

**Cruise Report**  
**and**  
**Forest Management Plan**  
**Prepared for**  
**City of Portland, Maine**  
**Public Services Department**  
**Pine Grove Park**  
**Mayor Baxter Woods**  
**Baxter Pines**  
**Evergreen Cemetery Woodlands**

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## Portland Forest Management Plan

### SUMMARY -

There are four lots included in this plan. They each have unique characteristics.

**Pine Grove Park** – located between Ray Street & Virginia Street in the North Deering area is a small lot which receives use by people in the neighborhood. Its forest is dominated by mature to over-mature white pine. The stand is starting to fall apart from a combination of weather events and tree age induced decline. The primary issues are the removal of hazard trees and planning the replacement of the existing pine stand. A light thinning is recommended that could net several thousand dollars from the sale of wood. Natural regeneration should quickly become established in the understory. A small population of invasive plants should be controlled. Herbicide use is controversial, but is the most effective if not the only affective way to deal with these weeds.

**Mayor Baxter Woods** - located between Forest and Steven's Avenue was given to the city to provide wildlife habitat. It is heavily used by people in the area and is a popular place to walk dogs. . There are very large, old growth stems scattered and maintaining these should be an objective of future management. There are deed restrictions on how the forest can be managed and on the selling of timber. However almost any trees cut would contain valuable wood that could be utilized if there is a legal way of accomplishing that. There are established infestation of invasive plants on both north and south boundaries which should be dealt with before they infest more of the property.

**Baxter Pines** – also known as ‘Deering Pines’ located on Lealand Street in Deering Center is a small wooded area behind the ball fields of Deering High School. Most of the forest was established when a mix of pine species was planted following World War II. It is used and looks like a wooded park. Sanitation cutting and thinnings should be applied periodically to maintain the growth and vigor of individual trees. Any wood harvested would be merchantable but volumes would be small. Bittersweet has taken over the northern acre of this lot making the area unusable. This species is well established over the entire area. This does not allow for any lapse in the mowing. In one or two growing seasons it would grow into a tangled mass of vines making the area difficult to use.

**Evergreen woods** - is located at the rear of Evergreen Cemetery and is an excellent forest resource. Of the four parcels it is the most natural. There are numerous trails through the property and it receives a good amount of use by walkers, bikers and bird watchers. Still it is large enough, so by going onto the less used trails it is possible to find some solitude. It is well stocked with good quality trees. Some trees should be harvested to thin existing stands, to release established seedlings and saplings and to create conditions suitable to establish more seedlings of desirable species. There are fewer restrictions to harvesting timber here than the other parcels. It

is certainly a good place to demonstrate beneficial timber harvesting and the sale of trees will provide a good cash flow.

As with all the lots there are problems with invasives. The Japanese knot weed to the north of the old quarry stands out the most. It will take sustained effort to return this area to native vegetation. There are pockets of invasives in the areas adjacent to the cemetery. These should be treated before they become problem areas.

If the condition of the forest were the primary concern, all of these lots should be treated, but with what foresters often refer to as an improvement cut. This is a commercial cut where treatment varies depending on what is needed. The goal is to remove the least desirable stems in the stands and “improve” the residual stand. Diseased, damaged, defective, overmature and overcrowded stems would be removed. Wind damage is a concern in any forests which has not experienced any thinning. The trees have come to rely on each other for support. How much to thin and still leave a wind firm residual stand is some of the “art” of forestry. In many instances it will not be possible to thin down to ideal levels for future growth. In these instances a shorter period of time between cuts is recommended to reduce stocking in a series of cuts until the residual stems grow root systems and stem form that will resist wind damage.

## **DESCRIPTION**

The properties which were included in the Forest Canopy plan consist of four lots. Pine Grove Park is 6.7 acres of woodland. Mayor Baxter Woods is thirty acres. Baxter Pines is 4.5 acres of woodland and Evergreen Cemetery Woods which is 111 acres of woods. These are all found within the city limits of the City of Portland, Cumberland County, Maine. (See location map included.) For the most part the boundary lines or at least the approximate location of the boundary lines on all the lots could be located. The lines are not well marked and evidence marking the lines varies from iron pins installed by surveyors, corners marked by iron pins or stones installed many years ago, fence lines, plastic flagging or simply a line of differing land uses.

Reports from Maine Natural Areas Program and the Maine Historical Preservation Commission do not indicate the presence of endangered species significant wildlife habitat and/or historic sites on the lots. Regardless of the reports, findings on these lots are significant wildlife habitat for the wildlife that utilizes it. These properties are islands of natural habitat surrounded by urban settings, and the properties are in Maine’s largest and oldest cities. There were noted artifacts of long human use on all of the properties.

The terrain on all the lots is for the most part gentle. Ranging from flat to rolling with occasional steep slopes. Soils are mostly upland sites which are moderately well drained to well drained. There are several small brooks found on the properties and some wetland areas. The soils provide good to excellent sites for tree growth and wildlife habitat.

All of the lots are served by public roads. Trails exist in and are passing through all of the lots. Access is good for recreational use and general maintenance of the properties is good because of

adjacent roads and well developed trail systems. Access for large trucks and heavy equipment is not developed. Where forest products will be removed to manage vegetation on the properties this will need to be address.

### **FOREST HISTORY**

During the late 1700's and 1800's, the properties were used for agricultural, residential and industrial purposes, such as cropland, hay-land and pasture. It is well documented that Baxter Woods was a forested estate known as 'Forest Home'. Remains of a stone quarry are found in Evergreen Woods. Evidence of these past uses exists in form of stone walls, old wire fence, stone foundations, trail and road remains, and old earth works. In the late 1800's to early 1900's, agricultural use of most of the land was abandoned. Mayor Baxter acquired Baxter Woods and allowed the maintained grounds to revert to more natural conditions. Local lore is that Baxter Pines was used as a victory garden during WWII. It was planted to trees following the war by Mayor Baxter and volunteers / students. As time went on, mature forest developed on all the properties. For 75 or 100 years the forest was left much to it self. Some problem trees were felled and some trees cut for road maintenance and other reasons, but the forest stands were by and large left to nature. The results are forest stands which are middle age to mature and heavily stocked. Some stands are past their prime and showing evidence of decline.

These remnant forests hark back to a time when Portland was less urban. A time when land was used for agricultural and forestry. Maintaining these areas in these uses would be keeping part of Portland's history alive.

