TIMBER CRUISE AND FOREST MANAGEMENT PLAN

OF THE

GOFFSTOWN CONSERVATION AREA

GOFFSTOWN NH

Prepared for the

GOFFSTOWN CONSERVATION COMMISSION

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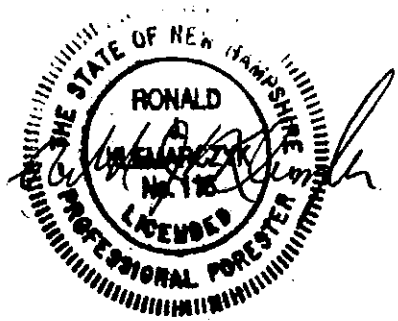

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GOFFSTOWN CONSERVATION AREA
GOFFSTOWN, NH

INTRODUCTION

The Goffstown Conservation Area contains approximately 235 acres and is owned by the Town of Goffstown. It is located on the northeast slope of the South Uncanoonuc Mountain, between the summit of that mountain and Mountain Base Pond, about two and a half miles southeast of downtown Goffstown. The majority of the property was originally part of a large recreational development that was laid out in the early 1900's. For several reasons, the development was never completed and the Town began acquiring the unused land for Conservation purposes. The property contains portions of the summit of the South Uncanoonuc Mountain, frontage on Mountain Base Pond, and many acres of woodland that are found on the slope in between.

The goal of the Conservation Commission is to manage the property under a sustained Multiple-Use program where consideration is given timber production, wildlife habitat improvement, watershed protection, recreation, education, and historic preservation. Because of the character of the land, a slight emphasis would be placed on the recreational aspects of the property during any forest management activities. This management plan contains a description of the forest as well as recommendations on how to best integrate the management of the above mentioned uses.

ACCESS

The Conservation Area can be accessed from three directions. The Base Mountain Pond area can be reached by following Wallace Road southeasterly off of Route 114 for about 1 1/2 miles and then turning southwest onto Mountain Base Road. The summit area can be reached by two different directions. Mountain Road can be followed southerly out of Goffstown Village until it reaches Back Mountain Road at Browns Corner. Back Mountain Road should then be followed easterly for about 1/4 mile and then turn northeasterly on the Summit Road. Summit Road heads up to the summit where it becomes an unpaved loop called the Perimeter Road. Back Mountain Road can also be reached from Wallace Road over Shirley Hill and approaches the Summit Road from the easterly direction. Vehicular access within the lot is limited to a few woods roads that pass by some of the homes and cottages south and west of the Pond. Most of the roads are used as either trails or as driveways to service the cottages. Although the lot was last logged in the late 1930's, little evidence was found of the logging trails that were used during that harvest. An old incline railway bed runs from Mountain Base Pond to the summit and is the primary hiking trail on the lot. The other trail that runs to the summit follows an old woods road northwesterly from the pond and onto the Water Precinct Property before turning southerly and running back onto the property and up to the summit area. Mountain Base Road, Summit Road and the Perimeter Road are maintained by the Town of Goffstown. Parking facilities are somewhat limited on both the summit and near the pond. Efforts should be made to expand the parking lot near the pond and could be tied in with a timber harvest.

Whereas it would not be practical to skid logs across the old railway bed, two log yards would have to be set up to harvest the lot. One would have to be built along the old woods road west of the pond. The other would have to be constructed somewhere south of the houselots found along the south side of Mountain Base Road. Portions of the woodlot are also inaccessible, due to the steep slopes and ledge areas found along the edge of the non-commercial forest type that surrounds the summit.

BOUNDARY LINE STATUS

At the writing of this management plan, the boundary of the Goffstown Conservation Area was in the process of being surveyed by Joseph Wichert of Manchester, New Hampshire. The project was delayed due to the complications of surveying the small, numerous cottage lots found at the base and the summit of the mountain, along with those few lots scattered in between, that have few, if any, bounds to tie into. Most of the forest management activities should be delayed until all boundaries are readily identifiable. The best way to identify the boundary is to blaze and paint the lines after the corners have been set. This will limit the forestry activities to the Conservation Area, and reduce encroachment on the part of the abutters. The lines should be re-painted every 7 to 10 years, and reblazed about every 15 to 20 years.

Because the Forest Type Map is based on the Goffstown Tax Map, the acreage may change once the property is formerly surveyed, and a precise measurement of the acreage becomes available.

TOPOGRAPHY

The Uncanoonuc Mountains are a pair of distinctly shaped mountains found in the southwest part of Goffstown. Legend has it that "Uncanoonuc" is an indian word for "two breasts". North Uncanoonuc Mountain is the taller of the two, with an elevation of 1,324 feet above sea level. With the Conservation Area occupying the northeast side of the South Uncanoonuc Mountain, it is not surprising that the topography would be described as sloping. The area south of Mountain Base Road is relatively flat, with a few minor hills and slopes and is quite operable for timber harvesting. The rest of the lot is part of the mountain side. Slopes would be described as moderate to severe. The ledge outcrops found southeast of the summit area are vertical in some areas and mark the limit of the operable acreage. There are several other steep areas found within the lot, though most can be circumvented during harvesting activity. Elevations run from 1,310 feet above sea level on the summit of South Uncanoonuc Mountain down to about 655 feet on Mountain Base Pond. Whereas the lot includes the summit area, exposure runs from north to east to south. There are several vista areas on the summit that provide views in those directions, but many have started to grow in with trees. South Uncanoonuc Mountain contains the headwaters for several different watersheds. There is one small brook that runs through the lot parallel to the south side of the old incline railway, finally crossing the railway near the bottom of the slope before it reaches Base Mountain Pond. Base Mountain Pond is a man-made pond and is unique in that it can drain in two directions. One direction is to the northwest where it ties into Whittle Brook which drains into the Piscataquog River in downtown Goffstown. The Pond also drains to the

northeast, down the Dan Little Brook which eventually empties into Glen Lake. The western slopes of the mountain drain southwesterly into Bog Brook, which then turns and runs northerly into the Piscataquog River, just west of downtown Goffstown. Areas on the southern slope of the mountain eventually drain into McQuade Brook which runs southerly until it joins Baboosic Brook along the Bedford-Merrimack Town Line. Areas along the southeastern boundary drain into Riddle brook which also runs southerly into Baboosic Brook east of the McQuade Brook junction. Baboosic Brook joins the Souhegan River just before it enters the Merrimack river. All of the above mentioned brooks and rivers are part of the Merrimack River Drainage basin, which empties into the Atlantic ocean in Newburyport, Massachusetts.

