

Timber Cruise Report
And
Forest Management Plan
For
York County Soil and Water Conservation District

Town of Lyman Map1 Lot 7 & Map 2 Lot 11 & 12
&
Town of Waterboro Map 8 Lot 67

County of York, State of Maine

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INTRODUCTION

The purpose of this plan is to update the previous plan developed in 1991. Most of the recommendations made in that plan have been implemented. The improvements combined with years of growth have resulted in substantial growth and many positive changes.

DESCRIPTION

The majority of the property is located in the Town of Lyman. It is found on the north side of town on the Brock Road where it meets the Williams Road. It is identified as Lot 7 on Map 1 and Lot 11 & 12 on Map 2 on the Lyman tax assessment maps. Town records show this property to be 118.5 acres in size. The previous plan indicated the property to be 126 acres in size. For the purpose of this plan the old acreage estimate will be used as the base acreage to stay consistent. Based on that acreage, 120 acres are productive forest land, and 6 acres are wetland. The lot is rectangular in shape, a larger rectangle west of the Brock road and a small rectangle east of it. The long rectangle covers several different soil types and aspects and resulting timber types allowing them to be compared and contrasted.

A smaller piece of property is found in the Town of Waterboro. It is 4.5 acres in size. It is identified by the town assessor as Lot 67 on Map 8. It is a narrow piece of property running along the Bennett Road.

It is stocked with 2,970 cords, worth \$79,158.42, growing 102.7 cords per year, worth \$2,756.47 for an average of \$21.20 per acre per year. This is far below the potential of the property and is the result of most of the property being stocked with low value immature trees following the 1947 fire. In contrast, Stand I, the most productive stand of planted softwood is growing \$80.10 per acre and it also is a young stand with a relatively small percentage of sawtimber.

MANAGEMENT OBJECTIVES

This management plan is for the period of 2009 through 2019. It is intended to update the past plan prepared in 1991. The management goals for this property are to demonstrate good forestry practices for the production of forest products while providing for multiple uses of the property including recreation and wildlife habitat while protecting soil and water quality and aesthetics. The management demonstrated is targeted primarily towards small private landowners.

FOREST HISTORY

Since the plan was prepared in 1991 many of the recommendations have been implemented except for harvesting. The vast majority of the work completed including harvesting has been accomplished with volunteer labor. The harvesting has been done on a chain saw and pickup truck scale. A small amount of harvesting was done on a small commercial scale with either a small skidder or farm tractor. The primary forestry improvements accomplished are the conversion of over 7 acres of low quality hardwood to softwood, the pruning of softwood crop trees and pre-commercial spacing of softwood crop trees. Much of the softwood conversion was an overstory removal to release under planted and naturally regenerated white pine.

The forest access road has been improved with multiple BMP's installed for demonstration purposes. Many tours have taken place at the site to demonstrate and show off these BMP's. Several hiking trails have been established and are frequently used by the public throughout the year. The property is a favorite place to exercise dogs by some users. A kiosk has been installed near the parking area. In addition, many signs have been placed along the truck road and trails identifying BMP's, different species of trees and other items of interest.

Some portions of the boundary lines have been marked with spray paint.

PROPERTY TAX STATUS

The property is owned under a public private partnership and is not subject to property taxes. It is important to note that a private land owner does not enjoy the freedom from real estate taxes. Therefore, a private landowner may not want to or be able to manage as idealistically as has been done on this forest.

PERTINENT LAWS AND REGULATIONS

Shore land zoning; The town of Lyman is in the process of adopting state standards for shore land zoning. The brook running through the property west of the Brock Road is not specifically zoned or identified by the town. Based on state law a 75 foot buffer zone along each side of the brook is subject to harvesting no more than forty percent of the timber in any ten year period. This requirement will have little to no impact on the management goals or recommendations for the property.

Clearcutting; Clearcuts of five acres in size or greater are regulated by the state of Maine. Cutting of such size and scale or intensity is not desired or planned. Therefore, clear cutting regulations have no impact on the management goals or recommendations for this property.

The town of Lyman requires a permit before any timber harvesting takes place. The permitting process requires substantial lead time, approximately three months. The process involves at least three meetings with the selectmen at publicly announced meetings. This is an onerous requirement adding additional expense and may limit a private owner's ability to take advantage of short term market conditions.

Hiring a consulting forester to administer the sale of timber as recommended within the plan will ensure compliance with all Maine State laws. The town ordinances should also be checked for possible new rules affecting the harvest of timber before doing so.

NON-TIMBER RESOURCES

Endangered species/ Exemplary Communities; No threatened or endangered species or their habitat was identified by the Maine Natural areas Program.

Fish and wildlife Habitats; Specific wildlife habitat descriptions and management recommendations are found in each stand description under recommendations. The brook and adjacent wetland running west through the property is identified as waterfowl and wading bird habitat by the Maine Natural Areas Program. The brook also likely holds wild brook trout and other native fish. No area of the property was identified as a deer wintering area. Some areas of the property may provide winter cover including the area identified as stand IX. No tracks or sign was seen during the field work for this plan. The frequent use of the property for exercising dogs and abundant coyote sign on the frozen beaver flowage may account for the lack of deer using the area.

Water Quality and Wetlands; Several small drainages and an area of poorly drained soils drain the property and feed into a large unnamed tributary of Shaker Brook that flows west across the property.

A truck road running from the Brock road north to the Shaker Brook tributary demonstrates multiple best management practices to maintain the integrity of the road as well as soils and water quality. A portable skidder bridge is also installed west of the truck road. The area north of the

Shaker Brook tributary is currently not accessible for timber harvesting. The installation of corduroy and a portable skidder bridge is recommended for accessing this area. A board walk can then be constructed to provide walking access to the area for observing management and general recreation. The use of best management practices including operating machinery when soils are dry or frozen, the placement of slash and/or corduroy in wet areas and slash on steep slopes will minimize damage to soil or water from the use of heavy equipment.

Terrain & Hydrology; This large rectangular piece of timberland covers a swath of soils and terrain common to York County. The predominant soils are fine sands ranging from shallow, droughty soils over ledge on hill tops to deeper moister soils providing good sites for growing timber to poorly drained areas at the other extreme. Also found are sites with different aspect. This allows the difference in productivity between northeast and southwest sites to be compared.

Cultural and Historical Sites; A few stone walls are found but little else is evident of historical monuments or markers. This is typical of the land affected by the 1947 fire.

Maine Historic Preservation Commission does not have any specific historical or archeological sites identified on this property but indicates old foundations may exist. See the appendix for a map.

Recreation; Several trails in addition to the truck road provide opportunities for hiking and snow shoeing. One or more wildlife observation blinds are planned for the edge of the beaver flowage. A small number of people use the property on a regular basis for hiking and snow shoeing. They also exercise their dogs at the same time. The regular running of dogs may be reducing the use of the property by wildlife, particularly deer in the winter.

Esthetics; Maintaining desirable esthetics of the property is a priority. Esthetics is in the eye of the beholder and based on expectations or based on their relevance to management taking place. Forest management can be defined as managing disturbance for a desired result. Silvicultural practices usually entail cutting and killing competing stems pre commercially or when harvesting a crop. Such activities result in changes to the forest and produce slash, areas of stumps, bare ground and possibly scarified soils. Better and more consistent signing would help the public better appreciate the esthetics in context of management.

TIMBER INVENTORY PROCEDURE

The maps drawn for this plan were developed using information from several sources. Corners of the boundary lines and inventory points were located using GPS. The GPS points were then placed into a geographic information system (GIS). Aerial photos were obtained from the state GIS web site. The photos were taken in May of 2003. Stand lines were located during the field survey and from the photos.

Variable plot or point sampling was the method used for the merchantable timber inventory. Point sampling measures the relative density of trees rather than the actual number of trees on a fixed area (fixed area sampling). Point sampling assumes that there is an equal stocking expressed as basal area (square feet of stump area) for each tree measured regardless of size. Since large trees have more basal area large trees are more intensively sampled than small trees. Point sampling is desirable because larger and generally more valuable trees are more intensively sampled and it is relatively quick and efficient to use.

For example, a 6 inch diameter tree has 0.196 square feet of basal area. Each stem sampled with a 20 square foot basal area factor prism represents 101.8 stems with a sampling intensity of less than 1%. In comparison a 24 inch tree has 3.149 square feet of basal area. Each stem sampled with a 20 square foot basal area factor prism represents 6.4 stems with a sampling intensity of 15.6%.

Inventory samples were systematically spaced 200 feet apart on cruise lines running in magnetic cardinal directions. Each sample represents approximately .9 acres. In addition, several small stands were inventoried at a greater intensity with plots spaced 100 feet apart. This intensity of sampling (expense of field work) is far greater than what is typically recommended or needed for management plans. The greater sampling intensity was done to identify the many small stand type changes and to have statistically valid data for them. The greater amount of data also allows better comparison of growth response based on site and past treatments for demonstration purposes.

A 20 basal area factor (BAF) prism was used for this inventory. Trees were measured by two inch diameter classes. All trees six inches in diameter (5.1 inches) or larger were recorded. Merchantable height was recorded by the number of eight foot sticks of pulp to a four inch top or the number of eight foot logs based on the utilization standards for each species. Sample data was then calculated using Two Dogs brand software. All volumes are expressed in standard cords and thousand board feet (MBF), international scale. Desirable, young stems likely to produce high value sawlogs or veneer in the future are identified as growing stock, although their current value is that of pulpwood. This is to distinguish them from other stems of poorer quality that are likely to remain as pulpwood or other low value products.

Log utilization standards for standing trees

Species	Diameter in inches	Small end
Spruce and fir	8	6
White birch	10	8
All other hardwoods	12	10
All other softwoods	10	8

ACCESS

Frontage on several town roads provides many opportunities for conventional management access but also provides great opportunity for demonstration purposes. What people see from the road as they drive by is an advertisement. It is important that active management be seen from the road.