### **MANAGEMENT OBJECTIVES**

The City has multiple goals for this property. Goals include providing educational and recreational opportunities, wildlife habitat, maintaining open space and a healthy vigorous forest. These goals are mutually attainable though some are more important on some areas than others. Maintaining a healthy forest is an important part of all these goals.

### **PROPERTY TAX STATUS**

The property is in public ownership and is not taxable.

### **PERTINENT LAWS AND REGULATIONS**

None of the forest is affected by shoreland zoning.

Baxter Woods has deed restrictions which limit the type of treatments that can be applied.

Forest Practices Act: Clearcuts of five acres in size or greater are regulated by the state of Maine. Considering the city's goals, this is unlikely to affect management unless there is a natural disaster where clean up and salvage become necessary and that would be exempted.

Hiring a consulting forester to administer the sale of timber as recommended within the plan will ensure compliance with all Maine State laws. A copy of Maine state laws regulating timber harvesting are found in the appendix. There are no city ordinances of which the author is aware that would affect the recommendations found in this plan.

## **NON-TIMBER RESOURCES**

**Endangered species/ Exemplary Communities;** See report from Maine Natural Areas Program in appendix.

**Fish and Wildlife Habitats;** Specific wildlife habitat management recommendations are found in each stand description. The forest management recommendations within this plan will positively affect habitat by creating conditions encouraging healthy vigorous forest growth. A greater diversity in tree ages classes, a mufti layered canopy and more plant growth at the ground level will create better habitat conditions for more wildlife species.

**Water Quality and Wetlands;** A tributary to Capisic Brook flows along the north boundary of Evergreen woods and numerous small streams and drain the properties. A flood plain is found along Capisic but it is not wooded along most of the boundary.

**Cultural and Historical Sites;** Maine Historic Preservation Commission list possibility several historical or archeological sites identified on this property (see MHPC review located in appendix). Extreme care should be taken when working near these areas.

**Recreation;** Recreation is a very important use of the property. Educational and recreational programs are part of the long term goals. Numerous trails are found through out the property. Several teachers use parts of the properties as outdoor class rooms. The trails and property are open to the public and the city would like to expand the educational use of the woodlands.

**Aesthetics;** Managing the trees on the property will maintain a vigorous healthy forest stands of with multiple age classes which will help maintain aesthetic quality of the stands. Actively managing the forest for the production of forest products in close proximity to a residential neighborhood in forest heavily used for recreation demonstrates responsible forest management is compatible with recreational and abutting residential use. It will also provide opportunities to enhance recreational uses.

Large woody debris should be mentioned in this section. It is dead wood in the form of trunks, large branches and stumps. It is an important component of habitat for many wildlife species. It is also seen as waste or messy by many people. This is an excellent educational opportunity to inform people that this is actually a component of wildlife habitat and while not aesthetically pleasing is an important part of that habitat.

## **TIMBER RESOURCE AND VEGETATION MANAGEMENT**

All of the lots are stocked with high volumes of forest products. Little evidence was seen of any wood harvesting. In places hazardous trees have been cut and the wood left to decay. Some wind

damaged trees were salvaged from Pine Grove Park. These are obviously not rural woodlots dedicated to growing timber. However, there are numerous opportunities to harvest trees, utilize the wood they contain and realize income or defray expenses by selling this wood.

Portland is surrounded by an area where there is an active forest products industry and markets and a good logging infrastructure. Loggers are available from small chainsaw/tractor equipped contractors to those with large mechanize tree harvesting equipment. There are positives and negatives to the various equipment spreads. With good definition of goals it is possible to choose contractors with the right equipment to achieve the stated goals.

## **INVASIVE SPECIES**

It should be expected that with over three hundred years as a human population center and sea port that non native, invasive plants components of the forests. By definition invasives regenerate vigorously and are aggressive in occupying new sites. Once established the often form dense stands and exclude native vegetation. Often they have few enemies that feed on them. Some will provide some wildlife habitat but they displace native species and many have growth characteristics that make it difficult to use the forest.

Species that were most commonly seen during the field work were bittersweet, Japanese knot weed, Norway maple, barberry, Japanese honeysuckle. There are other species also found but these five are very common. I would recommend controlling these at every opportunity.

## **TIMBER INVENTORY PROCEDURE**

The maps drawn for this plan were developed using information from several sources. Aerial photos were down loaded from the state's GIS web site. Property lines were located with GPS data and/or digitized from the city tax maps. Aerial photos were used to identify prominent stand types. Stand type lines were further refined on field maps produced during field work for the forest inventory.

Variable plot or point sampling was the method used for the 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 more valuable trees are more intensively sampled and it is relatively quick and efficient to use. A 20 basal area factor (BAF) prism was used for this inventory

Inventory samples were systematically spaced. On the smaller parcels on a grid 200 by 200 feet apart. In Evergreen Woods samples were space on a 200 by 300 foot grid. All stands were inventoried down to the two inch class for tree species. Regeneration, shrub and herbaceous species were noted around plot center.

Merchantable height was recorded in five foot increments of cordwood to a four inch top or the number of eight foot logs sections of saw or veneer 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 ¼ inch scale.

Desirable, young stems likely to produce high value sawlogs or veneer in the future are identified as growing stock, although because of small diameter their current value is that of pulpwood or firewood. This distinguishes the volume 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 Breast Height in inches	Small end
Spruce and fir	8	6
White birch	8	7
Red oak	10	9
All other hardwoods	12	10
All other softwoods	10	8

**SILVICULTURAL TREATMENTS**

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. Also the visibility of regularly applied treatments will educate the public that the forest benefits from regular treatments and to expect that they will occur.

Forest in Maine’s largest city are a unique asset. Cultural treatments are recommended that will maintain the health and vigor of the forest and assure that natural forests continues to exist for future generations. The production of forest products and income derived from the sale of those products are by-products of treating the forest for continued health. That said the cutting of trees is a necessary cultural practices. Trees need to be cut to give growing room to more desirable stems, release existing regeneration or to create conditions suitable for the establishment of regeneration, to remove hazardous trees and for many other reasons encountered in managing a forest.

Some may argue that these parcels be treated as wilderness. While large compare to city residential lot they are small from a forest’s perspective and cannot fill the ecological role of a wilderness. They are affected by land use of abutting property, invasive plants and constant human and domestic animal traffic. Managing the vegetation, forest trees, in this situation would be proactive. A forest appropriate to its intended used can be developed. The alternative is reactive management dealing with trees which have become dangerous or have fallen do to natural events.

