

TIMBER CRUISE AND FOREST MANAGEMENT PLAN

of the

HOPKINTON TOWN FOREST SYSTEM

HOPKINTON N.H.

prepared by

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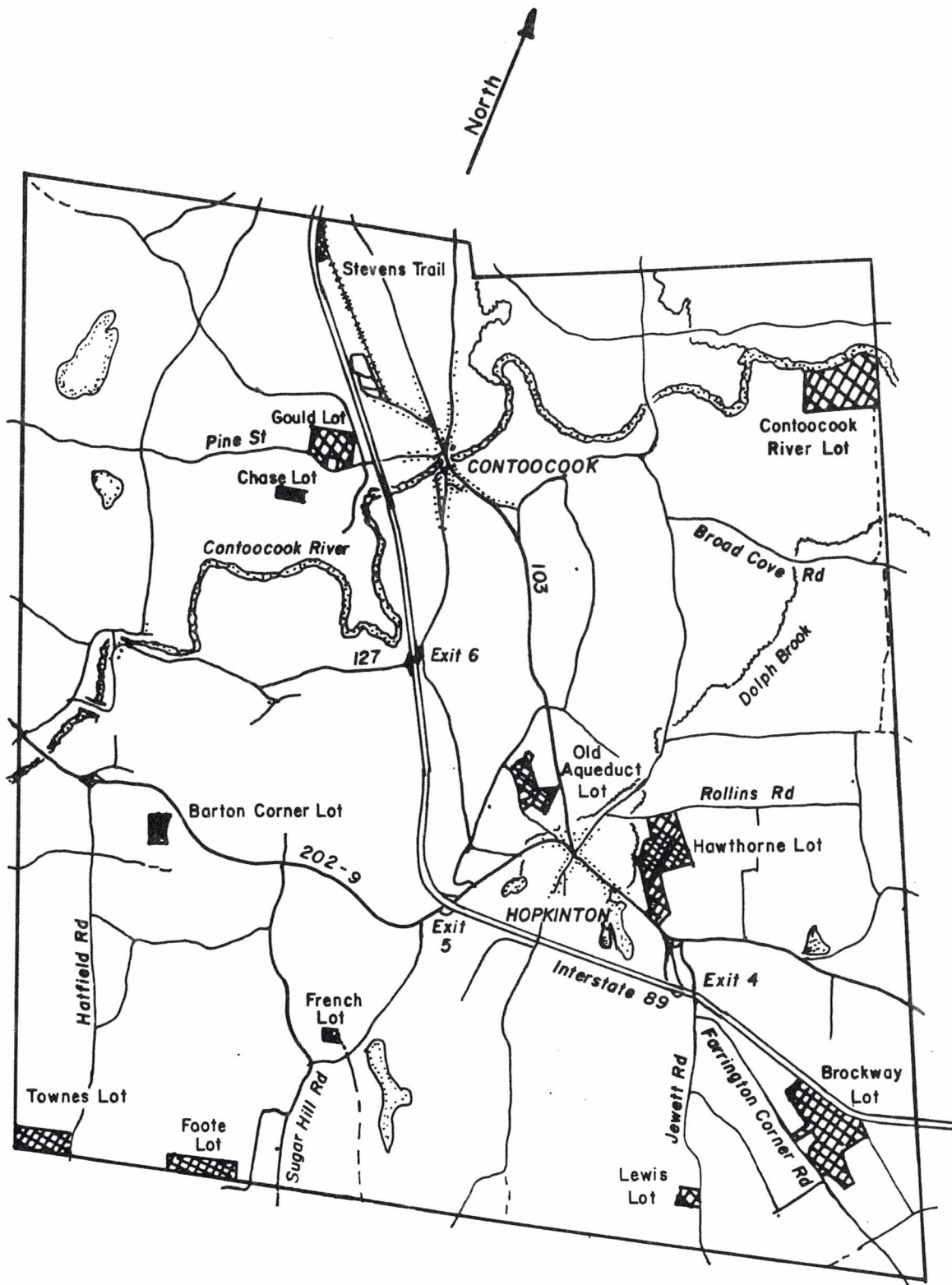


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LISTING OF HOPKINTON TOWN FORESTS
JANUARY 1999

<u>Tax Map/ Lot Number</u>	<u>Common Name</u>	<u>Forested Acreage</u>	<u>Wetland Acreage</u>	<u>Other Acreage</u>	<u>Total Acreage</u>
206-19'221-126	Stevens Trail	8.3		11.2	19.5
214-1	Townes Lot	41.5			41.5
217-41	Barton Corner Lot	24.0			24.0
220-35	Chase Lot	12.0			12.0
221-44	Gould Forest Lot	41.5	4.0		45.5
231-8	French Lot	9.7			9.7
233-2	Foote Lot	29.5	1.5		31.0
239-56	Aqueduct Lot	33.5			33.5
246-6	Contoocook River Lot	78.0	19.0		97.0
250-6;251-10.1	Hawthorne Lot	101.0	7.0	3.0	111.0
256-5	Lewis Lot	10.0	6.4		16.4
265-2;266-44.01	Brockway Lot	76.0	22.0		98.0
Total Acreage		465.0	59.9	14.2	539.1



Location Sketch
HOPKINTON TOWN FOREST LOTS
1 inch=1.2 miles
1999

TIMBER CRUISE AND FOREST MANAGEMENT PLAN HOPKINTON TOWN FORESTS

INTRODUCTION

The Hopkinton Town Forest system contains twelve lots that total approximately 540 acres and are found scattered throughout the Town. They range in size from 9 to 110 acres and are currently managed by the Hopkinton Conservation Commission. Of the 540 acres, 465 acres would be considered commercial forest land. The remaining acreage consists primarily of wetlands. Several are protected by Conservation Easements. About half of the lots were acquired by the Town by Tax Collector's deeds. One was purchased through the Federal Land and Water Conservation Program and two were purchased through the N.H. Land Conservation Investment Program. Two lots were donated to the Town by generous townspeople. The Commission has been managing the Town Forests since the early 1980's when Forest Management Plans were drawn up for two of the lots by the N.H. Division of Forests and Lands. Monies from the timber sales on those two lots were used to set up a Forest Management Fund to cover future management costs as the need arose. Most of the lots have been formally or informally surveyed and have identifiable boundaries. All but three are accessible by Town maintained roads. In the mid 1990's, the Commission felt that the forests should be more intensively managed using the "Multiple Use" concept where equal consideration is given to timber, recreation, wildlife, watershed and education. FORECO was then hired to help the Commission expand their Forest Management program to include the many and sometimes conflicting uses currently demanded of the Town Forest system. In 1998, the Commission decided to start developing a Forest Management Plan to cover all of the Town Forest lots.

GOALS AND OBJECTIVES OF THE TOWN FOREST SYSTEM

The goals and objectives for the Town Forest system are many and quite diverse, but all ultimately enhance the environment in which the Town's citizens live. Listed below are the goals of the Hopkinton Conservation Commission that are used as guides in their forest management activities.

- Provide enough undeveloped "Open Space" to help the Town maintain a rural ambiance and character.

- Develop high quality, healthy forest types, whose harvests will produce sufficient income to cover management expenses and allow the purchase of additional conservation lands.

- Provide a variety of productive habitats to maintain a diverse and healthy wildlife population and to protect critical habitat types.

- Provide residents with public land for outdoor recreational activities.

- Protect watersheds and wetland areas.

- Provide areas for Environmental Awareness and Education.

- Protect cultural, historical or other unique features found in the forest.

GENERAL RECOMMENDATIONS TO ATTAIN THE GOALS AND OBJECTIVES

Whereas the Town Forest System contains multiple lots that have similar recommendations regarding non-timber production activities, several general recommendations are listed below to avoid repetition and when applicable, will be referred to within the silvicultural recommendations for each forest type.

OPEN SPACE

Open Space is a very important part of any community. It provides aesthetic and recreational opportunities, wildlife habitat and helps to minimize the "urban sprawl" appearance. The Town of Hopkinton has experienced sporadic periods of intense housing development. Some of those developments carried scenic words in their titles such as "meadows", "woodland", and "Green" which reflects the appeal of Open Space. However, such developments frequently destroy the very thing that they are trying to promote. It is extremely important to protect some open space areas allowing the residents a place where they can at least relate to the desirable qualities that originally attracted them to the Town. Any development, large or small, will have an immediate impact of the use of the forest. For example, wildlife populations may have been using the now developed acreage as part of their habitat. If their habitat needs can not be met within an abutting forest, they will move out of the area. Animals will sometimes adapt and become a nuisance in the eyes of homeowners. Deer will browse on shrubbery, skunks will dig up lawns looking for grubs and occasionally have strongly scented liaisons with pets. Raccoons are notorious for getting into trash and eating pet food left outside. On the other hand, having a forest in the back yard gives children an unlimited opportunity to explore and learn about nature on their own. A definite "kiddie zone" can often be found extending 100 to 200 feet into the woods from the back yards in new developments where small forts, camps, and secret paths are frequently located. This zone is technically called the "Urban-Wildland Interface" and as development continues to expand, more and more acreage will fall into this zone.

Recommendations on how to protect the designated Open Space within the development, or within an existing Town Forest that is located adjacent to a proposed development are usually based on an overall environmental evaluation of proposed development. Is the development eliminating habitats and travel corridors not found in adjacent Town Forests? What will the impact be on the management plans for the nearby Town Forest? These are only a few of the questions that should be asked when a proposed development either abuts a Town forest or is to be built on a large tract of forest land. Usable open space should be part of most large scale developments. Buffer zones should be established along the boundary in any Town Forests that is adjacent to a development to account for

the "Kiddie Zone", and conversely, buffer zones should be established within developments around wetlands and other critical habitats and connected to other protected open space when possible. Usable public access routes to such open space should also be required.

Although the Town Forest system is relatively small, Hopkinton also contains three State Forests totaling 526 acres, with the largest being the Mast Yard State Forest, along with 2,820 acres of Federal Flood Control reservoir that together provide for extensive "Open Space" within the Town. As the population expands, demand for housing will continue to increase to meet the "habitat" needs of the people. Long term planning with environmental considerations will help keep all types of habitat healthy, productive and relatively compatible.

TIMBER PRODUCTION

Establishing a Town Forest solely for timber and income production is no longer preferable now that forests are recognized for providing many non-income producing benefits. However, income production is still important to cover the costs associated with land management. These costs typically include boundary surveys and maintenance, trail and road construction and maintenance, management plan updates and occasional wildlife habitat improvements. It also provides funds to purchase other conservation lands.

Forest growth is dependent on the interaction of site/soil quality, weather, and past and present management practices. In the past, white pine was considered "king of the forest" and much time, money and effort were wasted throughout the State trying to grow pine on sites not suitable for that species. Frequently, the treatment was detrimental to species that are now more valuable than pine. As a result, emphasis should be placed on growing trees that are suited to the site conditions found within the Town Forest. Site conditions are most easily determined by soil types. In general, the deep, dry sand and gravel outwash soils will favor pine; deep, fairly well-drained glacial till soils will favor a mix of oak, birch, pine and maple; and poorly drained soils will favor red maple and hemlock. Poorly drained soils are often considered wetlands and are not productive timber growing sites. Their value lies in watershed protection and as wildlife habitat. There are only a few areas in the Hopkinton Town Forests that contain the dry, outwash soils. Not surprisingly, those sites are currently dominated by pine. Whereas these natural pine sites are relatively rare in the Town Forest system, efforts should be taken to maintain the pine forest on those sites. The majority of the Town Forests contain the mixed hardwood-white pine type in the mid to late successional stage. Most of the Town Forests were once

cleared for pasture or cropland. When the farms were abandoned, the fields grew in with white pine. Almost all of the pine stands have been cut over at least once. Some were clear-cut many years ago which allowed the hardwood forests to develop. Others have been selectively cut once or twice which created a more mixed hardwood-softwood forest. The mixed forest type will continue to expand as the regeneration established after the first selective cuts begin to mature. Past gypsy moth defoliation killed off many oak and hemlock trees that had been growing in sites considered marginal for those species and those areas are now slightly dominated by species not included in the moth's diet. As the years progress, the species composition in the mixed forests will probably remain the same, though the proportions of each species will change.

Due to the relatively long time that it takes for a tree to mature, and that forest product markets fluctuate and change over time, stem quality instead of species type should be a stronger consideration when managing a stand of timber. Straight, vigorous stems should be favored for long term growth and development instead of trees that are crooked, forked, growing in clumps, suppressed, diseased or damaged. This does not mean eliminating hollow "den" trees, or trees that are so outrageously deformed that they have aesthetic appeal. Some species are relatively rare for the area, such as spruce, balsam fir, hickory and black gum and should receive some protection.

Cordwood and whole tree chipping (Biomass) thinnings should be conducted when the forest is young to prevent early stagnation. Later timber harvest should be designed to sustain the forest ecosystem, with the high-volume/high-value harvests put out to bid to area mills and loggers to maximize financial returns. Using the services of a Licensed Professional Forester should help insure the successful integration of the silvicultural needs of the Town Forest with the other uses of that particular forest during a harvest operation.