Access is a prerequisite of management and harvesting. Without access timber has no value. As a demonstration forest it is important to show access roads and landings in a size and scale necessary to sell timber commercially.

An internal truck road west of the Brock road provides access for commercial timber harvesting and management. Where the truck road meets the Brock road is quite steep and needs to be modified to accommodate commercial logging trucks. This steep approach is likely the result of the Brock road being built up and upgraded several years ago.

A larger commercially sized landing also needs to be developed. The current demonstration landing, while well constructed, is barely large enough to turn a three axle truck around on, never

mind land forest products or turn a tractor trailer truck around. Tractor trailer trucks are the industry standard now and are required to sell biomass fuel chips or maximize the value of income from the sale of pulpwood and even saw logs. To demonstrate otherwise does a disservice to landowners seeking information on what they should reasonably expect.

Commercial access for timber harvesting needs to be developed for the land along both sides of the Williams road. A small woods road suitable for a pickup truck is found on the west side of the fire pond. Although it was apparently used during the previous harvest, it is not well suited for a commercial harvest. The soils are seasonally wet in this area. A better location would be to use the flat brushy area adjacent to the intersection of Williams Road with the Brock Road. There is sufficient room to support a cable skidder or cut to length crew. It might even support a smaller mechanized chipping crew.

The south side of the Williams road has no vehicle access. When the Brock road was rerouted a short piece of road was abandoned. This section of road would provide good access for harvesting and could also easily be reclaimed to provide parking for those visiting the property. If the road were reopened it would be fairly easy for town plow trucks to pass through providing an off road parking area for winter users. Maintaining a winter parking area would increase use during the winter. Developing this area would provide better vehicle access and more visibility to the public. It would be desirable to add a new kiosk to this area as well.

The Waterboro parcel is accessed by a driveway and small landing. The landing is suitable for a cable skidder or cut to length equipment. Access is controlled by a cable gate with a sleeve of PVC pipe for safety. This is an excellent demonstration of a low cost gate.

It is recommended that the landing be moved to the north end of the lot near the power lines parallel with the road. Moving the landing to an end of this small narrow lot would making skidding much more efficient for the skidder operator and reduce the damage to the residual crop trees and regeneration.

BOUNDARY LINES

Maps drawn by surveyors show the location of the property lines. Some of the lines and one corner are not marked. The boundary lines are marked by a combination of stone walls, barbed wire, spray paint, plastic flagging, and substantial portions remain unmarked. Recommendations within the previous plan to blaze, paint and brush out the lines went largely unfulfilled. Some lines were marked with spray paint but these lines are not clear as several trails are also marked with the same paint.

West of the Brock Road a rebar pin and an iron pipe are found on the southerly line and an iron pipe and a small section of stone wall mark the northerly line. The lines on the majority of the property west of the Brock road are poorly marked with surveyors tape or not marked at all. A cement bound was located on the town line, but it is unclear whether it is the south west corner or a monument just south of it. The North West corner remains unmarked. Properly marking all boundary lines remains the top recommendation. Coincidentally, boundary line maintenance is also the most frequently ignored practice by private landowners.

The lines around the Waterboro property and the area east of the Brock Road are well defined and easily located.

All lines should be marked by blazing and painting “line” trees. They should then be maintained every ten to fifteen years. Well marked boundary lines also help deter trespass and timber theft. Maintaining a line is much cheaper than hiring a surveyor to reestablish it. Refer to the Maine Forest Service handout on boundary line maintenance in the appendix.

DEMONSTRATION OF PRACTICES;

Many standard forestry recommendations have been put into practice across the property. Much of the work has been applied opportunistically. Such work has resulted in the betterment of the forest but not in a systematic way. To the knowledgeable eye the practices are readily apparent. To the general public it is probably much less apparent.

Future improvements should be better documented as to the location and extent performed. Ideally all practices should be signed as to the type of practice and date performed. At minimum, one example of each practice should be signed. Good record keeping is a good practice. It is also desirable for better demonstrating a practice and just as importantly the resulting growth, benefit or change years later.

Maintaining control plots demonstrating a before or do nothing example have been left but not designated in any way. Without signing and designating the boundaries of such plots they give the impression of a haphazard approach to management. Control plots should be large enough so that the plot is not greatly influenced by management around the edge. Three or four control plots of 2 to 3 acres in size would likely be sufficient.

An interpretive trail has been developed for the soil and water BMP’s demonstrated along the truck road. The demonstration trail should be updated and expanded to include other forest improvements and harvests undertaken as well as the control plots on the forest.

An abundance of signs have been placed in the forest along trails. In most cases signs have been nailed to trees. In the future signs should be placed on posts. Using trees as posts and placing nails and screws in them should strongly discouraged. In ten to fifteen years the tree will have grown enough to push the sign off the nail. Then the nail will remain hidden in the tree as a hidden defect spoiling a potentially valuable piece of sawtimber from the most valuable portion of the tree. It is important that this simple management practice be pointed out to those using the property. If a sign must be hung on a tree aluminum nails should be used as they will not damage milling equipment.

Undertaking many different practices at once require coordination. Different colors of paint should be designated for marking trails, boundary lines, trees to harvest, trees for pruning, delineating control plots, etc., etc. Blue and red spray paint have already been used to mark both trails and boundary lines. Blue should be reserved for marking trees for harvest. This color is best seen by loggers from the cab of machines. Blue is also the lowest cost color to purchase. This is a factor since marking timber for harvest can consume more paint than other functions on the forest. Mint green is a good color for marking trees for pruning. It shows up surprisingly well for a worker on foot and is not readily apparent to someone operating a machine. Red, yellow and orange are good colors frequently used for boundary marking. A light color such as yellow can help lead a person out of the forest if overcome by darkness. White might be a good choice for designating control plots.

Paint use recommendation;

Blue: marking timber for harvest

Green: marking trees for pruning

Red:

Orange:

Yellow: boundary?

White: control plots?

Purple:

Maple Stone School;

The Maple Stone School from Acton uses the property as a facility for field trips and a hands on learning site. It is desired to incorporate the school into the on the ground management activities of the property. One option is to designate a certain plot of land for the school to manage with direction from YCS&W or their forester. In this situation students would be able to see the long term improvement from their actions. Over the short term of ten to fifteen years this would work well in a young stand but as the timber matures there would be little need for on the ground work and the harvesting of larger trees would not be well suited to hand labor.

An alternative would be to incorporate the students into the management of the whole property. This would allow them to focus their energy where the work is most needed and also demonstrate to the public a more realistic and economically viable investment of labor. The older district members such as Sid Emery are not able to invest as much time and energy as they once did. The students would be a great resource for continuing the cultural work begun on the property. This would still allow the students see the forest grow and improve from their involvement. This is the recommended use of the schools time and energy.

RECOMMENDATIONS;

For both the short and long term management, a combination of the shelterwood and selection methods of silviculture is recommended, with a cutting cycle of 10 years. That is, on the average each area should be cut every ten years. A fairly short cutting cycle allows more of the potential mortality to be salvaged and also, allows for more conservative thinning.

It should be pointed out that the recommendations are based on current conditions to attain the owner's current goals. Should conditions, such as markets, or as the landowner's needs change, the recommendations should be modified to reflect those changes. For example, it makes no sense to sell high valued timber when markets for that timber are weak. Waiting will have little effect on forest growth, but could greatly increase the income realized. Alternatively, should the owner's needs change; there is timber available for cutting. Cutting sooner than planned may not maximize the timber value, but may be the owner's best financial choice, and can be done without damaging the long term productivity of the forest.

Recommended harvesting should be scheduled so that a third of the property (approximately 40 acres) is cut every three to four years. This will result in a regular stream of income to the district as well as always having a recent harvest or upcoming harvest to feature during demonstrations. Because some of the plantations are so heavily overstocked, a thinning of lighter than usual intensity be done followed by another thinning in six or seven years to achieve the desired stocking level. This will allow the remaining stems in the stand to gradually become acclimated to the additional growing space and greatly reduce mortality and stem damage from wind, snow and ice. If the plantations are thinned early in this ten year period it will result in 4 harvests during the ten year period or a harvest every other year.

Due to current market conditions it is recommended that a harvest this year be done with a mechanized harvest in stands IV, VII, and VIII totaling about 40 - 50 acres. Estimated gross income will be a modest \$100/acre based on 5 cords of firewood and a couple loads of biomass chips per acre.

The next harvest should be the plantations. This will yield a high percentage of low value pulpwood but will yield a greater income due to a small percentage of high value sawlogs. Income will likely be \$150 to \$200 per acre.

The final area to be harvested should be Stand IX and XI. While these areas would benefit from harvesting now they are better able to wait for treatment than the other areas. Income will again be modest as the primary product removed will be firewood. Income will likely be about \$100/acre. The Waterboro parcel could be harvested any time. If it is cut with a cable skidder it can be its' own sale. If it is desired to have it harvested with cut to length equipment it will need to be coordinated with the other plantations.

Following harvesting, intensive precommercial weeding and release can be done in stands III, IV & VII and in other areas as the need may develop. Foliar and basal application of herbicide is a very effective technique to achieve this work as is described in the stand descriptions. Such work will typically cost \$150 to \$200 per acre.

Many stems have been partially pruned and should be completed. A third of the property will be stocked with white pine that will be large enough to begin pruning by the end of this planning period if the harvest recommendations are followed at the beginning of the period.

Invasive species are well established along the road side of the Waterboro parcel and around the intersection of the Williams Road and the Brock Road. Controlling this growth should be a top priority. Cost will range from \$150 to \$225 per acre. If this work is combined with some acres of softwood release it will help reduce the cost per acre by improving the economics of scale.

The permit application process to harvest timber is very time consuming in Lyman. One should plan on at least three months in order to attain a permit.

Hiring an independent consulting forester to mark the timber to be cut and administer the sale will ensure that the silvicultural goals of the recommended harvests are met and that the timber is marketed to its' fullest value.