Large trees have an attraction of their own and it is recommended that some be grown to maximum size for the species and site. These may occur as single stems or groups of stems depending on what nature provides. Where these large stems occur or grow in the future the area around them should be treated with periodic sanitation cuts to remove younger stems that are crowding these old slow growing relics. Depending on their location these large stems should be examined regularly to determine if they have become hazardous and treated appropriately.

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, natural conditions or 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.

Forestry is defined as an art and a science. To assure that treatments are applied properly it takes a skillful selection of trees to be removed and layout of trails to allow equipment access. Considering this I strongly encourage a skill and experienced forester be used when any silvicultural treatments or timber sales are applied.

## **SILVICULTURAL SYSTEMS**

### **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. Also in that it results in forest stands that are composed of trees that are near the same age.

### **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, pre-commercial 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. The regeneration component in this forest is relatively young. Pre-commercial thinning is not likely to be needed as a cultural treatment within the time that this plan covers.

## **FOREST DESCRIPTION AND RECOMMENDATIONS**

### **Pine Grove Park**

Northeast of Ray Street just past Merrymeeting Drive

#### Introduction:

This is a small lot surrounded by a residential neighborhood. The bulk of the area is occupied as a white pine forest and is mature to over mature. There has been some recent wind throw and stem breakage. Because of the height and shallow rooting depth over much of the lot this is a precursor of more to come. The stand has begun to break up and treatments to remove the more weaker stems may slow the decline but will not stop it.

#### Growth

There is a total of 6.7 wooded acres making up this stand. These acres grow 4,032 board feet of sawtimber, and 4.29 cords of pulpwood and firewood per year. Looked at in a standard measure, the total merchantable growth is 12.4 cords per year, or 1.84 cords per acre, per year. If this were a wood lot where average stumpage values could be expected the value of this growth is approximately \$907.02. Which is \$135.38 per acre per year. These numbers are good for forests in this area, however, they are peaking. The overstory trees are mature and beginning to sustain damage from wind and other natural causes.

#### Public Use

This small lot has a dense network of trails criss crossing the lot. The trails are obviously well used by walkers and bikers. It is pleasant to be in a mature forest.

One of the issues that must be faced is the large amount of dead wood on this lot. It is a natural component of mature forests and an important habitat for many species of wildlife. As it decays it returns nutrients and humus to the soil. It is, however, unsightly to many people. What is the balance between letting nature take its course and a clean tended appearance to the forest and trails?

#### What's Natural

This stand is an old field white pine stand and as such is an artifact of past land use by man. The forest that is there reflects this origin and a naturally occurring forest would not exhibit the

characteristics of the forest that is here. In time if seedlings and saplings that are growing or will become established mature a more forest of more natural characteristics will develop.

One thing which is not natural are the non native invasive plants found along the eastern and northern boundaries. If nothing is done, these will become larger components of the vegetation community on this lot. I'd advise controlling these now while the populations remain fairly small.

### Stand Descriptions

#### Mature White Pine, Stand I

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
5.3	210.9	13.2	174.3	709.0	0.66

**Location:** This stand occupies most of the lot.

**Terrain and Soils:** The terrain is rolling. Soils are classified as Hollis stony sandy loams and provide fair to good sites for tree growth. This soil type is well drained. The ridge running through the property is a rock outcrop and soils along the top of this ridge are quite shallow to bedrock.

**Access:** Access for this stand is provided by trails from Ray Street. This is a light duty access suitable for foot traffic and 4-wheel drive vehicles. The people of the neighborhood use this area fairly heavily and there is a network of trails throughout the lot. An old picnic site was noted and a trail had to have been planned to access this site. However, most of the trails appear to have become established by repeated use and not by any sort of pre-planning.

**Composition and Quality:** This stand developed from natural seeding on open land in the first part of the 1900. It is composed primarily of eastern white pine. Scattered stems of red oak and red maple are also found. The timber is of medium to large sawlog size and poor to good quality. The stand is heavily stocked. The trees are tall. Where rooting depth is limited or where stems are exposed there has been damage caused by wind. A small salvage of damaged stems was completed in the northeast corner of the lot in the recent past. Most of the pine is quite tall. Many of the stems have forks, crooks, decay and other issues typical of open grown white pine. These issues cause weak places in the stems. There are also areas where soils provide only shallow rooting depths. It can be anticipated that a significant portion of the mature stems in this stand will be lost over the next twenty-five years whether they are harvested and removed or fail do to natural causes.

**Understory:** Regeneration is scattered composed mostly of white pine, red maple, red oak, and lesser numbers of white oak and black cherry. Along the eastern boundary invasive Norway maple and Japanese honeysuckle were noted. Shrubs and herbaceous growth, blueberry, bracken fern, sarsaparilla and false lily of the valley were common. There is a considerable amount of

large woody debris. A convoluted system of trails show evidence of regular foot and bicycle traffic over them.

**Recommendations:** Some damaged stems were removed in the recent past. Other high risk stems and stems in obvious decline should be harvested to reduce the need for future clean up. Also opening the canopy to allow more light to penetrate releasing existing younger stems and create conditions suitable for the establishment of tree seedlings. There are several issues in harvesting trees from this area, which will increase the cost of cutting trees, and removing wood from the area. The wood has considerable value and its sale should at least cover the cost of removing it.

It is recommended that about a quarter of the standing volume be removed in an improvement cut/thinning. This would result in 100 to 150 cords of wood being removed from the stand. Hazardous trees, trees which have sustained damaged in the past, those showing obvious signs of decay or decline and those with structure that is likely to fail should be selected for removal. Additional thinning should be done removing stems in the suppressed or weak intermediate crown classes reducing basal area to the 150 to 160 square foot range.

A similar treatment should follow five to seven years after the first. Should the stand develop as expected a third similar treatment is recommended to follow seven to ten years after the second.

A number of invasive plants were found around the perimeter of the property. These should be controlled while the populations are still small.