SITE

Site, or growing site, refers to the condition of how well trees will grow in a particular area. In most cases, sites are based on soil types. Trees have adapted to various sites through the evolutionary process and some sites will favor certain species over others. The major site influences include soil depth and composition, drainage and exposure. The Goffstown Conservation area contains two major and three minor soil types. Chatfield-Hollis soils make up the largest soil type on the property. The Chatfield-Hollis complex is found on the summit in the area of the Perimeter Road. It is known for being a shallow, droughty soil with numerous bedrock outcrops typically found on somewhat flat summit areas. It is not a productive forest soil and will seldom produce a good quality sawlog. Being on a summit, the trees are more susceptible to ice damage and windthrow and are often quite stunted. Because of the adverse soil and weather conditions, the primary use of the site should be managed for recreation and not timber production. Surrounding the summit is an area of the Chatfield-Hollis Rock Outcrop complex. This soil extends from the summit to the area near the base of the slopes around the South Uncanoonuc Mountain. This soil is called a complex as it contains some good soil interspersed with ledge outcrops. Ledge outcrops become more frequent as elevation increases to a point where the soil is either non-productive or inoperable for logging. The soil will typically favor hemlock, red oak and ash over white pine. The somewhat steep areas at the base of the mountain just west of the Mountain Base Pond and along the southern boundary south of Mountain Base road contain a Canton stony fine sandy loam that will tends to slightly favor pine over red oak. A small section of Canton fine sandy loam is found in the extreme southeast corner of the lot. There is a small area of Montauk fine, sandy loam just below the summit in the northwest part of the property. It is very similar to the Chatfield-Hollis soil except that it has a "hardpan" layer, which is somewhat impervious to water and will restrict root development. The soil is generally a good forest soil for both oak and pine, but logging is difficult during prolonged wet spells. The area occupied by the cottages along Mountain Base Road contains a Leicester-Walpole Complex. It is a relatively productive soil that is currently growing cottages and houses. The beach area contains a small section of Deerfield loamy fine sand.

HISTORY

The history of the Goffstown Conservation Area can be separated into two general categories, Geologic and Land Use, though both are interrelated.

Geologic

Geologic history contains the subcategories of mountain formation and soil formation. The formation of South Uncanoonuc Mountain is based on millions of years of plate tectonics (movement of the earth's crust) while soil formation is the result of relatively recent glaciation.

The bedrock found on Mt. Uncanoonuc is a rock type labeled as a medium to course grained quartz-feldspar mica schist, and is part of what is called the Lower Rangely Formation. That rock type was created in the Silurian period of the Paleozoic era of about 395 to 430 million years ago. The formation is classified as a meta-sedimentary which is a sedimentary rock that became metamorphisized by heat and pressure as additional rock formations accumulated above it. During the Silurian period, most of what is now New Hampshire was covered with what is called the Silurian Sea. Initially, sand and gravel deposits accumulated on the sea bed, but were eventually covered with deeper calcareous (seawater based calcium) sediments, typically limestone, and calcareous sand and mud which later developed into shale. That rock formation was in turn, covered with other sediments during the Devonian period of 345 to 395 million years ago. These newer sediments resulted from the complete erosion of a mountain range located in what is now the Gulf of Maine. It is believed that this mountain range was created from the collision of the North American, European and African continents of 335 to 375 million years ago and that the eastern portion of New England is part of either the original European or African continent that got left behind when they later separated.

The metamorphism of the Silurian rock began as the new sediments accumulated above it. Metamorphism changes a rock's mineralogy and texture, but does not actually melt it. About 200 million years ago, the continents split apart and the pressures associated with the earth's plate tectonics caused the Devonian, Silurian, and even older rock formations to fold and start their own erosion process. South Uncanoonuc Mountain is a formation (or fold) of relatively hard Silurian rock that became exposed when the newer granite type Devonian rock that was above it slowly eroded away. The bedrock geology is relatively inactive compared to West Coast volcanic and earthquake zones, and little change regarding the bedrock is expected in the near or far distant future.

The most recent geologic event was caused by the last glacier, called the Wisconsin Glaciation. That glacier reached its peak 18,000 to 20,000 years ago and ended only 6,000 years ago. Central New Hampshire was last covered with ice 10,000 to 12,000 years ago. The effect of the glacier on Mt. Uncanoonuc was two-fold. As the glacier moved from the northwest to the southeast, it scoured and smoothed the northwestern slopes of the mountain as it rode up over the top, then plucked off pieces of bedrock as it descended the southeastern side. As a result, the southeastern slopes are steeper with numerous ledge outcrops. North Uncanoonuc Mountain and Joe English Hill show similar characteristics. As the climate warmed, its rate of melt exceeded its rate of advance. Just before it

melted off of the mountain, it plastered soil to the northwest side of the mountain. Subsequent erosion of those soils exposed the summit area and allowed silt deposits to accumulate in the low spots around the base of the mountain. That is why the soil types are so different along Mountain Base Pond.

(For information sources, see "The Geology of N.H." by Marland P. Billings and "Roadside Geology of V.T. and N.H." by Bradford B. VanDiver)

Land Use

Land use of the property has somewhat reflected the geology of the site. During colonial times, the outlands of Goffstown were dedicated to agriculture. In the 1800's, most of the land on South Uncanoonuc Mountain was owned by the Orr family, whose main farm was on the east side of Shirley Hill. Although the slopes of Uncanoonuc were not suitable for growing crops, they were cleared for pasture land as evidenced by the stone walls and old barbed wire fences that were encountered during the cruise. It soon became apparent that the slopes were even too poor for pasture, and they were abandoned as pasture in the mid 1800's. The pastures grew in with white pine but just as they reached commercial sawlog size, most were blown down in the Hurricane of 1938. A majority of the pines were salvaged and even stored in Mountain Base Pond until they could be sawn into lumber. The areas that blew down grew in with a mix of oak, maple, beech and hemlock which developed into the forest found today. Only a few large scattered pine around the base of the mountain give evidence to the type of forest that would have existed if not for the more destructive forces of nature.

