Left to Right: Pat Sweeney, Jon Regetz—C.C., Amy Boduch, Karl Miller, Justin Shalata

<table>
<thead>
<tr>
<th>Crew Member</th>
<th>Major</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Pat Sweeney</td>
<td>Forestry—EFM</td>
<td>Freshman</td>
</tr>
<tr>
<td>Jon Regetz</td>
<td>Forestry—EFM</td>
<td>Freshman</td>
</tr>
<tr>
<td>Amy Boduch</td>
<td>Forestry—Veg. Mgmt</td>
<td>Junior</td>
</tr>
<tr>
<td>Karl Miller</td>
<td>Forest Technician</td>
<td>Freshman</td>
</tr>
<tr>
<td>Justin Shalata</td>
<td>Forest Technician</td>
<td>Freshman</td>
</tr>
</tbody>
</table>
REGETZ PLOT

J. Regetz—C.C., A. Boduch, K. Miller,
J. Shalata, P. Sweeney

Plot is located at the Old Boy Scout Camp
approximately 1 mile north of Paul Smith's College
on the East side of NYS Rt. 30
It is reached by following the fence line
due north and continuing straight through
the 5-way intersection.
Plot can be found on the east side of the trail
at the top of a short rise.

Natural White Pine stand with a silviculture treatment
applied Spring 2005

In partial fulfillment of the requirements of Silviculture 132, the entire crew has read and
agrees with all the information contained in this report.

Jon Regetz  4/21/05
Amy Boduch  4/21/05
Karl Miller  4/21/05
Justin Shalata  4/21/05
Pat Sweeney  4/21-2005
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WRITTEN DESCRIPTION OF PLOT

The Paul Smith’s College Silviculture plots are found at the Old Boy Scout Camp north of Paul Smith’s campus on NYS Rt. 30. Approximately 1 mile north of campus, there is an orange gate on the east side of the road. Continuing through that gate there is a fence that continues due north and begins right before an open field. This field serves as the landing for any harvesting activities that take place on the plots. Follow the woods road right before the fence due north and after reaching a 5 way intersection, continue straight up a small rise. The Regetz Plot is located on the east side of the woods road at the top of this small rise.
TRaverse MAP of Regetz Plot
Located on Route 30
Town of Brighton
County of Franklin
State of New York
Date Complete: April 20, 2005
Map Drawn By: Karl R. Miller

Legend:
- = corners (purple)
- - = boundary
- - - = path to plots
- - - - = skidder trail
= 1/1000" plots

UTM of plot center:
E 559345 mE
N 22150 mN
PLOT HISTORY

This new plot does not have a previous record so the history has been interpreted by looking at the nearby plots and the past management plans associated with them. The neighboring plot (Dickerson) has had six thinnings occur over the past 30 years. The area surrounding the Dickerson Plot and our plot was all a farm back in the late 1800s. Once being a farm for years, the plots were then transformed into a golf course for Paul Smiths Hotel and planted with grass seed. Due to the poor soil conditions which were derived from glaciation, making a glacial till, the grass seed was unable to germinate and flourish on these sandy soils. In response, Paul Smiths Hotel planted the lands with Scotch, Red and White Pines. John Harding, an Environmental Conservation officer, oversaw the planting operation on the site. Soon objectives were set by the Hotel and John Harding about the survivability and management of the young plantation. In the 1920’s there was a school for boys that had been established, and then later in the 1930’s it was transformed into a Boy Scout camp. This indicates that at this time recreation really began to take place in the area. The Boy Scout camp was in need of funds, so in the 1950’s the lands were given to the silvicultural students of Paul Smith's College. They managed this area to promote the growth of the Scotch pine and understory hardwoods. Due to the increase in recreation in the area, the proposal for the Visitor’s Interpretive Center (VIC) was formulated along with the establishment of several trail systems that run all around the area. Those trails include but aren’t limited to the Jack-Rabbit trail, connecting trails to the Red Dot trail system and various lean-tos that have been built around the surrounding ponds. Looking at the location today, the area has changed drastically from cleared farm land to a mature forest.
THE TREE SILVICS

Red maple (*Acer rubrum*)

**Tolerance:**

Red maple is considered to be a shade tolerant species as well as a prolific sprouter. It has a large range in elevation from sea level to about (3000 ft) and grows over a wide range of microhabitat sites. Red maple can be considered either a pioneer species or a sub climax species, and responds rapidly to release to occupy any space in the overstory. Once the stand begins to mature and competition for light increases, the vigor begins to decline.

**Regeneration:**

Red maple is polygamo-dioecious meaning that some trees are monoecious with both male and female parts on the same tree; some are trees have only male flowering parts, which generates 0 seeds; or some are entirely female producing only seeds. Generally this species tends to be dioecious. The flowers of Red maple are considered to be perfect. A good seed crop occurs every year, and on average, a good bumper crop occurs once every 2 years. Moist mineral soil seems to be the best seedbed for red maple, and a thin layer of hardwood leaf litter does not hinder germination and early survival.

**Soils:**

It does well on a wide range of soil types, textures, moisture, pH, and elevation than any other forest species in North America. Red maple grows on a wide variety of different sites, varying from dry ridges and southwest slopes to peat bogs and swamps. It commonly grows under extreme soil-moisture conditions – either very wet or quite dry. It grows best on moderately well drained, moist sites at low to intermediate elevations, although it is common in mountainous country on the drier ridges and on the south and west aspects of upper slopes.

**General site requirements:**

Red maple can grow on a wide variety of sites. It has a large geographic range up and down the east coast to the eastern shores of the Mississippi. The northern extent of the red maple range coincides with the -40°C (-40°F) mean minimum isotherm in southeastern Canada. The western range is limited by the dry climate of the Prairie States.