Traffic on this property has not caused any significant soil damage but it is at about the turning point where some erosion can be expected. There are also some small areas where foot traffic prevents any plant growth. Some light earthwork to direct water off the trails would prevent future erosion. If traffic increases the more heavily used trails may need to harden with stone dust or crushed gravel where there are risk of erosion. Someone has placed downed tree stems in a manner that marks the edges of trails. This may not be natural or aesthetically pleasing to all but it does keep people on the trails. If traffic is focused onto the actual trails the forest floor will recover quickly where traffic has been heavy.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	129,200	114
White Pine Pallet	14,300	
Red Oak	2,300	6
Soft maple	1,600	2
Misc. hardwood		6
Totals	147,400	128
Per acre	27,811	23
Total cords per acre		79

Mixed Hardwood White pine, Stand II

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
1.4	80.0	9.6	126.4	194.6	0.57

**Location:** This stand type occupies a fringe along Ray Street and about an acre in the northeast corner of the lot. These small areas would not be separated from the main stand in larger woodland but are in this case. This forest type is what is likely to develop as the current mature trees decline and are replaced by natural seedlings that grow up into openings made by the loss of mature stems.

**Terrain and Soils:** Same as stand I.

**Access:** Same as stand I.

**Composition and Quality:** This type developed from natural seeding following disturbances in the adjacent pine stand. The most common hardwood is red oak. Seedlings and saplings of white ash, cherry and white pine is also common. Scattered residual stems of white pine also exist in this type. The hardwood stems are mostly in the 4 to 8 inch diameter and are of good quality. The few pine are large and of good quality.

**Understory:** Regeneration is scattered composed mostly of white pine, red maple, red oak, white oak and black cherry. Along the eastern boundary invasive Japanese honeysuckle has been released and is growing quite vigorously. Shrubs and herbaceous growth, blueberry, bracken fern, spire species are common.

**Recommendations:** There are some residual old field white pine in this stand. When stems are harvested in the adjacent stand these should be examined and harvested if it will benefit the forest. A small number of stems in the younger age cohort could be harvest at the same time to favor more desirable stems. Some regeneration is established in this stand and it would benefit from the increase light that would be provided by a light harvest.

A number of invasive plants were found along the east side of stand IIB. These should be controlled while the populations are still small.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	10,900	4
Red Oak		14
Totals	10,900	18
Per acre	7,786	14
Total cords per acre		28

# **Mayor Baxter Woods**

## Between Forest and Stevens Avenues

### Introduction

Located between two major roads into down town Portland Stevens Avenue and Forest Avenue it is seen everyday by thousands of people. It is heavily used by many people and has a well-developed trail system throughout the forest.

The forest has developed mostly naturally from a forested estate purchased by Mayor Baxter and gifted to the city. Its character is a mix of park like and natural forest. It contains some very large trees which are residuals from the time in was an estate. With the exception of a small Norway pine plantation and some large residual relics of its time as a forested estate natural forces have guided the development of the forest stands.

### Growth

Currently, the 30 acres is growing 7,932 board feet of sawtimber, and 41.6 cords of pulpwood and firewood per year. Looked at in a standard measure, the total merchantable growth is 51.4 cords per year, or 1.91 cords per acre, per year. Were this wood salable with only normal restrictions the value of this growth is approximately \$3,133.26 which is \$104.44 per acre per year. These numbers are good for forests in this area. However, mortality appears to be increasing because of age and overstocking. It is likely net growth will decrease over time. Recommendations made below to for thinning and improvement cutting would result in the harvest of over 300 cords of various forest products.

### Public Use

There are almost always people walking on the trails of this forest. Dogs are allowed to be off leash and for the most part people are very responsible with their pets. There are education station established within the forest that are used by local schools. Trails through the forest have been maintained and in some cases improved. There is a certain amount of handicap accessibility.

### What's Natural

Public ownership began when this was a forested estate. The trees were incorporated into a landscape plan. For seventy years or more natural forces have directed the development of the forest. A small field planted to Norway pine has been thinned. Hazard trees have been felled but that is the only evidence the forest has had any management.

A large amount of large woody debris is present in some areas. The same issues discussed above for Pine Grove Park concerning this debris exist here.

There are scattered about the woods some old, very large specimen trees. These are relics of the time this area was an estate. They are unique, native species and it is worth an effort to extend their lives.

Non native in the woods are invasive plants. They are most common around the edges but found through much of the forest. Norway maple is quite common in along the southern boundary as is Japanese knot weed. A vigorous stand of bittersweet is found in the Norway pine plantation and along the north boundary line. There is barberry and other species used for landscape plantings which have escaped and found scattered about the lot. At this time the Norway maple and knot weed populations could be controlled with a reasonable effort. The bittersweet will take a more sustained effort as it is well established and there will be reinfestation from abutting property.

### Norway Pine Plantation, Stand I

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
1.0	173.3	7.0	543.3	232.0	1.52

**Location:** This stand occupies a small area in the northeast corner of the lot along Stevens avenue.

**Terrain and Soils:** The terrain is flat. Soil is classified as Windsor loamy sand which provide good for tree growth. This soil type is well drained.

**Access:** This stand is located next to the entrance trail from Stevens avenue and is easily accessed. .

**Composition and Quality:** This is a planted stand of Norway pine and appears to be about 40 years of age. The timber is of pole to small sawlog size and poor to good quality. The stand is heavily stocked. A light thinning from below was completed in the southern section of this stand be even hear stocking is high.

**Understory:** It appears the area may occasionally be mowed. Grasses and Forbes are common and bittersweet is common. There were few tree seedlings noted.

**Recommendations:** Some suppressed stems were removed in the recent past. Ideal basal area for the best growth would be about 120 square feet.

I would recommend a similar treatment to the one recently completed. Remove low quality stems across all diameter classes and thin from below favoring stems with best quality boles and good crown development. Norway pine's ability to respond to release declines fairly early so if development of healthy large trees is the goal this treatment should be given a high priority. In

the area already treated the stocking can be reduced to the ideal level in a single thinning. If the “control” or unthinned areas is to be treated it should be reduced to a more ideal stocking level in two stages spaced five to seven years apart. This treatment would produce about 12 cords of mostly pulpwood quality material.

Bittersweet is an invasive plant that has been discussed regularly in this report. Once it is well established it is difficult to control. Here the plants are mostly small and easily controlled. I recommend it be eliminated before it becomes a problem.

**Volume Estimate:**

Species	Board Feet	Cords
Norway pine	5,800	38
Totals	5,800	38
Per acre	5,800	38
Total cords per acre		50

**Mature Hardwood, Stand II**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
10.0	155.6	7.3	313.1	240.6	1.11

**Location:** This stand type is found along the western and southern perimeter of the lot.

**Terrain and Soils:** The terrain is flat. Soils are classified as Paxton fine sandy loams or Windsor loamy sands and both provide good sites for tree growth. Most of the area is moderately well drained. An intermittent stream flows through the lot and off the property under Forest Avenue at the southeast corner of the lot.