Basal area

Basal area is a term used to describe the density of stocking and is expressed in terms of square feet of stem area per acre. This would be the total surface area of all the stumps if you cut down every tree at 4.5 feet above the ground. The estimate of basal area is listed for each stand. Softwood species can maintain optimum growth at higher stocking rates than hardwoods. Mixed-wood stands fall somewhere in the middle and it depends on the shade tolerance of the species. Softwoods are fully stocked at a basal of 120 to 140 square feet while hardwoods are well stocked at 50 to 70 square feet. Optimum stocking varies depending on diameter and species but for the average person looking at the numbers this will give you a good starting point. It is important to remember that this is a relative number and is an average across the stand. It is easier to visualize this as an evenly spaced stand of trees of the same size and age. Uneven aged stands are uniformly variable with great variation in stocking.

SILVICULTURAL SYSTEMS

Thinning

Thinning is an intermediate or tending harvest. Its' primary purpose is to promote the growth of those stems left to grow. Desirable stems intended to be grown to maturity are referred to as crop trees. Ideally, thinning should be accomplished by harvesting stems of low vigor, poor health, poor form or of undesirable species. In this way crop trees and other vigorous stems are left to continue growing. If all other factors are equal it is preferred to maintain the vigor of a fast growing dominant stem rather than increasing the vigor of a suppressed stem. Thinning should give additional growing space to the stand but not reduce the stocking so much that substantial growing space is unused. Severe thinning, especially to an unmanaged stand leaves the remaining stems vulnerable to stress from severe weather such as wind, heavy ice or snow or sun scald.

If a forest is "thinned" by taking the better quality higher value stems it is referred to as high grading. Over time this practice results in a low value unproductive forest.

Shelterwood

The shelterwood system is an even-age system of silviculture. That is, all of the trees in the forest stands are near the same age. In this system, the stands are thinned periodically until they are mature. Once mature, they are thinned in a manner that will encourage the establishment of seedlings of desirable species. These seedlings then develop under the "sheltering" overstory. As the seedlings develop, that sheltering overstory is removed in one or more harvest cuts.

By extending the removal period to two, three or more cutting cycles, a forest managed by a shelterwood may take on the appearance of a forest managed under the selection system. The difference is somewhat academic, but does affect which trees are selected for cutting and when they are cut.

Selection

In the selection system, individual stems and groups of stems are selected for cutting. Thinning and harvest are combined in this system. Reproduction becomes established in openings created when groups are cut, and uneven or all-age forest stands result. If only small openings are made in the canopy, reproduction will be only of species that are tolerant of shade. Larger openings, at least as wide as the surrounding trees are tall, will allow some stems of intermediate and shade intolerant species to become established. A cutting cycle of ten years is recommended. In the most intensive applications of this system, precommercial thinning and weeding is conducted within groups of young stems. This is generally done following a commercial harvest and is restricted to those areas that do not have a competing overstory.

When initiating thinning for the first time it is recommended to establish a logical network of skid trails to allow for access. Skid trails should be laid out approximately every 100 feet with gradual turns and trail intersections. Some desirable crop trees may need to be sacrificed to establish the trail. But this will result in minimal skidding damage to the remaining crop trees. Thinning should typically aim to remove 25% to 30% of the stand volume. On the initial entry half of the volume is generated from establishing the trails. The other half of the harvest is generated by thinning and selection cutting between the trails. It is recommended that at each future entry the poorer quality or high risk stems be harvested. The quality of the stand and timber is improved in quality and value with each successive harvest.

Commercial timber harvesting options

A brief analysis of commercial timber harvesting machinery is presented here. The home owner level of firewood harvesting has been well shown in several locations. It is recommended that one or more examples of commercial timber harvesting equipment be demonstrated. Potentially all three styles of equipment could be demonstrated side by side with an interpretive trail passing through each type. Such a harvest would require careful planning and lay out. Regardless of harvest method timber needs good truck access to be marketed to its best potential. Economics of scale demands trucking is done with tractor trailer.

Cable skidder; The number of cable skidders, particularly small machines, is declining due to a number of market forces. This was the industry standard 15-20 years ago but is on the verge of becoming a specialty service today. Plusses; able to economically harvest a relatively small volume of wood (100 cord minimum), can have the narrowest trail width of commercial options, can remove wood from the most challenging locations, able to harvest widely scattered stems, best option for harvesting large saw timber, provides good utilization of top wood for pulp. Minuses; few high quality contractors to choose from, most disruptive system for removing timber from existing regeneration, slash requires extensive lopping to reduce visual impact, requires the majority of harvested stems to be eight inches in diameter or greater to maintain profitability. Small contractors might not have good markets resulting in lower stumpage values paid due to lower production levels compared to larger contractors

Forwarder and cut to length processor; This is a relatively new harvesting system in southern Maine. The number of contractors available is gradually increasing. Plusses; requires a very small landing area, landing area stays clean with little debris except bark in the spring, most efficient system for harvesting small diameter round wood products especially softwood, slash is placed in harvesting trails minimizing slash, increasing esthetics and minimizing soil disturbance, processors with fixed heads can lift small to moderate size trees off of existing regeneration with little damage, trails can have sharp turns without scaring residual trees, trails are not gouged by dragging wood. Minuses; very expensive equipment requires efficient jobs to maintain profitability, require large harvest volume for economics of scale, dangle head processors are only capable of harvesting smaller size stems and have poor directional felling capability, not well suited to very large trees, large limbs or crooked stems, limited contractors to choose from, typically yields lower stumpage income due to high equipment cost and little competition from other contractors.

Mechanized harvesting and grapple skidders; Mechanized harvesting has become the standard due to productive capacity and flexibility in handling diverse timber types and reduced labor cost from decreased workers compensation rates. Plusses; greatly reduces slash left after the harvest, depending on markets biomass income can be substantial, provides flexibility in marketing lowest grade timber, can harvest stems as small as two inches in diameter allowing for silvicultural improvements earlier in a stands development, tracked boom style feller bunchers can cut and lift stems as large as eighteen inches in diameter off existing regeneration with minimal disturbance, Minuses; require large landing space, trails are quite wide, round wood utilization is typically reduced, several pieces of machinery are used and require greater economics of scale, at least 200 cords, large skidders need soil to be dryer or frozen deeper to minimize soil disturbance, tree to tree rubber tire feller bunchers damage a lot of established regeneration, grapple skidders must back up to each tree that is not cut by a feller buncher.

FOREST DESCRIPTION AND RECOMMENDATIONS

The Lyman property has 13 stands. Four softwood plantations, one natural spruce stand, four mixed wood stands, two hardwood stands and one area of wetland were identified. Most of the stands are similar in shape and size to those identified in the previous plan but exact dimensions and acres have changed so direct volume comparisons should not be made. The stand numbering followed that of the previous plan where possible. One hardwood stand was divided into two to better contrast the difference between east and west aspect sites.

The Waterboro property has three stand types, two softwood plantations and one natural hardwood type.

STAND I, WHITE & RED PINE, SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
1.8	240	10.3	416	439	2.06

Location: This stand is found on the north side of the intersection of the Brock Road and the Williams road.

Terrain and Soils: The terrain is smooth and gently sloping to the north away from the road. While small by today's standards, this area was formerly an intensively managed garden plot. The rich soils combined with a north east aspect provide excellent growth potential. The above average tree height is evidence of the good soils.

Access: This stand can be accessed from the Williams road. A small strip of stand III runs between much of this stand and the road edge and would be a good location for a landing.

Composition and Quality: This is a white pine plantation with lesser amounts of red pine and a few red spruce. It was planted in 1951. The trees are quite tall and stem quality varies from moderate to excellent. Some of the dominant stems have only one good log, particularly on the stand edge along the road. The codominant and intermediate stems have excellent stem quality and will likely produce sawlogs from their entire stem if allowed to grow to sufficient diameter. Many stems have been pruned. The red pine in the stand are of good quality and many are capable of producing a utility pole in the future.

The previous plan indicates it was thinned just before the plan was written in 1992. Several piles of four foot pulpwood remain in the stand. Average diameter has increased from 7 inches to 10 inches. Basal area has increased from 140sqft to 240sqft. Thinning as recommended in the previous plan has not been done. The basal area indicates the stand is heavily overstocked and in need of thinning.

Regeneration: Most areas of the stand are much too dense to allow regeneration to become established. The edge affect has allowed enough filtered light to let some groups of white pine seedlings throughout the stand and sugar maple saplings at the north end of the stand to become established despite the dense stocking. While the regeneration is very desirable, it is premature to regenerate this relatively young high quality stand.

Recommendations: The general goal for this stand is to produce high quality saw timber. The specific goals for this stand are to gradually reduce stocking to optimal levels through two light thinnings.

The basal area of 240 square feet indicates the stand is long overdue for thinning. The previous plan recommended thinning when the stand reached 180 square feet with a post thinning level of 130 to 140 square feet. Thinning the stand heavily enough to reduce the stocking to 140 sq. ft would put the remaining trees at severe risk to wind throw or ice and snow damage.

A lighter than normal thinning is recommended to gradually reduce the stocking to a more desirable density. This will allow the residual stems to gradually become accustomed to the additional growing space. About 20 percent of the stand volume should be harvested. The stems to cut are those at risk of mortality, with crown damage or with crooked upper stems and unlikely to produce more than a single log. A follow up thinning is recommended in six or seven years to again thin the stand lightly to drop the stocking to a more ideal level. Many high quality stems are found in this stand and they should be grown to a large size to maximize their full potential and the value grown. Once stocking density has been moderated it should be allowed to grow to a basal area in the vicinity of 160 square feet and periodically reduced to a level of about 120 square feet to fully utilize the growth potential of the site. Once the poorer quality stems have been harvested the stand should be thinned from below removing the less vigorous stems. Under better economic conditions several saw mills purchase small diameter clear to pin knotted logs down to four or five inches in diameter. The current inventory does not measure that volume. During future thinning those markets will likely be able to be utilized. The long term goal for the stand should be to produce large premium quality stems of at least twenty to thirty inches in diameter. Once the two recommended thinning have been accomplished rapid growth should be able to be maintained. It is quite realistic that the stand could achieve an average diameter of thirty inches in less than fifty years.