WILDLIFE

Observing wildlife can be the most memorable part of any forest experience. A variety of wildlife and wildlife sign were noted during the field cruise of the Town Forests in the fall and winter of 1998-99. Mammal species or signs of species observed included moose, deer, coyote, raccoon, beaver, muskrat, mink, otter, skunk, porcupine, fox, squirrels, rabbits, bats and mice. Bird species included ducks, geese, herons, hawks, owls, ruffed grouse, crows, woodpeckers, turkey and numerous songbirds. Due to time of year of the cruise, few insects, reptiles or amphibians were observed, though they have been seen at other times of the

year. The presence of these species usually indicates the presence of adequate habitat for a breeding population. The size of a species' population is usually dependent on the amount of suitable habitat. Animal populations can often be manipulated by varying the amount of habitat. However, unless a species is rare and endangered, one species should not be favored over another. There are no "good" or "bad" animals in the wild. Providing a variety of habitats will increase the diversity of wildlife. Most wildlife are opportunists and will take advantage of almost any type of habitat according to their needs. As habitats are slowly lost to development, it may become more important to replace some of the lost habitats to avoid losing wildlife populations.

There are several habitat improvement and protection practices that can be incorporated into the timber harvesting activities. First, all harvesting should follow the State's "Best Management Practices" (BMP's) guidelines for logging. Wetlands should be avoided and stream crossings should be kept to a minimum. Any crossings should be designed to prevent mudding of the stream. This includes installing temporary bridges, culverts and/or pole fords. Logging should be avoided during "mud" season or prolonged rain spells. Truck roads should be properly constructed to minimize erosion. These practices are designed to protect water quality, which in turn protects the aquatic habitats of fish, amphibians and certain birds and mammals. Vernal pools should also be protected during harvest activities by creating large enough buffer zones around the edges to keep the pool shaded and to prevent the logging slash from falling into the water zone. Such pools are important breeding grounds for many amphibians. Den trees as well as potential den trees should be left and protected during harvest activities. Leaving five to seven of those types of trees per acre is recommended to provide sufficient habitat. Hollow trees are nesting sites for squirrels, mice, bats, raccoons, owls and other birds along with many insects that are at the bottom of many food chains.

Trees with a three-pronged fork are preferred nesting site for hawks. Sufficient "mast" (nuts and acorns) producing trees should also be left to provide a food source for wildlife. Acorns are a primary food source for deer, squirrels, turkey and other birds. Most nesting activities occur during the latter part of mud season and are not often disturbed by the logging, though heavy recreational use during that time of year can also have a negative effect on wildlife.

Dense stands of young white pine and hemlock thickets provide critical winter shelter areas for deer, grouse, rabbit and several other species. Those types should be protected, and attempts should be made to establish or promote those forest types near areas lacking softwood cover. Mature pine and hemlock stands that show signs of winter use by deer

should be maintained for winter cover by keeping at least a 70% crown closure, of which 50% should be softwood. Hardwood sprouts, especially red maple are an important food source. Deer, moose and rabbit depend on such browse for their winter and early spring food supply. Most harvesting will temporarily increase the potential browse supply. Quarter to half acre patches of hardwood forests could be clear-cut to provide vigorous hardwood sprouting. Sprouts become too tall for the animals five to seven years after the harvest. At that point, the sprouts could be re-cut or allowed to develop into a forest, and new areas could be cut elsewhere.

Beaver ponds are prime habitats for many wildlife species. Most of the beaver ponds found in the Town Forests were abandoned as the beavers have exhausted their food supply. The pond areas are reverting to marshes which offer habitat to other types of animals. The natural cycle of a beaver ponds should be allowed to continue unhindered as each phase has its own ecosystem.

One particular habitat found lacking in the Town forest system is the "old field" type on upland soils that primarily contains grasses, weeds and shrubs. Efforts should be taken to preserve any existing open space by periodic mowing to slow down the normal forest succession process. Log yards could be made extra large and seeded and mulched upon completion of the harvest. Re-use of the log yards during future harvest will help keep those sites open. Edges of the woods roads can also provide the grass/shrub habitat if the trees are cut back far enough to allow direct sunlight onto the road. Although this provides some habitat, it also increases the maintenance needs to keep the "brush" from growing into the roadway.

RECREATION

Forest recreation in or around the Hopkinton Town Forests includes hiking, wildlife observation, cross-country skiing, snowshoeing, mountain biking, snowmobiling, hunting and All Terrain Vehicle (ATV) use. Some of the uses are often thought to be incompatible with logging and are sometimes incompatible with each other. Ironically, most of the above uses occur on logging roads and skidder trails. Occasionally, silvicultural prescriptions or site conditions will dictate the time of year when logging will occur. Advance notice of planned forestry activities helps reduce the shock factor typically found when a harvest is un-expectantly encountered. Buffer zones should be established along heavily used trails that were constructed for a specific use. The zones should be at least one tree length wide on either side of the trail. Topographic restrictions, such as wetlands or steep slopes, may require crossing or running on a trail for a short distance. Care should be taken in such a situation to keep the trail clean and passable at all times. Re-locating established trails out of the timber management zones will help alleviate conflicts.

Trails could be located in areas where cutting is not planned such as along brooks and boundaries. It is more difficult to address compatibility when logging roads are used for trails, especially in the winter. Plowing the road during a harvest eliminates recreational winter use of the road, and alternative routes are usually difficult. Safety becomes a major issue for trucking when snowbanks along the roads are high and difficult to climb over. Logging in areas with high recreational use should be avoided during weekends when the use is at its peak. There have been few, if any injuries to curious bystanders during logging, though there have been several close calls. Signs should be posted to warn the public of the dangers of logging, and they should be discouraged from entering the tree felling areas.

Except for ATV's, all of the above listed recreational uses are relatively environmentally friendly. The Contoocook River Lot receives most of the ATV use and that is mainly on the logging roads that access the Town Forest. That logging road has been gated and because the gate is relatively new and well constructed, it has not yet been vandalized. It is important to maintain any of the gates, as well as to provide parking places near the gates for recreational users. Maintaining the logging roads not only reduces the costs of future harvests, but also provides access routes for fire and rescue vehicles. The Class 6 roads throughout the Town have all been used by four wheel drive trucks during peak mud season as an apparent proof of manhood by a select group of individuals. Because such roads access several ownerships, gating has not been effective. Most landowners serviced by a Class 6 road are reluctant to properly upgrade the road above and beyond what is absolutely necessary do access their lot for a temporary use, especially if the improvements will be to the advantage of an abutter who is unwilling to share in the cost. As a result, whenever a Class 6 road is needed to access a timber sale, expect some high road improvement costs.

Most of the trails within the Town Forests are hiking/cross-country ski trails that are maintained by the Commission, abutters or other volunteers. There are occasional snowmobile trails that cross a Town Forest that are maintained by local snowmobile clubs. All three of the largest Town Forest Lots have a hiking/cross-country ski trail system. Most of the other lots are too small too support a formal trail other than small footpaths typically made by local children.

Typically, trail systems are laid out to access some major attraction or unique feature that will draw people to the site. Mountain and hill summits with views, along with cliffs and isolated ponds are the most effective draw, but none were found during the cruise. All summits encountered during the cruise were assessed for their view potential, but none had steep, long slopes that could be cleared to provide

a view. So, instead of creating an extensive trail system that may or may not be used, existing trails should be mapped and promoted for "walking" as opposed to "hiking". If possible, trails should be connected to create loops which are much more preferable than retracing one's steps from a dead end. Any trails that are promoted to the public require **YEARLY MAINTENANCE** and should have directional signs at major trail junctions and intersections. Streams and brooks should be bridged to allow year-round use. The City of Concord requires that bridges be designed to carry 100 pounds per square foot, though there are no formal trail bridge specifications as required by law. Liability appears to be the primary concern used during the City's design review process. Railings are usually dependent on the height of the bridge above the water, but again, there are no formal specifications other than what looks and feels right.

Recreational use is one way for the public to use and appreciate the Town Forests. Providing the potential for a memorable recreational experience is probably the best way to develop allies in protecting and promoting the open space that the forest provides.

WATER RESOURCE PROTECTION

Life can not be sustained without water, so it is a resource that needs to be respected as well as protected. Siltation from erosion is the most common pollution problem associated with forest management. Another problem source is spilled and leaking fuels and hydraulics. Soil disturbance can seldom be avoided during harvesting, but it can be minimized. Winter harvesting reduces soil scarification, though it is sometimes desired for regeneration purposes. Winter harvesting also reduces mud problems and allows operating in areas while they are frozen that would not normally be logged except during extreme drought conditions. One problem with winter harvesting is that pole crossings will sometimes freeze in and they can not be removed upon completion of the harvest, but the entire area may be too wet to go in and remove the crossing when the site thaws. If skid trails need to cross running streams in the winter, temporary bridges should be used to maintain the stream flow come spring time in case the bridge has to be left. Skid trails should not be run on steep slopes, and even minor slopes should be water-barred when the use of that trail is completed. Skidders should not be driven through marshes, bogs and open water. Logging should be stopped during mud season and periods of prolonged rain spells. Newly installed culverts should be over-sized to accommodate flood conditions. All culverts and water bars should be checked yearly to insure that they are functioning. Following the State's Best Management Practices guidelines for logging will prevent most of the sedimentation problems associated with logging.

Although Hopkinton and Contoocook Villages have a central water supply. The rural developments depend on wells for their water supply. Whereas all of the Town Forests are part of a watershed, groundwater contamination has a higher potential to affect area wells. Minor fuel spills are often unavoidable during a timber harvest and blown hydraulic hoses on log trucks are relatively common. Fuel contamination of the water resources can be minimized by making sure that truck and skidder fueling areas along with the log yards are not located adjacent to wetlands and drainage ways. Leaking equipment and hoses should be repaired before starting the harvest, and heavy maintenance and repair activities should be conducted off-site.

EDUCATION

The more people are aware of the environment, the more they tend to appreciate it. Demands for forest products along with the other uses of the forest has increased along with the population. Unfortunately, education regarding the local environment has not kept pace with the uses of that environment. Many people no longer associate that the forest products that they use everyday such as lumber, paper, firewood, pencils, etc. originally comes from trees. The Town Forests offer an excellent opportunity to educate the public regarding the many aspects of the Town's forest management program. Brochures or signs explaining the management goals and objectives could be placed near the site of the timber harvests when they occur in high use areas. Self guiding nature trails could also be established along the existing trails. A mailbox could be set up at the trail head to hold the tour brochures, though it will need periodic checking to insure an adequate supply is available to the public. Nature trails should focus more on concepts and relatively permanent features such as "white pine forest growing on its preferred habitat of dry sandy soil" or "bog ecosystem" or "large boulders left by the glacier and called glacial erratics" as opposed to specific items such as "beaver chewed stump" or "red maple tree" that may die, fall over or rot away rendering the brochure obsolete. Local media could be contacted to promote the trails and other forest management activities.

"Dear neighbor" letters that explain the proposed harvest should be sent to landowners and other interested parties that abut the timber harvest area prior to the start of cutting. This practice has greatly reduced inquiring and sometimes opinionated phone calls in other Towns who have implemented such a program. Supplements to the annual Town Report could also be used to promote the Town Forests. The Hawthorne Forest Lot is used by the Harold Martin School for their annual forest management tour and the Brockway Lot is used extensively by the N.H. Audubon Society as part of their Outdoor Education program.

Forests are dynamic and ever-changing. Good records kept over time will create a data base that can be used to judge the successes and failures of forest management activities.

HISTORIC PRESERVATION

Several items of historic interest were found during the cruise and were mapped whenever possible. The forest itself gives evidence of the past uses of the properties. The age of the white pines will give a pretty good idea as to when the area was last used as farmland. Because many of the Town Forests were woodlots and had been harvested repeatedly over the years, very few areas of "old growth" forests were found. If left alone, all of the forests would eventually develop into "old growth" forests. However, studies have shown that natural disasters (hurricanes, wind shears, fire, etc.) will affect any given area in New England at least once every 200 to 300 years. This means that few trees in New England exceed that age. Some areas of each forest type found in the Town Forest system should be left uncut and allowed to develop into "old growth". This will allow some relatively rare ecosystems to develop and will provide the classic "cathedral" forest type that most people think a forest should look like. It is recommended that the Conservation Commission decide if they want to manage for "old growth", and if so, how much and where. Such areas should be designated as "Natural Areas" so future Commission members and foresters will be aware of the situation.

Whereas most of the Town Forests were once farmland, evidence of farming activity was found within most of the lots. Stone walls and rock dumps were found on almost all of the Town Forests, providing the most obvious example of past agricultural use. Buffer zones should be set up around any old farm sites and skid trails routed away from those zones. Because of terrain restrictions, some of the old farm roads are also the only suitable routes for skidder trails. In this case, extreme care should be taken by the logger to avoid overly disturbing the site. The Conservation Commission should look into hiring an archeologist to further study any farmstead or mill site and to evaluate the Town Forests for potential Native American occupation sites.

The Town Forests contain both a future timber supply and evidence of our colonial culture. Both can be easily destroyed by carelessness and mismanagement. It is recommended that the Commission come up with a formal policy statement declaring the importance of both and continue to manage the forests in a way that the benefits of the forest will be sustained and maintained for countless future generations.

TIMBER CRUISING PROCEDURE

The Hopkinton Town Forest System cruise was performed using a point sampling technique with a 20 Basal Area Factor. Whereas the various Town Forest lots have different acreages and shapes, the distances between the Cruise transect lines; the intervals between sample points on the transect lines; and the total number of points varied from lot to lot. A total of _____ points were taken on the _____ acres of commercial forest land. At each sample point, all trees four inches in diameter at breast height (DBH) and greater were measured and tallied by species, DBH, and merchantable height by product such as grade sawlog, pallet quality sawlog, or pulp. Merchantable heights were measured to a ten inch top diameter for sawlogs and a four inch top diameter for pulp.