**Access:** The stand borders both Stevens and Forest Avenues. Several trails pass through portions of the stand. The areas are all easily accessed.

**Composition and Quality:** This stand developed from natural regeneration in the first part of the 1900. It is composed primarily of hardwood species with northern red oak being the most common. In the western part of the stand there are a number of very large old red oak that are likely residual estate trees. Scattered stems of white oak, white ash, Norway maple, hemlock and red maple are also found. The timber is of medium to large sawlog size and good to excellent quality. The stand is heavily stocked. Some dangerous or damaged stems have been felled and the wood left creating large woody debris in a number of places.

**Understory:** Under this dense stand there are large area with soil covering of leaf litter. Tree regeneration is scattered composed mostly of hemlock, beech and red maple. Ferns, witchazel and other species tolerant of growing in the shade are also found scattered in the stand. Along the

southwestern boundary invasive Japanese knot weed was noted. There is a considerable amount of large woody debris.

**Recommendations:** Some damaged stems have been felled in the past. Other high risk stems and stems in obvious decline should be so treated.

The large stems which are relics of the past are suffering from competition with younger stems. These big old trees vary in condition but all would benefit from being released from competing with neighboring younger trees. Opening the canopy would also allow regeneration of a variety of trees species. Now only the most shade tolerant species are successfully establishing themselves in the understory. Long term this will result in conversion of this stand to a mix of species .

Much of the stand is overstocked. Growth of all stems is slowing and there is some mortality in stems that are being crowded out. A improvement cut and thinning removing about 25% of the stocking would release relic stems, remove Norway maple, and give a light thinning to the residual stand. There are deed restrictions to harvesting timber on this property. However, if it is feasible the trees to be cut contain a volume of desirable saw timber as well as firewood. Sale of forest products produce could defray the cost of treatment. About 100 cords of various forest products would be produced following this recommendation.

Japanese knot weed is a noxious weed and I recommend it be controlled.

**Volume Estimate:**

Species	Board Feet	Cords
Hemlock	1,600	12
Red oak	86,800	
White oak	4,400	
White ash	5,000	
Norway maple	1,800	
Soft maple	5,400	
Hard maple	1600	
Misc. hardwood		209
Totals	109,000	234
Per acre	10,900	23
Total cords per acre		45

### Mature Mixedgrowth, Stand III

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
14.0	172.9	8.4	280.3	300.1	1.51

**Location:** This stand occupies the central portion of the lot of the lot.

**Terrain and Soils:** The terrain is flat. Soils are classified as Paxton fine sandy loams or Windsor loamy sands and both provide good sites for tree growth. Most of the area is moderately well drained. Some small wetlands drain into intermittent waterways, which feed into intermittent streams that drain off to the southeast.

**Access:** Access for this stand is provided by trails which pass through the stand in several places. It is easily accessed from either public road.

**Composition and Quality:** This stand composed of stems that are residuals from the time it was an estate and from trees which developed from natural seeding in the early part the 1900's. The residual stems are very large examples of their species. Softwood makes up about a little less than half of the stand with hemlock and white pine being most common. Hardwood, mostly red oak, white oak and soft maple being most common composes the rest of the stand. The stand is heavily stocked. Quality of the timber is poor to excellent. Some stems are overmature and decay is an obvious defect. However, there are also many excellent quality stems.

**Understory:** Similar to stand II in the dense shade of this stand there are large area with soil covered with leaf litter. Tree regeneration is scattered composed mostly of hemlock, beech and red maple. Ferns, and other species tolerant of growing in the shade are also found scattered in the stand. Some areas have significant amounts of large woody debris.

**Recommendations:** As elsewhere damaged or dangerous stems have been dropped. Other high risk stems and stems in obvious decline should also be dropped or harvested. Along with treating for safety reasons a similar treatment to stand II is recommended with the same goals - maintaining the very large residual stems and opening the canopy to encourage regeneration to become established. About 180 cords of various forest products would be produced following this recommendation.

This stand is found "deeper in the woods" and fewer invasive weeds were noted. Patrolling the stand and treatment of any invasive plants that have become established is inexpensive compared to controlling these weeds after they become a problem.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	57,700	32
Hemlock	25,900	137
Spruce & fir	4,400	
Red oak	45,400	
White oak	12,500	
White ash	8,400	
Blackgum	2600	
Norway maple	1,900	
Soft maple	7,800	
Misc. hardwood		209
Totals	166,600	493
Per acre	11,900	35
Total cords per acre		59

**Mature Hardwood tending to Mixedgrowth, Stand IV**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
5.0	187.5	9.0	313.9	212.5	1.57

**Location:** This stand type occupies two areas. A small one in the north west part of the lot and a larger area in a band along the east side of stand III.

**Terrain and Soils:** The terrain is flat. Soils are classified as Windsor loamy sands and provide good sites for tree growth. The area varies from poorly to moderately well drained. Some small wetlands drain into intermittent waterways which feed into intermittent streams that drain off to the southeast into the pond at the entrance from Forest Avenue.

**Access:** Access for this stand is provided by trails which pass through the stand in several places. It is easily accessed from either public road.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding in the early part the 1900's. Hardwood, with red oak, and soft maple being most common makes up about 80% of the overstory of this stand. Softwood, mostly hemlock makes up the remainder. By stem count softwood is a larger component, about 35%. This is because of many small understory hemlock stems. As these hemlock mature and push into the main canopy the stand will become more mixedwood. The stand is heavily stocked. Quality of the timber is poor to excellent. As with the other stands on the lot there are a mix overmature stems with defects and prime quality stems.

**Understory:** This type occupies the wettest parts of the lot. There were areas with seasonal surface water. In most years I doubt that these would contain water long enough to be considered vernal pools of importance to amphibians. Some hemlock and softmaple saplings were noted as well as ferns and shrub species that grow in wet soils.

**Recommendations:** As elsewhere in the lot damaged or dangerous stems have been dropped. Other high risk stems and stems in obvious decline should also be dropped or harvested. Beyond treating for safety reasons a thinning is also recommended with dual goals of growing trees to the full potential of the species and allowing light to penetrate the canopy to create conditions suitable for trees to begin to regenerate. About 50 cords of various forest products would be produced following this recommendation.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	7,900	12
Norway pine	2,900	
Hemlock	3,900	34
Red oak	32,000	
White ash	2,200	
Hard maple	1,400	
Misc. hardwood		131
Totals	50,300	177
Per acre	10,060	35
Total cords per acre		56

# **Baxter Pines**

North of Deering Sports Complex along Leland Street

## Introduction

With the location next to the sports field complex this small woodland is used as a park. It also is used as an outdoor class room. It is recommended that the forest be managed in a manner that reflects its use.