Invasive Species: Much of the stand is moderately to heavily infested with honey suckle. The plan indicates this species was planted for conservation to provide food and cover for wildlife. A late summer application of foliar applied herbicides is recommended to control the invasive species. An additional benefit to this application will be the release of any white pine regeneration growing in the treated area.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	18,880	36
Norway pine	590	3
white pine pallet	4,700	33
Spruce & Fir	1,290	
Norway pine poles	1,050	
Totals	26,510	72
per acre	14,728	40
Total per acre		69

STAND II WHITE AND RED PINE POLE TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
3.6	209	8.6	524	183	1.27

Location: This stand type is found north of the Williams road at the east end of the property.

Terrain and Soils: The soils are fine sandy loams. The stand sits atop a well drained knoll that runs parallel to the road. The soils are productive but less so than in Stand I.

Access: A small woods road accesses this stand from west of the fire pond. This woods road was apparently used for the previous thinning but is not well suited to support a commercial harvest. The landing recommended for stand I is recommended for this stand as well.

Composition and Quality: This is a plantation of white and red pine of pole and small saw timber size stems. Stem size is relatively small due to being highly overstocked. It was established in 1958. It was row thinned just prior to 1992. It has had no thinning since then. Quality is generally good except for a few white pine with forked stems, especially along the edges of the stand. Although it is a bit younger it is very similar in stocking to stand I. It provides a good comparison of growth potential in different soil and aspects.

A few stems have small to moderate size skidder injuries where the rows join the woods road. The stand in general is of moderate vigor due to the high stocking of 209 square feet of basal area. Many suppressed stems are also found. The southerly edge of the stand is predominantly red pine and no inventory plots fell in this area. A number of these red pine are likely to produce utility poles in the future.

Regeneration: Little regeneration is present because of the dense stand conditions. A few seedlings are found around the edges because of the filtered light.

Recommendations: Sid Emery has requested that this stand not be cut or disturbed until after he has passed away. This stand is heavily overstocked and in need of thinning. See the recommendations for stand I. Because the plantation was established on 6 foot by 6 foot spacing most late model logging machinery will likely not fit down the previously cut rows without damaging the stems on either side. If small enough machinery cannot be located the next thinning may again need to be another row removal. Utilizing a contractor with modern equipment would yield higher income from the wood harvested but would sacrifice some desirable growing stock. Utilizing smaller machinery would allow more silviculturally idealistic harvesting to be done but would likely yield very little income. A farm tractor and forwarder wagon would be ideal for harvesting this stand. If silviculturally more desirable thinning during the current entry yields a higher proportion of small diameter saw logs in the next thinning the net income from both harvests will likely be much greater and justify the lower initial income.

The long term goal for the stand should be to produce large premium quality stems of saw timber and utility poles. Once the two recommended thinning have been accomplished rapid growth should be able to be maintained. It is quite realistic that the stand could achieve an average diameter of thirty inches in less than fifty years.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	19,470	57
Norway pine	940	11
red pine pole & growing stock		14
white pine pallet	2,770	44
Poplar		2
Totals	23,180	128
per acre	6,439	36
Total per acre		48

STAND III, MIXED HARDWOOD & WHITE PINE POLE AND SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
8.8	111	9.6	219	132	1.04

Location: This stand is found on both sides of the Williams road. In the previous plan, Stand III was a smaller area located between stand I and II.

Terrain and Soils: The terrain is smooth and flat to gently sloping. Soils are fine sandy loams. Several small seeps drain the area and some areas of seasonably wet soils are found.

Access: This stand is accessed by a small woods road next to the fire pond. It is recommended that a commercially sized landing be established at the intersection of Williams road and Brock road to serve the stands on the north side of the road. The discontinued road on the south side of the Williams road would provide a good location for a landing and parking for the public using the property.

Composition and Quality: This is a mixed wood stand of pole to saw timber size hardwood and saw timber size white pine. Stems of all ages are found. Stocking and species composition varies considerably across the stand. Red maple described in the previous plan and good quality red oak are the predominant hardwood species. A couple larch, a few white ash, sugar maple, yellow birch and poplar were seen in the stand but not measured.

Regeneration: White pine seedlings and saplings are established in the understory. Also found are beech saplings, red maple saplings of low vigor and native shrubs including wild raisin, blue berries and hazelnut that produce hard and soft mast utilized by wildlife.

Invasive species: Several invasive species are found around the intersection of the Williams road and the Brock road. Japanese knot weed and honey suckle are the predominant species. It is recommended that these species be controlled by an application of foliar applied herbicide in late summer.

Recommendations: The long term goal of this stand is to produce high quality saw timber and to shift the species composition to white pine utilizing natural reproduction. This stand should be managed using the selection system in the form of improvement cutting. High quality saw tim-

ber, growing stock and regeneration should be released by harvesting lower quality stems, particularly red maple. Many of the red maple are of low vigor due to over stocking. These stems are quite prone to stain and decay from any minor injuries. Many of the stems have small cankers indicating advanced colonies of decay fungi. Any high quality red maple should be retained as crop trees where practical.

Relatively dense stand conditions have reduced the amount of material growing on the forest floor. This has provided good conditions for white pine seedlings to become established with little competition. Once white pine regeneration is established it should be released by harvesting low value stems such as red maple. Such cutting will gradually increase the composition of white pine in the stand. This will increase the value produced. The softwood regeneration will provide cover for wildlife while the periodic cutting will provide herbaceous growth on the forest floor providing feed for ground dwelling wildlife. Precommercial weeding and thinning could be done to reduce the amount of red maple and beech regeneration. The use of basal and foliar applied herbicides are recommended methods to achieve this.

The long term goal for the stand should be to produce large premium quality stems of at least twenty to thirty inches in diameter. Red oak, white pine and any good quality specimens of other species are recommended as crop trees. A cut to length system or cable skidder would be the best harvest option due to the small landing area.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	11,010	11
Norway pine		
White pine pallet	4,500	36
Hemlock		11
Red oak	6,960	19
White oak	630	
White birch	590	
Soft maple	1,780	5
b oak	1,850	
Hardwood	3,000	89
Totals	30,320	171
per acre	3,445	19
Total per acre		26

STAND IV, MIXED OAK POLE AND SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
24.3	82	9.4	171	83	0.57

Location: This stand occupies the westerly facing slope on the west side of the Brock Road.

Terrain and Soils: The terrain is a smooth, gently to moderately sloping westerly aspect. Soils are predominantly shallow fine sands over ledge at the top of the hill gradually becoming deeper as you move down slope.

Access: This stand can be reached from the internal truck road. Several pickup truck paths access the areas with smoother soils.

Composition and Quality:

This is a moderate to low quality hardwood stand made up of red oak, white oak, black oak and red maple of pole to small saw timber size. This stand is likely to be about fifty years of age having become established following the 1947 fire. The majority of the stems are short bodied with frost cracks at their base, old branch scars and epicormic sprouts. A few areas of deeper soils are stocked with taller better quality stems like north of the gate on the truck road. A few scattered white pine of saw timber size are also found. Many of the red maple are of intermediate to suppressed crown class and are of low vigor.

Regeneration: Abundant sapling size growth is found in the understory. This is the result of the overstory stand being under stocked and heavy gypsy moth caterpillar infestations in the early 90's allowing a lot of light to reach the forest floor. This resulted in a shelterwood like crown cover. Regeneration is primarily white pine, red maple and lesser amounts of hemlock, balsam fir, red and white oak. Witch hazel, hazel nuts, viburnum species and winter raisin are also present. Much of the understory is of low vigor due to the overstory filling in and the crowns regaining vigor following the gypsy moth outbreak.

Much of the regeneration is becoming suppressed and unthrifty. Most of the pine seedlings and saplings have short annual growth of less than eight inches with some less than four inches. Pine regeneration should be periodically released to maintain annual height growth of more than eight inches. Good vigorous growth should be able to achieve at least sixteen inches of annual height growth, probably more.

Invasive species: No invasive species were seen in this stand type.

Recommendations: It is recommended this stand be managed using an extended shelterwood system. The long term goal of the stand is to convert it to white pine. White pine is better adapted to the site and capable of growing far more sawtimber.

Harvesting to release existing pine regeneration is long overdue and should be a priority. Although the primary goal of the harvest is to release existing white pine regeneration, cutting should remove the poorer quality overstory first and allow better quality stems to continue appreciating in value. A winter cut with ample snow will reduce damage to established pine seedlings. A summer or fall harvest coinciding with a seed crop will help establish additional regeneration. While contradictory, both options have merit. An abundance of stems two to six inches in

diameter should be harvested to achieve this goal. This harvesting is best achieved with a tracked feller buncher and grapple skidder.

Once the initial harvest is complete, white pine regeneration can be further released from over-topping hardwood saplings using herbicides in a basal or foliar application. See the discussion of herbicides in stand XII, site conversion to intensive white pine management.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	2,270	8
White pine pallet	700	2
Red oak	32,030	74
White oak		17
Soft maple		8
black oak	8,680	
Oak pallet	12,000	
Hardwood		189
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Totals	55,680	298
per acre	2,291	12
Total per acre		17
White pine	2,270	8

STAND V, WHITE & RED PINE PLANTATION SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
6.4	227	9.3	480	277	1.33

Location: This stand is found North West of Shaker brook.

Terrain and Soils: The terrain is flat to gently rolling. The soils are fine sand.

Access: This stand currently has no access. With permission, the stand could be accessed from the abutting lot to the west. While this might be operationally preferable it is always recommended that long term access be considered for future management. This presents a good opportunity for demonstrating a challenging water crossing with heavy machinery. A stream crossing is recommended using corduroy over the poorly drained soils and a portable skidder bridge placed over the brook channel. Following the harvest a boardwalk could be constructed over the corduroy providing walking access to the North West part of the property.