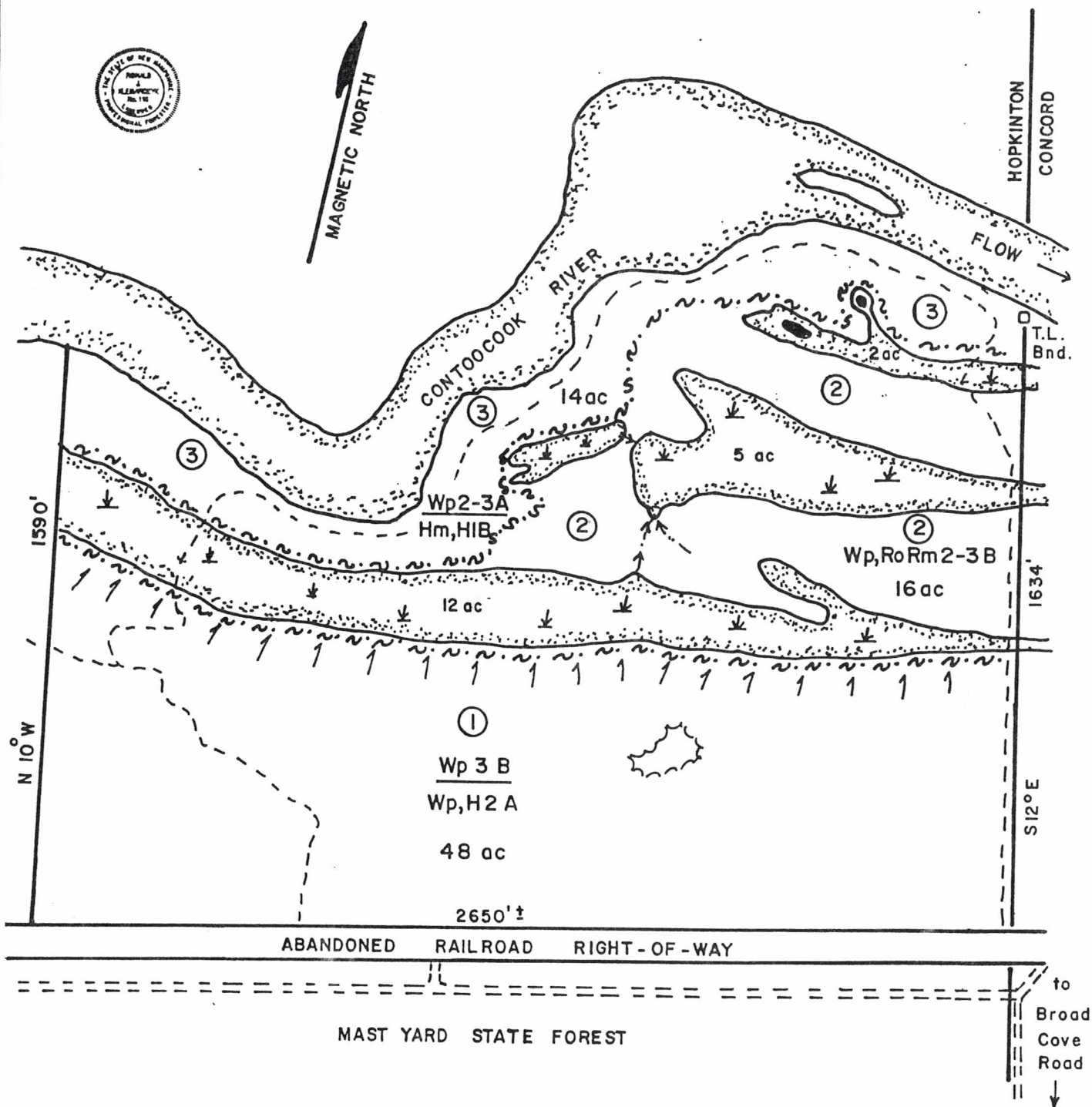
Tally sheets containing the sample point data were then sent to **Computer Forest Consultants Inc.** for processing utilizing the **MULTICRUISE** program. MULTICRUISE is an advanced variation of the forest inventory program originally developed at the UNH Forestry Department. The processed results are later summarized in this report.

Due to past harvesting, many of the forest types were found to have a wide variety of species, age classes, stocking levels and composition compared to similar aged forests that have not been cut. Some of the forest types have inclusions of other types that were too small in acreage to call a separate stand. Details such as streams, woods roads, trails, stone walls, cellar holes, wetlands and forest type boundaries were mapped in the field while running the cruise lines. This information was then transferred to a base map of the property, and the forest type acreage was then calculated by using a an instrument called a polar planimeter. Finally, all of the base map details and forest type information were traced with ink on mylar to produce the copies of the Forest Type Maps found in this report. All of the maps were fitted onto an 8½ x 11 inch format to allow for easy use and copying. The maps can also be altered with "White Out" and used for other purposes such as Trail Maps.

A Glossary and other related information are provided at the end of this report.



MAGNETIC NORTH



FOREST TYPE DESIGNATION

- Wp - White pine
- Hm - Hemlock
- Ro - Red oak
- Rm - Red maple
- Bb - Black birch
- Be - Beech
- H - Mixed hardwood
- 1 - Sapling size
- 2 - Pole size
- 3 - Sawtimber size
- A - Overstocked
- B - Adequately stocked
- C - Understocked
- ③ - Stand number

LEGEND

- Stone wall
- x- Wire fence
- o Iron pipe or pin
- Stone bound
- Cellar hole
- Woods road
- - - Trail
- Forest type boundary
- Stream
- Wetland
- Vernal pond
- Steep or ledge
- || Slope direction
- y Log yard

**Forest Type Map
CONTOOCOOK RIVER TOWN FOREST
Hopkinton N.H.**

Tax map 246 Lot 6

97 Acres±

1" = 400'



JANUARY 1999

RJK

CONTOOCCOOK RIVER LOT

Tax map 246 Lot 6

1999

GENERAL DESCRIPTION

This 97 acre lot is located in the northeast corner of the Town on the Concord/Hopkinton Town Line, between the south side of the Contoocook River and the Mast Yard State Forest. The northern half of the lot is primarily Contoocook River floodplain, while the southern half consists of a relatively flat glacial outwash plain. Access to the lot is from a logging road that starts under the NEPCO power lines on Broad Cove Road. The road follows the power lines for a short distance and then turns and runs along the Town Line all the way to the old railroad bed, which is the southern boundary of the lot. Because the lot is so flat, a log yard could be set up anywhere along the railroad bed. The railroad bed is a heavily used recreational trail, especially by snowmobiles in the winter months. The lot was purchased by the Town in 1975 with monies provided by the federal Land and Water Conservation Fund which added to the protected open space in the area provided by the State Forest and abutting Concord City Forest. A hiking trail loop was constructed by the Hopkinton Boy Scout Troop in the early 1980's but has received little use or maintenance.

SITE CONDITIONS

Regarding site conditions, the lot can be divided in half. The northern half is located on the floodplain of the Contoocook River and contains several old river meanders that eventually drain back into the river. The Flood Control system found up-river has minimized flooding of the area, allowing the meanders to develop into more stable wetlands. The soil underlying the floodplain is a Scarborough fine sandy loam which is known for its poor drainage, favoring wetland species such as red and silver maple. The southern half of the lot contains Windsor loamy sand which is a deep, dry soil that tends to favor white, red and pitch pine over most hardwoods.

UNIQUE FEATURES

Flat rock-free woodlots are relatively rare in the Town, though not to the surrounding area. The floodplain area, dominated by silver and red maple could be considered somewhat rare as most of the larger floodplain sites along the river were converted to farmland. The northeast corner bound on the Town Line is marked by a tall granite bound engraved with the date of "1865". Another granite bound used as a railroad mile post and some bench footings can be found along the old railroad bed. Although the mileage to Concord has been obliterated with time, the east side of the bound is painted with "CJ" and "48", meaning that it is 48 miles to Claremont Junction.

BOUNDARY LINE STATUS

Although the boundaries were intensively researched when the Town acquired the land, the lot was never formally surveyed. The northern boundary is the Contoocook River and the southern line is the old railroad bed. The eastern boundary is the Town Line which was blazed and painted red by the City of Concord in 1998. The western boundary is a blazed line that was painted after the lot's acquisition and now needs to be reblazed and painted.

HISTORY

The Contoocook River Lot is part of an area long known as the "Mast Yard". The dry sandy soil found on either side of the river produced many tall, straight white pines that were used for ship masts in colonial times. Eventually, the land was cleared of trees and attempts were made to use the land for agriculture, mainly pasture and hayfield as the site was too dry for more intensive farming. The Concord-Clairemont railroad went through in the 1840's and fires from the steam engines were known to periodically burn over the area creating large blueberry patches that were a favorite stop for the area residents. The railroad eventually put in some benches for the berry pickers to await the next train. All attempts to farm the land were abandoned in the early 1900's and the site grew in with white pine. The trees shaded out the blueberry bushes which can now only be found under the nearby power lines. Most of the larger pine stems were harvested in the 1950's, leaving patches of smaller stems as well as scattered individual trees that have since matured. The railroad was abandoned in 1962, leaving the lot somewhat isolated. In 1975, the lot was purchased by the Town of Hopkinton as part of the Conservation Commission's efforts to protect the Contoocook River corridor. Other than the hiking trail that was constructed in the early 1980's, little else has been done with the property.

A narrow buffer zone should be left uncut along the old railroad bed and if the hiking trail is upgraded or promoted, the trail should be kept free of logging debris. A few large stems of pine should be left uncut in the overstory to act as a seed source and to provide some variations in habitat. The small opening found within the stand could be expanded to help maintain the existing blueberry patch that is in danger of being shaded out. Blueberries are an important wildlife food source as well as a "people-pleaser".

STAND 2 Wp, Ro, Rm 2-3B

Description

This 16 acre stand is located in the central portion of the lot and contains the 19 acres of river meander wetlands. It is dominated by white pine with 55% of the basal area. Red oak follows with 19%, red maple with 14%, silver maple at 10% and black birch with 2%. Most of the stems are sawlog sized. Portions of the stand were logged in the 1950's. Areas that were cut tend to have a thin understory of white pine, red oak, white oak, white birch and red maple. Areas that were not cut tend to be around the wetland sites and have developed an understory of red and silver maple and some blue beech, also known as "muscle wood". In the past, this area was periodically flooded which favored the development of wetland species such as red and silver maple. However, the flood control dam in West Hopkinton has minimized the flooding of the site since 1961 which is now allowing the upland species of red and white oak, white birch and pine to develop. The wetlands have also stabilized, becoming more of a stagnant swamp nature as compared to a floodplain ecosystem. Beaver activity did raise the water levels in some of the wetlands for a short time which helped restore some of the floodplain characteristics, but the exhaustion of the local food supply caused them to move out of the area.

Prescription

Because floodplain ecosystems are becoming a rarity in the area, especially the silver maple forest type, it is recommended to leave the stand uncut to protect the wetland ecosystems that are intertwined throughout the forest type. However, Stand 3, located between this stand and the Contoocook River, contains a hemlock understory which is used as a deer wintering area. Hemlock is relatively rare in the Mast Yard area as are hardwood stands in general. Whereas one of the important winter foods for deer is hardwood browse, it may be beneficial to "patch cut" the upland hardwood understory areas to provide a source of nearby browse for the deer, eliminating the need for them to travel a considerable distance for a food source. The patches should be about 1/4 acre in size and the stems should be dropped and lopped by

chainsaw. Some oaks should be left to allow them to develop into acorn producers, often called "mast" trees, though it has no relation to "mast" yard. Skidders should be prevented from entering the area to protect the wetlands. A major flood in the future may help restore the floodplain ecosystem, but due to the development along the banks downriver, the flood control systems are constantly trying to prevent such an occurrence.

STAND 3 Wp2-3A/Hm,H1B

Description

This long, but narrow 14 acre stand is located on the bank of the Contoocook River. Although it is adjacent to the river, it is a dry site as it is located on top of the silt deposit berm. The berm developed when the river regularly overflowed its banks and the subsequent loss of velocity as the water spread out over the floodplain allowed the silt to settle out and eventually build up into a berm. However, the flood control system has prevented any recent deposits on the top of the berm, but has not prevented it from being eroded from below. Lateral wave action from power boat wakes has also increased the erosion problem. Because it is now a dry site, white pine quickly occupied the area and dominates the stand with 88% of the basal area. The remaining 12% consists of an even mix of hemlock and red oak. Most of the pine stems are pole to sawlog sized. There is a heavy understory of hemlock that offers enough shelter to be used as winter bedding area by the local deer population. The hiking trail follows the riverbank and is quite scenic except for the recent housing construction on the opposite shore which is visible enough to eliminate any feelings of wilderness.

Prescription

Because this stand is along the river, and contains the hiking trail and a deer wintering area, it is recommended to leave the stand in its "natural state". No cutting should occur except for trail maintenance. Whereas the silt deposits no longer occur, though the bank erosion does, the stand will eventually disappear and such a loss may jeopardize the wetlands found in the old river meanders. This will not occur for many years yet but there is little that can be done other than to let nature take its course.

Other considerations

The old railroad bed is heavily used for recreation, especially by snowmobiles, so aesthetics is an important consideration in that area. Care should be taken to protect the old bench foundations and mileage marker found along the right-of-way. The hiking trail that was constructed around the lot in the early 1980's is little used as it is a long walk in from Broad Cove Road. If a foot bridge is ever built on top of the old railroad bridge abutments located in the Contoocook river to the east on the Concord City Forest, hiking use of the area will greatly increase. Such a bridge has been discussed, though there are no current plans to construct one. The existing trail could be upgraded to encourage snowmobile use, **BUT** the trail leads right through the deer wintering area and would all but destroy that habitat and is therefore not recommended to allow such use. The trail could be maintained for hiking, but not promoted or marked in a way that would make it attractive for snowmobilers.