## Growth

There is about 4.5 total acres of woodland, Currently, it is growing 4,032 board feet of sawtimber, and 4.29 cords of pulpwood and firewood per year. Looked at in a standard measure, the total merchantable growth is 12.4 cords per year, or 1.84 cords per acre, per year. If this were a merchantable stand of timber the value of this growth is approximately \$907.02 which is \$135.38 per acre per year. These numbers are good for forests in this area.

## Public Use

As mentioned above about two thirds of this area is used as a park. There are trails along the ball fields and through the forest. That northern corner, around an acre and half, of the lot sees little use. The area is overgrown and infested with noxious bittersweet vines and Japanese honeysuckle making it very hard to even enter the area.

## Invasive Plants

The population of invasive plants here is about as bad as it can get. Where the lot is mowed it has kept these plants under control but on examining what looks like turf much of it is short bittersweet. Any interruption in mowing and the bittersweet and other invasives will quickly over grow the site.

White pine, Norway Pine, Scots pine Plantation, Stand I

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
3.5	136.7	13.3	133.8	354	1.32

**Location:** This stand type occupies an area north of the Deering sports fields and northeast of Leland Street. It was reportedly planted following WWII by Mayer Baxter and a group of volunteers.

**Terrain and Soils:** Most of the lot is on Belgrade very fine sandy loams. There are some small areas of Hollis and Scantic soils. The lot is flat with a slight slope up at the north end of the lot.

**Access:** There is good access from Leland Street. Several trails and light duty service roads traverse the woods.

**Composition and Quality:** This type is softwood of planted origin. White, Norway and Scots pine were planted on old agricultural land in the 1950's. It appears to have been a random mix distance between rows and spacing within the rows varied. Survival also appears to have been variable resulting in variations of stocking through the stand. A few stems of popple, soft and Silver maple have volunteered into the plantation. Quality of the white pine is fair to good. Most of the Norway pine is also of good quality. While the Norway pines appear to be in good condition at this it is not expected that to reach its full potential on these soils. Scots pine is not native and has been a failure as a forest tree in this part of the world. However, it appears to be doing well here at this time.

**Understory:** It appears much of the understory in this stand is mowed from time to time. Grasses and forms are the common ground cover. Within the grass are found many seedlings of invasive species. Bittersweet, honeysuckle, barberry, and multiflora rose, all of which are noxious weeds were noted.

**Recommendations:** The area has been managed as a park. It receives a lot of use and it is appropriate to continue this type of management. Periodically trees, which are in declined or are becoming hazardous, should be removed. At some point stocking will increase and a thinning will become a desirable treatment. A thinning from below would be recommend with the focus being to release the best stems in the stand. The stand should be examined in about 5 years to schedule this treatment. This stand can easily be maintained for 50 to 75 years with this sort of management.

As long as annual mowing is practices the invasive species will be kept under control and will not become a problem for people using this area. If mowing is abandoned, however, even for a short period the understory will quickly become a jungle as is seen in Stand II. To avoid future problems and maintain flexibility in future management I recommend a program to control these weeds be implemented.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	20,000	15
White pine pallet	8,300	
Norway pine	2,400	
Scots pine	3,200	
Soft maple	900	
Popple		10
Misc Hardwood		4
Totals	34,800	29
Per acre	9,943	8
Total cords per acre		28

**Mixed Natural Hardwood and White pine, Norway Pine, Plantation, Stand II**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
1.0	86.7	10.7	115.3	174.0	0.26

**Location:** This stand type occupies an area at the far north corner of the property.

**Terrain and Soils:** Most of the lot is on Belgrade very fine sandy loams. There are some small areas of Hollis and Scantic soils. The lot is flat with a slight slope up at the north end of the lot.

**Access:** There is good access through stand I to Leland Street.

**Composition and Quality:** This softwood is of planted origin planted at the same time and the same species as stand I. However, survival of the planted seedlings was not as good and naturally established hardwoods are a larger component of this stand. Quality is fair to good. Most of this area is not mowed and invasives have taken over the area making almost unusable.

**Understory:** Bittersweet, honeysuckle, barberry, and multiflora rose, all of which are noxious, invasive weeds dominate.

**Recommendations:** Most of this property is managed as a park. The dense understory composed of mostly of invasive weed species make this area unusable for that purpose. The area should be reclaimed by cutting and controlling undesirable species. There are several large silver maple that add diversity to the area. Opening this area to greater use would allow people to appreciate the areas more natural forest. Several have fallen and could be salvaged for firewood as part of reclaiming this area.

**Volume Estimate:**

Species	Board Feet	Cords
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White pine	1,800	8
Norway pine	2,000	
Scots pine	700	
Silver maple	1600	2
Totals	6100	10
Per acre	6100	10
Total cords per acre		22

# Evergreen Cemetery Woods

## Introduction

This woodland is northwest of the actual cemetery. There is a well established network of trails throughout and recreational use is high. Of the four lots included in the plan this is the least park like and the most like a woodlot. The best opportunities to apply traditional silvicultural treatments to improve timber growth and wildlife habitat are also found here.

Six different forest types were identified. All appear to be of natural origin. These vary from stands that originated when agricultural use of fields was abandoned and they reverted naturally to forest. To second or third growth stands which became established following harvest or other disturbance of prior stands. There is little evidence of remaining stumps. Any harvesting was likely over 70 years ago. One stand has grown on an area which was cleared to expand an old rock quarry. Scattered wind damage was noted. The most recent from a storm that occurred on Patriots Day 2007. There are also small areas damaged in previous storms. Younger trees have grown to occupy openings created by windfalls. A fire burned along the ridge west of the old quarry I'd estimate about thirty years ago. It did not kill the overstory but did damage many of the stems. It has been 50 or 75 years since forest has seen any significant disturbance.

## Growth

There is about 111 acres of forest found in this parcel. Currently, the forest is growing 45,131 board feet of sawtimber, and 121.83 cords of pulpwood and firewood per year. Looked at in a standard measure, the total merchantable growth is 212.1 cords per year, or 1.91 cords per acre, per year. The value of this growth is approximately \$13,641.49 which is \$122.90 per acre per year. These numbers are good for forests in this area. However, similar to the other lots the forest here are likely peaking. The forest stands are well stocked to overstocked and many stems are mature. These conditions will lead to increasing natural mortality and lower net growth.