American Beech (*Fagus grandifolia*)

**Tolerance:**

Beech is classified as a very shade tolerant species. In some parts of its range beech is the most shade tolerant species. Its tolerance is partly due to its very low respiration rate and the quick response by the stomata, which open when light suddenly increases and rapidly close when light intensity diminishes. The stomata of beech are more responsive than those of red maple, red oak, or yellow-poplar which are less tolerant. On very poor soils or in very cold climates, beech may be less tolerant. The tolerances of beech and associated sugar maple are about the same, although locally one species or the other may predominate in the forest understory. Factors other than shade tolerance appear to govern the relative success of beech and its common tolerant competition, the sugar maple, eastern hemlock, and balsam fir. Beech and sugar maple are recognized as climatic climax species in the northern hardwood types of the Northeast, Lake States, and Appalachian Mountains.

**Regeneration:**

The American beech regenerates by vegetative reproduction, with sprouts developing on the trunk of beech immediately below a wound, and from the tops of stumps; here adventitious buds develop in callus tissue of the cambial region. Shown that reproduction is almost exclusively by suckering in the "beech gaps" and is abundant in the Adirondack Mountains of New York, in Maine, and in many other areas, often those near the northern and western limits of its range where the environment that beech seeds germinate from. Germination is epigeous and chilling is required to break dormancy. On either mineral soil or leaf litter, germination is good, but on excessively wet sites it is poor. Both germination and survival tend to be better on more humus than on mull humus soil.

Beech seedlings develop better under a moderate canopy or in protected small openings than they do on larger open areas where the surface soil may dry out below the depth of the shallow roots. Height growth, dry weight, and root development in the open are less than in shade. Seedlings are found in large numbers beneath even the densest stands, but under such conditions their growth is slow. Beech reproduction can start under, and come through, fern and raspberry cover.

Dormancy of beech seedlings can be broken in spring and growth can be prolonged in fall by supplemental light. Decreasing day length plays the major role in inducing dormancy in the fall, but day length may be secondary to temperature in controlling resumption of growth in the spring. That is, day length probably becomes adequate for growth to resume in the spring before temperatures are high enough for growth to occur. Temperature, therefore, exerts the final control over growth resumption.
Soils:

Beech prefer soils of loamy texture and those with a high humus content are more favorable than lighter soils. It will grow on poorly drained sites not subjected to prolonged flooding and may grow where the water table is within 15 cm to 25 cm (6 to 10 in) of the surface. It is reportedly less tolerant of such conditions than are red maple (*Acer rubrum*) and sweetgum (*Liquidambar styraciflua*). Beech is found on soils with a pH ranging from 4.1 to 6.0, but rarely where pH exceeds 7.0.

General site requirements:

Beech is a mesophytic species; it uses twice as much water for transpiration and growth processes annually, compared to some drought resistant oaks and even lesser amounts by some pines. American beech is found within an area from Cape Breton Island, Nova Scotia west to Maine, southern Quebec, southern Ontario, northern Michigan, and eastern Wisconsin; then south to southern Illinois, southeastern Missouri, northwestern Arkansas, southeastern Oklahoma, and eastern Texas; east to northern Florida and northeast to southeastern South Carolina. A variety exists in the mountains of northeastern Mexico.


Balsam fir (*Abies balsamea*)

Tolerance:

Balsam fir has a strong ability to become established and grow under the shade of larger trees. It is classified as very tolerant. The tolerance of the species may vary with soil fertility, climate, and age. Competition is evident in many sapling and small pole-size stands of pure balsam fir. As these stands mature, dominance usually is expressed. Competition is severe in dense fir thickets, however, and growth rates of individual trees suffer greatly. Other major competition is from the shade-tolerant hardwoods.

In New England, balsam fir is considered a subclimax type, except that it may be a climax species in the zone below timberline. It tends to become climax in Quebec and in the Lake States.

Regeneration:

Balsam fir is a monoecious species meaning that it has both male and female parts on one tree. Most germination occurs from late May to early July. Seeds are dispersed by wind
and gravity. Good seed crops occur at intervals of 2 to 4 years with some production in
between. If enough moisture is available, almost any seedbed type is satisfactory, but
mineral soil—neither too sandy nor too heavy—with some shade is best. Litter and humus
are poor seedbeds, especially if moisture is scarce or to much light is present. A seedbed
with a thick layer of duff exceeding about 3in is less favorable for balsam fir but even
worse for the slower growing associated spruces. Balsam fir seedlings may have a heavy
central root, much like a taproot, that extends to the bottom of the humus layer and then
splits into several laterals. Balsam fir can also regenerate vegetative by means of
layering. This is most common among the trees growing in the northern most region of
the range.

**Soil Requirements:**

Balsam fir grows on a wide range of inorganic and organic soils originating from
 glaciation and generally falling within the acid Spodosol, Inceptisol, and Histosol soil
orders. These are characterized by a thick mor humus and a well-defined A₂ horizon.
Balsam fir has been reported as growing on soils of a wide range of acidity. In the
northern Lake States it is most common on cool, wet-mesic sites with pH values ranging
from 5.1 to 6.0. Optimum growth occurs on soils where the pH of the upper organic
layers is roughly 6.5 and 7.0. On gravelly sands and in peat swamps, growth is
comparatively slow.

**General site requirements:**

Balsam fir grows best in the eastern part of its range in southeastern Canada and the
Northeastern United States. This area is characterized by cool temperatures and abundant
moisture. The precipitation requirements for Balsam fir vary greatly where in some areas
they receive 55” annually and other areas have received as little as 15”.

