy more than half the height of the dominant trees to maintain enough shade for hemlock to grow and to continue to serve as a deer wintering area. Areas with ash and maple concentrations will be thinned more aggressively to stimulate regeneration and enhance growth on trees with sapling and small pole stems. Leave standing trees of good stem quality for timber and with good seed potential. Residual stocking should remain no lower than 80 sq. ft. per acre in areas with mostly hardwood tree species and 120 Sq. Ft. per acre in areas dominated with softwood trees.

Vista improvements at the Tower

Assistant Director Alec Ellsworth and I visited the tower site to explore how the scenic vistas from the tower could be enhanced. Many trees on all sides are at full height and are blocking some very desirable views. The challenge here is the fact that the State of Vermont owns the forested lands on three sides of the tower. The park owned portion is only on the north side and has full control over no more than a third of the trees that are blocking views.

For the park side there is a very large red oak tree front and center in the viewshed and if removed would open up a very large area to view mountains and the countryside to the north and west. This oak tree, however, is also a very attractive tree in it of itself, so should we remove one attractive site for another? It was suggested that if we removed enough of the smaller trees near to and surrounding the oak tree, a view of the countryside can be seen and showcased by the oak tree. Once a decision is made on the oak tree, Ed Larson can survey the forested area the north and northwest and northeast areas and identify and mark trees to be removed to reduce the number of trees impeded the viewshed. The park staff can remove the trees on a schedule that it finds suitable.

The portions of the viewshed towards the south, southeast and southwest are impeded by trees on state owned land. Two stands closest to the tower include a fairly large pocket of over mature red pine trees. The red pine trees are found mostly to the west and south blocking a fair amount of the view towards the mad river valley. These trees are tall, but have spindly tops with a live crown ratio of below 15%. These trees are quickly losing vigor, are in decline and blow downs will increase. The second stand is located east of the red pine block views of land surrounding National Life. It is a hardwood mix dominated with poor quality black cherry trees. Many of the cherry trees have up to 90% dead wood and are in rapid decline, again blow downs will accelerate if left alone. Removing most of the trees in these two stands will enhance the views on much of the state-owned land. That land is also the forested backdrop for the Vermont Statehouse. It is desirable to maintain the forested backdrop for the unique and popular appeal of the statehouse. Looking across at the Statehouse from National Life campus, it is not easy to see the red pine or cherry trees at the top of the hill behind the Statehouse. If those trees were removed, the view of the Statehouse and the forested backdrop will not be negatively impacted.

Contact was made with the Commissioner of Building and Grounds, responsible for the Capitol Complex grounds. Coincidentally, the City of Montpelier, with Tree Warden John Snell met with BGS to discuss the Emerald Ash Borer and seeking a method to mitigate damage to the forest surrounding the Statehouse. This meeting included the Commissioner of Forests, Parks and Recreation who appointed one of his foresters David Wilcox to survey the forested area and come up with a plan. After a discussion with Mr. Wilcox, it was agreed that the needs of the state to mitigate ash damage and the Park's desire to improve a vista by removing over mature red pine and black cherry could and should be done simultaneously. After Wilcox completes the field survey, we can meet again to discuss the concept in more detail. At that time, Park staff can coordinate with the state on a harvest plan for this area.

Summary

All three stands in the project area would benefit from prescribed treatments described in this plan. Careful thinning will improve the health and vigor of the trees and enhance habitat conditions for all forms of wildlife that use and visit these stands.

This project may be performed either with staff or by contract with a commercial logging contractor. It is a large project for staff and a small to medium operation to a commercial logger depending on the type of equipment the logging contractor uses. Due to terrain constraints and access limitations, this project it would be a better fit for an operator using a smaller cable skidder and felling is done by hand. The process for placing the project out to bid for an outside logging contractor involves a few steps and is subject to any city procurement or contracting policies. Steps include:

- Mark trees for harvest and the boundaries of the harvest site
- Create an Invitation to bid including a map, copy of the plan and a summary description of what is being cut and specific conditions that will be included in a contract.
- Send invitation to an approved list of reputable logging businesses with a deadline for closing bid acceptance.
- Set a couple dates for interested logging contractors to view the site and ask questions, or set up a by appointment system.
- Accept bids for what the contractor is willing to pay for the trees and describe their operation.
- Determine best bid (not always highest bid) and engage in a contract with the contractor awarded the contract or reject all bids and start again.
- Contract includes detailed information on expectations contained in the terms of the agreement, most are also described in the invitation to bid.
- Prepare site for the project such as signage for visitors and a diversion of walking trails to avoid the harvest site.
- Oversee operation to confirm compliance to terms and conditions of the contract and collect revenues on regular intervals.
- Upon completion of the operation, inspect site to assure the project is properly closed, water quality is protected, roads and trails are reasonably restored and all proceeds are collected.

Portions of the existing walking trail will likely be used as a skid row because the terrain conditions. Depending on weather conditions, it is expected that this operation could be completed in 12 weeks or less.

The next step involves full review from staff and a discussion with the Commission on how and when to move forward. This involves both the wildlife enhancement project in the north end and the work that could be performed around the tower to enhance views.

Volume and Value of a Harvest

Based on prescriptions in this plan, a rough estimate is found below of the volumes and value of a harvest in these three stands. Much depends on which trees are selected for harvest and the quality of the sawlogs. This estimate is based on current market conditions which can fluctuate greatly depending on supply and demand factors. The ash, white pine and sugar maple trees are

of the highest value for sawtimber. The dominant ash tree will be the largest volume and value of trees harvested in this project. Much smaller numbers of sugar maple and white pine are expected to be marked for harvest. Beech and aspen will likely contain very few sawlogs and will likely be mostly hardwood pulp quality. White birch, yellow birch, red maple will generate a small percentage of the total volume and value of the harvest. Hemlock, red spruce will not be targeted for harvest except in very crowded areas and will not be a large percentage of the harvest. Balsam fir will be targeted for harvest but most will likely be softwood pulp due to over maturity.

Product	Volume	Revenue Range
Hardwood Sawlogs	25-30 MBF	\$3,500 – 4,500
Softwood Sawlogs	10-15 MBF	\$1,100 – 2,200
Pulp	80-120 Tons	\$160 – 250

Total Range expected is between \$4,800 to \$6,600.

*MBF= 1,000 Board Feet