The lot abuts Mast Yard State Forest and one of the Concord City Forests, which combined with the Town Forest, provides almost 900 acres of protected Open Space between the river and Broad Cove Road. The area is centrally located between the populations of Penacook, Concord, Hopkinton, Contoocook and Webster. As those populations grow, recreational pressure on the land will increase. Efforts should be made to coordinate long-range management activities with the State Division of Forests and Lands and the Concord Conservation Commission to promote compatibility of management goals and objectives and to avoid redundancy of management activities.

**HOPKINTON TOWN FOREST
CONTOOCOOK RIVER LOT**

**TOTAL OPERABLE VOLUMES
1999**

Species/Product	Stand 1 Wp3B/Wp, H2A 48 ac.	Stand 2 Wp, Ro, Rm2-3B 14 ac	Stand 3 Wp2-3A/Hm, H1B 16 ac	Total Volume
White pine	440,000	110,000	260,000	810,000 Bd.Ft.
White pine #4	60,000	5,000	10,000	75,000 "
Black Birch		3,000		3,000 "
Red oak		12,000		12,000 "
Hardwood pallet		14,000		14,000 "
	-----	-----	-----	-----
TOTAL SAWLOG	500,000	144,000	270,000	914,000 Bd.Ft.
Softwood pulp	400	120	70	520 cords
Hardwood pulp	80	90	30	200 cords

CONTOOCOOK RIVER TOWN FOREST

Immediate potential harvest volumes and values
1999

<u>Species/Product</u>	<u>Estimated Volume</u>		<u>Estimated Value</u>		<u>Total Value</u>
White Pine	130,000	bdft	\$120.00	/mbf	\$15,600.00
White Pine #4	30,000		\$50.00		\$1,500.00
	<hr/>				
	160,000	bdft			
Softwood Pulp	180	cds	\$2.00	/cd	\$360.00
Firewood	10		\$5.00		\$50.00
Total Value					\$17,510.00
Estimated timber harvest management fees (also includes trail and boundary work)					<u>\$4,000.00</u>
Estimated net value					\$13,510.00

TOWN FOREST PROJECT RECORD

LOT NAME TAX MAP BLOCK LOT

[illegible]

**FOREST TYPE
DESIGNATION**

Wp - White pine
Hm - Hemlock
Ro - Red oak
Rm - Red maple
Bb - Black birch
Be - Beech
H - Mixed hardwood

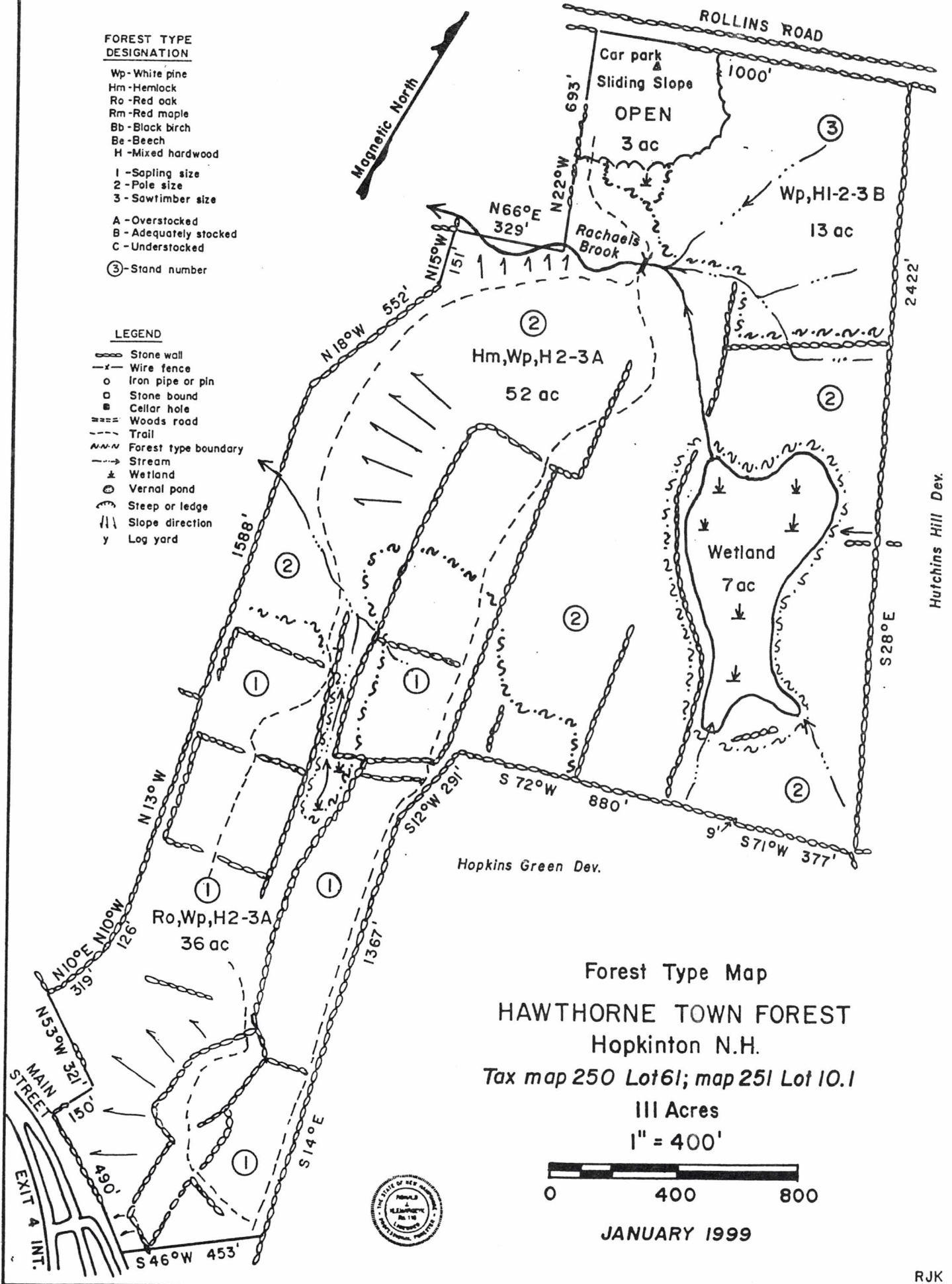
1 - Sapling size
2 - Pole size
3 - Sawtimber size

A - Overstocked
B - Adequately stocked
C - Understocked

③ - Stand number

LEGEND

— Stone wall
-x- Wire fence
o Iron pipe or pin
□ Stone bound
■ Cellar hole
=== Woods road
--- Trail
--- Forest type boundary
--- Stream
Wetland
Vernal pond
Steep or ledge
Slope direction
y Log yard



Forest Type Map

**HAWTHORNE TOWN FOREST
Hopkinton N.H.**

Tax map 250 Lot 61; map 251 Lot 10.1

111 Acres

1" = 400'



JANUARY 1999



HAWTHORNE LOT
Tax map 250 Lot 61; map 251 Lot 10.1
1999

GENERAL DESCRIPTION

This 111 acre lot is located just east of Hopkinton Village between the east end of Main Street and Rollins Road. It contains the 92.5 acres of land that were purchased from Rachael Johnson and the 18.5 acre old Salt Shed Lot. Most of the lot is forest land, with the exception of a seven acre wooded wetland found within the eastern portion of the property and about three acres of open area off of Rollins Road that originally contained the old stump dump and highway salt shed but are now used for parking for the hiking trail and the winter-time sliding slope. Several small intermittent streams combine within the lot to form a small brook called "Rachael's Brook" in the northwest corner of the lot. The only current access to the lot is from Rollins Road as the frontage on the east end of Main Street and Hawthorne Hill Road is very steep and restricted to "Limited Access" by the State.

SITE CONDITIONS

With the exception of the relatively flat area found along the southeastern boundaries, the lot is moderately to steeply sloped with a generally north-westerly exposure. Elevations run from 450 feet where the Rachael's brook crosses the boundary in the northwest corner to 600 feet on the small hill summit in the southern tip of the lot. Rachael's Brook runs into Dolph Brook and is part of the Contoocook River Watershed. Most of the lot contains Gloucester very stony sandy loam which is a good forest soil slightly favoring red maple, white birch, beech and hemlock. A small section of Paxton very stony loam is located east of the wetland area which is also a good forest soil that slightly favors red maple over red oak and white pine. The wetland contains a Ridgebury-Whitman soil and favors shrubs and trees adapted to a wetland site such as red maple, black ash and winterberry holly.

UNIQUE FEATURES

The gorge-like valley found along Rachael's Brook in the northern part of the lot is quite scenic and contains several small cascades during periods of high water. The sliding slope is the only publicly owned slope in Town. However, the most impressive feature of the lot are the numerous stone walls that mark out several old croplands and pastures. Some of the walls are quite thick and filled with small stones indicating that past agricultural use was quite intensive and probably included root crops and tubers.

BOUNDARY LINE STATUS

The property was first surveyed in 1982 by Al Lewis and Ron Klemarczyk when Rachael Johnson proposed to sell some land to the

Town and later in 1989 by Richard Bartlett when she contemplated subdividing the property for a housing development. Her house was subdivided from the lot when the Town acquired the land in 1989 and the map is recorded at the Merrimack Registry of Deeds as Plan #11272. Almost the entire boundary consists of stone walls, but due to the high amount of walls in the area, one is not always sure as to which wall is the boundary. Therefore, it is recommended that the entire boundary be blazed and painted.

HISTORY

Both the Johnson Property and the Salt Shed lot had similar histories at one point. Both lots were used for agriculture in colonial times. Although much of the land was used for pasture and hayfield, portions of both lots were used for growing crops as evidenced by the very small rocks found within the stone walls. The heavily sloped and wetland areas were probably abandoned in the mid to late 1800's as agricultural efforts started to become focused on the more productive sites. The abandoned areas grew in with white pine which appear to have been logged off around 1930 with the use of a portable sawmill that was set up in the north central part of the Johnson property. The cut-over areas then grew in with hardwoods, mostly oak and maple around some scattered pine that were too small to cut. As the forest replaced the pasture, water run-off decreased, making Rachael's Brook an intermittent stream. Rachael Johnson once mentioned that she caught trout in the brook when she was a young girl.

The Town acquired the Salt Shed Lot in 1933 after it was cut-over and started using about three acres along the road as a stump dump and for other assorted debris. It was later used as a road salt storage area. The area behind the stump dump as well as the last fields behind Rachael Johnson's house were abandoned in the early 1930's and started to grow in with white pine, creating the small, almost pure stands of pine currently found there. Rachael Johnson had her lot logged in the 1960's and had some timber stand improvement performed in the early 1970's. In 1980, the Salt Shed Lot was cruised by Ron Klemarczyk, then working for the N.H. Division of Forests and Lands. The resulting management plan followed the typical State Forest format, meaning that the information consisted mainly of statistics and scientific terms. Although it recommended that the lot be logged, the rest of the plan was little used. The Salt Shed lot was eventually logged in 1983 by the Kearsarge Lumber of Warner N.H. which produced about 83,000 board feet of white pine sawtimber and netted the Town \$5,333.00. The Town acquired the Johnson Lot in 1989 through monies from the NH Land Conservation Investment Program which provided 50% of the purchase price. Rachael Johnson generously "donated" the other 50% that was to come from the Town to make the purchase possible. A hiking trail was constructed in the early 1990's between the Salt Shed and Johnson lots, including a bridge over Rachael's Brook. The Salt Shed was moved to the Town Highway garage on Maple Street in Contoocook at about the same time. In 1997, the stump dump was graded into a sliding slope and in 1999 the two lots were combined as the Hawthorne Town Forest.

FOREST TYPES

STAND 1 Ro,Wp,H2-3A

Description

This 36 acre stand occupies the southern third of the lot. Portions of the stand were lightly logged in the 1960's and the remaining areas were weeded and thinned by girdling unwanted species and poor quality stems. This process is called Timber Stand Improvement (TSI). As a result, the stand contains a higher than normal proportion of good quality trees. The type is dominated by red oak at 47% of the basal area, followed by white pine at 31%, red maple at 10%, and a scattering of beech, white oak, black birch, sugar maple and hemlock. The last harvest allowed some regeneration to develop, though it is thin and somewhat patchy. It consists primarily of beech, black birch and white pine, with a scattering of red oak, hemlock, red maple and sugar maple. The relatively flat southeast corner of the stand was the last field to be abandoned by Rachael Johnson's family and is now heavily stocked with white pine. The western portions of the stand are steeply sloped and are more dominated by red oak. Numerous stone walls mark off a variety of old fields or pastures, and even a drainage way found on the northern end of the stand. Any harvesting will be difficult due to the narrow shape of the stand; its high visibility to the numerous residences on Main Street and Hopkins Green; the hiking trail; and numerous stone walls. Heavy deer use of the sunny southwestern slopes was observed as the shallower snow depth allowed them to more easily find acorns.

Prescription

With a basal area of 128 square feet and 237 trees per acre, the stand can be considered overstocked and in need of a selective thinning. Because of the various conditions mentioned above, any harvesting will have to be on the lighter side. With most of the trees being relatively good quality, any thinning would focus on removing the more mature stems of oak and pine as well as the poor quality or suppressed stems that were left as "spacers" to avoid over-thinning the stand in the past. About 20% of the basal area could be harvested, while leaving a narrow buffer zone along the trail and a slightly wider zone along the boundaries. It would be ideal to access the stand from Main Street near the site of the old Johnson Garage, otherwise a skid trail would have to be run all the way from Rollins Road. This would make a harvest economically marginal and would require leaving the pulp quality stems as they would not be worth the time it would take to skid them to Rollins Road. Yarding to Main Street would reduce the skid distance, lessen the skid trail crossings on the hiking trail and would allow the removal of the poorest quality stems. Any harvesting would have to be done in conjunction with the other stands as none could support a harvest on their own. Because the initial thinning would be light, any regeneration would tend to be light, and would tend to favor black birch and beech. Bare

ground logging would encourage pine and oak regeneration, but because of the light nature of the cut, those species would tend to develop mostly in the skid trails. Should the stand be thinned, another harvest could be expected in 20 to 25 years. The focus on this second harvest would be to again remove the more mature trees and to release any new regeneration. Because recreational use of the lot is expected to increase by then, aesthetics will probably be more important and may require further restrictions on harvesting activity. In any event, care should be taken to protect the numerous stone walls found throughout the lot.