Forest Service. Retrieved on April 13, 2005 from

**White Pine (Pinus strobus)**

**Tolerance:**

White pine is intermediate in shade tolerance, and vegetative competition is a major
problem. Although it will tolerate up to 80 percent shade, tree growth increases as shade
is reduced. It can achieve maximum height growth with only 45 percent full sunlight.
White pine does well in natural stands with similar species, and when other species are
present there becomes too much competition for sunlight. White pine grows on nearly all
the soils within its range, but generally competes best on well drained sandy soils of low
to medium site quality. These soils allow for moderate growth of white pine but not
hardwoods. On these sandy sites, white pine regenerates naturally, competes easily, and can be managed most effectively and economically.

**Regeneration Requirements:**

White pine is monoecious. Embryo dormancy is common in white pine, and for nursery sowing, stratification of seeds for 60 days at 1° to 5° C (33° to 41° F) is recommended. Bare mineral soil is not necessary for seed germination; seeds can germinate and survive on both disturbed and undisturbed litter layers. Under full exposure to sunlight, moist mineral soil, polytrichum moss, or a shortgrass cover of light to medium density are favorable seedbeds. Dry mineral soil, pine litter, lichen, and very thin or very thick grass covers are unfavorable. Good seed years are thought to occur every 3 to 5 years, a few seeds being produced in most intervening years.

**Soil:**

Soils within the range of white pine are derived from granites, gneisses, schists, and sandstones, and less commonly from phyllites, slates, shales, and limestones. The soils are excessively drained or somewhat excessively drained sandy deposits or stratified sand and gravel deposits. White pine grows on nearly all the soils within its range, but generally competes best on well drained sandy soils of low to medium site quality. These soils permit fair growth of white pine but not hardwoods. On these sandy sites, white pine regenerates naturally, competes easily, and can be managed most effectively and economically. White pine cannot tolerate a soil that has a pH of 4 or lower.

**General Site Requirements:**

The climate over the range of white pine is cool and humid. The distribution of white pine coincides reasonably with that part of eastern North America where the July temperature averages between 18° and 23° C (65° and 74° F).


**Red spruce (Picea rubens)**

**Tolerance:**

Red spruce is classified as shade tolerant in the United States and tolerant or very tolerant in Canada. Opinions differ as to whether red spruce is more tolerant than balsam fir, but the relative tolerance may vary with soil fertility and climate. The species' chief competition comes from balsam fir and hardwoods that produce heavy shade, like beech and maple. Competition from aspen, birch, and other thin-crowned species is not so
severe. Red spruce doesn’t really have a moisture stress since it can grow on sites that are unfavorable for other species, such as steep rocky slopes, thin soils and wet bottomland.

**Regeneration:**

Red spruce is a monoecious species. Germination takes place on almost any medium (mineral soil, rotten wood, or shallow duff) except sod. Mineral soil is an excellent seedbed for germination. Generally ample moisture is available and soil temperatures are moderate. Good seed crops occur every 3 to 8 years, with light crops during intervening years.

**Soil:**

The soils where red spruce and its associates grow are mostly acid Spodosols, Inceptisols, and sometimes Histosols with a thick mor humus and a well-defined A₂ horizon-characteristics commonly associated with abundant rainfall, cool climates, and softwood cover. The pH of these soils range from 4.0 to 5.5. In northern New England, red spruce is found predominantly on shallow till soils that average about 18 in to a compact layer. It will grow on many sites unfavorable for other species, such as organic soils overlying rocks in mountainous locations, steep rocky slopes, thin soils, and wet bottomland. On poorly drained soils, lack of aeration limits growth.

**General Site Requirements:**

Red spruce grows best in a cool, moist climate. The range of red spruce extends from the Maritime Provinces of Canada west to Maine, southern Quebec, and southeastern Ontario, and south into central New York, eastern Pennsylvania, northern New Jersey, and Massachusetts. The climate of the northeastern part of its range can be summarized as follows: annual precipitation (total), 910 to 1320 mm (36 to 52 in); annual snowfall, 203 to 406 cm (80 to 160 in).


**Eastern Hemlock (Tsuga Canadensis)**

**Tolerance:**

Eastern hemlock is the most shade tolerant of all tree species (3,15,35). It can survive with as little as 5 percent of full sunlight. The tree is capable of withstanding suppression for as long as 400 years. At all ages, however, eastern hemlock responds to release in
both height and diameter growth. When hemlock is released exposing drastic differences in sunlight and other elements it often results in reduced growth and mortality and has been a contributing factor to partial uprooting or windthrow because of shallow rooting.

**Regeneration:**

Eastern hemlock is monoecious in flowering and the seed is spread by wind, gravity and over snow by drift. Eastern hemlock is one of the most frequent cone producers among the eastern conifers. According to an observation in Wisconsin, good seed crop years occurred 61 percent of the years, based on 32 years. Despite ability of hemlock to be a prolific cone producer, the viability of eastern hemlock seed is usually low. Germinative capacity commonly is less than 25 percent due to insect damage and other abiotic environmental factors. The seeds of Eastern hemlock are partially dormant at maturity and must be stratified about 10 weeks at or slightly above freezing temperatures for best germination. Unstratified seed must be exposed to light to break the partial dormancy. Contrary to common belief, the species requires a warm, moist site for stand establishment rather than the cool, moist conditions that usually develop as stands mature. Failure to have adequate moisture results in the dessication of seedlings. The site must be prepared, however, by thorough mixing of organic and mineral soil or by prescribed fire to expose a partially decomposed layer. Eastern hemlock doesn’t reproduce vegetatively by sprouting and very rarely by layering.

**Soil:**

There isn’t an exact soil specification for Eastern hemlock. They are universally characterized as being moist to very moist but with good drainage. In the Lake States the species is known to grow on upland sandy loams, loamy sands, and silt loams, often with an abundance of ground or coarse rocky material throughout the upper profile deposited from glacial or fluvial material. Typically, most soils are highly acid, particularly in the upper horizons, but some are nearly neutral.

