

Forest Management Plan

For the property of:

Steve and Jim Kneeland

Located in:

The Town of Lee

Penobscot County, Maine



Eastern Hemlock Branch and Cones

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MAPS

Maps are provided for geographic reference to property lines, soils, roads, trails, timber stands, and recommended management activities. The maps were prepared using from GPS data collected by *BTMFM*, public domain information from the Maine Office of GIS, and USGS topographic maps. **Maps are not presented or to be used as a legal survey.**

MANAGEMENT PLAN OVERVIEW

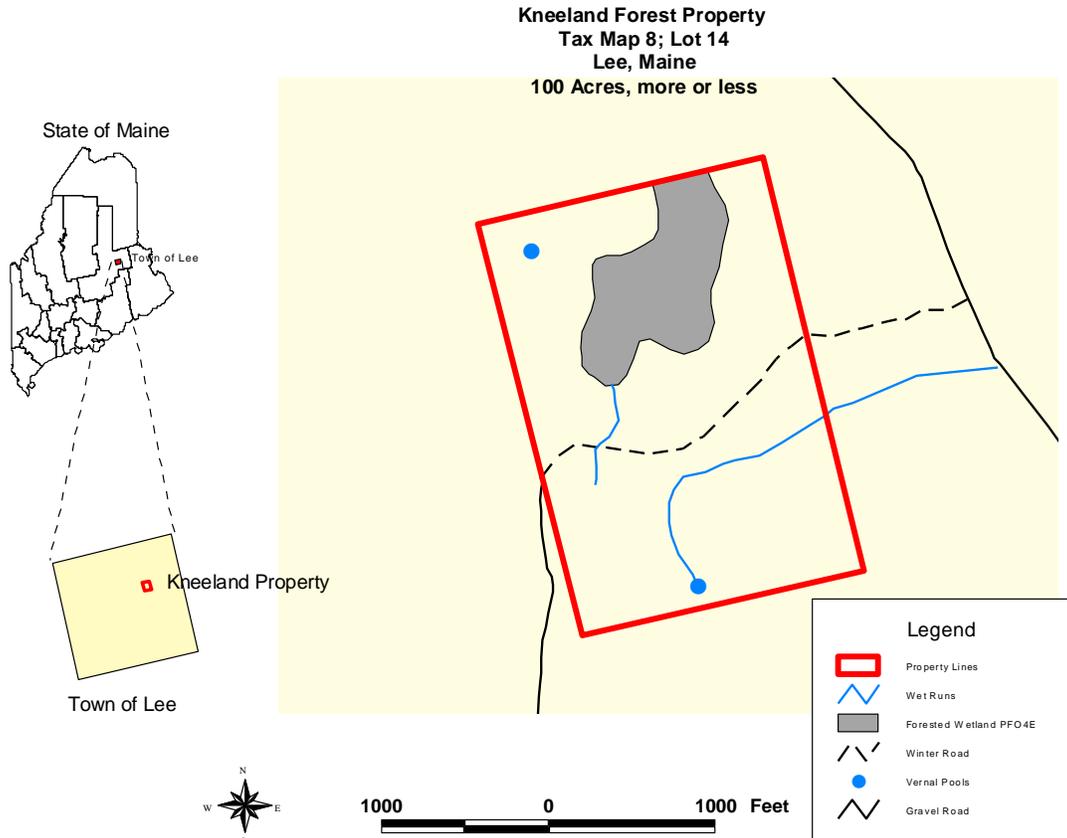
The purpose of this plan is to provide Steve and Jim Kneeland a status report of their forest and present suggestions to attain their objective. *Back to Maine Forest Management* has been contracted to draft this plan and will do so in accordance with current and accepted forest and wildlife management practices. The following pages include a statement of the landowners' objective, general information about their forest, individual forest stand summaries, and the recommended management activities for the next ten year period.

PROPERTY INFORMATION

This forest management plan is prepared for the forest ownership of Steve and Jim Kneeland, both residents of Lincoln, Maine. Their forest ownership is located in the Town of Lee in Penobscot County, Maine. It is a contiguous parcel of land, 100 acres, more or less, and is recorded at the Penobscot County Registry of Deeds in Book 7364 on Page 338. The property is identified by the Town of Lee as Lot 14 on Tax Map 8. Eighty-four (84) acres of the property are currently productive timberland, fifteen (15) acres are forested yet commercially unproductive wetland, and one (1) acre is devoted to a winter access road which bisects the property.

LANDOWNER OBJECTIVE

The overall objective of Steve and Jim Kneeland is to create and manage a diverse and sustainable forest that maximizes timber quality and quantity. They also wish to obtain periodic revenue from timber products harvested from the forest and will continue to leave the property open for the free recreational use and enjoyment of the public.



PROPERTY BOUNDARIES AND ACCESS

The property is bounded to the north, east, and south by land owned by the Gardner Company and formerly owned by International Paper. Timber harvest activity along each of these lines shared with Gardner has been substantial; the adjacent forest is in an immature condition. The west line is bounded by property owned by Mr. Gifford. Timber activity has occurred somewhat recently along this line with at least 50% removals from Mr. Gifford's property.