Composition and Quality: This is a mixed white and red pine plantation. It was established about the same time as the other soft wood plantations. The westerly side is mostly white pine with the east side being mostly red pine. Stems are of average height and stem quality is moderate to good. Many of the dominant white pine have a single but log with crooked or forked tops. The codominant and intermediate white pine have better stem quality. The red pine are of moderate to good quality with some stems likely being suitable for utility poles now or in the future. It appears a row thinning was done in some portions of the stand while other portions were passed over. Many of the white pine have been partially pruned.

Regeneration: Minimal regeneration is present due to the dense stand conditions.

Recommendations: The long term goal for this stand should be to produce high quality saw timber and utility poles. This stand is heavily overstocked and long overdue for thinning. This stand should be thinned following the recommendations for stand I. The hierarchy for selecting trees for harvest should first be suppressed and poorly formed red pine unlikely to produce a pole followed by white pine with poorly formed stems. Where uniformly high quality red and white pine are growing together the red pine should be cut to release the higher value white pine. If intensive management is desired partially pruned white pine should be completely pruned to a height of seventeen feet. Pruning should be done following the recommended thinning. A cut to length or mechanized chipping crew is best able to carry out this harvest.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	37,140	81
Norway pine	15,970	39
Norway pine poles	5,720	24
White pine pallet	6,450	50
Red oak	1,210	2
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Totals	66,490	196
per acre	10,389	31
Total per acre		51

STAND VI, RED PINE PLANTATION, SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
4.8	236	9	536	330	1.52

Location: This stand type is found in several small irregularly shaped areas on either side of the brook.

Terrain and Soils: The soils are stony fine sandy loams. The terrain is flat to gently rolling.

Access: Areas east of the brook are currently accessible for management. Areas North West of the brook need a water crossing to be installed to allow for access as described in stand V.

Composition and Quality: This stand type is several groups of red pine plantation. They were planted at or about the same time as the other plantations. Three larger groups and several small groups of stems are found. The larger groups have more uniform stems and stocking. The very small groups are influenced a great deal by much of the stand being an edge. This is the result of how these stems came to be planted. The seedlings became available and the planting crews planted them in any openings they found. Some of the groups are a quarter acre patch or a narrow meandering strip of three to five rows.

Red pine, particularly plantations, are quite susceptible to root rot. To prevent the spread of this disease harvesting should be done during frozen conditions when spores are not present or stumps should be treated immediately following cutting with borax. Borax changes the PH of the stump so the spores are unable to survive.

Regeneration: This stand is much too dense to allow much regeneration to become established. Partial harvesting in red pine stands provides excellent conditions for natural white pine regeneration to become established.

Recommendations: The goal for this stand type should be to produce utility poles and high quality saw logs and then to convert the stand to white pine utilizing natural regeneration. This stand type is overstocked and long overdue for thinning like the other softwood plantations. It is recommended that the stand be lightly thinned removing no more than twenty percent of the stocking followed by another thinning in six to seven years.

Utility poles are the highest value product that can be produced from red pine. Clear red pine logs can be sold at a premium price into the specialty market for flooring. Conventional red pine logs are of very modest value and are frequently used for pressure treated products.

A plantation should be managed in a way that maximizes the number of poles produced. A utility pole must be very straight with no crooks or substantial sweep. In addition, the limbs must be relatively small, averaging an inch and a half in diameter or less. This requires that stands be maintained at a relatively dense stocking to moderate growth rates. Reducing stocking to less than 80 or 90 square feet of basal area is the surest way to degrade a pole by simply growing the tree to fast. Red pine plantations should be managed with frequent light thinning. After the majority of the stems are of pole size the stand can be regenerated using the shelterwood system. Frequently a thinned red pine plantation provides excellent conditions for white pine regeneration to become established in. Cut to length or a mechanized chipping crew is best able to carry out this harvest.

Volume Estimate:

Species	Board Feet	Cords
White pine	2,700	
Norway pine	35,500	71
White pine pallet	770	5
Hemlock		5
Norway pine poles & growing stock	13,870	56
Hardwood		2
Totals	52,840	139
per acre	11,008	29
Total per acre		51

STAND VII, HARDWOOD, WHITE PINE POLES & SAWTIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
15.3	91	7.8	274	44	0.6

Location: This stand lies on the north side of the brook and is the old stand VII and has had the old stand XI combined with it.

Terrain and Soils: The terrain is gently rolling and the soils are stony fine sands. The majority of the stand is well drained except for the former stand XI that is a poorly drained swale.

Access: Developing a demonstration access across the brook is recommended as described in stand V. Access could also potentially be gained across an abutting property to the west. It is always best to be in control of your long term access.

Composition and Quality: This is a mixedwood stand similar in composition to stand IV. Hardwoods of pole to small saw timber size predominate. They vary greatly in quality. Some of the younger stems that developed after the fire are of good quality while the older stems are of uniformly poor quality. Red, black and white oak and red maple are the predominant species. Scattered white pine is also found. The pine range in size from small pole timber to large saw-timber. The larger older stems that lived through the fire are of poor quality while those that became established after it are of good quality. There are a number of planted stems also. The short rows are easy to spot. They were likely planted at the same time as nearby stand V. The planted pine are of uniformly excellent quality which is surprising since the white pine in stand V are of variable quality.

Regeneration: The understory is heavily stocked with seedling and sapling size stems. The hardwood understory is of uniformly low vigor and quality. It is vigorous enough to impede the development of new more desirable regeneration but unlikely to ever develop into a high quality stem. The white pine understory is of modest to low vigor but is capable of responding to release if done so in the near future. Many of the white pine saplings are tall and spindly and will likely be susceptible to snow and ice damage after they are released. However, without release few if any of these stems will develop into a good crop tree. The seedling size white pine are likely better able to respond to release. Several areas of the wet swale has had the crowns close in resulting in an open forest floor providing good conditions for softwood seedlings to become established. Those seedlings are now in need of release.

Recommendations: This site would be most financially productive if it were stocked with white pine. Over time the species composition will naturally shift to a higher percentage of white pine. Selection cutting is recommended to speed up this transition. Lower quality hardwood should be harvested to release desirable white pine regeneration and crop trees. Where the stand is stocked with better quality stems the cutting will be a thinning but where low quality hardwoods over top white pine regeneration the cutting will be of the shelterwood system. Because there are numerous small low quality, low value stems of two to five inches in diameter a mechanized harvest producing biomass fuel chips as part of the product mix is recommended. Cutting along the large brook and the wet swale will release and invigorate many of the shrubs, including wild raisin and viburnums, which produce soft mast utilized by migrating songbirds.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	7,310	46
White pine pallet	1,800	16
Hemlock		4
Spruce & Fir		4
Red oak	880	9
White oak	2,690	8
White birch		4
Soft maple	900	
black oak	3,570	
Oak pallet	1,200	
Hardwood		110
Totals	18,350	201
per acre	1,199	13
Total per acre		16

STAND VIII, WHITE PINE RESIDUAL OVERSTORY & MIXEDWOOD SAPLINGS AND POLES

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
24.5	89	7.8	268	59	0.64

Location: This stand lies along the south side of the large brook and south along the edge of the wet run draining the middle of the property.

Terrain and Soils: The terrain is smooth and ranges from nearly flat to rather steep at the west end of the stand. The soils are stony fine sands. They provide moderate growth potential for hardwoods and excellent growth potential for white pine and other softwoods.

Access: This stand is accessible to the truck road for timber harvesting. A portable skidder bridge has been installed over the small intermittent brook. The steep slopes at the west end of the stand are operable but are challenging terrain for most types of machinery except the most advanced feller bunchers with self leveling cabs.

Composition and Quality: This is a mixedwood stand of sapling to pole size timber with scattered residual overstory stems that survived the fire. White pine and a lesser numbers of hemlock and varied hardwoods make up this size class. Most of the overstory stems are of moderate to poor quality due to old fire injuries. Some of these stems now have large cavities useful to wildlife.

The second growth understory is fully stocked to overstocked in most places. Many different species are found including red, black and white oak, white, gray, black and yellow birch, balsam fir, red spruce, hemlock, white pine, poplar and red maple. Hemlock and white pine are the most productive species on this site and white pine will grow the most value. On the steep slope densely stocked hemlock are over topped by hardwoods, predominantly white birch and poplar. In the remainder of the stand red maple and oaks are the predominant species with white pine and other softwoods mixed in.

Regeneration: Some white pine regeneration of seedling and sapling size is found in the middle and eastern side of the stand. All other areas of the stand are quite dense and have barren under stories.

Recommendations: This stand should be managed to produce high quality forest products, wintering cover for deer and other wildlife and to retain cavity trees for wildlife. To improve growth and quality harvesting in the form of weeding and thinning should be done. Thinning will greatly increase the rate of growth. Many stems in this stand will jump product class from sapling size to stems of six inches of diameter or greater with merchantable round wood. Over the next ten to twenty years the stand volume will increase greatly.

Equipment that can produce biomass fuel chips as part of the product mix is recommended. There are many stems of two to five inches in diameter that could be cut and sold to benefit the growth of the residual stand. In years past this type of work would have been considered pre-commercial and represented a considerable expense and investment to the owner. The biomass fuel market allows silvicultural work to be performed on stands much earlier in their development improving species composition, stand structure and productivity for the land owner.

All of the older overstory stems could be harvested to release the younger more vigorous stems. It is recommended that at least a few large white pine be retained as a seed source for establishing additional white pine regeneration after future harvests. Some of these stems could also be retained as cavity trees for wildlife. There are several hollow hardwoods on the steep slope. Large cavity trees are at a premium on the landscape dominated by second growth timber after the fire.