**General site requirements:**

Eastern hemlock is generally restricted to regions with cool humid climates. Stocked stands of eastern hemlock will develop similar microclimates due to their dense canopy, dense shading, deep duff layer, and subsequent retention of moisture and uniformly low temperatures.

Scotch pine (*Pinus sylvestris*)

**Tolerance:**

Scotch pine is intolerant of shade. Once seedlings are overtopped by other species they tend to fall prone to suppression. When Scotch pine has been mixed with red or white pine at planting, the scotch pine tends to gain the advantage over them due to much more aggressive growth rates during the first few years due to the roots overcrowding the roots of other species. Due to its tolerance to poor droughty sites, scotch pine is used to control erosion in many areas that experience similar characteristics. Since the site quality of those sites is so poor though, it makes the tree very susceptible to serious insect attacks and poor timber quality wood.

**Regeneration:**

Scotch pine is primarily a monoecious species, although some shoots, branches, and even entire trees are predominantly of one sex. The cones require alternating periods of dry and wet weather to open and shed few seeds until early winter. Good seed crops are produced at intervals of from 3 to 6 years with light crops in most intervening years. As soon as the parent stand reaches seed bearing age, it begins to spread outward into firebreaks and along open road sides. In many areas reproduction is so plentiful as to present a mat of seedlings. Field germination is best under full or partial sunlight. Seedling establishment is best when adequate moisture is available and some shade is present. Scotch pine doesn’t reproduce by vegetative means.

**Soil:**

Scotch pine grows best on freely drained sands and gravels, which are often located on knolls and terraces. Although Scotch pine can grow on soils with a pH ranging from 4.0 to 7.0, it grows best on soils in the 4.5 to 6.0 range. In the Lake States, Scotch pine is planted most commonly on level or gently rolling sand plains-chiefly at elevations between 300 m (1,000 ft) and 460 m (1,500 ft). In the Eastern States, it has been planted not only on outwash plains, but also on mountain slopes at elevations from a few meters above sea level to about 820 m (2,700 ft) in the Adirondacks.

**General site requirements:**

Scotch pine is adapted to a wide variety of climates as indicated by its extremely large natural range. In some areas this species is capable of growing where the subsoil is permanently frozen. Scotch pine can also survive high temperatures, and it is found at middle altitudes in the Mediterranean region. The primary distribution of Scotch pine, however, indicates that it is a tree of the continental climates. In the northeast, scotch pine is considered a naturalized species, and is considered adapted to a wide variety of climate types.
Black cherry (*Prunus serotina*)

**Tolerance:**

Black cherry is classified as intolerant of shade, and in sapling and larger sizes, they are considered very intolerant of competition. The diameter distribution of black cherry in even-aged stands follows the bell-shaped curve typical of intolerant species. Black cherry will not move up into the dominant canopy position without at least moderate levels of sunlight. Black cherry maintains a dominant growth advantage over associated species for 60 to 80 years, so the proportions of the basal area in cherry stands tend to increase over time in mixed stands. By age 60, codominant red maple diameter growth is often as good as or better than that of codominant cherry. Beyond age 80 to 100 years, diameter growth slows and the mortality of cherry increases rapidly, and the importance of the species in the stand declines. This allows for red maple, sugar maple and white ash to begin dominating the site depending upon the stand.

**Regeneration:**

Good seed crops occur at intervals of 1 to 5 years across the geographic range of black cherry. A moist seedbed is required for good germination, and burial of seeds to a depth of several inches is beneficial, apparently because it provides a stable moisture supply. Shade also improves germination by helping to maintain stable moisture. The dispersal of seed is mainly by gravity, which produces a viable seed bed for future regenerations if the conditions are right. Song birds and other small mammals also spread seed after defecation because they can’t digest the seeds.

**Soil:**

Throughout its range in eastern North America, black cherry grows well on a wide variety of soils if summer growing conditions are cool and moist. The forest soils that are important to black cherry tend to be very strongly acid, relatively infertile, and have high, coarse fragment content throughout their profile. Kaolinite is the dominant clay mineral and is responsible for relatively low cation exchange properties. The bulk of the upland soils have textures that range from sandy loam to silty clay loam, and many soils have developed fragipans that impede drainage and restrict root growth. Very saturated soils are known to impede growth, but they can tolerate a variety of drainage.
General site conditions:

Black cherry grows under a wide range of climatic conditions. In the heart of the commercial range on the Allegheny Plateau of Pennsylvania and New York, the climate is cool and moist. Further southward throughout the Appalachian Highlands, black cherry generally grows on good to excellent sites as a scattered individual in association with other mesophytic hardwoods and sometimes in nearly pure stands at high elevations on soils with impeded drainage. In the Lake States, black cherry prefers deep, well-drained soils and is adversely affected by increasingly poorer soil drainage.


Yellow Birch (*Betula allehiensis*)

Tolerance:

Yellow Birch is often a pioneer species following fires, but is usually less abundant than aspen, pin cherry, and paper birch. Birch seedlings can't compete successfully with advance regeneration, but yellow birch is present in all stages of forest succession. It is generally considered intermediate in shade tolerance and is more shade tolerant than the other native birches. However, it is less tolerant than its major associates like sugar maple, beech and hemlock.

Regeneration:

Yellow Birch is monoecious and the fruit, a winged nutlet, ripens in late August or early September and are dispersed mainly by wind. The minimum seed bearing age is 40 with the optimum being 70, but heavy seed crops are also produced by 30 to 40 year old trees either open grown or in thinned stands. Good seed crops usually occur at about 2 to 3 year intervals and seed viability is often affected by weather conditions during pollination, fertilization, and seed development. Viability also varies by location, stand, and even individual trees within the same stand. Yellow birch is known as a prolific seeder and germination is epigeal.