Although the land was not suitable for agriculture, the mountain summit still created an attraction. Whereas the mountain is fairly isolated from other hills, and combined with the relatively flat lands to the east of Goffstown, the vista must have been quite spectacular when the barren summit offered a 360 degree view. After Manchester fully established itself as an industrial center, the numerous employees became a ready market for local recreational opportunities.

Development of the summit began around 1860, when the federal government constructed a US Coastal Survey Station for mapping purposes. In 1877, a toll road was constructed to the summit. At the turn of the century, an entrepreneur named Henry A. Laxson decided to develop the mountain into a recreational community. In 1905, a trolley line was constructed from the rail line at Shirley Station, and in 1907, a cable car line was constructed to the summit, which put an end to the toll road. The line consisted of only two cable cars. When one went up, the other came down which is technically called a "funicular" process. A year after the cable car line was built, a large hotel was constructed on the summit. It had a tall wooden lookout tower and a restaurant and was the site of many dances and other social events. The building burned in 1923, but was soon rebuilt, though a steel fire tower was constructed away from the building. Around 1926, Uncanoonuc Lake, now called Mountain Base Pond, was built for bathing, fishing and boating. Many cottage lots were sold and built upon in the area around the lake, and on the summit. The rough terrain on the slopes in between appeared to limit the development in that area. In 1930, the second hotel also burned, but was replaced. The Hurricane of 1938 brought a temporary end to the hotel era when it literally blew the hotel off of the mountain.

Downhill skiing began to rise in popularity in the 1930's and several trails were cleared on both the North and South Uncanoonuc Mountains. Ski use dwindled as larger resorts were opened elsewhere, and without a hotel on the summit, use of the Incline Railway decreased. A fourth hotel was built in 1948, but a serious fire to the trackbed during that year put and end to the railway. A severe December storm in 1950 damaged the fourth hotel. It was repaired and was later used as a Retreat, but was eventually torn down in 1967. The railway was sold for scrap in 1951, ending the recreational rail era for the Uncanoonucs. The old incline railroad bed is still used for hiking and is marked on either end by the concrete foundations of the cable pulley. Some of the trolley cars were used for cottages after that line was discontinued and can be seen protruding from a few of the modified buildings near Mountain Base Pond. In 1947, the first radio tower was erected on the summit by WMUR, and many more have been added since, though the towers now include television, phone and other high-tech communication networks. While new communication towers were being erected in the early 1980's, the fire tower was dismantled.

Despite the numerous towers, and remaining cottages still in use on the summit, the Mountain remains a popular hiking spot, and the trails all appear to be heavily used.

(Historical information was based on discussions with Doug Gove of Goffstown and information from Town history files at the Goffstown Library.)

TIMBER CRUISING PROCEDURE

The Goffstown Conservation Area cruise was performed using a point sampling technique with a 20 Basal Area Factor prism. Transect lines were laid out 400 feet apart throughout the lot and a sample point was taken at 600 foot intervals along the lines. A total of 27 points were taken on the 92 acres of commercial forest land. At each sample point, all trees four inches in diameter at breast height(DBH) and greater were measured and tallied by species, DBH, and merchantable height by product such as grade sawlog, pallet quality sawlog, or pulp. Merchantable heights were measured to a ten inch top diameter for sawlogs and a four inch top diameter for pulp.

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

Details such as streams, woods roads, trails, stone walls, old foundations, wetlands, ledge outcrops and forest type boundaries were mapped in the field while running the cruise lines. This information was then transferred to a base map of the property, and the forest type acreage was then calculated by using a an instrument called a polar planimeter. Finally, all of the base map details and forest type information were traced with ink on mylar to produce the copy of the Forest Type Map included with this report.

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

AREAS OF FOREST TYPES

GOFFSTOWN CONSERVATION AREA
GOFFSTOWN, NH

OPERABLE FOREST LAND

STAND NUMBER	FOREST TYPE	DESCRIPTION	ACRES
1	Wp3B/Ro,Hm,H2A	Overstocked stand containing a sawtimber sized white pine overstory, above an understory of pole sized red oak, hemlock and other hardwoods, with a rhododendron ground cover.	7
2	Ro,Hm3C/Ro,Hm,H2A	Slightly overstocked stand containing a scattered overstory of red oak and hemlock sawtimber above an understory of pole sized red oak, hemlock, and other hardwoods.	42
3	Wp3C/Ro,H,Hm2-3B	Slightly overstocked stand containing a scattered overstory of white pine sawtimber, above a forest of pole to sawlog sized red oak mixed hardwoods and hemlock.	33
4	Be,H,Hm2-3B	Adequately stocked stand of pole and sawtimber sized Beech, mixed hardwoods and Hemlock.	10
TOTAL OPERABLE ACREAGE			92

NON-COMMERCIAL/INOPERABLE LAND

		Area includes mountain summit, wetlands, and trail, lake and cottage buffer zones.	142

TOTAL FOREST LAND 235 Acres

The following descriptions and prescriptions are listed on a stand by stand basis. Similar prescriptions, such as a timber harvest, are found in several stands and should be combined as one operation. There are other management activities that could also be performed in conjunction with a timber harvest.

Stand 1 Wp3B/Ro,Hm,H2A

Description: This seven acre is stand is located on a strip of land on the eastern most part of the property. It is bisected by a trail, and contains a small drainage and a few short slope areas. Because the stand is relatively flat compared to the rest of the lot, it was the last area to be abandoned as pasture land which probably occurred around the 1930's. It grew in with pine, but was too young to be affected by the Hurricane of 1938 and is now the only pine stand on the lot. The overstory consists of fairly good quality white pine sawtimber that makes up about 50% of the basal area. Pole sized hemlock with 27% of the basal area, and red oak with 31% dominate the understory, followed by a scattering of red maple, beech and black and white birch. Regeneration includes a scattering of beech, hemlock and red maple. What makes this stand unique is the heavy ground cover of rhododendron. Rhododendron keeps its leaves all year and has a beautiful white flower in the spring, but is very difficult to walk through.