On the steep west facing slope the hemlock should be released from the overtopping hardwoods, particularly the low vigor white birch. The hemlock are beginning to provide good cover for wildlife, particularly deer, from snow. The solar advantage from the west facing slope will add to its' value as winter cover. This is connected to Stand IX that has previously been identified as potentially providing winter cover for deer. Retaining some poplar and yellow birch will provide winter feed for ruffed grouse near the hemlock roosting cover. In addition to these goals the timber should be managed to produce premium quality large diameter crop trees.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	16,780	7
White pine pallet	12,880	48
Hemlock	1,750	80
Spruce & Fir	4,210	44
Red oak	1,900	9
White oak	940	3
White birch		20
Yellow birch		7
Soft maple		4
Hardwood		128
Totals	38,460	350
per acre	1,570	14
Total per acre		17

STAND IX, MIXEDWOOD POLE AND SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
8.8	107	9.4	224	233	1.22

Location: This stand occupies the depression in the center of the property.

Terrain and Soils: The terrain is flat and nearly level with a high water table. The soils are Sebago peat over fine sands.

Access: Skidder trails from a previous harvest remain. New trails should be used during the next entry as desirable white pine seedlings are established in the current trails. The soils are extremely wet. It is a necessity that harvesting be done when the ground can be frozen or is dry. Either deep cold capable of freezing the rich wet soils or deep snow capable of being packed and frozen are recommended. This is most easily accomplished if a machine is able to tread down deep snow allowing it to freeze while it works elsewhere on the property. Then the machine can return to work the frozen down trails.

Composition and Quality: This is a mixedwood stand of stems ranging in size from small poles to large saw timber. This stand is quite similar to stand VIII except for the poorly drained soils and that the average timber size and height is greater. Red maple is the predominant hardwood. Tall scattered residual white pine over top shorter red maple, hemlock, spruce and balsam fir. The majority of the timber is of low quality showing evidence or signs of internal decay. As noted in the previous plan this stand has qualities that might provide winter cover for deer. No evidence of deer was seen on the property after substantial snow accumulation occurred at the end of December. Abundant sign of snow shoe hair was seen.

Regeneration: Desirable white pine regeneration has become established in areas disturbed during the past harvest and under the filtered light of red maple groves. In other places balsam fir saplings of low to moderate vigor predominate. Most of the hardwood regeneration is of undesirable species and poor vigor except some yellow birch also established in areas disturbed during the previous harvest.

Recommendations: The previous harvest recommended managing to promote softwood cover as potential deer wintering cover. This is a desirable recommendation from both an economic and wildlife perspective. Softwoods are the most productive species on these wet, acidic low nutrient soils and white pine has the potential of growing substantial value. White pine grown in mixed softwood stands naturally develops very high quality clear to pin knotted stems. Stump sprouts developing from harvested red maple will also provide desirable browse for deer and snowshoe hair. Selection cutting best describes the recommended harvesting to achieve these goals. Retaining yellow birch will provide winter feed for ruffed grouse. Yellow birch is also moderately well suited to grow on these wet soils and may produce some valuable saw timber. In addition to these goals the timber should be managed to produce premium quality large diameter crop trees. A cut to length system is a good choice for harvesting this stand.

Volume Estimate:

Species	Board Feet	Cords
White pine	28,890	
Pine pallet	15,540	37
Hemlock		22
Spruce & Fir	4,580	9
Soft maple	3,400	6
Hardwood		100
Totals	52,410	174
per acre	5,956	20
Total per acre		32

STAND X, WETLAND

Acres
6

Location: The wetlands adjacent to the brook are identified as stand X.

Terrain and Soils: Soils are poorly drained muck and fine sand.

Access: This stand can be accessed for recreation from adjacent stands.

Composition and Quality: This area is a combination of open beaver flowage and seasonally flooded soils adjacent to the brook. These soils support abundant hardwood shrubs including alder, winter raisin, different viburnums and red maple. Alder thickets provide valuable wildlife habitat, especially for species such as wood cock that are in decline due to habitat loss. The red maple are gradually colonizing the better drained portions of the flowage shading out the shrub component of the stand. Maine Natural Areas Program identifies this area as waterfowl and wading bird habitat. The primary management concern for this habitat is minimizing disturbance during courtship and rearing (early spring through mid summer).

Regeneration: Most of the growth is of shrub size but is relatively old.

Recommendations: Regenerating the alder thickets by mowing with a brontosaurus type flail mower would maintain critical habitat for woodcock and other species dependent on early successional habitat. Such cutting will reinvigorate alder thickets that are becoming over mature and dying out. Funding for such work is occasionally available from NRCS. Such cutting may also be accomplished at reasonable cost with a tracked feller buncher in conjunction with a planned timber harvest. A wildlife observation blind is desired for this general area. A well drained point near the dam would be a good location for it. The trail leading to it should not follow the shoreline so as to minimize disrupting to wildlife using the area. The running of dogs during early spring and summer should be discouraged.

Volume Estimate: No commercial volume.

STAND XI, RED OAK POLE AND SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
14.3	95	9.2	204	92	0.87

Location: This stand is found in the south west corner of the property on the north east facing slope.

Terrain and Soils: The terrain is generally smooth with a few large rock out crops and slopes to the north east. A northeast aspect is known as a superior site for timber growth. This is because such sites generally have deeper, richer, moister soils and experience less moisture stress. Easterly facing slopes were not exposed to the glaciers pushing away top soils as occurred on westerly facing slopes. The east facing slopes are also not exposed to the direct sun and drying breezes during the hottest part of the day in the afternoon. Trees can't photosynthesize when they are under moisture stress. Thus, trees on the north east side of a hill experience more growing days in a season than their neighbors on the other side of the hill.

Access: This stand is easily accessible to logging machinery. Several old skidder trails are found on the lower slopes of the stand.

Composition and Quality: This is a hardwood stand. Red oak is the dominant species with lesser quantities of black and white oak and poplar and red maple. Also found are a few stems of white pine. The dominant red oak are of pole to small saw timber size with most stems not quite saw timber size yet. The stems are approximately 50 years of age having become established after the fire. A handful of old fire scarred residual stems from the previous stand are also found. This is a high quality stand in contrast to the oak in stand IV.

Regeneration: White pine saplings are found throughout the stand. The majority are suppressed and in need of release. Hemlock saplings are found along the north side of the stand. A handful of black birch saplings were seen. The very west end of the stand at the top of the hill is becoming dominated by beech whips.

Recommendations: Long term management of this stand should be to produce premium quality large diameter oak crop trees. This stand should be thinned by harvesting black oak, red maple and suppressed stems of other hardwoods in addition to establishing a network of skidder trails. The hollow fire scarred stems could be left for cavity nesting wildlife without sacrificing significant growth or income. Such cutting will improve the growth rate of the red oak and improve the vigor of the white pine regeneration. Such cutting may also help establish additional pine seedlings. Thinning will also increase the mast crop available for wildlife.

Volume Estimate:

Species	Board Feet	Cords
White pine & growing stock	1,830	
White pine pallet		2
Red oak	18,550	83
White oak		12
Yellow birch		4
Soft maple		5
black oak	5,770	
Poplar		43
Hardwood	7,800	101
Totals	33,950	250
per/acre	2,374	17
cords/acre		22

STAND XII, WHITE PINE SAPLINGS

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
7.1	44	7.8	132	59	0.47

Location: This stand type is found in numerous small patches throughout the eastern half of the property. All areas are adjacent to smooth terrain accessible to pick up trucks.

Terrain and Soils: The terrain varies from nearly flat to gently sloping and soils are predominantly fine sands.

Access: All areas of this stand type are accessible by pickup truck with some effort.

Composition and Quality: This stand type is intensively managed advanced white pine regeneration. The majority of these patches were established by under planting hardwood stands to enhance natural reproduction. Some areas of just natural reproduction have also been cultured. Most or all of the hardwood overstory has been harvested. The low quality hardwood overstory has been harvested by cutting the stems for firewood. All of the material was loaded by hand into pickup trucks that could be driven to within at least fifty to one hundred feet of the harvested trees.

Many of the stems have begun to be pruned. Corrective pruning has also been done following weevil damage. In many places competing hardwood saplings have been controlled by cutting.

In most places the white pine are only of sapling size. An area of more advanced aged stems is found on the east side of the truck road. These stems are all of merchantable size and all have been pruned. Most areas are densely stocked and will need at least one additional precommercial thinning or biomass thinning before a harvest will yield pulpwood sized stems. Several areas are under stocked, most notably the large group near the top of the hill extending west from the side of Brock road. This area has many large openings stocked primarily with hardwood seedlings.

Regeneration: The stand type is of regeneration ranging in size from seedlings to small poles.

Recommendations: The long term goal for this stand type is to demonstrate intensive management to produce premium quality large diameter crop trees. A great variety and quantity of pre-commercial work has been done to favor white pine regeneration. In many places the seedlings and saplings have been released from surrounding hardwoods growth, and some places spaced from other softwood regeneration and begun to be basal pruned when the stems are less than five feet tall. While this has resulted in vigorous growing stems it has also resulted in crooked more bushy stems with more weevil damage than might have occurred otherwise. In some young stands every stem has been pruned. While a park like forest is esthetically pleasing it is not recommended for the production of forest products. Such intensive management is not cost effective. Where such work has been done it should be signed and noted that it is above and beyond recommended investments.

Research has shown that once the crowns close in on a thicket of regeneration the amount of weevil injuries declines sharply. In addition, with so many stems per acre the sweep or crook caused by weevil injuries is greatly minimized. Also, there are many stems to choose from as crop trees and damaged stems can be discarded during thinning.

So long as sufficient numbers of white pine are not over topped it is recommended that weeding and thinning not be implemented until the stems are at least five to six feet in height if not taller and able to maintain a fairly closed canopy. If softwood regeneration is over topped by undesirable hardwoods it should be released. Height growth of less than eight inches per year is a sign of being suppressed. Most free growing pine are capable of growth of 16-24 inches per year.