- All property lines are in very good condition. Line location is depicted by well painted tree blazes.
- Access is currently suitable for efficient implementation of primarily winter season management activities. The property has a winter road originating from a gravel road located to the east on the Gardner land. This winter road extends through the property to the west line. This road may be utilized for transport of timber products only during the winter months when it may be frozen. Other than snow plowing, neither road construction nor maintenance will be required in any manner.

FOREST MANAGEMENT AND LAND USE HISTORY

- This property has not ever been managed with a formal forest or land management plan. Timber harvest activity has occurred with evidence (stumps, trails, openings, stand structure) traced to two separate entries, one in the 1950's and another during the past year. The 1950's entry, based on observance of stumps, consisted of a variety of large and small diameter hemlock and red spruce removals. This year's entry consisted of significant removals of softwood (hemlock and red spruce) and hardwood but with significant retention of these species as well. It is estimated that approximately forty to fifty percent (40 -50%) of the merchantable growing stocked was removed during the past year.
- The forest is currently enrolled in the Maine Tree Growth Tax Program. This status will be maintained for the next ten year period under the management of this plan. The Forest Type Map to be attached to the Tree Growth Tax Application is located on page 7.

LOCAL AND STATE FOREST REGULATION

The Town of Lee is an organized township. Jurisdiction of land use, including timber harvest, belongs to the Maine Department of Environmental Protection (DEP) and the Maine Forest Service. According to the Town of Lee's tax maps, there are not any **mapped** special zoning or land use standards that restrict general forest management activities on this property. However, there are two "wet runs" and two vernal pools located on the forest (See Property Map). These "wet runs" and vernal pools, and the area along them should be treated as shoreland zones, thereby requiring minimum 75-foot buffers on all sides; harvest removals and use of equipment in these buffers should be held to a minimum. Otherwise, forest management activities are required to comply with rules set forth in the Maine Forest Practices Act. In addition, all roads, skid trails, and log landings are expected to adhere to Maine's Forest Management Best Management Practices for soil protection and water quality. The Forest is currently in compliance with the law and best management practice standards. Copies of the Forest Practices Act and Best Management Practices are located in Appendices IV and V.

FOREST PRODUCTS MARKET

The forest is strategically located within a diverse network of forest product facilities. Pulpwood markets are available for lower quality softwood and hardwood timber at pulp and paper facilities in the region. Some lower quality hardwood timber may also be sold or consumed as firewood. Tree-length markets are available for moderate quality and sized softwood timber at a variety of sawmills. Higher quality cut-to-length log markets exist for both hardwood and softwood timber.

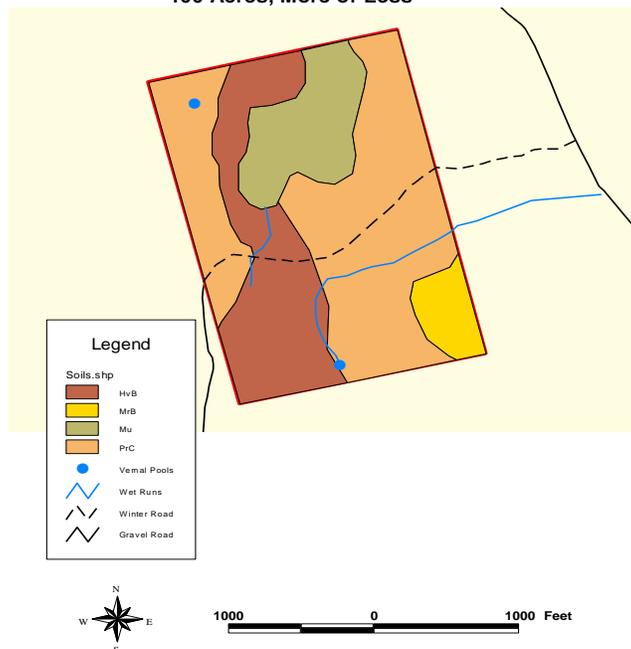
Since Jim and Steve Kneeland are self-employed wood harvesters and have recently harvested wood from this property, they are well versed on the systems involved with the selling of timber to wood processing facilities. However, it is recommended that before future timber is sold from this or other owned properties that they should consult with the most current (2003) Penobscot County stumpage prices compiled by the Maine Forest Service. A copy of the prices is located in Appendix III.

FOREST SOILS AND TOPOGRAPHY

Topography of the forest does not constrain access. The surface is mostly free of boulders, ledge, or other geologic formations. The forest's highest elevation is approximately 400 feet. Four primary soil types exist on the property and are described in the following table and located on the Soils Map. Difference between the types is relative drainage. Utmost care should be taken while operating equipment on any of these soils to prevent soil erosion and rutting.

Soil Type	Descriptions provided by the Natural Resources Conservation Service
Mu - Muck	More than 12" decomposed organic material; very poorly drained, high moisture holding capacity. Very slow permeability.
Pr - Plaisted very stony loam	Deep, well drained glacial till soil with moderate moisture holding capacity, moderate permeability, firm gravelly loam sub-soil 12-25" stones scattered over the surface.
Hv - Howland very stony loam	Deep, moderately well drained glacial till soil with high moisture holding capacity, acid with very firm sub-soil.
Mr - Monarda & Burnham very stony silt loam	Deep poorly and very poorly drained glacial till, soils having water near the surface, slow permeability, firm gravelly loam sub-soil.