Prescription: Due to the heavy ground cover of rhododendron, this stand has two separate prescriptions. The first prescription would be to designate the area as a "Botanical Area" to protect the rhododendron. Any cutting of trees would be limited to methods used to encourage the growth and development of the rhododendron, especially if it is found that the shade from the hemlocks and pine are starting to cause the plants to die off. It is doubtful that such cutting would be commercially feasible, so some income generated from a harvest elsewhere on the lot should be set aside to cover the costs of removing a few scattered trees every now and then. The existing trail should be expanded to create a loop trail that would allow a scenic walk during peak bloom. In order to discourage the people from walking through the plants, the trail should be well built, clearly marked and frequently maintained.

The second prescription involves a light thinning. With a basal area of 164 square feet and 408 trees per acre, the stand can be considered overstocked. About 30% of the pine stems could be harvested, with the focus on removing the poor quality (diseased, crooked, forked, or stagnated) stems, leaving the better quality stems to continue to grow in volume and value. Even with a harvest, there should be some consideration given to the rhododendron. According to Mike Walsh, who is the park manager for the Monadnock and Rhododendron State Parks, harvesting should never remove more than 50% of the canopy, and should be done in a manner to leave an evenly spaced canopy cover. It is generally recommended to not remove more than 25% of the canopy and the residual trees should be evenly spaced. Water drainage patterns should not be altered, but if they need to crossed, efforts should be made to restore the crossing to the original level as soon as possible. One way to assess the light needs of the plant is by the color of the leaves. If the leaves are the same size as the leaf stems and are dark green in color, they may need some more light. If the leaves are shorter than the leaf stem and are yellowing, it means that they are getting too much light.

Stand 1 continued

Whereas there are several areas in the forest that could be harvested, and few areas with such a concentration of rhododendrons, it is recommended to follow the first prescription and declare the site a "Botanical Area".

Stand 2 Ro,Hm3C/Ro,Hm,H2A

Description: This 42 acre stand is located on the southeast slope of Mount Uncanoonuc. The eastern most portion of the stand located south of the cottages contains several small hills and a few steep slopes. It also contains two intermittent streams, some hiking/ATV trails that appear to mainly be used by some of the cottage residents, and a 2 acre wetland area. The western portion of the stand is on the actual mountain and is steeply sloped with some ledge outcrop areas. A small stream runs parallel to the old incline railway, and has created its own narrow, steep sided valley. Due to the steep slopes, ledge outcrops and drainage ways, the stand would be a challenge to log. The pine stand that occupied the site blew down in 1938. Because that salvage efforts resulted in an almost a total clear cut of the area, few main skid roads were built. The loggers just headed straight downhill from wherever they cut the timber. Some of the old hurricane blowdowns can still be found on the upper slopes in the southwest portion of the stand.

The stand is made up of scattered groups of mature hemlock and red oak that were too small to blow over during the hurricane. Because they grew out in the open after the pine was cleaned up, they tended to develop large crowns and short trunks, and some have started to deteriorate. This tends to lessen their value as potential sawlogs. Areas that were cleared after the hurricane grew in with red oak and hemlock, along with white and black birch, beech, yellow birch and a few white pine. Most of those stems are now at the upper end of the pole size class and will be developing into sawlog size in the next 15 to 20 years. Hemlock dominates the stand with 35% of the basal area, followed by red oak at 22%, white birch at 12%, black birch at 11%, and just a scattering of the other previously mentioned species. Regeneration consists mainly of beech and hemlock. A few scattered rhododendron shrubs can be found in the lower portions of the stand.

Prescription: With a basal area of 120 square feet, and 396 trees per acre, the stand can be considered slightly overstocked. Because the mature red oak and hemlock are growing in groups, it is recommended to harvest the scattered groups of large stems, along with any of the poorer quality, younger hardwood stems that are immediately adjacent to the scattered groups. The group selection areas should not exceed a half acre in size, and areas in between should be left uncut if the groups are visible from one another. Only about 15% of the basal area is ready for harvest. Due to the deterioration of the stems, this volume will start to lessen as time progresses. Once the scattered groups of mature trees are cut, the younger stems that developed after the hurricane will need their own thinning in another 20 to 30 years. This second thinning will contain a much higher volume of sawtimber, and will be of better quality, especially if some of the poorer quality stems are removed along with the groups of currently mature stems. Buffer zones should be established around the 2 acre wetland and along the streams and drainages found within the stand.

STAND 3 Wp3C/Ro,H,Hm2-3B

Description: This 33 acre stand is located in the northeast portion of the Conservation Area. It contains a few short, but steep slopes, but no ledge outcrops and is much easier to log as compared to Stand 2. Some old logging roads cut across the northeast corner of the Stand and are now heavily used as hiking trails. The remains of one of the old downhill ski trails bisects the stand and a stone wall crosses the stand in an east-west direction which probably marks the extent of the once active pasture land. A small patch of long dead american chestnut trees was found in the center of the stand and many of the black birch in the eastern portion of the stand were infected with the nectria canker fungus and are starting to die off. Like Stand 2, the type was originally a pine stand that blew down in 1938. Small groups as well as larger patches of hemlock and other hardwoods, mainly oak and black birch survived as did some of the smaller pine on the more north-facing slopes. All of those stems have since matured and some are starting to deteriorate. Areas that blew down grew in with a mix of hemlock and hardwoods, and because of the better growing conditions, some of those stems have already reached the small sawlog size class. Red maple slightly dominates the stand with 28% of the basal area, followed by black birch at 20%, red oak at 17%, hemlock at 15%, white pine at 6% and white birch at 4%. Regeneration is dominated by beech and hemlock

Prescription: With a basal area of 132 square feet and 236 trees per acre, the stand can be considered slightly overstocked. About 35% of the basal area could be harvested. The smaller groups of hemlock and mixed hardwoods should be cut before they start to deteriorate any further. The group selection method is described in Stand 2. The larger patches of Hemlock, oak and birch should be selectively thinned to remove the poorer quality stems, leaving the most vigorous, though mature stems to be harvested in another 15 to 20 years. Most of the pine stems are in poor condition and several have already died off. Most of them should be harvested while they are still of commercial quality. About 25% of the pine stems should be left to promote species diversity, though it is not the ideal pine growing site. Areas of smaller stems that developed after the hurricane will need to be thinned in 15 to 20 years to remove the poorer quality trees and could be done in conjunction with the final harvest of the mature stems mentioned above. Buffer zones should be left along the hiking trails, though part of the old road/now trail may have to be rebuilt to locate a log yard for harvesting Stands 3 and 4.