In undisturbed stands, yellow birch can only regenerate on mossy logs, decayed wood, rotten stumps, and windthrown hummocks because hardwood leaf litter is detrimental to its survival. It cannot regenerate under a closed canopy and must have some sort of soil disturbance and an opening in the canopy. In fact, unless stands have been burned or heavily disturbed by blowdown or logging, regeneration is usually restricted to edges of skidroads or landings. Clearcutting small patches or strips provides suitable conditions for yellow birch seedling establishment in the Northeast where rainfall is abundant.
Soil:

Yellow birch grows best on well-drained, fertile loams and moderately well-drained sandy loams. In the western part of its range (MI and WI) it is found on glacial tills, outwash sands and lacustrine deposits derived from sandstone and limestone. It is often abundant where drainage is restricted because competition from other species is less severe. It is usually stable on moist sites but when on dry sites, it succumbs to more tolerant species.

General site conditions:

Yellow birch grows over a large area with diverse geology, topography, soil and moisture conditions. It is found from eastern Canada through southeastern Manitoba, south to Minnesota and Iowa and east to New England. It is also found in the southern Appalachian Mountains in eastern Tennessee and northeastern Georgia. Although the average annual temperature throughout its range is about 45° F, the extremes range from -40° F to 100° F. The annual precipitation ranges from about 50” in the east to 25” at its western limit. The growing season ranges from 60 to 150 days with an average of about 120 and yellow birch requires overhead light, growing space, soil moisture, and nutrients in order to compete with its faster growing associates.


White Birch (Betula papyrifera)

Tolerance:

Paper birch is classified as a shade-intolerant tree and among its common associates in the Northeast, only aspen, pin cherry, and gray birch are more intolerant. In the natural succession of species, paper birch usually lasts only one generation and then is replaced by more tolerant species. Because of this intolerance, it often requires release from faster growing species that may overtop it in the early stages of regeneration.

Regeneration:

Paper birch is monoecious and it flowers from mid-April through early June depending on the location. The seeds ripen from early August to mid September and seed dispersal occurs soon after the seeds are ripe and begins earlier in injured trees. Although dispersal is by wind, the majority of seeds fall within the stand where they are produced. Paper birch begins producing seeds at about 15 years of age, but optimum seed bearing age isn’t
reached until 40 to 70 years. In mature stands, good seed crops occur every other year but in some areas, seeds are produced every year. Germination is epigeal, and newly germinated seedlings are very fragile. They are sensitive to moisture, temperature, light, and seedbed condition and best germination occurs on mineral soil.

Following clearcutting or other disturbances, the bulk of paper birch regeneration becomes established during the first growing season from seeds that fell the previous fall and winter. Paper birch can vegetatively reproduce from sprouts following cutting or fire but usually occurs when young vigorous trees have been cut in the spring. However, sprouts are seldom abundant enough to reproduce mature stands.

Soil:

Paper birch grows on almost any soil and in almost any type of topography ranging from steep rocky outcrops of the mountains to flat muskegs of the boreal forest. Best development and growth though are on the deeper well-drained to moderately well-drained soils common to glacial deposits throughout its range. In the northeast, it tends to be more abundant on the dry sites than on the wet or poorly drained sites. The soils found under birch and aspen tend to be warmer but drier than soils under softwoods.

General site conditions:

Paper birch is a northern species adapted to cold climates. It is found throughout Canada and the northern United States. In the east, it also extends down the Appalachian mountains from central New York to western North Carolina. It seldom grows naturally in the south where July temperatures are over 70° F. It tolerates varying amounts of precipitation and in the east this can get as high as 60”. In general though, the climate where it is found has short cool summers and long cold winters during which the ground is covered with snow for long periods.

The average diameter (in inches) for the stand was 4.7

<table>
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<th>Species</th>
<th>Avg. Height</th>
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<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Scotch Pine</td>
<td>22</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Red Spruce</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
<td>3</td>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>Red Maple</td>
<td>59</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
<td>3</td>
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</tr>
</tbody>
</table>

 TOTAL TREES/ACRE

<table>
<thead>
<tr>
<th>Species</th>
<th>1776</th>
<th>376</th>
<th>163</th>
<th>62</th>
<th>22</th>
<th>19</th>
<th>16</th>
<th>54</th>
<th>34</th>
<th>74</th>
<th>59</th>
<th>39</th>
<th>29</th>
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<tbody>
<tr>
<td>Yellow Birch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Eastern White Pine</td>
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<td></td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Red Spruce</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

 AFTER TREATMENT
<table>
<thead>
<tr>
<th>Per Hectare</th>
<th>Total SQ. FEET PER ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.04</td>
<td>1.26</td>
</tr>
<tr>
<td>5.47</td>
<td>0.93</td>
</tr>
<tr>
<td>0.95</td>
<td>0.21</td>
</tr>
<tr>
<td>0.06</td>
<td>1.59</td>
</tr>
<tr>
<td>2.19</td>
<td>0.03</td>
</tr>
<tr>
<td>2.25</td>
<td>1.30</td>
</tr>
<tr>
<td>1.90</td>
<td>3.30</td>
</tr>
<tr>
<td>0.70</td>
<td>1.94</td>
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<tr>
<td>0.83</td>
<td>0.70</td>
</tr>
<tr>
<td>0.06</td>
<td>0.08</td>
</tr>
<tr>
<td>1.45</td>
<td>1.49</td>
</tr>
<tr>
<td>7.16</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Stand Table-Basal Area (sq. ft) per Acre per Diameter Class

BEFORE TREATMENT
**Note:** The multiplying factor used to obtain these numbers was 2.5