STAND 2 Hm,Wp,H2-3A

Description

This 52 acre stand is the largest forest type in the lot and is centrally located in the property. It contains stone walls, though not as many as Stand 1 and a seven acre wetland within the eastern portion of the type. Its slightly wetter nature and generally north to northwest exposure has given this stand slightly cooler conditions which have tended to favor the development of a heavy hemlock component. Hemlock dominates the type with 35% of the basal area, followed by red maple with 28%, white pine at 15%, red oak at 9%, with a scattering of white birch, red pine, sugar maple, and black birch. Regeneration is mainly hemlock, but is quite light and scattered. The stand was also logged and received TSI at the same time in the past as Stand 1. The pine and hardwoods are generally good quality, though the most of the hemlocks have the low, thick crowns which is typical of hemlocks that slowly developed in the understory. The hemlock was heavily used by deer for winter shelter, while they migrated to Stand 1 for acorns and Stand 3 for browse. The hiking trail runs through the center and western edge of the stand. Rachael's Brook and its associated scenic stream valley runs across the northern portion of the stand. As in Stand 1, the western portion of this stand contains some steep slopes. A portable sawmill was set up in the north central part of the stand in the early 1930's, but the only evidence of that activity are some scattered pieces of rusted metal and some old broken glass.

Prescription

With a basal area of 130 square feet and 267 trees per acre, the stand can be considered slightly overstocked. However, there are several factors that must be considered in the management of the stand. The scenic area along Rachael's Brook needs to be protected from any harvesting activity. The seven acre wetland which is the source of the brook also needs to be protected. The narrow upland areas to the south and east of the wetland abuts the Hutchins Hill Road housing development and contains several drainages that flow into the wetland. That area should also be set aside as a buffer zone/natural area. Although hemlock is a low value sawtimber tree, it does provide critical winter shelter for the local deer population. It is therefore recommended to manage this stand for wildlife habitat as opposed to the

production of high quality sawtimber. The focus would be on maintaining a healthy, vigorous stand of hemlock in mixed age and size classes. This could be accomplished by removing the overtopping stems of hardwood. Cutting the red maple, especially stems 4 to 10 inches diameter will provide preferred browse for the deer. Healthy red oaks should also be left as they provide acorns. Some of the scattered mature stems of white pine and hemlock could also be harvested to make the harvest economically feasible as their crowns are too high to offer prime winter shelter. Soil scarification from bare ground harvesting will encourage hemlock regeneration. Future harvests will depend on the health and vigor of the hemlocks, and would focus on the removal of competing hardwood stems and the removal of the mature hemlock stems. For economic reasons, the harvest would have to occur in conjunction with the other two stands.

STAND 3 Wp,H 1-2-3 B

Description

This 13 acre stand is located at the northern end of the lot along Rollins Road. It makes up the majority of what was the old Salt Shed Lot. Variable terrain, past logging and other activity has made this a very mixed stand. The drainage ways that run southwesterly within the stand are dominated by red maple, sugar maple, and white ash. The drier sites in between have a higher concentration of white pine and white birch. It appears that the area burnt over in the late 1930's or 40's, probably the result of a dump fire, which allowed the aspen to develop. The southern hillside exposure of the stand made the pines more susceptible to the white pine weevil which kill off the terminal buds of the pine stems. This causes the lower branches to develop into tree trunks, and when several branches become tops, the sawlog quality drops considerably. The worst quality trees were harvested in 1983 leaving the higher quality residual pine stems, though "higher quality" is a relative term. The log yard was set up on the edge of the stump dump. A variety of regeneration developed after the last harvest and includes a heavy mix of beech, red maple, red oak, red maple, white pine and hemlock.

Another unique aspect of this stand are the "exotic" shrubs that have seeded in from the yard waste that was dropped off at the stump dump. Japanese Barberry and Bittersweet have become well established and their berries provide a food source for wildlife. Several clumps of Burning Bush have also become established, ironically in the old fire site. They are quite pretty in the fall but have little wildlife habitat value. The thorns on the Barberry make areas of heavy infestation difficult to walk through. Heavy infestations of Bittersweet not only make walking through the forest difficult, but will actually kill off the trees that they are growing on either by strangulation, shading or excessive weight. Both species should be watched to make sure that they do not become too dominant.

Recommendations

With a basal area of 110 square feet and 231 trees per acre, the stand can be considered adequately stocked. However, many of the residual pine stems from the last harvest have matured and are starting to deteriorate. Their generally poor quality will make them difficult to market if their deterioration continues. Many of the white birch, though better quality than the pine, have also matured and will start to die off if not harvested within the next few years. It is therefore recommended to harvest the stand to remove the mature stems of pine and birch along with any other trees that appear to be mature to over-mature. This will also release the thick regeneration currently found there. Once those trees are removed another harvest could be expected in 15 to 20 years to remove the remaining overstory, completely releasing the developing regeneration. Future emphasis would be on developing a high quality hardwood forest. Narrow buffer zones should be set up along the streams and along Rollins Road.

Other considerations

Because of the lots closeness to Hopkinton Village and surrounding developments, recreational use of the lot will continue to increase. Word will get out on the sliding slope and the hiking trail, especially if a sign is erected on Rollins Road. Once the trail is promoted, proper maintenance becomes a must. Special care will be needed during any harvesting to protect the aesthetics along the trail. The area along Rachael's Brook is extremely scenic and should be protected. It will be even more impressive as the trees along the gorge-like valley develop into an "old growth" forest. The upland area south and east of the wetland should also be allowed to develop into "old growth".

The southern-most tip of the woodlot contains the highest point on the property. Clearing certain sections of the hillside will open up views of Craney Hill, Putney Hill and Irish Hill. Unfortunately, any such clearing will be highly visible to either the eastern end of Main Street or the backyards of the houses along Main Street.

The hiking trail was laid out with both hiking and cross-country skiing in mind. A counter-clockwise loop is probably the safest route for skiing as it requires going up the steeper sections. The bridge will need yearly inspections and the trail needs yearly maintenance. The trail also needs to be marked and could be made into a "Nature Trail" at some point as use increases. The sliding slope also needs some maintenance to keep it clear of trees and shrubs. A heavy infestation of a "bamboo" type exotic annual shrub-type plant was found to be growing next to the slope. Some form of eradication should be taken to eliminate the plant before it dominates the entire area. Herbicidal treatment is recommended as it has a very hardy root stock and resists mowing as a form of elimination.

The lot's closeness to Hopkinton Village has also allowed the teachers at the Harold Martin School to conduct some out-door education classes there. Such use should be encouraged as it exposes the children to a "real" forest ecosystem at an early age when they are most impressionable.

Finally, a logging access route should be obtained from the abutter at the east end on Main Street. Unless the owner is willing to donate some land, either a small strip of land or a permanent right-of-way should be acquired.

HOPKINTON TOWN FOREST
HAWTHORNE LOT

TOTAL OPERABLE VOLUMES
1999

Species/ Product	Stand 1 RO,Wp,H2-3A <u>36 acres</u>	Stand 2 Hm,Wp,H2-3A <u>52 acres</u>	Stand 3 Wp,H1-2-3B <u>13 acres</u>	Total Volume	
White Pine	110,000	90,000	15,000	215,000	bf
White Pine #4	4,000	2,000	1,000	7,000	
Hemlock		60,000		60,000	
Red Oak	115,000	20,000	8,000	143,000	bf
Sugar Maple	2,000			2,000	
Red Maple	2,000	30,000	15,000	47,000	
White Ash			10,000	10,000	
White Birch		8,000	6,000	14,000	
Hardwood Pallet	<u>35,000</u>	<u>15,000</u>	<u>10,000</u>	<u>60,000</u>	
Total Sawlog	268,000	225,000	65,000	558,000	
Softwood Pulp	130	300	10	440	cds
Hardwood Pulp	340	450	150	940	

HAWTHORNE TOWN FOREST

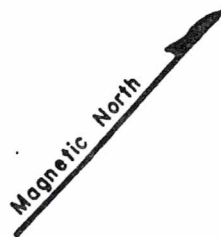
Immediate potential harvest volumes and values 1999

Species/Product	Estimated Volume		Estimated Value		Total Value
White Pine	43,000	bf	\$120.00	/mbf	\$5,160.00
White Pine #4	2,000		\$40.00		\$80.00
Hemlock	1,000		\$30.00		\$30.00
Red Oak	12,000		\$300.00		\$3,600.00
White Ash	2,000		\$100.00		\$200.00
White Birch	5,000		\$40.00		\$200.00
Hardwood Pallet	<u>15,000</u>		\$30.00		\$450.00
	80,000				
Softwood Pulp	60	cds	\$2.00	/cd	\$120.00
Firewood	100		\$5.00		<u>\$500.00</u>
Total Harvest Value					\$10,340.00
Estimated timber harvest management fees (also includes trail and boundary work)					<u>\$2,900.00</u>
Estimated net value					\$7,440.00

TOWN FOREST PROJECT RECORD

LOT NAME TAX MAP BLOCK LOT

[illegible]



1" = 400'



FOREST TYPE DESIGNATION

Wp - White pine
Hm - Hemlock
Ro - Red oak
Rm - Red maple
Bb - Black birch
Be - Beech
H - Mixed hardwood

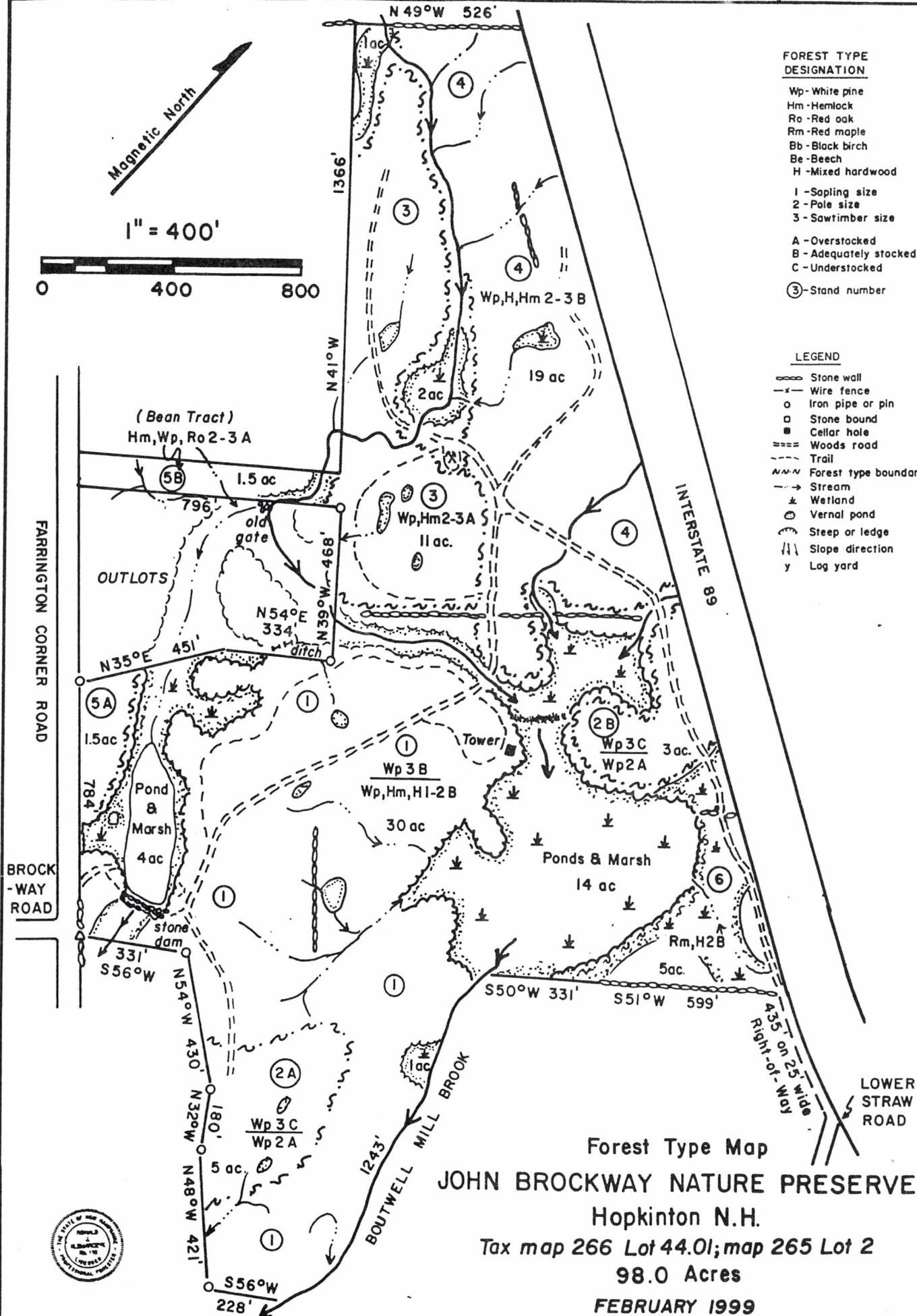
1 - Sapling size
2 - Pole size
3 - Sawtimber size

A - Overstocked
B - Adequately stocked
C - Understocked

③ - Stand number

LEGEND

- Stone wall
- x- Wire fence
- o Iron pipe or pin
- Stone bound
- Cellar hole
- === Woods road
- - - Trail
- Forest type boundary
- Stream
- Wetland
- Vernal pond
- Steep or ledge
- || Slope direction
- y Log yard



Forest Type Map
JOHN BROCKWAY NATURE PRESERVE
Hopkinton N.H.
Tax map 266 Lot 44.01; map 265 Lot 2
98.0 Acres
FEBRUARY 1999

JOHN BROCKWAY NATURE PRESERVE
Tax map 266 Lot 44.01; map 265 Lot 2
1999

GENERAL DESCRIPTION

This 98 acre lot is located on the northeast side of Farrington Corner Road, across from the Brockway Road intersection. It consists of 96 acres that were bought from Stephen Duprey in 1990 with financing from the N.H. Land Conservation Investment Program and the generosity of Dorothy Brockway Osborne, and an abutting 2 acre lot that was given to the Town by Bruce Bean in 1996. The lot contains about 76 acres of woodland and 22 acres of wetland. The wetland areas are associated with beaver activity found along Boutwell Mill Brook and its tributaries, along with an old mill pond. Although the lot fronts on Farrington Corner Road, access is restricted by the pond and its outlet. Vehicle access to the interior of the lot is by way of a Right-of-Way from the terminus of Lower Straw Road where it was cut off by Interstate 89. A woods road system was built, though not well maintained, by a previous owner and runs throughout the entire lot. The lot contains five forest types and is currently used by the Audubon Society of New Hampshire for one of their outdoor education locations.