STAND 4 Be,H,Hm2-3B

Description: This 10 acre stand is located in the far northwestern corner of the property. It is bisected by a hiking trail that runs up to the summit from separate trailheads located on the Mountain Base Road and Mountain Road. Because of its remote location, the area appears to have been abandoned as pasture somewhat earlier than the area of Stand 1 and 2. As a result, the hardwood/hemlock forest had already replaced the pines when the rest of the property blew down in 1938. Many of those hardwoods, especially the beech, have matured and have deteriorated beyond commercial value. Most of the pole sized stems developed after the hurricane, and are slowly working their way up into the overstory. Due to the high elevation of the stand, some of the stems were damaged during the ice storm of 1998. Beech dominates the stand with 50% of the basal area, though none were tallied during the cruise the exceeded pallet grade. Red maple and hemlock make up 18% each, followed by red oak and white birch at 6% each. The regeneration consists mainly of beech and hemlock.

Prescription: With a basal area of 106 square feet and 211 trees per acre, the stand would be considered adequately stocked. However, slightly over 60% of the stems in the stand tallied during the cruise were considered as poor quality or overmature growing stock. Typically, when a forest reaches 50% of undesirable growing stock, the recommendation is to clear-cut it. Because of the hiking trail, it would not be considered acceptable due to aesthetic concerns. It is therefore recommend to patch cut the stand by creating four or five-1 acre clearcuts, with a buffer left along the trail. These small clearcuts will allow a new forest to become established rather quickly, and would help make a marginal harvest slightly more economical to operate. The remaining uncut area could be harvested in 15 to 20 years in conjunction with Stand 2. However, the patch cuts still may not be enough to interest a logger due to the poor quality stumpage and long skidding distance. An alternative management option is to designate the area as a "Natural Area" and allow it to develop into an old growth ecosystem. If a large area is cleared on the summit to open up a major north-looking vista, having a relatively undisturbed forest located just below it will provide some habitat diversity as well as a more sheltered area for hikers who might get caught on the summit in bad weather.

Goffstown Town Forest
Total Operable Volumes

	STAND 1 Wp3B/ Ro,Hm,H2A 7 AC	STAND 2 Ro,Hm3C/ Ro,Hm,H2A 42 AC	STAND 3 Wp3C/ Ro,H,Hm2-3B 33 AC	STAND 4 Be,H,Hm2-3B 10 AC	TOTAL
White Pine	35,000	5,000	11,000		51,000
White Pine #4	2,000		9,000		11,000
Hemlock	12,000	45,000	22,000	12,000	91,000
White Birch			8,000		8,000
Black Birch			15,000		15,000
Beech			4,000		4,000
Red Oak	5,000	25,000	45,000	4,000	79,000
Hardwood Pallet	1,000	8,000	25,000	9,000	43,000
Total Sawlog	**55,000**	**83,000**	**139,000**	**25,000**	**302,000**
Softwood Pulp	**55**	**210**	**80**	**5**	**350**
Hardwood Pulp	**75**	**520**	**460**	**120**	**1,175**

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TOTAL OPERABLE VOLUMES
and
FIRST HARVEST VOLUME AND VALUES

From data gathered during the field cruise, and information calculated from that data, a summary of the timber and cordwood volumes in the Conservation Area was prepared. It is broken down by species and product for each stand within the forest and represents the total operable volumes found growing in the forest. Next, an estimation was made of the volumes that would be generated through a timber harvest should the recommendations of the timber management section be implemented. These are estimates only, and are based on a marking strategy designed to accomplish the goals set forth in the management plan.

Timber values are based on current market conditions and will fluctuate with time.

ESTIMATED TIMBER HARVEST
VOLUMES and VALUES

Goffstown Conservation Area
1999

SPECIES/PRODUCT	ESTIMATED VOLUME	1999 VALUE	TOTAL VALUE
White pine	34,000 Bd.Ft.	$120/1,000 Bd.Ft.	$ 4,080.00
White pine grade #4	9,000 "	$ 40/ "	360.00
Hemlock	30,000 "	$ 30/ "	900.00
White birch	8,000 "	$ 30/ "	240.00
Black birch	15,000 "	$ 60/ "	900.00
Red oak	17,000 "	$350/ "	5,950.00
Hardwood pallet	18,000 "	$ 25/ "	450.00
TOTAL SAWLOG	130,000 Bd.Ft.		$12,880.00
Softwood pulp	45 cords	$ 2/cord	$ 90.00
Hardwood pulp/cordwood	220 cords	$ 8/cord	$ 1,760.00
TOTAL ESTIMATED VALUE			$14,730.00
TOTAL ESTIMATED EXPENSES			
Includes forester timber harvest management fees, permits, and access road improvement along with log yard/parking lot construction.			$ 4,900.00
NET TIMBER HARVEST VALUE			$ 9,830.00
NET HARVEST VALUE NOT INCLUDING STAND 1			$ 5,800.00

GENERAL GOALS AND OBJECTIVES OF A TOWN FOREST

The goals and objectives for the Town Forest can be many and quite diverse, but all ultimately enhance the environment in which the Town's citizens live. Listed below are the goals that are often used as guides for forest management activities.

A town forest is a place to:

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

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

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

- Provide residents with public land for outdoor recreational activities.

- Protect watersheds and wetland areas.

- Provide areas for Environmental Awareness and Education.

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

GENERAL RECOMMENDATIONS TO ATTAIN THE GOALS AND OBJECTIVES

OPEN SPACE

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

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

As the population expands, demand for housing will continue to increase to meet the "habitat" needs of the people. Long term planning with environmental considerations will help keep all types of habitat healthy, productive and relatively compatible.

TIMBER PRODUCTION

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

Forest growth is dependent on the interaction of site/soil quality, weather, and past and present management practices. In the past, white pine was considered "king of the forest" and much time, money and effort were wasted throughout the State trying to grow pine on sites not suitable for that species. Frequently, the treatment was detrimental to species that are now more valuable than pine. As a result, emphasis should be placed on growing trees that are suited to the site conditions found within the Town Forest. Site conditions are most easily determined by soil types. In general, the deep, dry sand and gravel outwash soils will favor pine; deep, fairly well-drained glacial till soils will favor a mix of oak, birch, pine and maple; and poorly drained soils will favor red maple and hemlock. Poorly drained soils are often considered wetlands and are not productive timber growing sites. Their value lies in watershed protection and as wildlife habitat. Most of the stands within the Conservation Area contain a mixed hardwood-hemlock forest type in the mid to late successional stage. As the years progress, the species composition in the mixed forests will probably remain the same, though the proportions of each species will change.

