

FOREST MANAGEMENT PLAN



Property of:

Town of Cumberland
290 Tuttle Road
Cumberland, Maine 04021
(207) 829-5559

Woodland Location

Town: Cumberland, Maine
County: Cumberland
Tax Map R05 Lots 23 and 23A
Parcel Names: Rines, Rines II, Godsoe, Milliken
Forested Acreage: 303+/- acres
Non-Forested Acreage: 0+/- acres

Plan Prepared By:

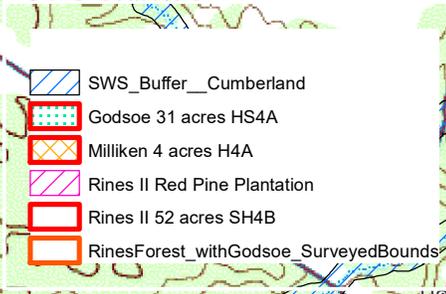
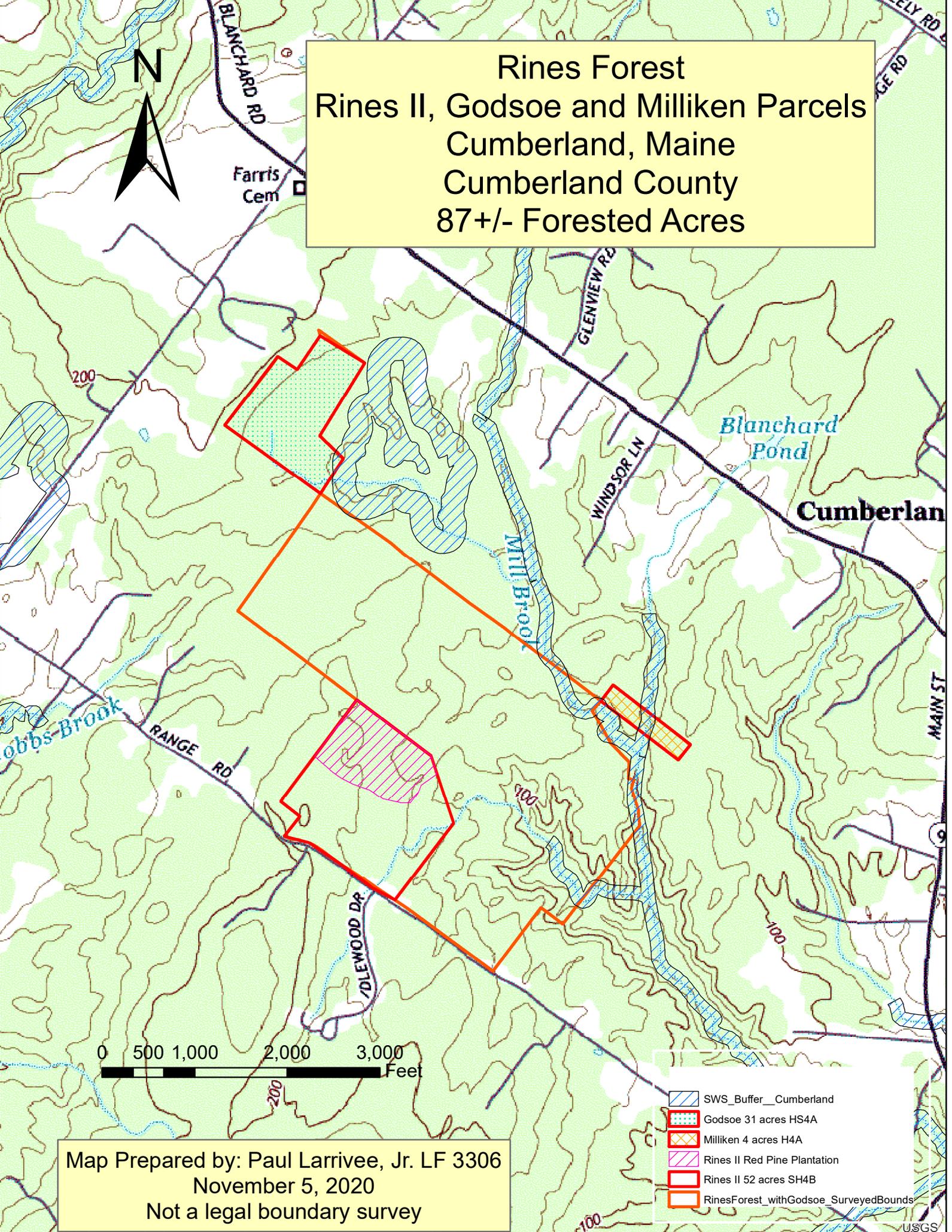
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Plan Date: September 20, 2021