**Kneeland Soils Map
Lee, Maine
Tax Map 8; Lot 14
100 Acres, More or Less**



FOREST RECREATION AND AESTHETICS

- The forest is currently open for responsible and courteous use by the public for hunting, hiking, photography, and general observance of nature. The land has traditionally been open for all uses and will continue to be as long as the land is respected by all those using it.
- Within the boundaries, some areas of the forest are in a mature, well-stocked condition thereby making it highly valued visually to users, especially the Kneeland family. Management activities should maintain these visual conditions whenever possible.

FOREST INVENTORY

The forest was sampled in August, 2004 using randomly located variable radius sample points. A 10 BAF prism was used to determine each tree's inclusion to point. Tree species, Diameter at Breast Height (DBH), and Tree Grade were assessed for each tree. NED-1, a forest inventory computer program, was used to calculate the stand and species data. The results are summarized in tables and charts in the following sections of the plan.

Stand	Acres	Number of Sample Points
Hemlock – Red Spruce	78	22
Tolerant Hardwood - Hemlock	4	4
Balsam Fir – Intolerant Hardwood	4	2
Cedar Swamp	15	2

FOREST HEALTH SUMMARY

During the forest inventory and other reconnaissance activities, moderate to poor health conditions are observed with red maple, balsam fir, and beech, and overall good health conditions with hemlock, red spruce, sugar maple and yellow birch. In the understory, poor health is observed with beech but all other species are in overall good health.

- The primary factor of moderate to poor health conditions with red maple is age. Most of these trees in the forest beyond their biological maturity and display signs of internal decay, crown dieback, overall timber degradation. The solution to this problem is to manage these species on a short rotation (50-60 years).
- Poor to moderate health of balsam fir is due to a combination of age, insect, and disease factors. As fir ages, a root disease, *Armillaria spp.* initiates root decay, and then travels into the stem. The stress causes defense mechanisms in the foliage to decline. As foliage defense declines, the tree becomes susceptible to spruce budworm, *Choristoneura fumiferana*, an insect that disregards its name and characteristically targets fir. The budworm then consumes most of the green foliage. To prevent this problem, management of fir on a short rotation (50 years) is recommended.
- American beech trees have been affected by the beech bark disease, a symbiotic relationship between an insect, *Cryptococcus fagisuga* and fungus, *Nectria galligena*. These agents work together in diminishing young, vigorous beech into slow-growing, poorly formed trees with little commercial or biological value. Beech in this condition may consume a significant amount of growing space and prevent other more valuable trees from thriving. Control may be through the slow course of natural selection. Timber harvest may accelerate the process by removing diseased individuals but retaining those immune.

SPECIAL SITES

Four sensitive sites have been identified within the forest; two vernal pools and two "wet runs". These sites will be marked clearly and protected by buffers from disturbance during harvest activities. Protection measures for water related sites will comply or exceed legal standards, as well as Best Management Practices. The sites may be viewed on the Property Map on page 3.

RARE, THREATENED, AND ENDANGERED WILDLIFE AND PLANTSPECIES

Evidence of State or federal rare, threatened, or endangered species was not observed. The potential of any species on or near this forest was reviewed using the "Threatened and Endangered Species in Forests of Maine" handbook. This handbook was compiled in 1999 by Brian D Carlson, edited by James M Sweeney through a cooperative effort from various public and private entities. As a result of this review, no potential of any species was found to exist.

COMMON WILDLIFE SPECIES

During the forest inventory and other reconnaissance activities, several common wildlife species or sign of species activity were observed. Species observed include ruffed grouse, red squirrels, black-capped chickadees, two small white-tailed deer, and a moderate sized bull moose.



Moose similar to the one observed on the property during the field work.

WILDLIFE HABITAT SUMMARY

General quality of wildlife habitat was assessed using wildlife trees and vertical stand structure as indicators.

Wildlife Trees

- Three types of “wildlife” trees were assessed; cavity/den, dead/down, and mast crop. Cavity/den are all living, partially living and dead standing trees that now and potentially may provide nesting, den, or roosting habitat. Dead/down trees are those dead and lying on the ground that now and in the future will provide ground habitat and food and nutrient sources to wildlife and plant species. Mast crop trees, primarily American beech in this forest, are trees producing seeds that provide significant value as a wildlife food source.
- Overall density of wildlife trees is acceptable, but could be improved whenever feasible. Distribution of cavity/den and dead/down trees was found in moderate densities throughout all stands except Fir- Hardwood Stand. Mast crop trees were present only in the Hardwood-Hemlock stand, with relatively low densities of poor quality beech. The following table provides a summary of wildlife trees.