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

Cordwood and other Timber Stand Improvement (TSI) techniques should be used to weed and thin the forest when it is young to prevent early stagnation. Later timber harvest should be designed to sustain the forest ecosystem. Using the services of a Licensed Professional Forester should help insure the successful integration of the silvicultural needs of the Conservation Area with the other uses of that particular forest during a harvest operation.

WILDLIFE

Observing wildlife can be the most memorable part of any forest experience. A variety of wildlife and wildlife sign were noted during the field cruise of the Conservation Area in the early summer of 1999. Mammal species or signs of species observed included moose, deer, coyote, porcupine, fox, squirrels, rabbits, bats and mice. Bird species included hawks, owls, ruffed grouse, crows, turkey vultures, woodpeckers, turkey and numerous songbirds. Many insects, reptiles and amphibians were also observed. The presence of these species usually indicates the presence of adequate habitat for a breeding population. The size of a species' population is usually dependent on the amount of suitable habitat. Animal populations can often be manipulated by varying the amount of habitat. However, unless a species is rare and endangered, one species should not be favored over another. There are no "good" or "bad" animals in the wild. Providing a variety of habitats will increase the diversity of wildlife. Most wildlife are opportunists and will take advantage of almost any type of habitat according to their needs. As habitats are slowly lost to development, it may become more important to replace some of the lost habitats to avoid losing wildlife populations.

There are several habitat improvement and protection practices that can be incorporated into the timber harvesting activities. First, all harvesting should follow the State's "Best Management Practices" (BMP's) guidelines for logging. Wetlands should be avoided and stream crossings should be kept to a minimum. Any crossings should be designed to prevent mudding of the stream. This includes installing temporary bridges, culverts and/or pole fords. Logging should be avoided during "mud" season or prolonged rain spells. Truck roads should be properly constructed to minimize erosion. These practices are designed to protect water quality, which in turn protects the aquatic habitats of fish, amphibians and certain birds and mammals. Vernal pools should also be protected during harvest activities by creating large enough buffer zones around the edges to keep the pool shaded and to prevent the logging slash from falling into the water zone. Such pools are important breeding grounds for many amphibians. Unfortunately, few vernal pools were found on the Town Forest. Den trees as well as potential den trees should be left and protected during harvest activities. Leaving five to seven of those types of trees per acre is recommended to provide sufficient habitat. Hollow trees are nesting sites for squirrels, mice, bats, raccoons, owls and other birds along with many insects that are at the bottom of many food chains. Trees with a three-pronged fork are preferred nesting site for hawks. Sufficient "mast" (nuts and acorns) producing trees should also be left to provide a food source for wildlife. Acorns are a primary food source for deer, squirrels, turkey and other birds. Most nesting activities occur during the latter part of mud season and are not often disturbed by the logging, though heavy recreational use during that time of year can also have a negative effect on wildlife.

Dense stands of young white pine and hemlock thickets provide critical winter shelter areas for deer, grouse, rabbit and several other species. Those types should be protected, and attempts should be made to establish or promote those forest types near areas lacking softwood cover. Mature pine and hemlock stands that show signs of winter use by deer should be maintained for winter cover by keeping at least a 70% crown closure, of which 50% should be softwood. Hardwood sprouts, especially red maple are an important food source. Deer, moose and rabbit depend on such browse for their winter and early spring food supply. Most harvesting will temporarily increase the potential browse supply. Quarter to half acre patches of hardwood forests could be clear-cut to provide vigorous hardwood sprouting. Sprouts become too tall for the animals five to seven years after the harvest. At that point, the sprouts could be re-cut or allowed to develop into a forest, and new areas could be cut elsewhere.

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

RECREATION

Forest recreation in or around the Conservation Area includes hiking, wildlife observation, cross-country skiing, snowshoeing, mountain biking, snowmobiling, hunting and All Terrain Vehicle (ATV) use. Some of the uses are often thought to be incompatible with logging and are sometimes incompatible with each other. Ironically, many of the above uses occur on old logging roads. Occasionally, silvicultural prescriptions or site conditions will dictate the time of year when logging will occur. Advance notice of planned forestry activities helps reduce the shock factor typically found when a harvest is unexpectedly encountered. Buffer zones should be established along heavily used trails that were constructed for a specific type of recreation. The zones should be at least one tree length wide on either side of the trail. Topographic restrictions, such as wetlands or steep slopes, may require crossing or running on a trail for a short distance. Care should be taken in such a situation to keep the trail clean and passable at all times. It is more difficult to address compatibility when logging roads are used for trails, especially in the winter. Plowing the road during a harvest eliminates recreational winter use of the road, and alternative routes are usually difficult. Safety becomes a major issue for trucking when snowbanks along the roads are high and difficult to climb over. Logging in areas with high recreational use should be avoided during weekends when the use is at its peak. There have been few, if any, injuries in the State to curious bystanders during logging activities on Town Forests, though there have been several close calls. Signs should be posted to warn the public of the dangers of logging, and to discourage them from entering the tree felling areas.

Except for ATV's, all of the above listed recreational uses are relatively environmentally friendly. All of the access roads have been gated to prevent the larger four-wheel drive vehicles from entering the property. It is important to maintain any of the gates, as well as to provide parking places near the gates for recreational users. Maintaining the logging roads not only reduces the costs of future harvests, but also provides access routes for fire and rescue vehicles. Most of the trails within the Conservation Area are hiking/cross-country ski trails that are maintained by the Commission, abutters or other volunteers.

Typically, trail systems are laid out to access some major attraction or unique feature that will draw people to the site. The summit of Mt. Uncanoonuc has long been a major attraction to the area. It can be reached by car using the Summit Road and by foot by either using the Old Incline Railway bed or by another trail that loops around the north side of the mountain after crossing through the Water Precinct property. A short trail connects the northern trail with the old railway bed, just below the north side of the summit, and includes a few small vista outlooks. One vista looks towards Craney Hill in Henniker and Mt. Kearsarge in Warner. The other vista looks towards Manchester. Another short trail loops around the southeast side of the summit and includes a good vista in that direction, where the Boston skyline can be seen on a clear day.