Planning Period: September 2021 to September 2031

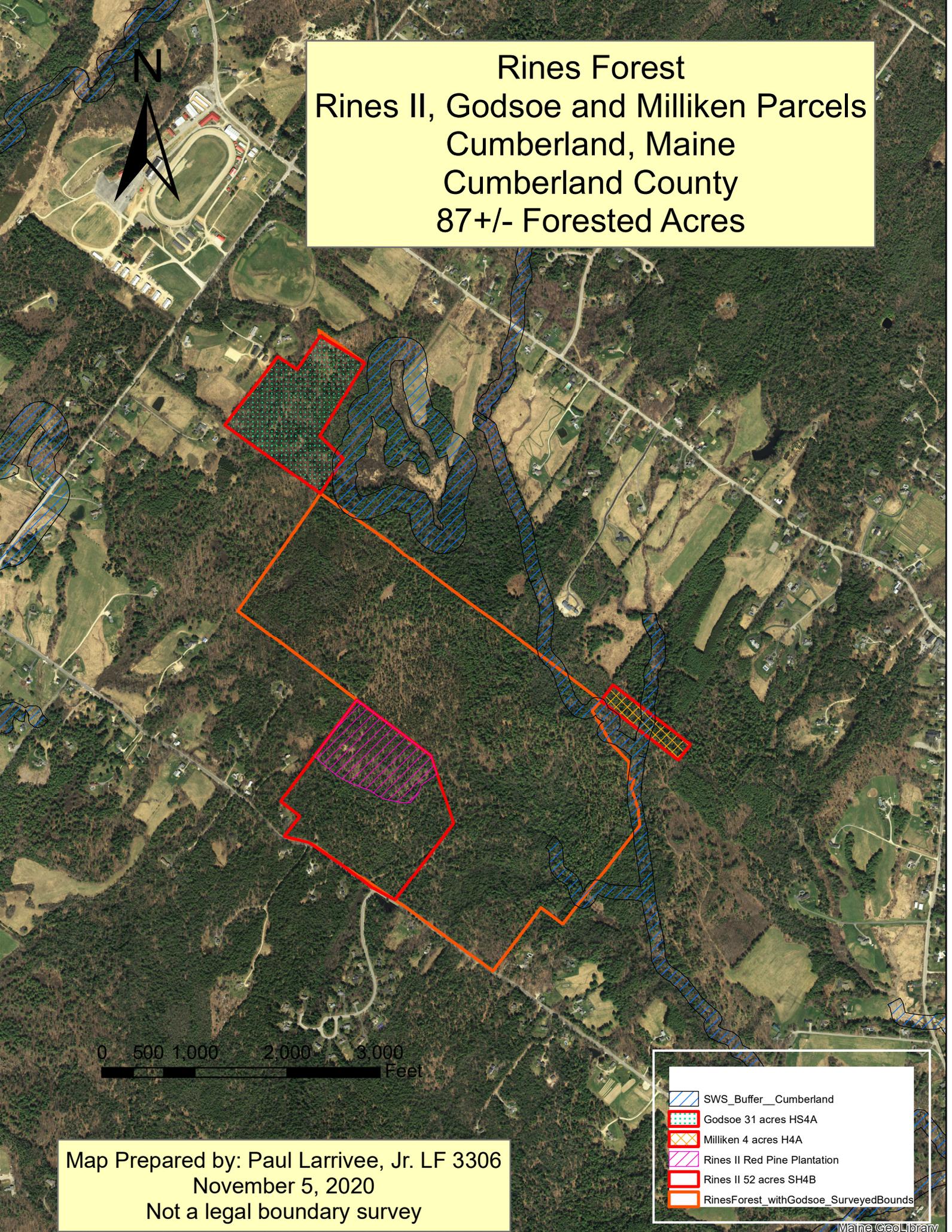
This management plan was prepared to meet the requirements of The Maine Forest Service's Woods Wise Program, The Maine Tree Growth Tax Law Program and the American Tree Farm System. There should be no need to update the original plan until 2031 unless the landowner's management objectives change or some natural disturbance occurs such as insect or disease

Rines Forest
 Rines II, Godsoe and Milliken Parcels
 Cumberland, Maine
 Cumberland County
 87+/- Forested Acres



Map Prepared by: Paul Larrivee, Jr. LF 3306
 November 5, 2020
 Not a legal boundary survey

Rines Forest
Rines II, Godsoe and Milliken Parcels
Cumberland, Maine
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87+/- Forested Acres



0 500 1,000 2,000 3,000 Feet

-  SWS_Buffer__Cumberland
-  Godsoe 31 acres HS4A
-  Milliken 4 acres H4A
-  Rines II Red Pine Plantation
-  Rines II 52 acres SH4B
-  RinesForest_withGodsoe_SurveyedBounds

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Schedule of Recommended Activities:

Activity Name	Extent	Recommended Time	Stand Location	Cost/Income	Priority
IPM Plan for Buckthorn and Invasives		ASAP	Rines and Rines II	?	Very High
Boundary Line Maintenance	3 – 4 miles	2022-2032	All	\$700/mile	High
New Gate for Access Road	1	2022-2025	Rines II	?	Moderate
Examine acquiring access for harvesting equipment	Godsoe Milliken	2022-2025		?	Moderate
Potential Selection Harvest if access is secured and invasives plan implemented	20 acres	2026-2032	Godsoe	\$5,000 - \$7,500	Low