The average diameter (in inches) for the residual stand height was 6.9

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Species</th>
<th>Eastern Hemlock</th>
<th>Baldem Fir</th>
<th>American Beech</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Yellow Birch</td>
<td>0.5%</td>
<td>70%</td>
<td>20 ft</td>
</tr>
<tr>
<td>4.0</td>
<td>White Pine</td>
<td>44%</td>
<td>55%</td>
<td>12 ft</td>
</tr>
<tr>
<td>4.9</td>
<td>Scots Pine</td>
<td>45%</td>
<td>45%</td>
<td>6 ft</td>
</tr>
<tr>
<td>9.5</td>
<td></td>
<td></td>
<td>55%</td>
<td>10 ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height</th>
<th>Trunkage</th>
<th>Average</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>7</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>60</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>6</td>
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<td>3</td>
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<tr>
<td>22</td>
<td>9</td>
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<tr>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>3</td>
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</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Trees/Acre</th>
<th>Trees/Hectare</th>
<th>Total Trees/Acre</th>
<th>Total Trees/Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3</td>
<td>7</td>
<td>200</td>
<td>494</td>
</tr>
<tr>
<td>60</td>
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</tr>
<tr>
<td>7</td>
<td>3</td>
<td>3</td>
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<td>3</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**After Treatment**
<table>
<thead>
<tr>
<th>Hectare</th>
<th>1.979</th>
<th>1.793</th>
<th>1.613</th>
<th>1.132</th>
<th>1.569</th>
<th>1.590</th>
<th>1.000</th>
<th>0.790</th>
<th>0.580</th>
<th>0.211</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.39</td>
<td>3.43</td>
<td>1.27</td>
<td>0.51</td>
<td>0.37</td>
<td>0.70</td>
<td>0.37</td>
<td>0.042</td>
<td>0.055</td>
<td>0.081</td>
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<tr>
<td>98.06</td>
<td>14.92</td>
<td>14.38</td>
<td>16.04</td>
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<td>3.04</td>
<td>1.75</td>
<td>1.84</td>
<td>1.59</td>
<td>1.59</td>
</tr>
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</table>

**Stand Table - Basal Area (ha) per Acre Diameter Class**

**After Treatment**
<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>Dominant</th>
<th>Co-Dominant</th>
<th>Intermediate</th>
<th>Suppressed</th>
<th>BEFORE TREATMENT-123 TOTAL TREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Birch</td>
<td>0.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Pine</td>
<td>5.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scotch Pine</td>
<td>2.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Spruce</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Maple</td>
<td>8.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper Birch</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Hemlock</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Cherry</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balsam Fir</td>
<td>10.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Beech</td>
<td>12.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Total</td>
<td>100%</td>
<td>99.8%</td>
<td>1.4%</td>
<td>33.3%</td>
<td>4.1%</td>
<td>47.0%</td>
</tr>
</tbody>
</table>

Before Treatment-123 Total Trees
<table>
<thead>
<tr>
<th>Age</th>
<th>22%</th>
<th>23%</th>
<th>25%</th>
<th>27%</th>
<th>29%</th>
<th>30%</th>
<th>32%</th>
<th>34%</th>
<th>36%</th>
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</thead>
<tbody>
<tr>
<td>Tree #</td>
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<td>118</td>
<td>121</td>
<td>122</td>
<td>127</td>
<td>126</td>
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<td>124</td>
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<td>DBH</td>
<td>4.9</td>
<td>5.1</td>
<td>5.9</td>
<td>6.2</td>
<td>6.5</td>
<td>6.6</td>
<td>6.8</td>
<td>7.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Estimated Height (in)</td>
<td>37</td>
<td>37</td>
<td>39</td>
<td>41</td>
<td>45</td>
<td>46</td>
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<td>41</td>
</tr>
<tr>
<td>Actual Height</td>
<td>41</td>
<td>41</td>
<td>43</td>
<td>45</td>
<td>47</td>
<td>48</td>
<td>47</td>
<td>46</td>
<td>44</td>
</tr>
<tr>
<td>Actual LCR</td>
<td>Estimated Difference</td>
<td>Difference</td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>9%</td>
<td>7%</td>
<td>9%</td>
<td>7%</td>
</tr>
</tbody>
</table>
STAND OBJECTIVES AND PRESCRIPTION

Our silviculture stand is located in close proximity to some other stands with large numbers of Scotch Pines (Pinus sylvestris) on them. However, our stand only has 22 scotch pines per acre but 288 Eastern White Pines (Pinus strobus) as well as 8 other species. Our objective for this stand is to maintain the diversity in the stand, but thin out some of the suppressed or unhealthy trees by performing a Timber Stand Improvement (TSI). Some of the Black Cherry (Prunus serotina) specimens in the stand have black knot and are not healthy so we will be cutting them out. Since Paper Birch (Betula papyrifera) is an intolerant species and usually only lasts one generation before being replaced by more tolerant species, we will be cutting them out as well (Safford, Bjorkbom & Zasada, 1990). We are leaving the large diameter (8 inch DBH or above) American Beech (Fagus grandifolia) because they seem to be in good form but we will be cutting out all the smaller beech and Red Maple (Acer rubrum). Although red maples stump sprout vigorously, we decided to cut them anyway and the since there were visible signs of deer in the stand, the regeneration from the sprouts will serve as deer browse. Red maple is a desirable deer food, so much so, that in areas of excessive deer populations, reproduction may be almost completely suppressed (Walters & Yawney, 1990). Paper birch regenerates from sprouts as well, but the sprouts are seldom abundant enough to reproduce a mature stand (Safford, Bjorkbom & Zasada, 1990). Although American beech is seldom severely browsed by deer and reproduction is almost exclusively by suckering in the Adirondacks, the ability to sprout from stumps diminishes after the trees reach 4 inches DBH (Tubbs & Houston, 1990) and we will be removing trees in the 4, 5, and 7 inch classes.