Once the boundaries of the cottage lots have been established on the north-northeast area of the summit, a large area should be cleared to open up some significant views. The entire White Mountain range could be seen in the past before the summit grew in with trees. Creating a large vista while leaving a buffer of trees between the vista area and the communication towers found higher on the summit will create a site that will offer the feel of an isolated summit, and to give an idea of how the visiting the mountain must have been in the 1800's. Maintaining the vista clearing will also encourage the development of blueberries which will create another attraction on the summit.

Any trails that are promoted to the public require YEARLY MAINTENANCE and should have directional signs at major trail junctions and intersections. The old incline railway is steep, straight and has a loose gravel base, making it a difficult trail to hike. Some of the worst eroded areas could be decked with a wooden walkway to reduce the erosion and provide a bit of a respite from hiking on the loose gravel.

Streams and brooks should be bridged to allow year-round use. The City of Concord requires that bridges be designed to carry 100 pounds per square foot, though there are no formal trail bridge specifications as required by State law. Limiting liability appeared to be the primary concern of the City's design review process. Railings are usually dependent on the height of the bridge above the water, but again, there are no formal specifications other than what looks and feels right.

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

WATER RESOURCE PROTECTION

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

Whereas the Conservation Area contains the headwaters of several watersheds, and part of the precinct watershed, groundwater contamination has the potential to affect area wells and wetlands. A typical contamination source is spilled and leaking fuels and hydraulics. Minor fuel spills are often unavoidable during a timber harvest and blown hydraulic hoses on log trucks are relatively common. Fuel contamination of the water resources can be minimized by making sure that truck and skidder fueling areas along with the log yards are not located adjacent to wetlands and drainage ways. Leaking equipment and hoses should be repaired before starting the harvest, and heavy maintenance and repair activities should be conducted off-site.

EDUCATION

The Conservation Area offers a good opportunity for education. The forest's location adjacent to the suburban areas of Goffstown provides easy access to the Town's residents. The more people are aware of the environment, the more they tend to appreciate it. Demands for forest products along with the other uses of the forest has increased along with the population. Unfortunately, education regarding the local environment has not kept pace with the uses of that environment. Many people no longer associate that the forest products that they use everyday such as lumber, paper, firewood, pencils, etc. originally comes from trees. The Conservation Area offers an excellent opportunity to educate the public regarding the many aspects of the Town's forest management program. Brochures or signs explaining the management goals and objectives could be placed near the site of the timber harvests when they occur in high use areas. Self guiding nature trails could be expanded to include the upland areas. Brochures are currently available at the trailhead kiosks though it requires periodic checking to insure an adequate supply is available to the public. Nature trails should focus more on concepts and relatively permanent features such as "stunted trees growing on shallow soils in high elevations" or "bog ecosystem" or "large boulders left by the glacier and called glacial erratics" as opposed to specific items such as "beaver chewed stump" or "red maple tree" that may die, fall over or rot away rendering the brochure obsolete. Local media could be contacted to promote the trails and other forest management activities. A copy of this management plan could be sent to the school system, along with brochures to encourage schools to use the area for their science classes.

"Dear neighbor" letters that explain a proposed harvest should be sent to landowners and other interested parties that abut the timber harvest area prior to the start of cutting. This practice has greatly reduced inquiring and sometimes opinionated phone calls in other Towns that have implemented such a program. Supplements to the annual Town Report could also be used to promote the activities in the Conservation Area. Forests are dynamic and ever-changing. Good records kept over time will create a data base that can be used to judge the successes and failures of forest management activities.

HISTORIC PRESERVATION

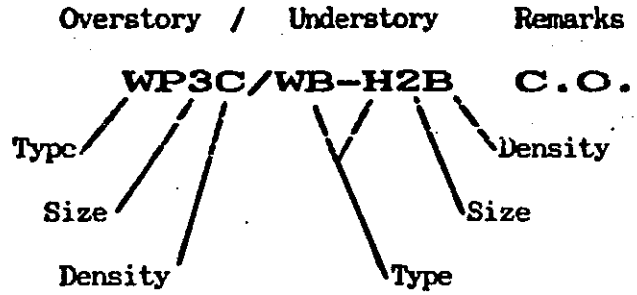
Several items of historic interest were found during the cruise and were mapped whenever possible. The forest itself gives evidence of the past uses of the properties. The age of the white pines will give a pretty good idea as to when the area was last used as farmland. Because most of the forest blew down in 1938, very few areas of "old growth" forests were found. If left alone, all of the forests would eventually develop into "old growth" forests. However, studies have shown that natural disasters (hurricanes, wind shears, fire, etc.) will affect any given area in New England at least once every 200 to 300 years. This means that few trees in New England exceed that age. Some areas of each forest type found in the Conservation Area should be left uncut and allowed to develop into "old growth". This might allow some relatively rare ecosystems to develop and will provide the classic "cathedral" forest type that most people think a forest should look like. It is recommended that the Conservation Commission decide if they want to manage for "old growth", and if so, how much and where. Such areas should be formally designated as "Natural Areas" so future Commission members and foresters will be aware of the situation.

Evidence of past agricultural activity was mainly limited to the existence of stone walls and barbed wire fences. The walls should be protected whenever possible during any harvesting activity. The concrete footings on either end of the Old Incline Railway should also be protected as they are the only structural evidence of the once popular attraction.

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

TIMBER STAND DESIGNATIONS

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



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

TYPES DESIGNATIONS:

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

SIZE DESIGNATIONS (based on average stand diameter):

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

DENSITY DESIGNATIONS:

A	Overstocked
B	Adequately stocked
C	Understocked

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

SPECIES ABBREVIATIONS

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

GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SILVICULTURE: The practice of growing trees.

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

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

SAWLOG	-	A live tree which measures over 10 inches in diameter 4½ feet from the ground.
POLE	-	A live tree which measures between 4 and 10 inches in diameter, 4½ feet from the ground.
SAPLING	-	A live tree taller than 4½ feet but less than 4 inches in diameter 4½ feet from the ground.
SEEDLING	-	A live tree less than 4½ feet tall.