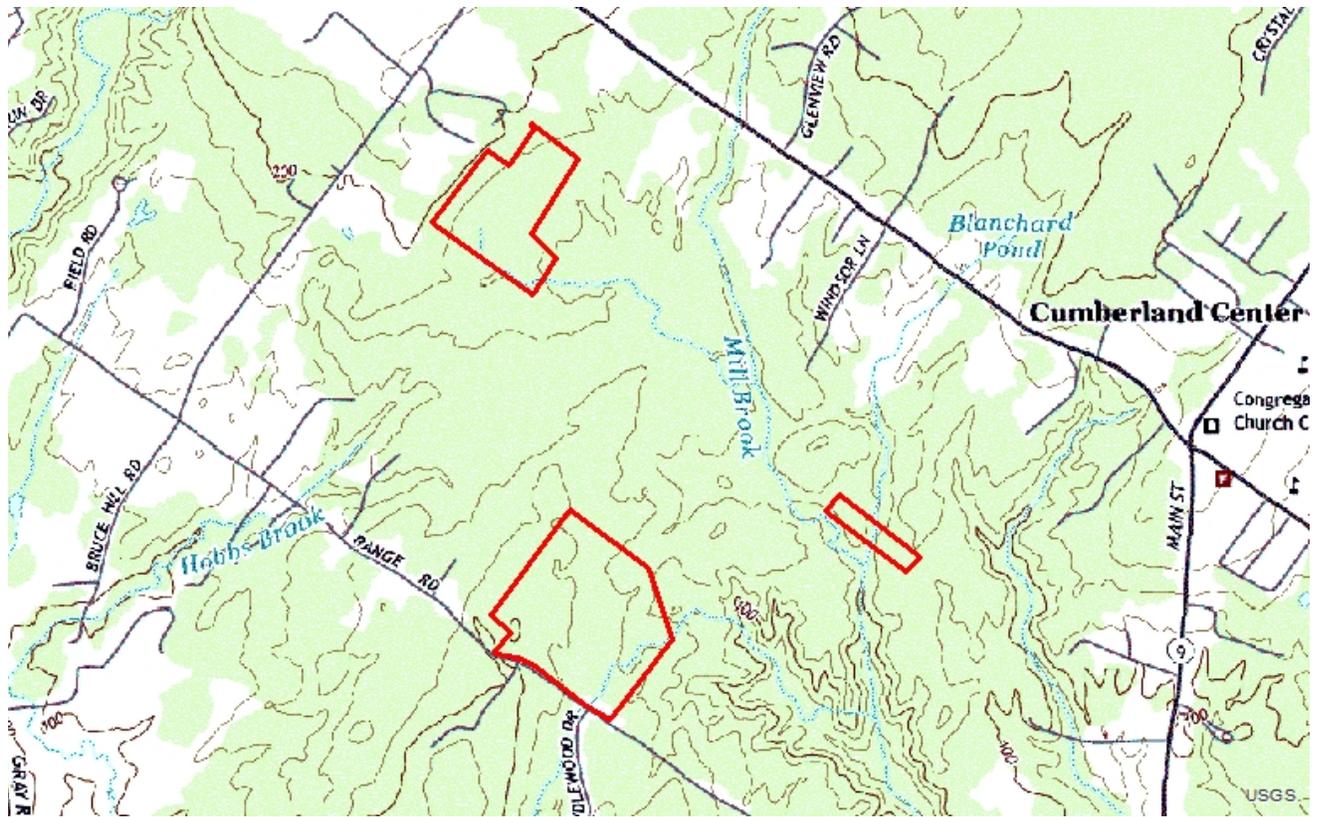
Introduction

This management plan was prepared to meet the requirements of the Maine Forest Service’s Woods Wise Program, Maine Tree Growth Tax Law Program and the American Tree Farm Program. There should be no need to update this plan until 2032 unless the landowner’s management objectives change or some natural disturbance occurs such as insect or disease. This management plan is intended to cover forest management decisions on the Rines II, Godsoe and Milliken Parcels, all three associated with the most recent expansion of the Rines Forest. This plan is intended to serve as a guiding document for 20 years while being revisited in 10 years for necessary updates.

This plan is intended to be a “living” document to guide forest management decisions in order to meet the Rines Forest Principles and Objectives as outlined in the management plan dated December 14, 2020. It is important to remember that conditions may change, such as major storms, insect or disease, or new regulations, that require modification of this plan during the planning period (next twenty years). Having the best written forest management plan is no replacement for having a good working relationship with a forester.

Parcel Location

The Rines Forest is an undeveloped parcel, approximately 300 acres in size, located off of Range Road in the Town of Cumberland, Cumberland County, Maine. The Rines Forest comprises 268 acres previously owned by the Rines family, 30 acres previously owned by the Godsoe Family, and 4 acres previously owned by the Milliken Family. The conservation easement held by the Chebeague & Cumberland Land Trust encumbers the 268-acre portion previously owned by the Rines family. The original 216 acres acquired from the Rines family has an active forest management plan prepared by IFM in 2009. This management plan will cover forest management decisions for the Rines II, Godsoe and Milliken additions to the Rines Forest.



Parcel History

The largest portion of the Rines Forest was owned by the Dale and Elizabeth Rines. In 1918, J. Henry Rines, Dale's grandfather, combined several parcels of land totaling 275 acres along Range Road. The original 216-acre Rines Forest Parcel was acquired by the town of Cumberland in 2003. In 2019 the town purchased the remaining 52 acres piece owned by Dale and Elizabeth Rines (Reference is made to Book 36185 Page 83 in the Cumberland County Registry of Deeds). The town was gifted 31 acres owned by the Godsoe Family in 2013 (Reference is made to Cumberland County Registry of Deeds Book 31223 Page 96). In 2016 Roger and Margo Milliken donated 4 acres of woodland (Reference is made to Cumberland County Registry of Deeds Book 33344 Page 299).

For approximately twenty years the Rines family maintained the property for farming and supporting their livestock. In 1941, Dale Rines' grandfather decided to return the property to forest land. Seventy acres of open fields were planted with red pine and white spruce. Up until the 1960's the forest grew and was pretty much left alone until the Rines family began to thin the forest. It was also at this time when the forest's major woods roads were built by Dale Rines and his father. This enabled the Rines family to harvest wood from the front to the rear of the lot. In more recent years Dale Rines, a forest engineer by training, has managed the property by thinning and selectively harvesting trees as well as maintaining the land. The result is a healthy working forest.

Rines Forest is a typical forest for southern Maine; its composition shaped by past agricultural use, weather events and logging activity. Stonewalls and old wire fence witnessed indicate that the majority of the property was used as agricultural land. Much of this agricultural land abandonment began in the early 1900s as farming activity transitioned west. The forest appears to have been actively managed with selective harvests. The forest management activities were well executed which has resulted in well stocked stands of higher-than-average quality timber.