WILDLIFE TREE SUMMARY						
Stand	Cavity / Den		Dead / Down		Mast Crop	
	Trees per Acre	DBH	Trees per Acre	DBH	Trees per Acre	DBH
Hemlock – Red Spruce	18	9.7	10	7.8	8	12.2
Tolerant Hardwood - Hemlock	19	10.6	21	8.3	24	11.4
Balsam Fir – Intolerant Hardwood	13	9.5	4	6.2	----	----
Cedar Swamp	78	7.2	120	6.8	----	----

Stand Vertical Structure

- Vertical structure is measured by the amount of layers or groups of different sized trees within a stand. It occurs naturally, increasing as stands develop; some trees inevitably succumb to environmental stress causing them to fall down, creating a hole in the forest canopy allowing new trees to fill the open growing space. This mixing of old, mature and young, regenerating trees throughout a stand creates vertical structure. And generally speaking, the amount of vertical structure determines the stands wildlife diversity; as structure increases, diversity increases. See Figure 1.
- There is typically little vertical diversity in the mature Hemlock Stands which dominate this property. However, the recent timber removals will spur a flush in both conifer and deciduous regeneration, in effect creating a new layer of vertical habitat.

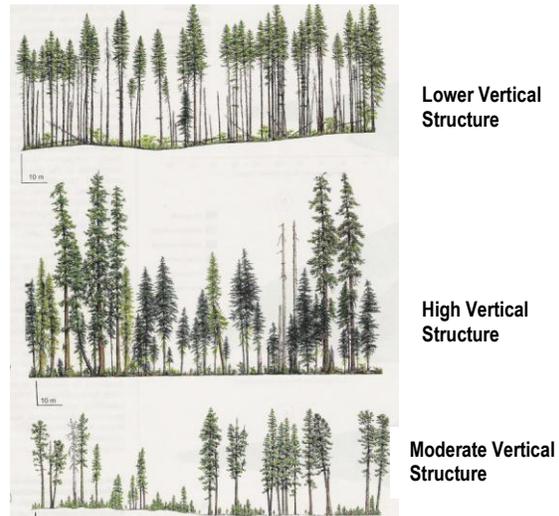
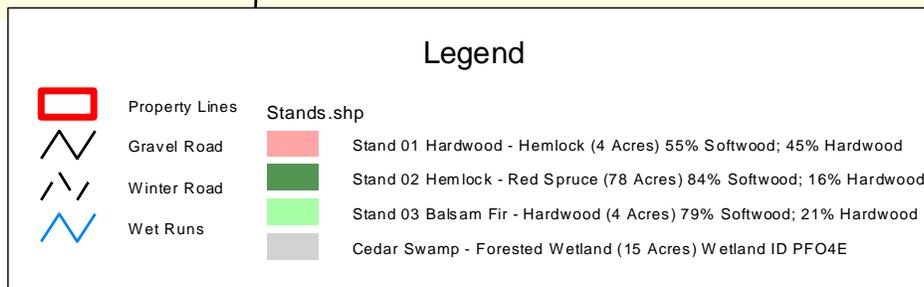
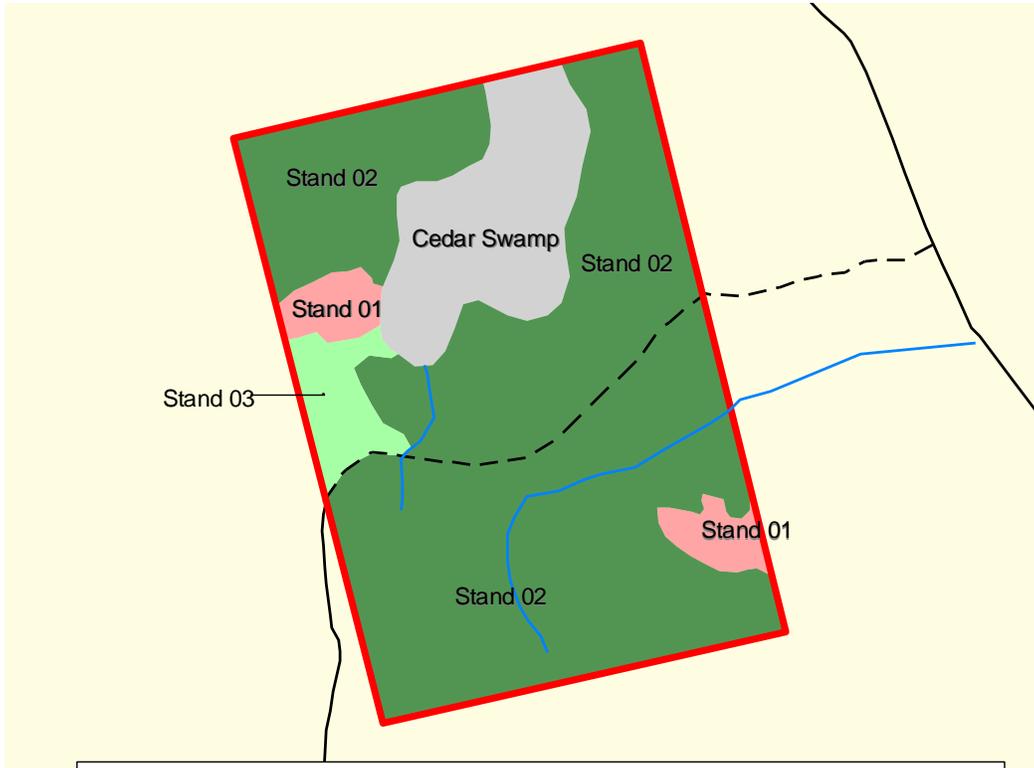


Figure 1. Adapted from graphics located in *Journal of Forestry*, April/May 2004 “Spatial Aspects of Structural Complexity in Old-Growth Forests”, Franklin and Van Pelt

TIMBER SUMMARY

The Forest has three productive timber stand types and one unproductive cedar swamp, summarized in the following tables, and described within each stand page. Stand location may be viewed on the following Forest Type Map. The dominant stand is the Hemlock – Red Spruce Type, encompassing 78 acres. The other two productive stands (Tolerant Hardwood – Hemlock and Fir – Hardwood) each are approximately 4 acres in size. The Cedar Swamp, a non-productive forested wetland, is 15 acres.