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

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

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

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

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

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

OVERSTOCKED	A stand condition where there are too many trees present to maximize growth and yield.
ADEQUATELY STOCKED	A favorable stand condition where growth and yield in near optimum levels.
UNDERSTOCKED	A stand condition where yeild is lessened because all growing space is not adequately utilized.

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

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

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

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

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

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

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

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

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

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

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

SILVICULTURAL PRESCRIPTION DEFINITIONS

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

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

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

STRIP CUTS - Long, narrow clearcuts with specific orientation.

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

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

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

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

WEEDING - Removal of undesired species in an immature stand.

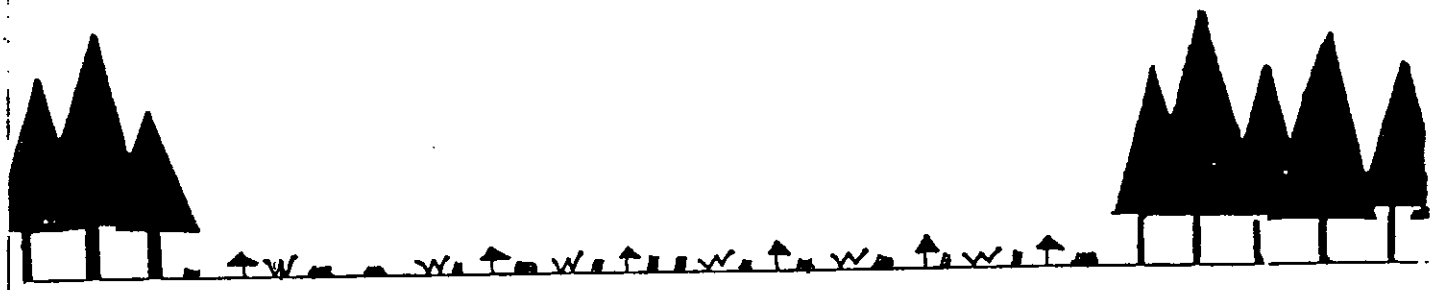
THINNING - Removal of poor quality stems in an immature or not yet mature stand.

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

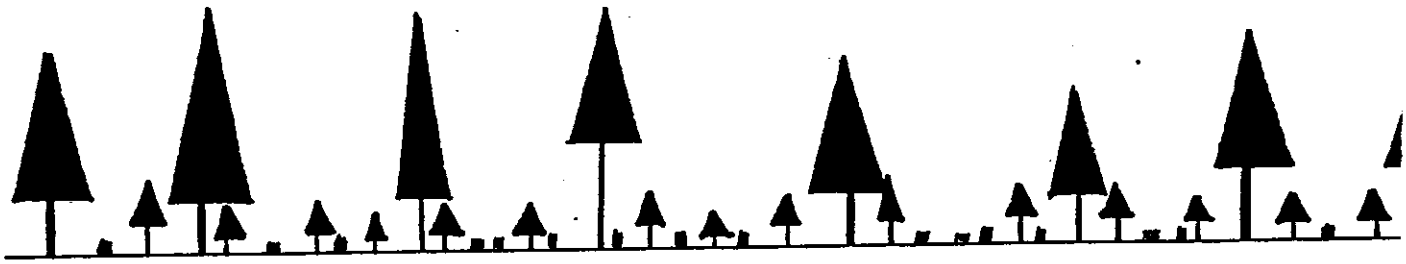
TIMBER STAND IMPROVEMENT - Typically referred to when weeding and thinning pole sized stands.

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

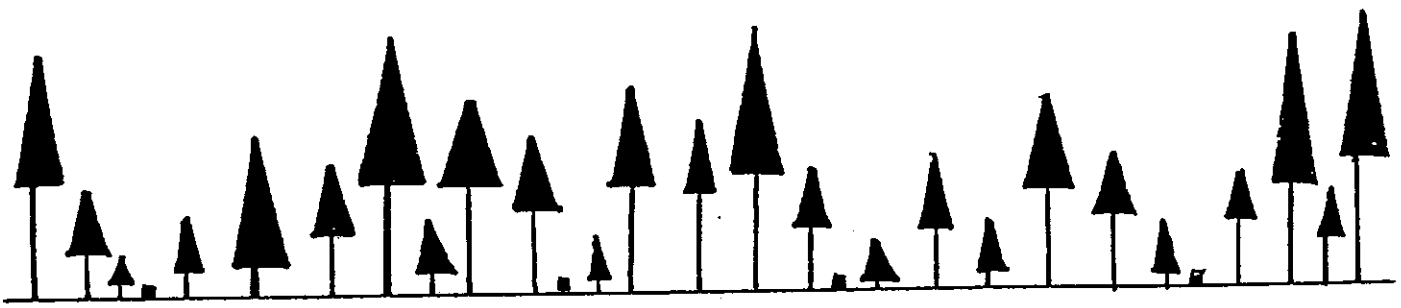
Clearcut



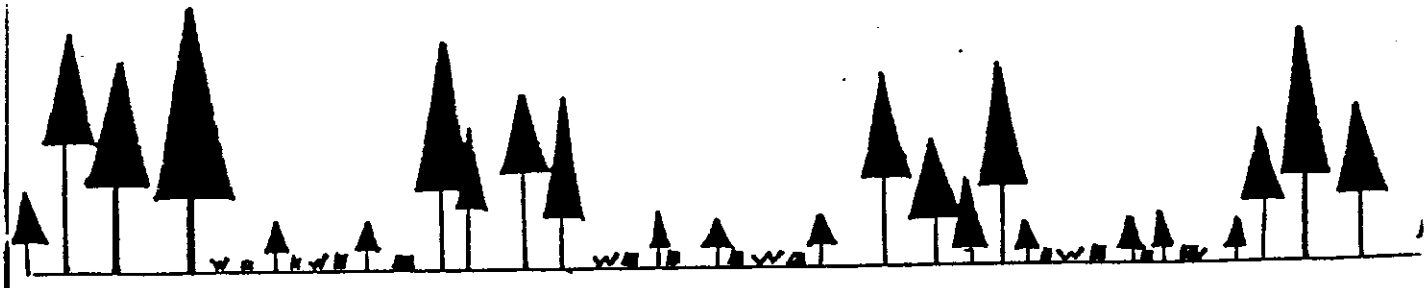
Shelterwood



Single-Tree Selection



Group Selection



Thinnin