Landowner's Goals and Objectives

The town of Cumberland developed Management Guiding Principles for Town Forests which may be appropriate for active forest management activities. These principles were adopted by the Cumberland Town Council on December 14, 2020. Cumberland's Guiding Principles State:

“The Town of Cumberland owns multiple properties that are forested and may be appropriate for active forest management. Below is a list of forest management goals for all primary town-owned forest sites, including as of 2020 the Town Forest, Rines Forest, Knights Pond, and Twin Brook. This list refers specifically to forest management and related activities and not to all other management considerations that are pertinent to each site, such as what types of use are allowed. That will be covered in the other parts of the Management Plan for each property. A site-specific Forest Management Plan shall be developed for each primary forest site that is consistent with these guiding principles and is designed to protect and reflect the unique characteristics of each of the town's forested properties (such as landscape setting, geography, important natural resources, and public use). The Town will strive to manage the town's forests as models of a well-managed community forest.

- Maintain and protect productive soils and water quality, including using Stream Smart crossings, with a particular emphasis on the Mill Creek and Presumpscot River watersheds (see Maine Forest Service 2017 Water Quality BMPs).
- Protect special ecological features and functionality intrinsic to each Forest (i.e., rare plant or animal sites, wetlands, riparian areas, vernal pools, deer wintering areas, rare or exemplary natural communities, late successional forests, dead and downed wood, etc.).
- Manage forest stands in a manner that maintains or improves habitat and the overall biodiversity of native plant communities and fish and wildlife species to the extent possible. Particular emphasis will be on maintaining and expanding structurally complex, mature portions of the forest, balanced by special and unique areas, small gaps of early successional habitat, and reserve areas. Two programs that can help guide this approach are Focus Species Forestry and Forestry for Maine Birds.
- Identify and protect reserve areas as forest stands or compartments which express the following attributes: large blocks of forest, older forest, unusual natural areas (e.g., streams, wetlands, riparian areas, rare natural communities), presence of legacy trees, and topographically or geologically diverse or interesting areas.
- Focus long-rotation silvicultural efforts on stands and compartments with productive soils, good access and of reasonable size and quality. Long-term goals may include increasing structural and species diversity, emphasizing the growth of high-quality sawlogs of commercially important species, promoting the continued sequestration of carbon, and contributing to the local wood products market.
- Maintain resilience of native biodiversity and ecosystem processes in the face of climate change. Increase resilience by managing for multiple age classes; managing for the forest types and species best suited to the site; avoiding conversion to other types (e.g., spruce-fir dominated to hardwood dominated); and using natural regeneration to retain and increase species diversity characteristic of the site and forest type, including the proportion of species predicted to be better adapted to future conditions, such as white pine and red oak. In addition, plan for high-volume runoff by using Stream Smart crossings.
- The actual balance of forest type, age, and silvicultural treatment recommended within each forest should be determined in consideration of the habitat matrix of the surrounding landscape. This would include an analysis of the extent and age-class structure of habitats in the surrounding lands as well as opportunities for maintaining and enhancing both terrestrial and aquatic habitat connections and recreational trail connections; and management opportunities across all town forests. In other words, different properties may be managed for different site-specific goals as long as the sum of the whole meets the overall town's forest management goals.
- Make every reasonable effort to control invasive plant species in the forest while reaching out to adjacent landowners to encourage the same.
- Implement exemplary forest management that is consistent with sustainable forestry standards such as those provided by the Forest Stewardship Council (FSC).
- Strive to keep forest harvesting activities revenue neutral over the long run (this is separate from the cost of managing other activities in the forests such as reducing invasive species, building and maintaining trails, and providing educational signs, etc.).

- Offer quality aesthetic, educational and recreational opportunities to the community for the benefit of the public as long as it doesn't detract from above goals. All trails should be built and maintained to minimize soil erosion and compaction and limit disturbance to fish and wildlife.
- Conduct all harvests in a manner that minimizes impacts to soil, water, and fish and wildlife, including avoiding or minimizing the use of new roads and road-stream crossings; using Stream Smart crossings where crossings are needed; putting unused roads to bed; giving preference to harvesting on frozen ground or dry-soil conditions; avoiding harvesting during peak amphibian and bird nesting times (April 1- July 31); and using appropriate equipment given the silvicultural goals".

The Cumberland Forestry Committee and town forester have spent time exploring Rines II, Godsoe and Milliken while discussing site specific objectives for the additional parcels added to the Rines Forest. Those specific objectives are:

1. Focus on the invasive species issue, especially buckthorn. Do not promote timber harvesting with the existing invasive species component.
2. Locate, blaze and paint boundary lines on the Godsoe and Milliken parcels.
3. Potentially expand the amount of the Rines Forest in Reserve, especially on steep slopes and riparian corridors.
4. It appears that the Godsoe and Rines forest only touch at a common corner. Expanding access from the Rines forest to the Godsoe parcel should be examined.
5. Future timber harvesting should utilize low impact equipment and only be conducted after a comprehensive invasive species strategy is developed.