**Kneeland Forest Type Map
Lee, Maine
Tax Map 8; Lot 14
100 Acres, More or Less**



TIMBER SUMMARY CONTINUED

Silviculture

The forest is well-stocked in all stands with currently merchantable and / or regenerating timber species. The overall site quality of the forest is moderate, with best growing conditions occurring in the Tolerant Hardwood – Hemlock Stand. Current stocking levels and growing conditions provide viable opportunities for sustainable and quality timber production. The following table provides a summary of the key aspects of each stand that are considered when drawing conclusions on recommended management activities.

Stand Silviculture Summary								
Stand Type	Acres	Regeneration	Site Index (at 50 years)	Basal Area Stocking (Square feet / Acre)			Density (Trees / Acre)	Average DBH (Inches)
				Total	Softwood	Hardwood		
Hemlock – Red Spruce	78	Poorly stocked conifer seedlings with patches (10%) thick saplings	Hemlock: 55	105	85	20	250	8.5
Tolerant Hardwood - Hemlock	4	Poorly stocked hardwood and hemlock saplings	Sugar Maple:60	77.5	42.5	35	221	7.7
Balsam Fir – Intolerant Hardwood	4	No measurable stocking	Red Spruce: 45	120	95	25	550	6.1
Cedar Swamp	15	Poorly stocked ash, cedar, and fir saplings	Not measurable	20	20 = Cedar	----	55	7.9

Timber Volume and Value

Standing timber volume and value were calculated and are presented in the following table. The most current (year 2003) stumpage values compiled and made available by the Maine Forest Service were used in this assessment. In reference to these stumpage values (Appendix III), average prices reported for each product class were used in the calculations for this analysis. Today's values may differ from the values used but significant discrepancy is not anticipated.

Overall, the forest has a modest amount of value currently growing as merchantable timber. The highest value per acre is in the stands with a higher density of softwoods. With management, our goal is to maintain or enhance the stand by developing a higher density of Sawlog or Studwood quality and size trees.

2004 Current Stand Volume and Value Summary (TOTAL STAND VOLUMES AND VALUES)								
Stand Type	Spruce-Fir Studwood		Hardwood PULP		Hemlock LOGS		Hemlock PULP	
	Cords	Stumpage Value	Cords	Stumpage Value	Thousand Board Feet	Stumpage Value	Cords	Stumpage Value
Hemlock – Red Spruce 78 acres	203	\$5603	257	\$3855	18.486	\$1183	725	\$10,875
Tolerant Hardwood – Hemlock 4 acres	6	\$166	28	\$420	----	----	28	\$420
Balsam Fir – Intolerant Hardwood 4 acres	50	\$1380	18	\$270	----	----	----	----
TOTAL	259	\$7,149	303	\$4,545	18.486	\$1,183	753	\$11,295

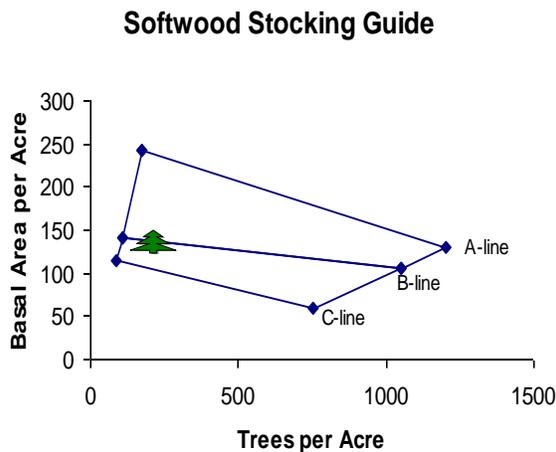
HEMLOCK – RED SPRUCE STAND

History

Most recent harvest occurred during the past winter 2003/2004 with removals near forty percent. Evidence of harvest previous to this may be traced to the 1950's. Timber removals at that time are unknown but seem to be relatively light, focusing on larger hemlock, spruce, and fir.

Current Condition

This stand is 78 acres in size and is the dominant forest type on the property. The Site Index for hemlock at age 50 is 55 feet. The distribution of tree size and age denotes an even-aged condition. Regeneration is generally insignificant throughout the stand. In some areas where the canopy has been relatively open, some hemlock, spruce-fir, and hardwood saplings have been able to stock the understory. Otherwise, at least 90% of the remaining area of the stand is poorly stocked with conifer seedlings. In the overstory, the stand is moderately stocked with 105 square feet of basal area per acre and currently resides at a point slightly below the B-line on the stocking guide for Softwood stands. Species composition is heavy to hemlock and red spruce but also has some scattered composition of shade tolerant hardwood species (yellow birch and sugar maple). Timber quality is fair to good; some Sawlog quality trees are currently available for harvest, but most of the stand's 16 cords per acre is composed of primarily smaller, pulpwood sized trees (Average DBH is approximately 8.5 inches).