We will be leaving some of the Balsam Fir (Abies balsamea) and some of the scotch pine as well as some of the white pine and balsam fir regeneration that is starting out already. The Red Spruce (Picea rubens), Yellow Birch (Betula alleghaniensis) and Eastern Hemlock (Tsuga canadensis) will be staying as well for some additional diversity. In addition to leaving a number of different species present in the stand, we will also be leaving some dead snags standing for some added wildlife value. Since this stand is in a recreation area with trails around it, another one of our goals is for its aesthetic value, so we will be pruning some of the dead branches of the trees so there is a
clear line of sight through the stand. Another obvious value of trees is for timber. The trees we cut down that are large enough to cut into saw logs, we will skid out to be sold. The smaller trees will be left in the stand for nutrient recycling.

Before the treatment, our stand had 1122 trees per acre with a total of 152.36 ft² of basal area per acre. Through our prescription, we will remove 809 stems per acre for a total of 66.30 ft² of basal area for the acre. This will leave our stand with 313 trees per acre for a total of 86.06 ft² of basal area per acre. Since we are cutting out most of the beech, all of the paper birch, all of the black cherry, and all of the red maple, we will be flagging the trees that we intend to keep. Our marking guide consists of looking for suppressed trees that lack vigor or are overtopping trees that may have more potential, and cutting them out to leave more growing space for their neighbors. In the case that there are some large dominant trees close together, we will inspect the tree for butt rot or other health concerns and keep the one with the most potential for future value. We will also be looking for advanced regeneration of any of the species we are keeping. The ultimate goal is to have an even distribution of the trees we leave with a good diversity of species.

REFERENCES


ENVIRONMENTAL IMPACT STATEMENT

The location of the new silvi plot is found by traveling north on Route 30 from Paul Smith's College about a mile until you reach Beech hill road leading into the boy scout camp. Our plot is the new plot which has never had a treatment done to it. It is the plot closest to Beech hill road, before the Dickerson Plot. Our plot is located on level terrain, with skid roads on the east and west borders. The silvicultural stand is located in close proximity to other stands with large numbers of Scotch pine (Pinus sylvestris) and Eastern White pine (Pinus strobus). Our crews objective for this stand is to maintain the diversity of species within the stand by performing a Timber Stand Improvement (TSI). This particular plot experiences a diverse number of activities due to wildlife habitat and human recreation. The presence of the jack rabbit trail and skid roads make for great trails for running, biking, cross country skiing, snow shoeing, and nature trails. By having access conveniently off of route 30 and connecting trails further down the paths to the red dot trail, and Osgood pond lean-tos make for a great outdoor experience for anyone looking for an outdoor experience.

There will be a few environmental impacts that will occur due to our actions. In relation to the wildlife in the area our silvicultural activities are happening at a time of year, the spring, when there is a lot of activity occurring within the forest. The migratory birds have come back into the woodlands to build nesting sites and reproduce. The mammals are also getting ready to bare their young and with our activities occurring we are very disruptive. Therefore a negative impact would be the use of loud equipment (chainsaws & skidder) that would temporarily displace the wildlife from habituating in that area. The emissions of gas and oil into the atmosphere from running the machinery is a negative impact, but will be operated only temporarily. We used a combination of skidding techniques by incorporating the use of both the team of draft horses and the skidder to remove the large logs from our plot. Although there were a couple trees damaged during the skidding, they were both small diameter and this didn’t have a heavy impact on the plot or area due to the skid roads already being present and the ground was still partially frozen at the time of extraction. In addition, this spring is uncharacteristically dry which is a benefit because we will not be creating large mud holes.
The tree species that are left on our plot after our tending is complete is a mixture of conifers; Scotch pine, Red spruce (*Picea rubens*), White pine and Eastern hemlock (*Tsuga canadensis*). The trees species that had been left in the stand will be utilized by the wildlife for habitat and food. The trees that have been removed have been left as brush on the forest floor which had been cut down to 3ft logs and smaller. The remaining brush will act as shelter to small mammals and browse for deer. This is composed of Red maple (*Acer rubrum*), Black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*), White pine and Paper birch (*Betula papyrifera*).

Other positive impacts due to our activities would be that we have opened up the canopy by removing a few of the declining dominant White pines in the stand along with the suppressed and intermediate hardwoods. The capabilities of both the red maple and beech to stump sprout will allow for regeneration in the future for years to come. This will replenish the browse for deer. In addition, this allows for regeneration on the forest floor of the conifers due to increased light by the opened canopy.
STAND DESCRIPTION

Our 1/4 acre stand is located at the old boy scout camp approximately one mile north of Paul Smith's Campus on NYS Rt. 30. It can be found by driving through the orange gate on the east side of Rt. 30 and following the fence line due north until it reaches an intersection of 4 or 5 trails. Continuing straight ahead, our stand is at the top of a small rise on the east side of the trail not too far from the previously mentioned intersection. Walking down the southern boundary of the stand, there is an old concrete boundary marker with yellow paint on the top sticking out of the ground about 1 or 2 feet. The stand appears to be a natural stand and if it can be classified into an SAF cover type it would probably be SAF #35 because it has White Pine (Pinus strobus), Balsam Fir (Abies balsamea), Paper Birch (Betula papyrifera) and Red Spruce (Picea rubens). There are several large dominant white pines in the stand with the other trees in the understory as well as American Beech (Fagus grandifolia), Scotch Pine (Pinus sylvestris), Yellow Birch (Betula alleghaniensis), Red Maple (Acer rubrum), Black Cherry (Prunus serotina) and Eastern Hemlock (Tsuga canadensis). The stand itself is very flat, so it has almost no aspect or slope but it is at the top of a small rise from the south. At close examination of the soil, it appears to be sandy with some loam and moist. However, since this is the spring, most soils will be moist so it is hard to tell what kind of drainage the stand has. Since there is a slight slope to the south just past the stand, and white pines seem to be doing so well on the site, the soil is most likely well drained. Although white pine can grow on all sites within its range, it competes best on well drained sandy soils (Wendel & Smith, 1990).