Acreege Breakdown

The following table summarizes total acreage by land use classification:

<u>Stand</u>	<u>Type</u>	<u>Acres</u>
Rines II		52
Godsoe		31
Milliken		4
Total		87

	<u>Acres</u>
<u>Hrdwd</u>	4
<u>Mxwd</u>	83
<u>Forested</u>	87

General Conditions of the Woodlot

General Woodland Description

The Rines Forest is an above average woodland in southern-Maine. Past management activities have focused on improving the stocking of higher quality timber on the lot. It appears multiple entries have been made since the 1960s. The Godsoe property appears to have had much of the hemlock and pine removed adjacent to some of the wetter soils. The Milliken Property had past entries decades ago to remove white pine. The overall stocking is moderate and past removals favored dominant trees. Regeneration exists in openings created during past harvests, though some areas would be considered closed canopy conditions. The forest is a two or possibly three age forest. The youngest age class is currently threatened by invasive species, especially in the most recent harvest areas. The Rines Forest encompasses the following broad major wooded upland types:

- **Oak - Northern Hardwood:** This broad upland forest type dominates the Milliken Property. Oak-Northern Hardwood is described as a mixed upland forest type with red oak and northern hardwoods in the canopy. Some stands are almost entirely deciduous (typically oak-beech), while others are mixed with white pine, spruce, hemlock, or cedar. These are typically closed canopy conditions with a spotty herb or sapling/shrub layer.
- **Red Pine Plantation:** The current collection of stands is dominated by planted red pine. The red pine was planted in the 1940s but was originally a pasture. Due mostly to variations in soil types and hydrology, small pockets of the plantation did not survive and regenerated naturally. The naturally regenerated species include white pine and red oak. This type dominates about 15 acres of Rines II.
- **Hemlock:** This broad upland type is dominated by hemlock. The closed conifer canopy allows little light to the forest floor; therefore, shrubs and herbs are sparse. In Rines II this hemlock type is a co-dominant with red oak, yellow birch, red maple and white pine. The 37 acres of Rines II would be considered this hemlock broad upland type. Most of the Godsoe properties 31 acres would be considered this broad type as well.

Boundary Lines & Monitoring

Property lines on the Rines II property are in good condition. Boundary evidence including old pipes and blazes were found in most areas. Based on limited research in the registry of deeds, I found a survey completed for the Godsoe Parcel (Cumberland County Registry of Deeds Plan Book 219, Page 510).

The current boundary line evidence is as follows:

- The Rines II parcel only has one external boundary line (north-western line). Old blazes and paint were found along this line.
- The Milliken Parcel only connects to the Rines Forest at one point. Boundary evidence is abutter signs and old ribbon. Some survey corner markers were located.
- The Godsoe parcel has been surveyed. However, on the ground there is very little boundary evidence on any of the lines.

The Rines II external lines exist and just need maintenance. The Godsoe and Milliken lines need to be located on the ground, blazed and painted. Blazing and painting greatly reduces the likelihood of future expensive survey costs. Existing corner pins should be noted and highlighted with paint.

Terrain/Hydrology

Several streams run through the Rines Forest, the largest being Mill Brook, which begins at Knight's Pond and eventually feeds into the Piscataqua River, which then feeds into the Presumpscot River and then Casco Bay. Several Mill Brook tributary streams exist. One begins on the Godsoe Property along the southern boundary line. A

tributary from Blanchard Pond bisects the Milliken Parcel and intercepts with Mill Brook just south of the Milliken Parcel. Finally, a tributary travers parallel and along the eastern boundary line of Rines II. This tributary intersects with Mill Brook just east of the Rines Forest. These generally flow down rocky beds between upland ridges and carry especially heavy flows during and after large rainstorms. The streams are generally clear except following rainstorms or snowmelt.

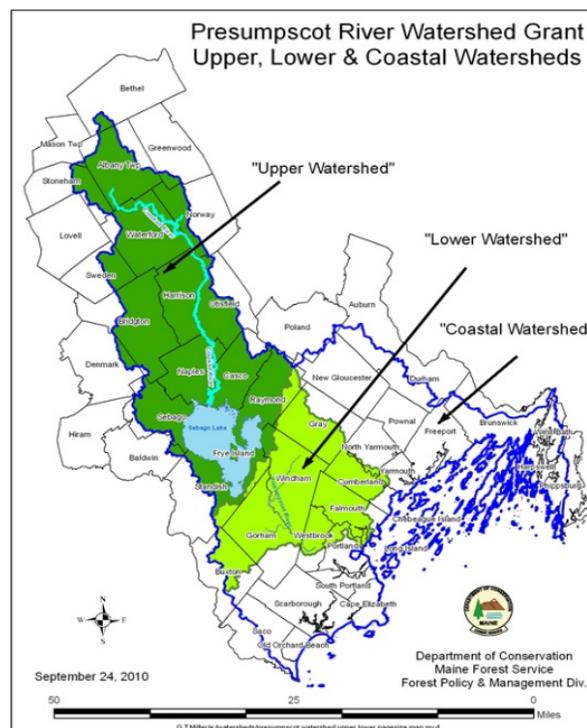
The Rines II parcel has large sections of relatively flat sandy soils and terrain where the red pines were planted. The Milliken Parcel is flat with a bisecting ravine associated with the Mill Brook Tributary. The Godsoe Parcel is relatively flat with some small forested wetlands in southern portions of the lot.

When planning a timber harvest, it is important to recognize the significance of these water features and conduct harvesting operations during very dry or frozen conditions. All applicable forestry BMPs should be implemented during future harvesting activities. As well, Maine Forest Service Statewide Standards for timber harvesting apply to some of these water features and regulate harvesting activities adjacent to them (see map). It is recommended that a licensed forester mark timber for removal in these areas.

Watershed – Name/Positions

In taking a state wide watershed view, this parcel is located within the Presumpscot River Watershed. More specifically the Rines Forest is located within the “Lower Watershed”. This watershed feeds clean water to the 30,000-acre Sebago Lake. Sebago Lake in turn is responsible for supplying clean drinking water to 16% of Maine’s population as well as countless seasonal visitors.