= Current Stocking Level

Hemlock – Red Spruce Stand (78 Acres; 84% Softwood Species. 16% Hardwood Species)				
Species	Trees/Acre	Basal Area/Acre	Cords/Acre	Average Tree Diameter
Hemlock	169	74	9.7	8.5
Red Spruce	28	11	2.1	8.3
Hardwood	41	17	3.3	8.7
Fir and Cedar	8	3	0.6	8.2
TOTAL	245	105	15.8	8.5

Recommended Management Activities

- This Stand should be re-assessed in 10 years from the date of this plan. At that point, it is projected there will be sufficient ingrowth of the current small hemlock and spruce trees into the Sawlog product class. When harvesting, possibly in 10 to 12 years from today, it is suggested that the stand should be managed in an uneven-aged condition. A **single tree selection harvest system** should be initiated using a 100-year rotation with 20-year cutting cycles. Single tree removals should target poorly formed individual trees and shade intolerant species, but should also remove trees that have met their financial maturity age and size. Residual trees should be selected based on quality as well as potential for growth and value.
- Ten years of growth will likely move the stand well above the B-line on the stocking guide above. Residual basal area and density after the next harvest should then reduce the stand to a point near the B-line, but is stressed that some sites within the stand may need to be at level significantly higher or lower than the B-line, depending on the initial site density, size, and quality of trees.

Hemlock – Red Spruce Management Recommendations	
Year	Recommendation
2015	Uneven-aged Single Tree Selection for Target Residual Basal Area at the B-Line

TOLERANT HARDWOOD - HEMLOCK STAND

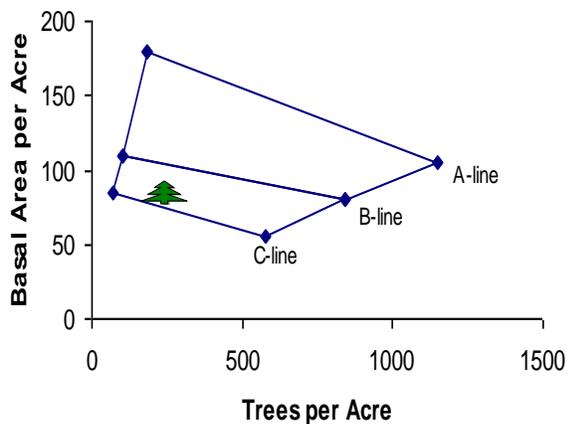
History

Most recent harvest occurred during the past winter 2003/2004 with removals near sixty percent of initial growing stock. Evidence of harvest previous to this may be traced to the 1950's. Timber removals at that time are unknown but seem to be relatively light, focusing on larger log quality hardwoods, hemlock, spruce, and fir.

Current Condition

This stand has two geographically isolated areas, one on the east side of the property and the second on the west side. The overall growing quality of the stand is very good, with a Site Index for Sugar Maple at age 50 years of 60 feet. The stand is currently in a two-storied even-aged condition. Trees are approximately seventy years of age, consisting primarily of tolerant hardwoods, hemlock and a small composition of spruce and fir. The stand is moderate to poorly stocked with 77.5 square feet of basal area per acre. Current stocking level on the mixedwood stocking guide is slightly above the C-line. Tree DBH averages nearly eight inches and volume of merchantable trees 6 inches DBH or larger is 15.5 cords per acre. Overall timber quality is moderate to poor as most stems qualify for pulpwood size products. Sawlog trees are rare primarily due to small size.

Mixedwood Stocking Guide



= Current Stocking Level

Tolerant Hardwood - Hemlock Stand (4 Acres; 55% Softwood Species, 45% Hardwood Species)				
Species	Trees/Acre	Basal Area/Acre	Cords/Acre	Average Tree Diameter
Hardwood	91	35	7	9.2
Hemlock	109	35	7	7.3
Spruce and Fir	21	7.5	1.5	8.5
TOTAL	221	77.5	15.5	7.7

Recommended Management Activities

- The Tolerant Hardwood - Hemlock stand should be managed in an even-aged condition. Since the stand was recently extensively harvested, it is not recommended to enter this stand again until at least ten years from the date of this plan. Upon re-assessment in 10 years, and regeneration is sufficiently stocking the entire stand, it is recommended that an Overstory Removal treatment in a regular even-aged shelterwood system should be performed.
- For harvest criteria, all merchantable stems should be harvested. In doing so, protection and retention of all possible stems of current regeneration must occur as these saplings are the next crop. Merchantable trees must be felled in a method to minimize impact to regeneration, and skid trails spacing must be maximized to limit the area devoted to open space. Since the stand was significantly harvested in the previous entry, this prescribed treatment is the only opportunity to feasibly remove merchantable trees that have reached their market potential.
- The residual visual effect of this harvest resembles the common label of clear-cut; however, by proper forest Silviculture terminology, it is not. The stand is over-stocked with the regeneration old enough and tall enough to justify this treatment.