## Public use

There are numerous trails on the property and they received regular use by walkers and bikers. The forest maintains a natural character of a forest varying from middle age to mature. The area is well know to local birders and some guided bird walks are conducted during periods of migration. The waterfowl using the ponds at the edge of the forest attracts many people who feed and observe them.

Several old "camp sites" were found but none with evidence of recent use. Some of the neighbors are dumping yard waste over the line onto the property.

## Invasive Plants

There are scattered non native invasive plants through out the property. As expected the forest edges are again the most infected areas. The most notable infestation is an area of Japanese knot weed to the north of the old quarry. I would estimate about an acre is dominated by this noxious weed.

**Mixed White Pine/Hardwood, Stand I**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
18.0	184.4	9.6	272.3	437.8	1.66

**Location:** This stand type occupies an area at the far or northeast end of the lot.

**Terrain and Soils:** The terrain is flat to rolling with some steep embankments down to a flood plane. Soils are classified as Belgrade and Walpole fine sandy loams and provide good sites for tree growth. The area varies from moderately well drained to well drained.

**Access:** Access for this stand is provided by trails which enter the stand from the south.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding in the early part the 1900's. White pine makes up about a third of the stocking. Hardwood, with soft maple and red oak being most common make up the remainder. The stand is heavily stocked. Quality of the timber is poor to excellent. As with most untreated stands there are stems which are of poor form, in decline or defective for various reasons. However, there is a good component of excellent quality stems.

**Understory:** There is heavy shade in any stand this dense. Most of the tree species in the understory are shade tolerant, hemlock and balsam fir. Much of this is very suppressed and not desirable regeneration. Broken fern, hazel, sarsaparilla, false lily of the valley are common but much of the forest floor is bare leaf litter.

**Recommendations:** The stand would benefit from an improvement cut and thinning to remove diseased, defective declining, suppressed and overstocked stems. Stocking should be reduced by about 40% in two cuts five to seven years apart to minimize increase risk of wind damage. The first cut should bring stocking down about 20% resulting in a harvest of about 250 cords of all forest products. This would improve growing conditions for residual stems and also create conditions where desirable regeneration can become established. The second harvest should reduce stocking the same amount. This cutting will bring stocking to a more ideal level of about 120 square feet of basal area, release regeneration that becomes established following the first cut and create condition suitable for more regeneration to become established.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	228,600	141
White pine pallet	6,000	
Hemlock	5,200	3
Spruce & fir	6,500	
Red oak	52,900	
Soft maple	14,000	
Misc. hardwood		526
Totals	313,600	670
Per acre	17,422	37
Total cords per acre		72

**Red Oak and other Hardwoods, Stand II**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
23.0	124.7	6.7	308.1	149.1	0.88

**Location:** This stand type occupies an area in the central part of the forest.

**Terrain and Soils:** The terrain is flat to rolling with some steep slopes and ledge out crops up onto a ridge that run northeast/southwest through the stand. Soils are classified as Hollis fine sandy loams and Hollis rocky fine sandy loams. These soils provide poor to good sites for tree growth. The area varies from well drained to excessively well drained. The poor growing sites which are also the excessively well-drained areas are due to bedrock being close to the surface.

**Access:** Access for this stand is provided by trails which enter the stand from the south and east.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding. It appears some of this area was cleared when the rock quarry was in operation. Also a good part of the stand, the northeast half or two thirds, burned 20 or 30 years ago. This is evidenced by fire scars on the base of trees and charcoal noted on various stumps and stems. Hardwood, primarily red oak is dominant in the stand. White pine makes up about ten percent of the stocking. The stand is well stocked. Quality of the timber is poor to excellent. On the ledgy sites trees are short bodied and limby. Where the fire occurred there are many damaged stems. Many fine looking trees were damaged and there is a good possibility of internal decay in many of these trees.

The stand is dominated by hardwoods because of past clearing and burning. Lacking these heavy disturbances the site would likely be dominated by softwood, primarily white pine.

**Understory:** Bracken fern and low bush blueberries are common indicating well drained to drought soil conditions through much of this stand. Tree regeneration is common in this stand. White pine, red and white oak, soft maple, beech and hemlock seedlings and saplings were noted. Some mortality in the oak component likely caused by past Gypsy moth defoliation and decay from in fire damaged stems open the canopy.

**Recommendations:** The stand would benefit from an improvement cut to remove defective stems, release established regeneration and create conditions suitable for the establishment of more regeneration. Approximately a third of the stocking should be removed resulting in a harvest of about 200 cords of all forest products. White pine seedlings and saplings in the understory will respond to the release. Two or three removal cuts of a shelterwood should be utilized over the next twenty years to nurture this pine into the overstory.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	43,800	81
Hemlock	4,000	24
Spruce & fir		6
Red oak	88,900	
Soft maple	9,800	
Beech	2,200	
Misc. hardwood		348
Totals	148,700	459
Per acre	6,465	20
Total cords per acre		33

**Mixedgrowth, Stand III**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth Per acre	
				Board feet	Cords
21.0	152.3	7.7	308.1	287.2	1.05

**Location:** This stand type is found in a band across the forests and along the southwest boundary.

**Terrain and Soils:** The terrain is flat to rolling. Soils are classified as Hollis fine sandy loams. These soils provide good sites for tree growth. Most of the area is well drained, however there are some small wetland areas and waterways draining through the stand.

**Access:** Access is provided by a light duty road to a storage area at the old quarry. Several trails pass through the stand.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding. Hardwood, primarily red oak and soft maple make up about 70% of the stocking. White pine and hemlock make up the remainder. The stand is well stocked. Quality of the timber is poor to excellent.

**Understory:** The understory reflects the differing levels of soil moisture in this stand. Highbush blueberry, interrupted fern and other moisture loving plants are found where soils are moist. Bracken fern low bush blueberry and other dry land plants found in better drained areas. Tree regeneration is common in parts of this stand. Several areas of well-established white pine saplings were noted.

**Recommendations:** This is an excellent area where combining the selection and shelterwood systems of silviculture makes good sense. The better drained sites will tend naturally to white pine which responds well to regeneration by shelterwood treatments. The more moist sites will tend to more hardwood/mixed growth forest which respond well to selection treatments. The stand would benefit at this time from an improvement cut and thinning to remove defective stems. This would improve growing conditions for residual stems and also released established regeneration. Stocking should be reduced by about 20% resulting in the harvest of about 200 cords of all forest products. A similar cut should follow in 5 to 7 years.