SITE CONDITIONS

The lot can be described as relatively flat, though the northwest portion of the lot has numerous short, but steep slopes. Elevations run from 380 feet in the southeastern tip of the lot along Boutwell Mill Brook to 450 feet along Interstate 89 in the northwestern part of the property, giving the lot a generally southeastern exposure. Boutwell Mill Brook bisects the northern part of the lot, then splits with part of the brook running southeasterly through a relatively large beaver swamp to the southern boundary, while the other part runs southwesterly parallel to Farrington Corner Road and into an old mill pond. This split was engineered for water storage which took advantage of existing wetlands in the area. Boutwell Mill Brook runs into Bela Brook near the intersection of Clinton Street and Page Road. Bela Brook eventually runs into Turkey Pond in Concord and is part of the Turkey River watershed. In addition to the ponds and swamps along Boutwell Mill Brook, the lot contains numerous, but scattered vernal pools and seeps. Despite the size of the lot, it only contains two major soils types. The wetland areas contain the Ridgebury-Whitman soils complex. Due to the high water table, this soil can not grow a commercial forest crop, but it is very important for wildlife habitat and flood storage. Upland portions of this soil will favor red maple and hemlock, while the wetter sites will favor alders and other wetland shrubs. Because of the meandering course of the brook and its tributaries, this soil is found "marbled" throughout the lot. The upland areas contain Gloucester very stony sandy loam. Gloucester soil is rated as a productive forest soil that slightly favors red maple, white birch, beech, and hemlock. The meandering nature of the wetlands

will limit any logging to either frozen or prolonged drought conditions.

UNIQUE FEATURES

The most unique feature of the lot was that it was used as a water storage system for two water powered mills. Both mills were located southeasterly off of the property. One mill foundation is still visible on the southwest side of Farrington Corner Road, while the other was located further downstream on the northeast side of the road. As mentioned earlier, Boutwell Mill Brook was split to direct water to the two different mills. Stone piles mark the location of the old diversion gate found in the brook along the northeast boundary of the Bean parcel. A hiking trail system starts on Farrington Corner Road at the Brockway dedication monument and crosses into the lot on the top of an old fieldstone dam. The trail incorporates some of the existing woods roads and has a few side loops to the various wetland areas. An observation tower was constructed by the Hopkinton Boy Scout troop and overlooks the large marsh in the northeastern part of the lot. That marsh along with the other beaver ponds, marshes and vernal pools offer prime habitat to numerous wildlife species. In association with the dam, there are two small, fieldstone cellar holes found next to the road on the south side of the trailhead.

BOUNDARY LINE STATUS

The entire property was surveyed in the late 1980's in preparation for a proposed subdivision. When that subdivision stalled, a small lot was subdivided from the parcel in 1990 along Farrington Corner Road, allowing an abutter to subdivide. That plan is recorded at the Merrimack County Registry of deeds as Plan #11553. Another plan, #11802, was recorded in 1990 when the property was about to be sold to the Town. The northeastern and northwestern boundaries are stone walls and are easily recognized. The westerly boundary is a wire fence that has been blazed and painted in either red or blue paint. The southern boundary behind the houses on Farrington Corner Road is sporadically blazed, and some portions are not easily identifiable, though all the corners exist. The southeastern boundary is the centerline of the Boutwell Mill Brook. Some iron pipes have been set along the brook as reference markers and should not be confused for actual corners. It is recommended to blaze or reblaze the entire boundary and paint the blazes in a uniform color. The Town's deed also contains flowage rights for the wetlands above the dam which one can assume to include the wetlands in the outlot as shown on the map. Further research should be conducted to determine the details regarding the flowage rights for both the Town as well as the abutters whose land underlies the flowage zone.

HISTORY

Like most of the Hopkinton area, the property was mostly forest when the settlers first arrived. The marshes and meadows created by beaver activity afforded an immediate source of hay for their livestock and such areas were considered quite valuable

until the surrounding land was cleared. It soon became apparent that most of the upland soil was not suitable for crops and use was limited to hayfield and pasture. The existing lot is made up of several smaller tracts which are still separated by old fence and walls. The northern corner of the lot was part of the "Town Farm" and was accessed from Straw Road. The northeastern part of the lot was probably a "meadow" lot, also accessed from Straw Road. Upland portions of that lot remained pasture until Interstate 89 cut it off in the early 1960's from the rest of the farms on Straw Road. The Town Farm along with the poorer sites on the rest of the Preserve were probably abandoned in the mid to late 1800's and grew in with pine and hemlock. Most of those stems were cut in the early 1940's or 50's allowing a mixed pine-hemlock-hardwood forest to develop. The area just east of the mill pond was also used for pasture and was connected with the old farms found on Farrington Corner Road. Because of the better site conditions, it was not abandoned until the early 1900's, although the best sites behind the houses were not abandoned until the 1950's. The pines that grew in the area east of the pond were thinned in the 1970's. Much of the second growth found on the Bean Tract is now reaching old growth conditions as the acreage was too small to harvest. Due to site and soil conditions; the removal of hardwoods by the beaver; and the poor demand for hemlock lumber, the second growth forest is slowly becoming dominated by hemlock.

As mentioned earlier, the tract's history is also tied in with water storage for a sawmill. In the late 1700's or early 1800's, the Farrington family built a sawmill on the now-called Boutwell Mill Brook located on the northeast side of Farrington Corner Road, towards Stickney Hill Road. The brook gets its start at the outflow of Whittier Pond located at the intersection of Currier Road and Hopkinton Road (Rte 202-9) and the marsh found on the west side of Crowell Road. Streams from those two sources combine with another small brook near the New England Power Company Transmission line on the north side of Interstate 89. The brook continues in a southeasterly direction under the highway and through the Brockway Lot. By the 1850's, the meadows were no longer used as a hay source and trees that had seeded into the poor quality pastures that had been quickly abandoned after their initial clearing were just starting to reach merchantable size for lumber. For whatever reason, perhaps the invention of the round-saw or the increased availability of local timber, it was decided to build a mill on the southwest side of Farrington Corner Road across from the original mill on a site with enough elevation change to create a suitable "head" for water power. Unfortunately, the area behind the mill could not contain enough water to run the mill. So a fieldstone dam, called the "upper dam" in the 1855 deed from Andrew Smith to Aaron Crowell, was built upstream in a meadow that when flooded, could store a sufficient amount of water to run the mill. Fieldstone was obtained locally and a shallow pit can be seen on the east end of the dam where dirt was excavated to fill between the stones. The inflow to the marsh was not sufficient enough to fill the pond,

so the owners decided to tap into the now-called Boutwell Mill Brook. It appears that even though the brook may have naturally split during times of high water feeding the usually separated marshes found on the western and eastern boundaries, a ditch was dug through the western meadow to the brook and a diversion gate was set up to direct the water to one mill or the other. During the timber cruise, another hand-dug ditch was noticed crossing the neck of the upland found in the outlot between the Bean Tract and the main Brockway Lot. This may have been the first attempt at a diversion ditch as it would have been shorter than digging the length of the meadow but may have proved too rocky, or it could have been an attempt to pick up backwater from another dam that might have been located near the present beaver dam by the observation tower. This dam catches another major tributary to Boutwell Mill Brook and originates on the southwestern slopes of Beech Hill. The cellar holes found adjacent to the trailhead on Farrington Corner Road were from buildings first mentioned in the 1855 deed. Whereas they seem to have appeared at the same time as the dam, it can be assumed that they were related to the mill complex or dam-keeping. The mill, outbuildings and flowage rights were eventually sold in 1872 by the Crowell family to Eli Boutwell, whose family ran the mill until the late 1920's. Local farmers probably logged during the winter and helped with the sawing during the spring high-water. The sawing schedule was also tied in with the schedule of the Whittier Pond sawmill whose outflow provided extra water to the brook. In any event, the water diversion and storage capabilities on the lot provided an important link to the early industries of Hopkinton, in a time when villages were almost self-sufficient. Gradually, the small, undependable and inefficient water powered mills were replaced by steam or gas driven mills, bringing a close to an era of small water powered mills in the Town of Hopkinton.

FOREST TYPES

STAND 1 Wp3B/Wp,Hm,H1-2B

Description

This 30 acre stand is the largest forest type on the lot and is located in the south central part of the property. It sits between the two major wetland areas and is the primary location for the NH Audubon's outdoor education program. The stand was harvested in the 1970's which resulted in the two-aged forest currently found there. Most of the poorer quality stems were removed during that harvest, so the timber found within the stand can be described as relatively good quality. White pine dominates the overstory with 42% of the basal area, followed by hemlock with 26%, red maple at 17%, white oak with 8%, and white birch and red oak at 2% each. The understory consists of regeneration that developed after the last harvest and includes white pine, hemlock, and mixed hardwoods, mainly red maple and some red oak. One of the logging roads bisects the stand and is now used as the main hiking trail. However, either a bridge or a large culvert would have to be installed in the brook found in the northern part of the stand to re-connect it with the rest of the road system. Another trail can be found on the western edge of the stand along the shore of the pond and marsh. An observation tower was set up in the northeastern corner of the stand to view the large marsh found to the east. There is a section of stone wall in the center of the lot that marks an old boundary between two lots that were once under separate ownership. Several vernal pools were found within the stand and are used as part of the education program. During the cruise, a large moose was found to be wintering in the eastern part of the stand, next to the outlet of the eastern pond/marsh area.

Prescription

With a basal area of 112 square feet and 253 trees per acre, the stand can be considered adequately stocked, and in no immediate need of a thinning. But due to the heavy educational program use of the stand, any timber harvesting will tend to disrupt the activity areas as well as present a safety problem during the harvest. Although the disruptions will only be temporary, the fact that the stand is located between the two major wetlands; contains several vernal pools and the more heavily used trails; and abuts Boutwell Mill Brook, any harvesting would require setting up an extensive buffer zone system around those sensitive areas. Such an extensive buffer zone, combined with the cost of installing a culvert or bridge, would probably make a harvest un-economical. It is therefore recommended to dedicate the stand as natural preserve for educational use. It is located on a productive growing site, so it should also provide a

productive habitat for wildlife. Although conventional timber harvesting with skidders would not be allowed, cutting a few trees to be removed by horses or oxen for an educational demonstration could be allowed. If the Audubon ceases to use the site, this classification as natural preserve could be revisited in view of what is found in the other Town Forest lots. However, many old growth forests in New Hampshire are on poor sites and difficult to access. Allowing an old growth forest to develop on a good growing site will allow the trees to stay healthier as they mature. It would also be easily accessible to the townspeople who could compare old growth areas (many years from now) with the other parts of the Town Forest under a more conventional forest management program.

Another recommendation, though not in true keeping with developing an old growth forest, would be to cut back several 1/4 acre patches of the hardwood regeneration to encourage sprout growth. Such sprouts are browsed by deer, rabbit and moose. The existing regeneration is getting too tall to be used by those wildlife species. The younger hardwoods are also used by beaver, who appear to have eaten most of the available food supply and have left the area. Providing a local food source will attract wildlife or at least help to maintain the existing wildlife populations which creates another educational opportunity.

STAND 2 Wp3C/Wp2A Units A&B

Description

This 8 acre stand consists of two separate units that were combined because of their similar forest type and the relatively small size of each unit. Three acres abut Interstate 89 just north of the eastern beaver swamp. The remaining 5 acre unit is located in the southern tip of the lot. It abuts the southwestern boundary and is surrounded on the remaining three sides by Stand 1. It is the only relatively pure stand on the lot. Although Unit 2B is the result of pines seeding into an abandoned field, Unit 2A was heavily harvested in the 1950's, where the smaller or poor quality stems were left uncut. Adjacent pines then seeded in the site, allowing a two-aged forest to develop. The scattered pines that were left have since matured and make up the overstory, while the pine regeneration has developed into an understory of pole sized stems and is quite overcrowded. A few scattered hemlocks have seeded in under the pole sized pine. Like Stand 1, Unit 2A also contains some vernal pools. Whereas that unit is adjacent to several backyards off of Farrington Corner Road, wildlife use by larger animals is somewhat minimal. Some deer and moose sign were noted in Unit 2B as it offers some shelter between two wetland areas and the Highway.