Tolerant Hardwood - Hemlock Management Recommendations	
Year	Recommendation
2015	Even-aged Overstory Removal to Release Well-Stocked Regeneration

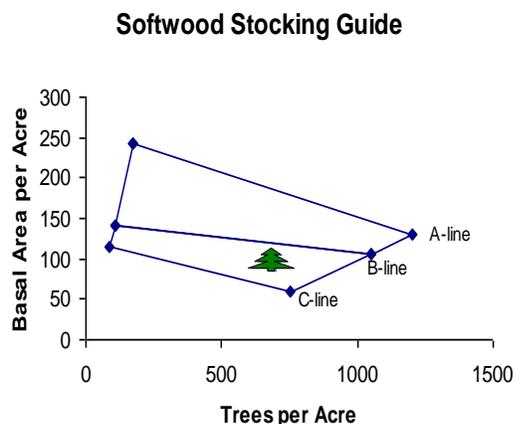
BALSAM FIR – INTOLERANT HARDWOOD STAND

History

This stand was last harvested in the 1950's when a significant removal of spruce, balsam fir, aspen, and mixed hardwood species occurred. Very good response by advance regeneration resulted from this harvest and is now the current stand.

Current Condition

This is four acres in size and is located along the western edge of the property. It is a typical softwood site with a Site Index for Red Spruce for 50 years of age at 45 feet. The stand is in an even-aged condition, single-storied condition with insignificant amounts of regeneration. It is moderately stocked with 120 square feet of basal area per acre of balsam fir, spruce, red maple, and brown ash, primarily in the pole sized timber size class. Average tree diameter is slightly greater than 6-inches and volume of merchantable trees is 17 cords per acre. Current stocking level is mid-way between the B and C-lines on the Softwood species stocking guide as demonstrated below.



Balsam fir – Intolerant Hardwood (4 Acres; 79% Softwood Species, 21% Hardwood Species)				
Species	Trees/Acre	Basal Area/Acre	Cords /Acre	Average Tree Diameter
Balsam Fir	464	90	11.5	5.7
Red Spruce	11	5	1	9.0
Intolerant Hardwoods	75	25	4.6	7.5
TOTAL	550	120	17	6.1



= Current Stocking Level

Recommended Management Activities

- The Balsam Fir – Intolerant Hardwood stand should be managed in an even-aged condition. A **commercial thinning treatment in a regular shelterwood system** should be performed as soon as possible to initiate the next age class, as well as to promote crop tree growth. Using a softwood species stocking guide, the stand should be reduced to a point 25% below the B-line. Shade intolerant hardwood species and poor quality spruce and fir should be targeted for harvest. All wildlife trees should be retained. Crop trees should be spaced 125 feet apart, from stem to stem. Crop trees should be identified as the best quality and largest size dominant or co-dominant spruce and fir, with hardwoods making up the remaining necessary basal area to achieve the target stocking level.
- Biologically, the stand should be thinned within ten years (when stocking exceeds the B-line), but considering that the remainder of the woodlot is scheduled to be harvested again until 10-12 years from the date of this plan, it is recommended that the thinning should occur simultaneous with cutting in other stands.

Balsam Fir – Intolerant Hardwood Management Recommendations	
Year	Recommendation
2015	Commercial Thinning to Promote Crop Tree Growth and Establish Softwood Regeneration

CEDAR SWAMP

The cedar swamp is on the northern end of the property and is 15 acres in size. This area currently does not nor will ever be able to produce commercial forest products. It is typed as a wetland by the National Wetland Inventory and is described by the Inventory in the following manner:

PFO4E: [P] Palustrine, [FO] Forested, [4] Needle-Leaved Evergreen, [E] Seasonally Flooded/Saturated
 [P] Palustrine - The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics:

- are less than 8 hectares (20 acres);
- do not have an active wave-formed or bedrock shoreline feature;
- have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin;
- have a salinity due to ocean-derived salts of less than 0.5 ppt.

[FO] Forested - Characterized by woody vegetation that is 6 m tall or taller.