The use of herbicides is the most cost effective means of releasing softwood from hardwood competition. Herbicides are quick to apply, provide long lasting control and the killed stems provide support to spindly stems being released reducing breakage and mortality due to snow and ice damage.

Two application methods are available. A foliar application done in late summer after the softwood annual growth has hardened off is the most efficient and cost effective method. This system is best used when the foliage is no taller than chest or waist height to the person doing the application. This is very effective to release seedlings from hardwood sprout growth, particularly beech, following shelterwood or improvement type cutting. Individual stems up to twenty feet tall can be controlled using a motorized mist blower if their foliage is exposed. Applying to the taller growth is most efficient when a network of skidder trails provides exposure to their foliage.

Basal application is the method of choice when the foliage is uniformly taller than the applicators shoulders and applying chemical to the foliage is impractical. The herbicide is delivered to the target stems in an oil carrier. The chemical is applied to the lower 16 inches of stem and root crown and is absorbed through the bark. This system is effective on stems up to four or five inches in diameter so long as they have thin young bark. Most paper birch and the thick bark of older oak are examples of stems that are not controlled well with this system. Basal application is a less cost effective way of treating many, many small stems per acre but is a very precise way to weed undesirable stems from a stand.

Pruning should be put off until stems are at least 12 to 15 feet in height. Sapling size stems should retain at least fifty percent live crown and pole timber at least thirty percent live crown after pruning to maintain vigorous growth.

Historically, pruning was reserved only for crop trees that would be cut in the final harvest. Stems pruned would be 6 to 8 inches in diameter and harvested at a minimum of 18 inches and preferably 2 feet in diameter or better. Pruned crop trees would be spaced about twenty feet apart for a total of 100 to 120 stems per acre.

If trees can be pruned at a diameter of three inches or a bit less, a substantial amount of clear lumber can be realized from a tree of ten inches in diameter. This would justify pruning a greater number of stems per acre.

In the past ten years technology combined with demand has allowed stems as five inches to be utilized for saw timber. Such stems must be quite straight and have knots of a half inch in diameter or less. While the value of these small stems is much less than that of conventionally sized saw timber it still far exceeds that of pulpwood or pallet logs. This new market may justify rethinking the strategy of initial spacing when establishing a plantation and how many stems to prune.

Widely spaced good quality red oak remain in the stand. It is recommended that these stems be harvested when they are still small enough (16-18 inches) to be picked up and lifted off of the white pine saplings with a tracked feller buncher.

Volume Estimate:

Species	Board Feet	Cords
White pine growing stock	1,970	24
White pine pallet		3
Hemlock		3
Spruce & Fir		
Red oak	3,190	2
Hardwood	2,367	6
Totals	7,527	38
per acre	1,060	5
Total per acre		7

STAND XIII, SPRUCE POLES AND SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
0.3	87	12.8	98	64	0.49

Location: This small stand is found at the North West corner of the lot. This is identified as a separate stand only for demonstration purposes. Otherwise it would have been combined with stand VII.

Terrain and Soils: The terrain is flat with a high water table. Soils are stony fine sands.

Access: This stand can be accessed in whatever way the surrounding stands are accessed. Any harvesting will need to be done in conjunction with an adjacent stand.

Composition and Quality: This is a natural red spruce stand. Stocking varies but is generally overstocked. Those stems that are more widely spaced are of sawtimber size while the more densely spaced stems are several inches smaller in diameter. A few red maple of poor quality and vigor are also found.

Regeneration: This very densely stocked stand has minimal regeneration present.

Recommendations: Over the long term it is recommended this stand be managed in conjunction with stand VII to convert it to white pine. Red spruce are not typically pruned. If intensive management is desired crop trees could be pruned. Clear spruce logs are in demand as a specialty product for the production of clapboards by the historical method. While this may be demonstrated, it is unlikely that there will be enough logs produced to market the product effectively. Harvesting should be coordinated with Stands V & VI.

Volume Estimate:

Species	Board Feet	Cords
Spruce	640	3
Hardwood		1
Totals	640	4
per/acre	2,133	13
cords/acre		18

BENNETT HILL ROAD, WATERBORO

The property is estimated to be 4.5 acres in size according to the survey map. The GIS mapping measurements show the property to be only 4 acres in size. The discrepancy may lie in the land that lies between the white pine stand and the road bed. Several years ago the road was widened and improved. When that was done a narrow strip of trees were cut from between the pine plantation and the road bed. A wide shoulder of hardwood whips now exists between the plantation and the actual road bed. The acres estimated using the GIS system are those used in the stand descriptions. The half acre discrepancy is most likely the road edge. No stand description or recommendations are given for the road edge.

STAND XIV, HARDWOOD POLE AND SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
1.1	87	10.2	154	116	.78

Location: This stand lies around the perimeter of the property.

Terrain and Soils: The terrain is nearly flat. A small swale and intermittent brook drains through a portion of the stand. Soils are loamy sands.

Access: This stand is easily accessed through the other stands.

Composition and Quality: This is a mixed hardwood stand of pole and sawtimber size stems. It is a narrow strip of naturally grown timber around the edge of the softwood plantation. Because many of the stems in this stand are further along in growth and development many of them have large spreading crowns that over top the planted pine.

Red oak is the predominant species with lesser volumes of red maple, white ash, and a few black oak, sugar maple, poplar and white birch. Also found are a few white pine of varying sizes. A few large open grown stems of hardwood and white pine are found along the stone wall.

Regeneration: Minimal regeneration is present except where harvesting has been done. Some white pine seedlings have become established in areas of filtered light. Hardwood regeneration is generally suppressed and of low vigor.

Recommendations: The long term goals for this stand should be to produce premium quality large diameter crop trees. The selection system is recommended for managing this stand. In many places it is recommended that groups of poor to moderate quality hardwoods be cut to release the planted white pine. This recommendation will result in harvest levels of 40 to fifty percent of the stand volume. Management of this lot is best accomplished with a cable skidder or cut to length equipment.

Volume Estimate:

Species	Board Feet	Cords
White pine	240	
Red oak	2,110	1
White ash	450	
Soft maple		1
Hard maple	260	
Black oak	140	
Hardwood	800	13
<hr/>		
Totals	3,200	15
per/acre	2,909	14
cords/acre		19

STAND XV, WHITE PINE SMALL SAW TIMBER

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
2.1	168	9.3	356	206	1.06

Location: This is a diamond shaped stand found on the better drained soils of the old field. The center of this stand is occupied by stand XVI.

Terrain and Soils: The terrain is flat and the soils are sandy loams. The previously farmed soils provide excellent conditions for growth.

Access: A small landing is found in the middle of this stand. It is suitable for a small cable skidder, farm tractor or forwarder. A cable gate is installed to control access.

Composition and Quality: This is a moderate to good quality plantation of white pine. It appears to have been thinned ten to fifteen years ago. Annual growth has resulted in the stand once again being overstocked. The dominant stems are of small saw timber size. Many stems have been pruned but not all have been fully pruned to 17 feet. A few natural stems of hardwood are also found. The southwest end of the stand has a high number of poor quality stems.

Regeneration: Most of the stand is too dense to allow much regeneration to grow. But, because the stand is long and narrow it is greatly influenced by the open road side and other stands. Filtered light has allowed abundant regeneration of many species including white pine to become established.

Invasive Species: Many stems of honey suckle are found in this stand, especially along the road side. A few stems of bitter sweet and barberry are also found.

Recommendations: The long term goals for this stand should be to produce premium quality large diameter crop trees. Thinning is recommended. Thinning should remove about 25% of the stocking and reduce the basal area to about 120 square feet. Suppressed, intermediate and crooked stems are the top priority for harvesting. The recommended harvest will yield minimal saw timber. Crop trees not fully pruned to a height of seventeen feet in height should be if intensive management is desired.

It is strongly recommended that the honeysuckle and any other invasives be controlled at the first opportunity. Glyphosate, the generic chemical name for Roundup, is the herbicide of choice. A foliar application after the middle of August is recommended. This will provide good control of the target pest. It will also provide a secondary benefit by releasing white pine regeneration from competing hardwood growth. By mid August the annual growth of white pine has hardened off and will not be damaged by the herbicide if applied at the rates recommended on the container. Management of this lot is best accomplished with a cable skidder or cut to length equipment.

Volume Estimate:

Species	Board Feet	Cords
White pine growing stock	12,270	20
White pine pallet	1,320	25
Red oak	640	
Totals	14,230	45
per/acre	6,776	21
cords/acre		35

STAND XVI, Red Pine Saw Timber

Acres	Basal Area	Avg. DBH	Avg. Number Trees /Acre	Growth per acre	
				Board Feet	Cords
.8	147	11	223	465	1.28

Location: This stand lies in the middle of the Bennett hill road tract. It is a long narrow stand.

Terrain and Soils: The terrain is mostly flat and smooth. The soils are rich sandy loam, an excellent site for growing most any crop. A slight swale drains the south end of the stand.

Access: This stand is easily accessed by most any kind of machinery.

Composition and Quality: This is a red pine plantation. The majority of the stems are of small sawtimber size. Many of the stems are of pole quality as well. Most areas of the stand were thinned ten to fifteen years ago. The remaining stems are growing well. A few dead and unthrifty stems were seen at the north end of the stand by the landing. It is likely these stems have died from root rot, a common disease of red pine, particularly on rich and or heavy wet soils.

Regeneration: Abundant white pine seedlings and saplings are found in much of the stand. At the south end of the stand some hardwood saplings are found. The regeneration is thrifty but in need of release.

Recommendations: Over the short term this stand should be managed to produce utility poles, the highest value crop produced by red pine. Over the long term this stand should be converted to white pine.

It is recommended that the entire red pine overstory be harvested. Doing so will improve the economics of scale of a harvest from this property. A harvest needs to generate at least 100 cords at minimum to maintain economics of scale and realize full stumpage values. Harvesting less volume will result in lower stumpage values in order to cover the overhead of moving machinery. While small parcels are capable of growing nice timber it is a challenge to sell the timber at full price and practice good silviculture. Management of this lot is best accomplished with a cable skidder or cut to length equipment.