It is important that the town of Cumberland be aware of the Sebago Clean Waters Program that exists and their mission to expand the amount of conserved forestland within the watershed. Currently only about 11% of the Sebago Lake Watershed is conserved. Their goal is to expand that percentage to 25%. More information can be found at their website; www.sebagocleanwaters.org



Soils Information

See attached Soils Information and Soils Map. Soils map and data extracted from the Natural Resource Conservation Service Web Soil Survey. The major classification is Lyman-Tunbridge complex, 0 to 15% slope, rocky. Below is a summary of soils for forest management purposes. The first chart is related to the soils site quality for some of the predominant species associated with the lot. More information can be found at: <http://websoilsurvey.nrcs.usda.gov>

Site Index

Site index is a measure of a forest's potential productivity. Site index is usually defined as the height of the dominant or codominant trees at a specified age in a stand. It is calculated in an equation that uses the tree's height and age.

<u>Soil Series</u>	<u>White Pine</u>	<u>Red Pine</u>	<u>Red Oak</u>
BgB	-	-	-
BuB	-	-	-
BuC2	-	-	-
DeB	-	-	-
HIB	61	54	49
HIC	61	54	49
HrB	56	-	53
HrC	56	-	53
Sn	-	-	-
SuE2	62	-	60
WmB	-	-	-
WmC	57	61	52

Factors Affecting Forest Management

<u>Soil Series</u>	<u>Erosion Hazard</u>	<u>Soil Rutting Hazard</u>	<u>Windthrow Hazard</u>
BgB	Moderate	Severe	Moderate
BuB	Moderate	Severe	Moderate
BuC2	Severe	Severe	Moderate
DeB	Moderate	Moderate	Moderate
HIB	Moderate	Moderate	Slight
HIC	Moderate	Moderate	Slight
HrB	Moderate	Severe	Severe
HrC	Severe	Severe	Severe
Sn	Slight	Severe	Moderate
SuE2	Severe	Severe	Moderate
WmB	Slight	Moderate	Slight
WmC	Moderate	Moderate	Slight

Nicholville very fine sandy loam, 0 to 8 percent slopes, (BgB) (+/- 7 acres): The Nicholville series consists of very deep, moderately well drained soils formed in wind or water deposited material having a high content of silt and

very fine sand. They are on lake plains and low benches on uplands. Estimated saturated hydraulic conductivity is moderately high or high. Most areas have been cleared and are used for growing hay, corn, small grain, and vegetable crops. Wooded areas support sugar maple, beech, Northern red oak, and some white pine.

Lamoine silt loams, 3 to 8 percent slopes (BuB) (+/- 5 acres): The Lamoine series consists of very deep, somewhat poorly drained soils formed in glaciolacustrine or glaciomarine deposits on coastal lowlands and river valleys. Slope ranges from 0 to 15 percent. Permeability is moderate or moderately slow in the surface horizon, moderately slow or slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil and in the substratum. Cleared areas are used mainly for hay or pasture. The remaining areas are forested. Common tree species include eastern white pine, balsam fir, red spruce, white spruce, eastern hemlock, red maple, yellow birch, gray birch, paper birch, sugar maple, alders and aspen.

Buxton Silt Loam, 3 to 8 percent slopes (BuC2) (+/- 1 acres): The Buxton series consists of very deep, moderately well drained soils that formed in glaciolacustrine or glaciomarine deposits on coastal lowlands and river valleys. Slope ranges from 3 to 50 percent. Permeability is moderate or moderately slow in the surface horizon, moderately slow or slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil and in the substratum. Cleared areas are used mainly for hay, forage crops, or pasture. Some areas are used for silage corn or vegetables. The remaining areas are forested. Common tree species include eastern white pine, balsam fir, paper birch, white spruce, eastern hemlock, and northern red oak.

Deerfield loamy fine sand, 0 to 8 percent slopes, (DeB) (+/- 8 acre): The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits. They are nearly level to strongly sloping soils on terraces, deltas, and outwash plains. Mainly cleared and used for truck crops, tobacco, potatoes, hay, pasture and silage corn. Forested areas have pitch pine, white pine, gray birch, red maple, oaks, and sugar maple. Many areas are in urban uses.

Hinkley loamy sand, 3 to 15 percent slopes, (HIB, HIC) (+/-17 acres): The Hinckley series consists of very deep, excessively drained soils formed in glaciofluvial materials. They are nearly level through very steep soils on outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Saturated hydraulic conductivity is high or very high. Most areas are forested, brush land or used as urban land. Northern red, black, white, scarlet and scrub oak, eastern white and pitch pine, eastern hemlock, and gray birch are the common trees. Unimproved pasture and idle land support hardhack, little bluestem, bracken fern, sweet fern, and low bush blueberry.

Lyman-Tunbridge complex, 0 to 15 percent slopes, rocky (HrB, HrC) (+/-22 acres): The Lyman series consists of shallow, somewhat excessively drained soils on glaciated uplands. The Tunbridge series consists of moderately deep, well drained soils on glaciated uplands. Mostly forested, principal species include sugar maple, yellow birch, paper birch, eastern white pine, eastern hemlock, balsam fir, and white spruce.

Scantic Silt Loams (Sn) (+/- 3 acres): The Scantic series consists of very deep, poorly drained soils formed in glaciomarine or glaciolacustrine deposits on coastal lowlands and river valleys. Slope ranges from 0 to 8 percent. Saturated hydraulic conductivity of the surface and subsurface horizons is moderately high or high and low or moderately slow in the subsoil and substratum. Mostly idle or woodland, some areas are used for growing hay and pasture. Common tree species include red maple, elm, gray birch, white ash, balsam fir, red and white spruce, tamarack, and some eastern white pine.