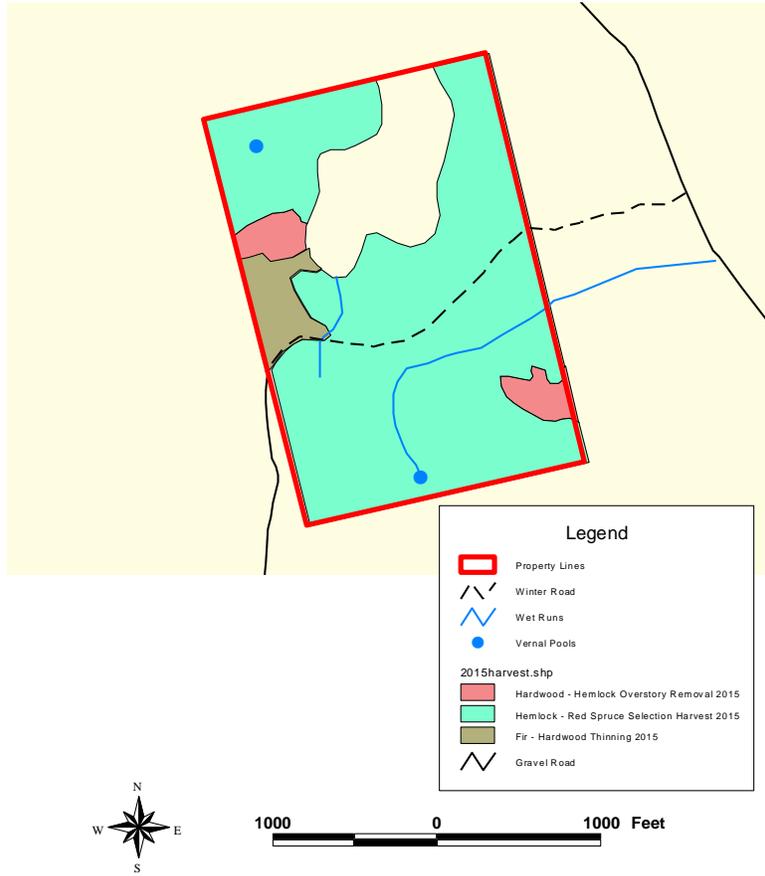
(4) Needle-leaved Evergreen - Woody gymnosperms with green, needle-shaped, or scale-like leaves that are retained by plants throughout the year; e.g. black spruce (*Picea mariana*).

[E] Seasonally Flooded/Saturated - Surface water is present for extended periods especially early in the growing season and when surface water is absent, substrate remains saturated near the surface for most of the growing season. **Attribute classification definitions derived from: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. 103 pp.**

RECOMMENDED MANAGEMENT SUMMARY

The following map and table provide a summary of when, where, and what type of management activities are recommended for the productive timber stands on the property. Three stands are recommended for management in 10-12 years (2015) from the date of this plan in order to maintain periodic revenue as well as health, growth, and quality the overall forest.

**Kneeland Harvest Plan Map
Lee, Maine
Tax Map 8; Lot 14
Harvests to Occur in Year 2015**



Kneeland Forest Management Recommendations		
Stand	Year	Recommendation
Hemlock – Red Spruce	2015	Uneven-aged Selection Harvest
Tolerant Hardwood - Hemlock	2015	Overstory Removal to Release Well Established Regeneration
Balsam Fir – Intolerant Hardwood	2015	Commercial Thinning to Promote Crop Tree Growth and Establish Softwood Regeneration

PROJECTED MANAGEMENT RESULTS

- **Wildlife Habitat**

Within the stands, recent harvest in all timber stands will significantly increase its vertical habitat structure; a new age class, or layer of vegetation will be established providing new wildlife habitat.

Management activities proposed in 10-12 years from the date of this plan will continue to enhance this feature.

- **Tree Quality**

Due to the most recent harvest, as well as an effect of incorporating the recommended management activities in 10-12 years, the overall genetic quality and natural condition of tree species will increase. Management activities will target poorly formed, diseased or biologically mature trees for harvest. Through this selection process, and shade control measures enforced by harvest guidelines, the forest will continue the shift toward better genetics and maintain natural species and development condition. The end result will be seen in the financial return of higher quality forest products to the Kneeland family.

LONG TERM MANAGEMENT STRATEGY

The following table provides a generalized long-term (30 years from the date of this plan) forest management strategy. The next forest management plan will more accurately place a date and other specifics for projected management activities.

Long-Term Strategic Management Schedule			
Stand	Year	Activity Description	Activity Goals
Hemlock – Red Spruce	2015	Uneven-aged Selection Harvest	Continue periodic removal of poor quality and mature trees and release of selected crop trees.
Tolerant Hardwood - Hemlock	2015	Overstory Removal	Release Well Established Regeneration while removing mature overstory trees.
Balsam Fir – Intolerant Hardwood	2015	Commercial Thinning	Promote Crop Tree Growth and Establish Softwood Regeneration.
Tolerant Hardwood - Hemlock	2025	Pre-Commercial Thinning	To weed and release selected crop trees.
Entire Property	2025	Property Line Maintenance	To maintain a clearly marked property line- clear brush and refresh old paint blazes.
Balsam Fir – Intolerant Hardwood	2035	Overstory Removal	Release Well Established Regeneration while removing mature overstory trees.
Hemlock – Red Spruce	2035	Uneven-aged Selection Harvest	Continue periodic removal of poor quality and mature trees and release of selected crop trees.

TIMBER HARVEST GUIDELINES

It is essential that proper operational guidelines are followed to attain the expected results of management. Operations must achieve residual stocking levels and wildlife habitat goals/protection set by the recommended management activities. In doing so, operations must maintain water, soil, and visual qualities currently on the forest. Operations are also expected to conform to all current forest regulations and all other site-specific conditions set forth in this management plan and contract.

Water, Soil, and Visual Quality

- All timber harvest operations must comply with guidelines set by Maine’s Best Management Practices (BMP’s). The BMP’s are located in Appendix V.
 - To minimize impact of harvest to soils, operations should occur during winter months when the ground is frozen.



Log Skidder used by the Kneelands for Timber Harvesting