Volume Estimate:

Species	Board Feet	Cords
Norway pine	7,560	6
Norway pine poles	4,830	
Hardwood		2
Totals	12,390	8
per/acre	15,488	10
cords/acre		41

GENERAL MANAGEMENT RECOMMENDATIONS

The boundary lines should be marked by blazing and painting the line trees. The line should then be maintained on a ten to fifteen year cycle. A well marked line helps prevent timber theft. A Maine Forest Service fact sheet on boundary line maintenance is included.

If invasive species are found, especially in areas not already identified, they should be controlled as soon as possible to slow or prevent their spread. The use of glyphosate type herbicides applied at the end of the growing season will best achieve this goal and also release desirable softwood regeneration.

If areas of desirable softwood regeneration are found or become established they can be released from competing hardwood regeneration with the use of glyphosate herbicides applied at the end of the growing season.

EROSION CONTROL

The soils found on this lot have low to moderate erosion hazard ratings. A few practices should be carried out to keep erosion to a minimum. Trails used for harvesting or hiking should have water bars placed on slopes, as needed, to direct water flow off the trail onto undisturbed forest soils. Log landings and other large areas of exposed soil should be seeded with a “conservation mix” seed. Harvesting should take place only when the soil is frozen or dry.

RECREATION

Trails created during timber harvesting will allow for hiking and snow shoeing. Establishing a trail along the brook as well as wildlife observation blinds is desired.

WILDLIFE

There is evidence of use by many species of wildlife. Those species now using the property include white tail deer, moose, fox, coyote, ruffed grouse, ducks, blue heron and many other birds. This use appears to be light to moderate at the present time.

The silvicultural recommendations for this property will also benefit many species of wildlife. The recommendations will maintain a diversity of habitat and will allow herbaceous and low growing woody plants to maintain themselves in reach of ground dwelling wildlife.

The following recommendations will improve wildlife habitat and will have a minimal effect on the production of timber.

1. Leave large den trees and dead snags.
2. Leave some large crowned oak and beech for the mast they produce, and some stems of other species important to wildlife including hop hornbeam, cherry, apple and striped maple.
3. Maintain landings and roads open and seed these areas with “conservation mix.” This will benefit those species that use openings and edges between forest and openings.
4. Maintain shade over brooks capable of holding fish.

APPENDIX A: Total volume in trees 6 inches in diameter and larger by species and product.

White pine & growing stock	160,760	290
White pine pallet	51,430	301
Norway pine	60,560	131
Norway pine poles & growing stock	25,470	97
Hemlock	1,750	125
Spruce & Fir	10,720	60
Red oak	67,470	199
Red oak pallet	27,167	
White oak	4,260	40
White ash	450	
White birch	590	24
Yellow birch	0	11
Soft maple	6,080	29
Hard maple	260	0
Black oak	20,010	0
Poplar		77
Hardwood		712
Totals	436,977	2,096
per acre	3,361	16
Total per acre		23

APPENDIX B: Recent stumpage range and most likely stumpage value.

Species & Product	Recent Range	Most Likely Price
White pine sawlogs	\$185.00 to \$290.00 per MBF	\$195.00
pallet logs	\$25.00 to \$100.00 per MBF	\$40.00
pulpwood	\$5.00 to \$20.00 per cord	\$7.00
Norway pine sawlogs	\$30.00 to \$175.00 per MBF	\$40.00
Norway pine	\$100.00 to \$160.00 per MBF	\$120.00
Hemlock sawlogs	\$30.00 to \$90.00 per MBF	\$50.00
Hemlock pulpwood	\$5.00 to \$25.00 per cord	\$16.00
Spruce & fir sawlogs	\$75.00 to \$200.00 per MBF	\$125.00
Spruce & fir pulpwood	\$5.00 to \$25.00 per cord	\$7.00
Red oak sawlogs	\$300.00 to \$700.00 per MBF	\$210.00
Red oak veneer logs	\$700.00 to \$1200.00 per MBF	\$700.00
Red oak pallet logs	\$25.00 to \$125.00 per MBF	\$40.00
White oak sawlogs	\$25.00 to \$125.00 per MBF	\$40.00
Black oak sawlogs	\$25.00 to \$250.00 per MBF	\$90.00
Red maple sawlogs	\$50.00 to \$200.00 per MBF	\$80.00
White ash sawlogs	\$50.00 to \$250.00 per MBF	\$100.00
White birch sawlogs	\$50.00 to \$250.00 per MBF	\$50.00
Hard maple sawlogs	\$100.00 to \$800.00 per MBF	\$200.00
Yellow birch sawlogs	\$50.00 to \$250.00 per MBF	\$125.00
Poplar pulpwood	\$5.00 to \$30.00 per cord	\$10.00
Hardwood pulpwood	\$8.00 to \$40.00 per cord	\$12.00

*** The current economic turmoil has depressed markets for timber with some products not being marketable at the current time. Pine pallet logs are an example of this. The long term average price for these products was used for the appraisal. An owner willing to wait for the market to regain some vigor would be likely to achieve these prices. If the sale of these products is required in the near future they may only command pulp or biomass prices.**

TOTAL VALUE OF ALL STANDING TIMBER: \$79,203.42

Stand Management Analysis Table							
S	Sta	Ac	Site	Cover	Descrip	Management Objec	Management Activ
t	nd	res	Quality	type	tion	ive	ity
	I	1.8	excellent	White pine	Small saw-timber	Maintain and improve growth.	Thin, prune & control invasives
	II	3.6	good	White & red pine	Pole timber	Maintain and improve growth.	Thin, prune
	III	8.8	good	Mixed-wood	Pole & sawtimber	Maintain and improve growth.	Selection cutting, release softwood regeneration
	IV	24.3	moderate	Oak	Pole timber	Maintain and improve growth.	Extended shelter-wood
	V	6.4	good	White & red pine	Small sawtimber	Maintain and improve growth.	thin
	VI	4.8	good	Red pine	Small saw-timber	Maintain and improve growth.	thin
	VII	15.3	good	Mixed-wood	Pole & sawtimber	Maintain and improve growth.	Extended shelter-wood
	VII I	24.5	good	Mixed-wood	Pole timber	Maintain and improve growth.	Thin
	IX	8.8	good	Mixed-wood	Saw timber	Maintain and improve growth.	Selection cutting
	X	6	wetland	-	-	Maintain and improve growth.	-----
	XI	14.3	good	Oak	Small saw-timber	Maintain and improve growth.	thin
	XII	7.1	good	White pine	Advanced regeneration	Maintain and improve growth.	Thin & prune
	XII I	.3	moderate	Spruce	Small saw-timber	Maintain and improve growth.	Thin
	XI V	1.1	good	Hard wood	Pole & sawtimber	Maintain and improve growth.	Selection cutting
	XV	2.1	good	White pine	Small saw-timber	Maintain and improve growth.	thin
	XV I	.8	good	Red Pine	Saw timber	Maintain and improve growth.	Overstory removal

Project summary Table, Planning Period 2005 - 2015						
S	Sta	Acr	priority	Management Activity	revenue	cost
t	nd	es				
	all		high	Locate westerly boundary lines		Cost dependent upon action taken, probably less than \$2,000,
	all		high	blaze & paint lines,		\$400/ mile
	I	1.8	High 2009-2014	Thin, 20% of stocking	\$200-\$250/ac	
	II	3.6	High 2009-	Thin, 20% of stocking	\$60-\$80/ac	
	III	8.8	Moderate 2014-2019	Selection cutting, 25-30% of volume	\$70-\$90/ac	
	IV	24.3	High 2009-2014	Extended shelterwood, 35% of stocking & biomass chips	\$100-\$150/ac	
	V	6.4	High 2009-2014	Thin, 20% of stocking	\$200-\$250/ac	
	VI	4.8	High 2009-2014	Thin, 20% of stocking	\$100-\$150	
	VII	15.3	High 2009-2014	Selection cutting, 25-30% of volume & biomass chips	\$100-\$150/ac	
	VII I	24.5	High 2009-2014	Thinning 25-30% of volume & biomass chips	\$100-\$150/ac	
	IX	8.8	Moderate 2014-2019	Selection cutting, 25-30% of volume	\$100-\$150	
	X	6	low			
	XI	14.3	Moderate 2014-2019	Thinning 25-30% of volume	\$100-\$150/ac	

	XII	7.1	Moderate 2014-2019	Pruning, crop tree release or thinning		\$3 to \$5 /tree & \$200-\$300/ac
	XII I	.3	High 2009-2014	Thinning 25-30% of volume	\$50/ac	
	XI V	1.3	High 2009-2014	Selection cutting, 25-30% of volume	\$150-\$200/ac	
	XV	2.1	High 2009-2014	Thinning 25-30% of volume	\$200-\$250/ac	
	XV I	.8	High 2009-2014	Overstory removal to release advanced white pine regeneration.	\$900-\$1,000	
	I, III & XV	2	High 2009-2014	Control invasive species, foliar application		\$175-\$225/ac
	IV & VII	30	High 2009-2014	Control of hardwood competition to release advanced white pine regeneration, foliar application		\$150-\$200/ac
	all	50	Moderate 2014-2019	Control of hardwood competition to release advanced white pine regeneration, foliar application		\$150-\$200/ac
	all	50	Moderate 2009-2019	Precommercial weeding & control of hardwood competition to release advanced white pine regeneration, basal application		\$150-\$200/ac
	all	50	Moderate 2014-2019	Prune pine crop trees, complete started trees and new crop trees.		\$1-\$5/tree

York County Soil & Water Property location:

Lyman: 70 degrees / 41 minutes longitude, 43 degrees / 31 minutes latitude

Waterboro: 70 degrees / 40 minutes longitude, 43 degrees / 35 minutes latitude.