Suffield silt loam, 25 to 45 percent slopes, eroded (SuE2) (+/- 3 acres): The Suffield series consists of very deep, well drained soils formed in lacustrine or marine sediments. They are mainly on gently sloping to very steep dissected plains. The soils formed in marine or lacustrine sediments consisting of a silt loam mantle over silty clay loam or silty clay materials. Mostly areas are cleared and are used for growing grass and legume hay, pasture, and corn silage. Common forest trees are sugar maple, oak, elm, white pine, and hemlock.

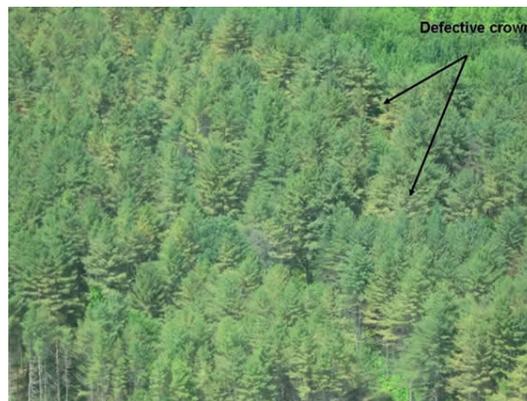
Windsor loamy sand, 0 to 15 percent slopes (WmB, WmC) (+/-12 acres): The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. They are nearly level through very steep soils on glaciofluvial landforms. Most areas are forested or in low growing brushy vegetation. Some areas are used for

silage corn, hay, and pasture. Small areas, mostly irrigated, are used for shade tobacco, vegetables and nursery stock. Some areas are in community development. Common trees are white, black, and northern red oak, eastern white pine, pitch pine, gray birch, poplar, red maple, and sugar maple.

Insects, Disease and Forest Health

As is typical with white pine in the area, some blister rust was witnessed as well as white pine weevil damage, especially in the shallow, rocky, high elevation outcrop areas. Also, with the amount of oak sawtimber present on this parcel, Gypsy moth activity should be monitored. Some gypsy moth egg masses were witnessed during the timber inventory. 16% of the basal area is red oak.

Another situation to monitor is the presence of white pine needle cast which was fairly moderate last year. The needles should be dropped and the trees green again by the beginning of July. The situation will be monitored by the forestry committee and forester. White pine needle cast has been occurring regularly now for roughly the past ten to 15 years. The problem appears to be much worse when the pine trees are in close proximity to waterbodies. 11% of the basal area is white pine.



(Picture Maine Forest Service)

As is typical with American Beech in Maine, Beech bark disease exists throughout the beech on the lot. Beech bark disease has been detected in Maine since the 1930's. The disease is caused by the combination of a scale insect and two necrotic fungi. The complex causes degradation of wood quality and mortality in Beech. It also allows other fungi and insects to enter the trees through the damaged areas it has created. There is no cost-effective approach to controlling beech bark disease in the forest setting. Forest management decisions should factor in the extent of the disease and options for diversifying species composition in heavily infested beech areas. While only 1-2% of the current basal area is beech, it is important to recognize during future management activities that disease resistant beech do exist. It is important to reserve resistant trees for current and future mast trees.



Scale infested beech

Several insects to be aware of that have the potential to cause damage to timber especially in the southern part of Maine are hemlock wooly adelgid, emerald ash borer and Asian long horned beetle.

- The Asian long horned beetle (ALB), is a woodboring beetle native to China. ALB develops and reproduces within healthy and stressed deciduous hardwood trees, such as maple, birch, horse chestnut, poplar, willow, elm, and ash. Attacked trees will eventually die. Currently, the Asian long horned beetle is known to be in Massachusetts, New York, and Ohio, where quarantines are in place to reduce its spread. It was rediscovered in Toronto, Canada in 2013.
- The emerald ash borer (EAB), *Agrilus planipennis*, is one of the most serious invasive species threatening our ash resources and forests. All species of (*Fraxinus*) ash trees, but not (*Sorbus*) mountain ash, that grow in Maine are susceptible to injury and death by the emerald ash borer. (EAB) was first found in Aroostook County (Madawaska, Frenchville, and Grand Isle), and York County (Acton, Berwick, and Lebanon), ME in 2018. It was detected in Cumberland County (Portland) in October 2019, and several new locations in Cumberland and Oxford County just recently, including Falmouth. Although the ash component is low (1% of the basal area), it is important to be aware of the insect and report any indications to the Maine Forest Service as soon as possible. None was witnessed at this time.
- Hemlock Woolly Adelgid (HWA) is an introduced, aphid-like insect from Asia that attacks eastern hemlock. Many areas infested with HWA display extensive tree decline and mortality. HWA affects all species of hemlock, but does not affect pine, spruce, fir or other conifers. The most obvious sign of HWA is the covering of wool-like wax filaments produced as the insect matures. The woolly masses generally range from about 1/16-inch to 1/8-inch in diameter. They are most visible from late fall to early summer on the undersides of the outermost branch tips of hemlock trees. The closest known population of hemlock wooly adelgid I have witnessed was on Harris Road in Cumberland. Although none was witnessed on the lot during the field work, it is important to be on the lookout as hemlock represents 18% of the lots basal area.

The Rines portion of the forest has a major invasive species issue with Buckthorn. The majority of the red pine plantation area is compromised with Buckthorn. The spread increased after the 2011 timber harvest. The non-plantation areas with a more closed canopy have limited the rate of spread. It is recommended that a long-term plan be developed for handling the invasive species problem on the Rines Forest. Timber harvesting should be paused until a plan to tackle the invasive issue is developed. I believe that any plan will involve mechanical and chemical treatment in order to begin the treatment of this issue. Below is the IPM that was developed with the 2009 Rines Forest Management Plan. This should be updated by the Forestry Committee ASAP.