**Volume Estimate:**

Species	Board Feet	Cords
White pine	105,300	62
Hemlock	17,300	21
Spruce & fir		10
Red oak	102,400	
Soft maple	20,800	
Misc. hardwood		390
Totals	245,800	483
Per acre	11,705	23
Total cords per acre		46

White Pine Sawtimber, Stand IV

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth per acre	
				Board feet	Cords
23.0	234.3	8.2	367.1	919.2	1.04

**Location:** This stand type occupies an area in the southeaster part of the forest and along the southern boundary line.

**Terrain and Soils:** The terrain is flat. Soils are classified as Hollis and Swanton fine sandy loams, and Scantic silt loam. These soils provide provide good sites for tree growth. The area varies from somewhat poorly drained to well drained. The wettest areas are poor sites but are a very small part of the stand. Most of the area is good growing site.

**Access:** Access for this stand is provided by trails which pass through the stand.

**Composition and Quality:** This stand appears to have originated as old field pine. White pine invaded open land sometime in the early 1900's and now makes up about 70 percent of the stocking. Windthrow and other losses over time have allowed a component of hardwood poles to become established in patches through out the stand. The stand is densely stocked. Quality of the timber is good.

**Understory:** Undergrowth varies with soil moisture conditions. Sarsaspirilla, false lily of the valley, cinnamon, hay scented and bracken ferns are all common. Tree regeneration is common in this stand. White pine, red and white oak, soft maple, beech, balsam fir and hemlock seedlings and saplings were noted. These are well stocked where windthrough has occurred.

**Recommendations:** Soil conditions are similar to those in stand III above. Over time it can be expected that they will become more similar with white pine being the dominant species in better drained areas and a hardwood/mixwood type occupying the wetter sites. At this time the stand would benefit from a thinning and improvement cut. This would improve growing conditions for residual stems and also released established regeneration. The stems in this stand are particularly tall and there has been little disturbance in much of the stand. The trees are relying on each other for support. Ideally stocking would be reduced by almost half. However, this reduction needs to be done conservatively over several cuts so as to not increase risk of wind throw in the stand. The first thinning should be from below and not remove more than 20% of the stocking. A second similar treatment should be planned 5 to 7 years after the first followed by another similar treatment 5 to 7 years after that. The first thinning should produce about 400 cords of all products.

**Volume Estimate:**

Species	Board Feet	Cords
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White pine	715,900	465
White pine pallet	36,700	
Tamarack	12,400	
Spruce & fir	8,500	
Red oak	27,400	
White ash	6,500	
Soft maple	19,300	
Misc. hardwood		244
Totals	826,700	709
per acre	35,943	31
Total cords per acre		103

### Red Oak, Stand V

Acres	Basal Area	Avg. DBH	Avg. Nmbr Trees/ac	Growth per acre	
				Board feet	Cords
11.0	156.0	8.4	294.0	213.6	1.14

**Location:** This stand type is found in a band along the eastern edge of the forest where it borders the cemetery.

**Terrain and Soils:** The terrain is flat. Soils are mostly classified as Belgrade very fine sandy loam. These soils provide good to excellent sites for tree growth. Most of the area is well drained, however there are some small wetland areas and waterways drain through the stand.

**Access:** Several trails pass through the stand. However access for forest management would out to the south end or west to the old quarry area.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding. Red oak makes up about 71% of the stocking. Other hardwoods compose most of the remainder of the stand. A small amount of hemlock is found as understory trees. The stand is well stocked. Quality of the oak is good to excellent. **This is one of the better oak stands I have seen in Maine in a 35 year career.**

**Understory:** The understory is rich and diverse reflecting the excellent soil quality. Highbush blueberry, hay scented and interrupted ferns, hawthorn, viburnums and spirea were noted. . Tree regeneration is common in parts of this stand. Several areas of well established white pine, red and white oak saplings were noted.

**Recommendations:** The stand would benefit from an improvement cut to remove less desirable stems and reduce stocking by about a third. This would produce about 120 cords of forest products. This would improve growing conditions for residual stems and also released established regeneration. Red oak is obviously very well adapted to growing on this site.

Treatments should be designed to encourage its continued dominance of the site. Long term management should be by individual tree and small group selection.

**Volume Estimate:**

Species	Board Feet	Cords
Hemlock		12
Red oak	109,700	
White oak	7,800	
Popple		62
Misc. hardwood		244
Totals	117,500	318
per acre	10,682	29
Total cords per acre		50

**Forested Wetland Stand VI**

Acres	Basal Area	Avg. DBH	Avg. Number Trees/ac	Growth per acre	
				Board feet	Cords
15.0	110.0	7.7	215.4	286.7	0.88

**Location:** This stand type is found in a band along the northern boundary.

**Terrain and Soils:** The terrain is flat. Soils are classified mostly as Buxton and Scantic silt loams however there are included areas which are better drained than these soils. The soils provide poor to good sites for tree growth. There are several intermittent streams and waterways draining through the stand.

**Access:** There are trails passing through the stand. Any access by heavy equipment will need to be when soils are frozen or very dry.

**Composition and Quality:** This stand composed of stems that which developed from natural seeding. Soft maple is a major component in the wetland areas. White pine and red oak are the common species on the upland sites. The stand is well stocked. Quality of the timber is poor to excellent.

**Understory:** The understory reflects the of soil moisture. Horse tails, willow, golden rod, alder and moss are found in the wetland. North of the old quarry is a stand of Japanese knot weed which is very dense. Barberry was also noted. .

**Recommendations:** The stand has some productive area for growing trees but the wetland is more important as wildlife habitat. The upland sites can be managed in conjunction with adjacent forest stands and would benefit from an improvement cut. The wetland areas managed more extensively or treated to create wildlife habitat conditions of choice.

Japanese knot weed is an invasive noxious weed and should be controlled. Here it is found in a very dense stand. Nothing else can become established or grow in this stand. This area seems to be acting as a reserve and slowly be spreading into adjacent forest.

**Volume Estimate:**

<b>Species</b>	<b>Board Feet</b>	<b>Cords</b>
White pine	93,800	83
White pine pallet	51,500	
Spruce & fir	3,600	
Red oak	9,400	
White ash	3,800	
Misc. hardwood		233
Totals	162,100	306
per acre	10,807	20
Total cords per acre		42