Prescription

With a basal area of 140 square feet and 448 trees per acre, the stand can be considered overstocked and in need of a thinning. Removal of most of the scattered overstory would effectively thin the stand. However, the relatively low harvest volumes would require that it be harvested with some other stand on the lot. Access to Unit 2A would be a problem if Stand 1 is considered a natural preserve as the last time the stand was harvested, the logs were trucked through what is now someone's lawn off of Farrington Corner Road. It is therefore recommended that Unit 2A be designated as part of the natural reserve, or be used as a Demonstration Forest where proper Timber Stand Improvement (TSI) techniques could be displayed. The decreasing Biomass markets may encourage the return of the old hand-girdling techniques to thin overstocked stands of non-commercial sized stems. Proper pruning techniques could also be shown to help improve stem quality by removing the dead branches from the tree trunks. If designated as part of the natural preserve, it will eventually blend in with Stand 1. Unit 2B should be thinned by removing the poorer quality mature stems and any stagnated pole sized trees. About 30% of the stems could be cut in conjunction with a harvest of Stand 3 and Stand 4. Another thinning would be needed in 15 years after the first cut to again remove the poorer quality trees and to release any regeneration that may have become established after the first thinning.

STAND 3 Wp, Hm 2-3 A

Description

This 11 acre stand is located in the northwest corner of the lot. It contains a hiking trail, several vernal pools and drainages and is bisected by Boutwell Mill Brook. It appears to have been last harvested in the 1950's or early 1960's. White pine dominates the forest with 47% of the basal area, with hemlock at 26%, and a light scattering of red maple, white ash, and white birch at 5% each and aspen, red oak, yellow birch and red pine at 3% each. Most of the existing regeneration consists of scattered hemlock, though there are a few dense patches of hemlock in areas that received some soil scarification during the last harvest. Most of the mature stems could be considered good quality. Deer appear to be wintering in parts of the stand where the hemlock crowns are close to the ground and in the areas of heavy hemlock regeneration.

Prescription

With a basal area of 152 square feet and 406 trees per acre, the stand can be considered overstocked and in need of a thinning. Because the stand provides a winter sheltering area for deer, a 70% crown closure should be maintained. Focus should then be on removing the tall, scattered mature stems of pine and hemlock to create openings in the canopy and to encourage hemlock regeneration, especially if the lot is logged during bare ground

conditions. Scattered hardwoods, other than oak, should also be cut to provide a source of winter browse. About 30% of the basal area could be selectively harvested by removing the mature and poor quality stems of pine, hemlock and mixed hardwoods. Buffer zones should be created along the trail, the brook and around the vernal pools. Another thinning will be needed in 15 to 20 years to again remove the mature pines and hemlock, and to release the hemlock regeneration. Maintaining a 70% crown closure may require leaving some of the larger trees, and it is important to protect any hemlock regeneration during the harvest activities.

STAND 4 Wp,H,Hm 2-3 B

Description

This 19 acre stand is located in the northeast corner of the lot between Interstate 89 and Boutwell Mill Brook. It contains a short section of stone wall related to past agricultural activities from farms along Straw Road that have since been cut off by the Interstate. There is a small red maple swamp in the center of the stand and several streams and drainage ways in the northern end. White pine is the dominant species with 36% of the basal area, followed by red maple at 30%, white oak 15%, hemlock at 12%, and beech and red pine at 3% each. The stand is somewhat irregular, with patches of almost pure softwood and patches of almost pure hardwoods found scattered throughout. The stand appears to have been cut somewhat heavily in the 1960's. The hardwoods tend to be of poor quality as a result of that harvest. The pine runs from poor to high quality. Regeneration consists of scattered hemlock and some advanced mixed hardwoods.

Prescription

With a basal area of 110 square feet and 237 trees per acre, the stand can be considered adequately stocked although 20% of the basal area is poor quality. The stand should be selectively thinned in 5 to 10 years to remove the poor quality pine and hardwood stems. Some of the hardwood regeneration patches could be cut back to encourage sprout growth for browse. This would be a good winter food supply for deer using the hemlock in Stand 3 for shelter. The white oak should be favored as they produce acorns which provide a good food supply for several wildlife species such as deer, turkey, to squirrels. Because the regeneration found within the stand is the result of the last harvest, any selective thinning will tend to release it for further growth and development. Another thinning will be needed in 15 to 20 years after this next one to remove the mature stems and to further release the understory. A final overstory removal will be needed in 30 years to fully release the understory which should starting to reach the small sawlog size category.

STAND 5 Hm,Wp,Ro 2-3 A Units A&B

Description

This 3 acre stand contains two 1.5 acre units and both are found along Farrington Corner Road. Unit 5A is located between the beaver pond and the road. Unit 5B is located to the north of 5A between two houselots and makes up most of the tract that was donated by the Bean family. Because of their size and location, neither has been harvested for many years which allowed them to take on the characteristics of an old growth forest. The understory in portions of 5A has been removed by abutters to create a more park like effect. Roadside portions of 5B have a ground cover of Canadian yew that was heavily browsed by deer, indicating that the preferred browse is becoming scarce. The yew area also has a high proportion of aspen trees which are starting to die out because of their age. Unit 5B has several drainages running through it. The forest contains a mix of large white pine, hemlock and red oak, with a scattering of aspen, yellow birch and white birch.

Prescription

Because of the unit's small size and their location along the road, wetlands and houselots, it is recommended to designate the areas as a natural preserve. The stand could already be considered old growth, though its minimal acreage may limit the types of wildlife that depend on the old growth habitat. Due to the stand's high visibility, it probably has more value for its aesthetics as compared to promoting it as an example of old growth. Tree cutting should not be allowed except for safety reasons.

If roadside parking by people using the property becomes a problem, a pull-over could be constructed along the road in Unit 5A, with minimal cutting of roadside trees.

STAND 6 Rm,H 2 B

Description

This 6 acre stand is located between the large marsh area and the Interstate in the southeast corner of the lot. Most of the stand is wetland associated with the marsh or the streams that feed into it. The stand is dominated by pole sized red maple, and would be considered a typical "red maple swamp". There is a one acre dry piece of land in the southern part of the stand that contains a mix of pole sized red and white oak along with some red maple. Reaching the dry area would require crossing an abutters

property to avoid going through the wetlands. The access route from Lower Straw Road runs along the eastern side of the stand, roughly parallel to the Interstate.

Whereas most of the stand would be considered a wetland, no sample points were taken within the type.

Prescription

Because the stand is mostly wetland and abuts the Interstate as well as the marsh, it is recommended to designate the area as a natural preserve. The only activity that would be allowed would be the upgrade of the access road into the main part of the woodlot. Any road improvement work should be done in drought conditions to lessen the risk of siltation. Silt barriers should be set up during any road improvements and all exposed slopes should be seeded and mulched. Adequate culverts and ditching needs to be installed to prevent washouts and erosion. The road should then be gated to prevent mis-use of the property.

Other considerations

Because the lot is used by the Audubon Society, a Memorandum of Understanding (MOU) was drawn up detailing the responsibilities of both the Town and the Conservation Commission in the use and maintenance of the property. A copy of the MOU should be kept with this plan. The existing trail system could be expanded to tie in with Lower Straw Road to allow the people on both the Farrington Corner Road and Lower Straw Road to walk a large loop both within the Town Forest and on the town roads. It is important to keep the access road from Lower Straw Road blocked by a strong gate or some other barrier. A foot bridge needs to be constructed at the site of the old access road crossing on Boutwell Mill Brook found northwest of the observation tower. This will allow for a safe crossing of the brook during periods of high water for hiking, snowshoeing and cross-country skiing.

The Town's deed to the property also refers to flowage rights in connection with the mill dam. The flowage rights aspect should be further investigated to see what rights the Town may have in the wetland areas going through the "outlots" as shown on the forest type map. The old stone dam should be checked periodically to insure stability and to effect any repairs as may be needed. The small cellar holes could be archaeologically excavated by students to try to determine what the purpose of the buildings were. One appears to have been used for a small dump in the early 1900's and may yield some interesting items.

**HOPKINTON TOWN FOREST
JOHN BROCKWAY WILDLIFE RESERVE
HOPKINTON, NH**

TOTAL OPERATING VOLUMES

Species/Product	Stand 1 Wp3B/Wp,Hm1-2B 30 AC.	Stand 2 Wp3C/Wp2A 8 AC.	Stand 3 Wp,Hm2-3A 11 AC.	Stand 4 Wp,H,Hm2-3B 19 AC.	Stand 5 Hm,Wp,Ro2-3A 3 AC.	TOTAL VOLUME
White Pine	110,000	35,000	50,000	40,000	2,000	237,000
White Pine #4	9,000	<u>3,000</u>	3,000	2,000		17,000
Hemlock	24,000		5,000	10,000	8,000	47,000
Red Pine			<u>2,000</u>	4,000		6,000
Red Oak	8,000				7,000	15,000
Red Maple				8,000		8,000
White Birch					<u>2,000</u>	2,000
White Oak				<u>5,000</u>		5,000
Hardwood Pallet	<u>1,000</u>					<u>1,000</u>
TOTAL SAWLOGS - Bd. Ft.	152,000	38,000	60,000	69,000	19,000	338,000
HARDWOOD PULP - Cords	125		50	125	15	315
SOFTWOOD PULP - Cords	125	115	80	65	35	420

BROCKWAY TOWN FOREST

Immediate potential harvest volumes and values 1999

STANDS 1 & 2

SPECIES/PRODUCT	ESTIMATED VOLUMES	ESTIMATED VALUE	TOTAL VALUE
White pine	30,000 BdFt	\$110.00/ mbf	\$ 3,300.00
White pine #4	5,000 "	50.00 "	250.00
Hemlock	3,000 "	30.00 "	90.00
Softwood pulp	90 tons	\$ 1.00/ ton	90.00
Firewood	10 cords	\$ 8.00/ cord	80.00

TOTAL VALUE			\$ 3,810.00

STANDS 3 & 4

White pine	23,000 BdFt	\$110.00/ mbf	\$ 2,530.00
White pine #4	3,000 "	50.00 "	150.00
Hemlock	2,000 "	30.00 "	60.00
Softwood pulp	20 tons	\$ 1.00/ ton	20.00
Firewood	25 cords	\$ 8.00/ cord	200.00

TOTAL VALUE			\$ 2,960.00
TOTAL HARVEST VALUE			\$ 6,770.00

Estimated timber harvest management fees - \$ 1,070.00
Estimated road repair costs - \$ 5,500.00

NET HARVEST VALUE \$ 200.00

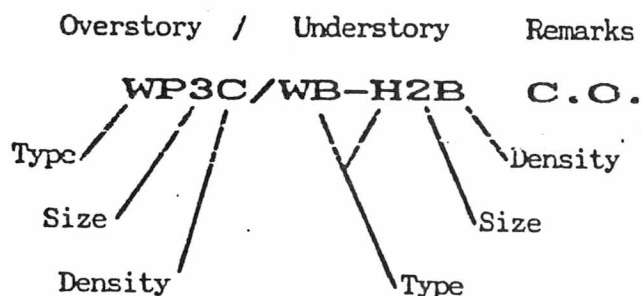
TOWN FOREST PROJECT RECORD

LOT NAME TAX MAP BLOCK LOT

[illegible]

TIMBER STAND DESIGNATIONS

Stand designations are made up of several parts depending on the situation. All parts are shown in the example below. The understory and remarks sections are sometimes omitted.



The first part before a slash is the overstory designation, the second part is the understory designation.

TYPES DESIGNATIONS:

- H Hardwood species
 - M Mixed hardwood and softwood species
 - S Softwood species
- Particular species may also be listed. See Species Abbreviations.

SIZE DESIGNATIONS (based on average stand diameter):

- 1 Sapling size \leq 4" DBH
- 2 Pole size $>$ 4" \leq 10" DBH
- 3 Sawlog size $>$ 10" DBH

DENSITY DESIGNATIONS:

- A Overstocked
- B Adequately stocked
- C Understocked

Remarks usually refer to past harvesting done, if any. In the above example, C.O. stands for cut over.

SPECIES ABBREVIATIONS

WP	White Pine
RP	Red Pine (Norway Pine)
PP	Pitch Pine
SC	Scotch Pine
HM	Hemlock
SP	Spruce
NS	Norway Spruce
BF	Balsam Fir
CE	Cedar
TA	Tamarack (Larch)
OS	Other Softwoods
SM	Sugar Maple (Hard, Rock)
RM	Red Maple (Soft, Swamp)
GB	Grey Birch
WB	White Birch
YB	Yellow Birch
SB	Black Birch (Sweet Birch)
RO	Red Oak
WO	White Oak
BO	Black Oak
BE	Beech
BW	Basswood
BC	Black Cherry
WA	White Ash
AS	Aspen (Poplar)
HH	Hophornbeam
EL	Elm
HI	Hickory
WI	Willow
OH	Other Hardwoods
T&P	Tie & Pallet

GLOSSARY

ACCESS: The place or ability to get onto a woodlot from an existing public road.

BASAL AREA: The cross-sectional area of a tree at 4½ feet above the ground, usually measured in square feet. The basal area per acre (BA/A) of live trees measures the density of tree stems in a forest stand.

BLAZE: An ax mark on a tree denoting a boundary line.

BIOMASS: Commonly refers to the entire mass of living tree material above stump height.