Most of the white pines in the stand are healthy, but there are some that had some previous injury because there were some access points for fungus in the lower trunks. These may have butt rot be the cause of some of the unhealthy trees. Some of the dominant white pines also have their tops broken off and some of them have a double leader halfway up the bole. During our inventory, we marked some of the trees as Acceptable Growing Stock (AG) and some as Unacceptable Growing Stock (UG). Any tree in the 11 inch class or above (10.5 DBH) with at least 16 feet of straight clear wood was considered to be AG and the rest was UG. Using that criteria, we had 19 trees (18 white pine, 1 scotch pine) in our stand that were considered AG. There are only two
black cherry trees in the stand and they both have black knot disease, which is a native disease, caused by a common fungus (Marquis, 1990). I would say that the stand is past the understory reinitiation stage, because there are some white pines that are larger than saplings, but it is not yet in the old growth stage. One of the 16 inch white pines was cut down and its age was determined to be 91 years. Since we have dominant trees that are larger than that, I would say the stand is over 100 years old.

PURPOSE OF UNDERTAKING

The purpose of our Timber Stand Improvement was to create a diverse stand of trees. Before any treatment, we had 10 different species present with a large number of American Beech (*Fagus grandifolia*) and Red maple (*Acer rubrum*) saplings. There were also some trees in the understory that were being outcompeted and we wanted to thin out the understory to reduce some of the competition to allow some of the healthier trees to thrive. Our marking guide consisted of cutting out most of the beech and all of the red maple. We also cut out all of the Black Cherry (*Prunus serotina*) because it was infected with black knot disease. If there were any trees in the understory crowded around other trees, we looked for the one with the largest live crown or the one that had the greatest future potential and cut out the other ones. When we came across dominant trees close to one another, we used the same criteria, but we also inspected the trunk for signs of disease or rot. Since this stand is near a recreation area, we also wanted to keep a clear line of sight through the stand so we pruned some of the dead branches off the trees we kept. To fulfill our obligation to wildlife in the area, we left a couple of dead snags and the red maple that sprouts back up will provide browse for the deer. Hopefully this marking guide will leave us with a well distributed stand with a diverse number of species, both plant and animal.

CHRONOLOGICAL PRESENTATION

When we got assigned our plot the first week of March 2005, the first step was to determine where our boundaries were since it was a new plot that had never been worked
before. When we figured out our boundaries, we determined that our plot was 4/10ths of an acre (.4). This number was used to find our multiplying factor which was then used to figure out our trees per acre and basal area per acre. This multiplying factor was 2.5, so the numbers we obtained from our plot we multiplied by 2.5 to get the numbers per acre. Since this was a new plot, we had to brush out our boundary lines, cutting trees that were in the way. This proved to be difficult since there was a lot of snow on the ground, but once the snow melted, we went back and cut the stumps down. Our next step was to take an inventory of all the trees in the 4 inch class or larger (3.5 DBH) to determine what we had which would help us decide what we wanted to do with the stand. When the inventory was finished and we had our stems per acre and basal area per acre, we decided on a prescription that would keep most of the species in the stand, but cut down on some of the competition. After our prescription was accepted by the instructors, we started implementing the plan.

Since we were cutting out a lot of trees, the first thing we had to do was determine which trees we were going to keep and we marked them with tape. At this point we were ready to start cutting and we began by cutting down some of the smaller trees with bow saws (when there were no professors present) and opening spaces for the big trees to fall. After we fell a couple of big trees, we cut them to a predetermined length and skidded them out to the landing. After we were finished cutting, we took an inventory of the remaining trees and calculated our residual stand numbers (stems per acre and basal area per acre).

**METHODS OF MEASURING**

In order to perform our inventory, we needed something to measure the diameter of each tree. For this we used a regular D-tape which measures the diameter to the nearest 1/10th of an inch. The height of the tree and the Live Crown Ratio (LCR) of the tree was estimated by the person recording the diameters. Once some of the trees were on the ground, we then measured their length and LCR officially to determine how far off our estimations were. When we were ready to cut and prune and there were no professors present, we used bow saws, mylan saws and loppers. When there were
professors in the area, we used chainsaws including all the required protective gear as well as a felling belt, an axe and a peavey.

REFERENCES


FUTURE RECOMMENDATIONS

Our recommendations for future crews working this plot are to maintain a stand with a diverse number of species while looking for white pine and red spruce regeneration. Since Red Maple and American Beech sprout so readily, there is little doubt that they will come back into the stand. Also, with the stand’s proximity to so many Scotch Pines, they will probably come back as well. We had to cut out the only black cherry trees in the plot because of black knot, but if they were to come back they should be kept. There is only one yellow birch and one eastern hemlock in the plot presently and if they regenerate, they should be encouraged. Other plot work may include cutting down suppressed or overtopped trees with little live crown that may be in the way of other trees with more potential.
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<th>Jon</th>
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<th>Karl</th>
<th>Pat</th>
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</table>
From NE Corner of Plot BEFORE

From NE Corner of Plot AFTER

From Eastern Boundary of Plot BEFORE

From Eastern Boundary of Plot AFTER

From SE Corner of Plot BEFORE

From SE Corner of Plot AFTER
Diameter Class

Basal Area (sq. ft.) per Acre per Diameter Class AFTER TREATMENT

Basal Area per Acre

American Beech
Balsam Fir
Eastern Hemlock
Red Spruce
Scotch Pine
White Pine
Yellow Birch