BOARD FEET: A measure of wood by volume. One board foot is the volume of wood equal to a piece 12 inches long by 12 inches wide by one inch thick. Many "log rules" are available for converting raw wood material to board foot units. Log rules are closely linked with the local forest industries and vary with geographical areas. The "International ¼ inch Log Rule" is commonly used in most areas of the Northeast. Board feet per acre (BF/A) is a measure of tree density in a forest stand.

BOLTWOOD: Wood which is used for turning stock and for the eventual manufacture of countless small items, such as buttons, golf tees, dowels and wooden toys. Boltwood mills buy the raw material in four-foot lengths (bolts) and/or log length form.

CAPITAL GAINS: Increase in value over time of an asset. For tax purposes it is the sale price of an eligible asset less its cost.

CORD: The standard cord of wood is an imaginary rick, or stack of wood, measuring 4 feet by 4 feet by 8 feet and containing 128 cubic feet of wood, bark and voids. Tables are available for estimating the number of cords represented by standing trees. Cords per acre (CDS/A) is a measure of density in a forest stand.

DBH (Diameter at Breast Height): The average diameter of a standing tree, measured outside the bark, at a point 4½ feet above the ground.

DEFECT: Internal rot, knots, or other defects in a live tree. The extent of unseen defect can be estimated from the history of a stand and from evidence of external damage from ice, wind, fire, insects, logging operations, etc.

DEPLETION ALLOWANCE: A tax benefit derived from the fact that timber is considered a depletable asset by the IRS.

FIREWOOD: Similar to pulpwood in that it is wood, not fit for higher uses such as sawlogs and veneer but it is used for heat production rather than paper production.

FLAGGING: The practice of hanging plastic ribbon as temporary markers in the woods for such things as boundary location and skid trail layout.

GROWTH: The amount of fiber added to a tree over a period of time. Usually expressed in cubic feet per acre per year or board feet per acre per year.

HARDWOOD: Hardwood trees are generally trees of the broadleaved species, also known as "deciduous" trees. Some more economically important hardwood species are maples, birches, ashes and beech.

INACCESSABLE: Describes land which cannot be logged at the present time because there is no economical way to get the timber out.

LOGGING COSTS: Include cost of cutting and yarding, trucking, internal road construction, and agents' fees.

MANAGEMENT PLAN: A document which analyses the forest on a woodlot and makes suggestions for future activities thereon.

MATURE: Describes a tree which is at its peak as far as biological or economic conditions are concerned.

MBF: Thousand board feet (see "Board Feet").

MEAN STAND DIAMETER: The average diameter of a group of trees measured at DBH.

MERCHANTABLE HEIGHT: The height of a tree where the merchantable portion of it ends. Usually at about 4"-6" in diameter.

MIXED WOOD: Describes a stand condition where both softwood and hardwood are present in significant amounts.

MULTIPLE USE: Concurrent use of the forest resources for more than one goal such as timber production, wildlife habitat, watershed management, etc.

NON-COMMERCIAL: A stand which is not able to be operated economically either due to terrain or size and value of the timber present.

OPEN AREA: Unforested land, typically hayfield, built up areas, or overgrown fields.

OPERABLE: Before a stand of timber can be logged (operated) on a commercial basis, it must have some minimum volume of timber. Just as markets vary from one geographical area to another, so does the minimum volume required to operate a stand profitably.

OVERMATURE: A condition in which a tree or stand is past its peak of either economic value or biological growth.

POINT SAMPLING: Statistical approach determining volumes in a forest. Commonly done with a prism at points randomly selected on a grid network spread out all over the property.

PRISM: In forestry, a prism is a calibrated wedge of glass which deflects light rays at a specific offset angle. In conducting a timber cruise, trees seen through the prism from fixed points are measured and are easily converted to "per acre" figures.

PULPWOOD: Wood or trees used to make pulp, from which paper products are manufactured. Trees of poor form and/or quality (rough and rotten), and of small size, are commonly tallied as pulpwood during a timber cruise.

SAWLOG: The portion of wood cut from a tree which will yield timbers, lumber, railroad ties and other products which can be sawn with conventional sawmill equipment.

SELECTIVE HARVESTING: The process of choosing some trees to cut over others based on such things as species, age, quality, location, health, etc., with the owners long term goals for management in mind.

SILVICULTURE: The practice of growing trees.

SITE INDEX: A measure of the ability of an area to grow timber.

SIZE CLASS: Stands fit into size classes based on the size of trees which occupy them.

SAWLOG - A live tree which measures over 10 inches in diameter 4½ feet from the ground.

POLE - A live tree which measures between 4 and 10 inches in diameter, 4½ feet from the ground.

SAPLING - A live tree taller than 4½ feet but less than 4 inches in diameter 4½ feet from the ground.

SEEDLING - A live tree less than 4½ feet tall.

SOFTWOOD: A class of tree species retaining their needles year round also known as Conifers such as pine, hemlock, and spruce.

SOIL SUITABILITY: The general quality of the soil to provide a good medium for the growth of timber products.

SOIL TYPE: A general description of depth and water content of soil.

STAND: A group or area of trees or forest having similar characteristics and requiring similar management practices.

STEMS: A term used to describe individual trees usually in the phrase "stems per acre".

STOCKING: The amount, usually in trees and less frequently in basal area or volume per acre of a stand.

OVERSTOCKED A stand condition where there are too many trees present to maximize growth and yield.

ADEQUATELY STOCKED A favorable stand condition where growth and yield in near optimum levels.

UNDERSTOCKED A stand condition where yield is lessened because all growing space is not adequately utilized.

STUMPAGE VALUE: The value of the standing tree. It consists of the mill price (M) paid for the logs, less the total logging costs (L) for cutting the timber and getting the wood to the mill. Stumpage value is crucial to the forest owner; it represents his profit on timber sales to the mill, and may be determined using the formula: $S = M - L$.

TIE AND PALLET: Logs that are too rough, short, small or crooked to be marketed as high quality sawlogs, but which can be sawn into railroad ties or pallet stock.

TIMBER CRUISE: A "cruise", or initial timber appraisal, is an inspection of a forest tract, conducted in order to determine the species composition, volume and value of timber of the tract. Other considerations during a cruise include site characteristics, reproduction and growth capacities of the species on the tract, operability, and the availability of markets.

TIMBER LIQUIDATION VALUE: The timber liquidation value (TLV) of a forest is the value of all the standing trees in operable stands. The value depends upon many variables, including logging costs and delivered mill prices, and may change from month to month.

TIMBER TYPE LINE: A boundary between two different stands of trees.

TRUCKING: Moving the logs or other wood products from the landing area to the mill. One of the costs of logging.

VENEER: Veneer logs are turned on a lathe to produce thin sheets of wood to be used in the production of veneer, plywood and paneling. Veneer logs are usually the highest quality logs produced in a logging operation.

VOLUME: A quantitative measure of the amount of wood in a tree, stand, or woodlot usually expressed in board feet, cords, tons, or cubic feet.

WETLAND: Area of property which has surface water or high water table and is not able to economically grow trees.

WHOLE TREE CHIPS: Wood fiber produced when the remains of a tree are ground up after logs and pulp have been removed.

YARDING: The transport of logs or whole trees from the stump to a yard, where wood is sorted. Yarding is usually done with rubber-tired "skidders," with tractors, or with horses.

SILVICULTURAL PRESCRIPTION DEFINITIONS

SELECTION CUT - A general thinning of the forest by removing scattered trees within the stand, leaving an evenly spaced forest behind.

CLEAR CUT - Total removal of all trees within the site.

PATCH CUT - Small clearcuts usually 1/4 acre to 3 acres in size.

STRIP CUTS - Long, narrow clearcuts with specific orientation.

CONTOURED STRIP CUTS - Strip cut laid out along the contours of a slope (as opposed to running straight up and down a slope).

GROUP SELECTION - Removal of enough adjacent trees to create openings in the forest of 50 to 60 feet diameter.

SEED TREE CUT - A clearcut where certain trees are left standing to act as a seed source on the site.

SEED YEAR - Year when trees produce acorns, nuts or cones.

WEEDING - Removal of undesired species in an immature stand.

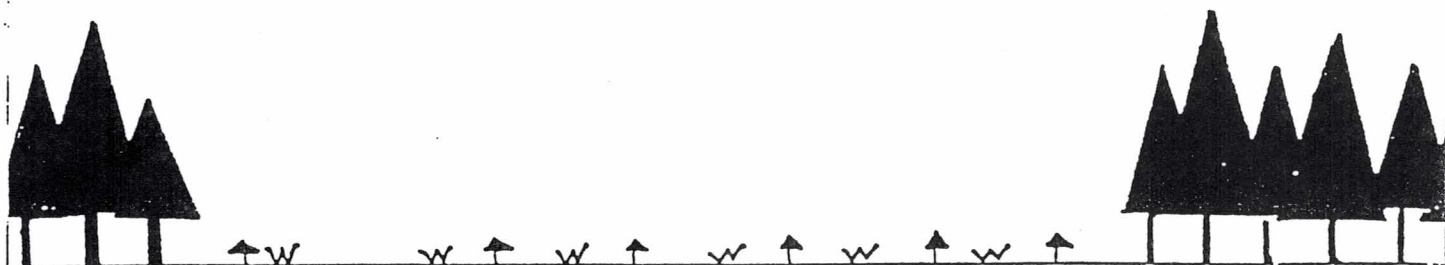
THINNING - Removal of poor quality stems in an immature or not yet mature stand.

RELEASE - Overtopping stems are removed from more desirable but smaller stems.

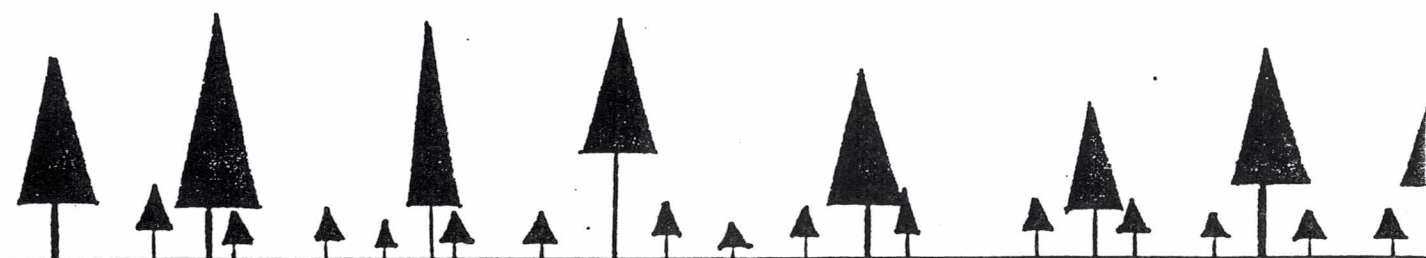
TIMBER STAND IMPROVEMENT - Typically referred to when weeding and thinning pole sized stands.

BUFFER ZONES - Areas requiring special attention or modified cutting prescriptions.

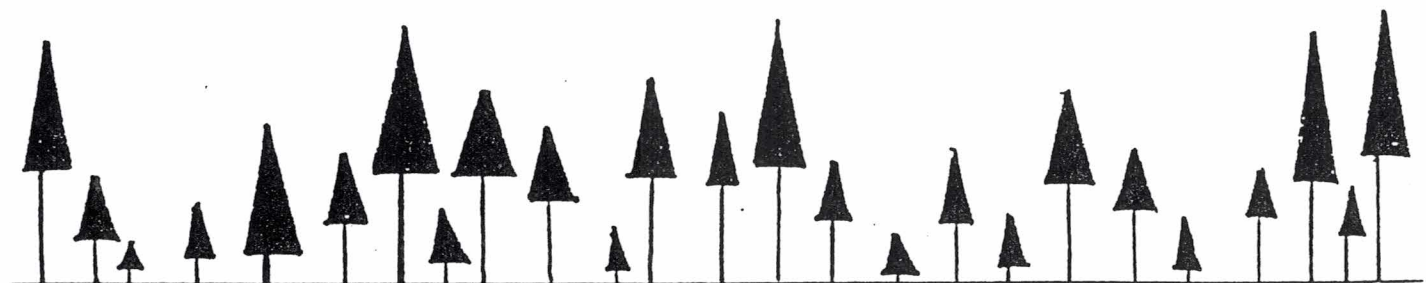
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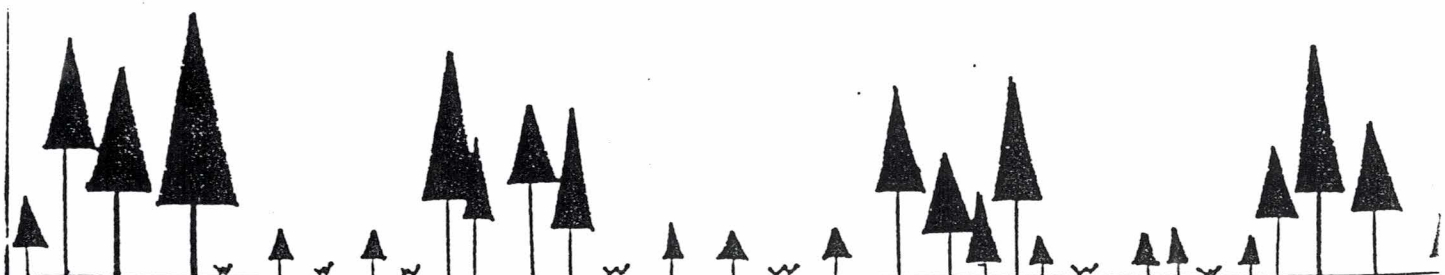
Shelterwood



Single-Tree Selection



Group Selection



Thinning