Integrated Pest Management Plan (IPM)

*Field observations have confirmed the presence of a major infestation of common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*Frangula alnus*). In some cases, this invasive species has completely taken over large portions of the understory, choking out all other species. The outbreaks seem to be associated both with soil condition (wet areas) and light treatment. Given the widespread nature of this infestation a significant, multi-measure control plan should be considered at this time. Currently, there are no known biological control measures available for buckthorn control as is the case for Purple Loosetrife. The control plan should include a means of mechanically cutting the well-established stems, some of which are 20' tall. Plants this tall cannot be adequately controlled, and increases the risk of applying chemicals off target, if a chemical approach is selected. Further I have identified smaller populations of the significantly less insidious Japanese barberry (*Berberis vulgaris*). These populations should be addressed during the entries where Buckthorn will be the primary target.*

IPM Action Plan

Mechanically remove as much buckthorn as possible as part of harvest plan (winter 2009)

Treat by hand those stems that were missed during harvest. (early spring 2010)

Chemically treat sprouts with a quality sub-contractor (fall 2010)

Hand pull remaining individual (summer 2011)

Monitor and hand pull (ongoing)

Please note that the IPM is a living document and will be completed in conjunction with an independent vegetation control expert. Please see the following pages for more information on buckthorn.

Access

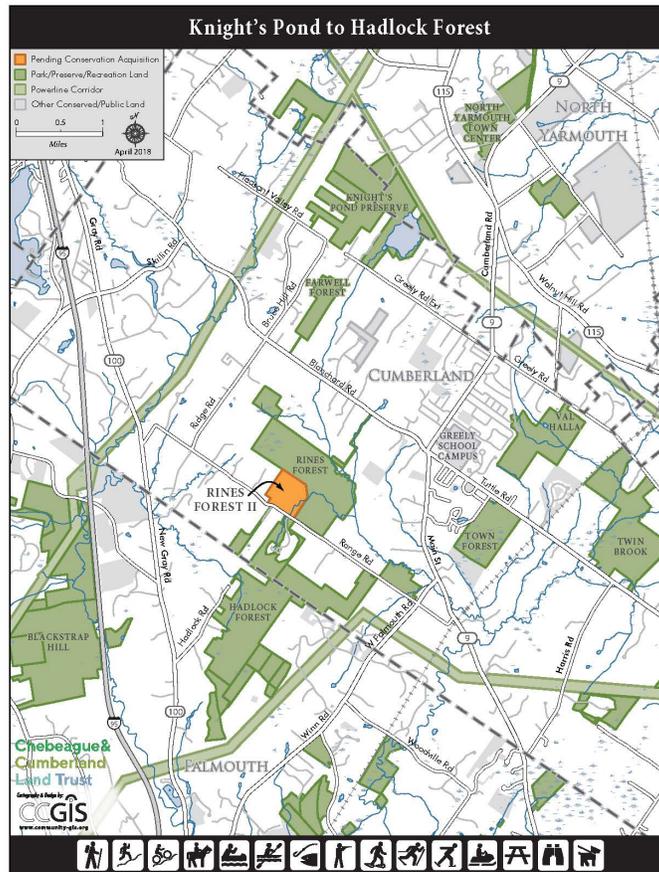
Access to the Rines Forest is sufficient from Range Rd. on an existing access road that originates on the Rines II parcel. Acquiring the Rines II portion of the Rines Forest was key in having adequate timber harvesting access. Access for logging on the Godsoe and Milliken parcels does not exist. There is no way to getting harvesting equipment on those lots. The two parcels only intersect the Rines Forest at a common corner point.

Developing access to these parcels should be considered a top priority. Possible trail easements should be wide enough for harvesting equipment to be able to access the Godsoe and Milliken parcels.

I did not witness any major erosion problems on the current access points. I do however believe a better gate system should be developed at the vehicle access points along Range Road. Last spring some rutting occurred when a vehicle entered the trails system from the access road. Gates should be wide enough for logging trucks to be able to use the access road.

Interaction with Surrounding Properties

The Rines Forest is a major component of a multi-town undeveloped corridor that stretches from the Hadlock Forest in Falmouth to Knight's Pond and Blueberry Hill in Cumberland/North Yarmouth, and is adjacent to CCLT's Frog Pond and Salamander Swamp along Range Road. The current 302-acre Rines Forest is a part of a 900- acre unfragmented forest that is also connected to other natural lands in Falmouth, Cumberland, and North Yarmouth.



Legal Obligations

Before harvesting timber, landowners should be aware that there are several laws that regulate timber harvesting in the State of Maine. While it would be difficult to explain them in detail, a brief overview has been provided. It is important to remember that the best protection to be assured that all applicable laws will be followed is to contract the services of a consulting forester to help administer the timber sale. Also, it is important to remember that before harvesting occurs, the town of Cumberland should be contacted to verify any new local ordinances exist and to ensure no local laws are violated during the timber harvest. The town of Cumberland is a “Statewide Standards” town under Maine Forest Service jurisdiction. However, the town of Cumberland requires a permit be filed with the CEO prior to beginning any timber harvesting activities in Cumberland.

-Deed restrictions: According to the best available knowledge of the landowner and the forester’s review of the deeds, the property is not subject to deed restrictions which affect forest management activities.

-Easements: The Property is governed by a permanent Conservation Easement held by the Chebeague and Cumberland Land Trust (CCLT) to "protect the Forest's natural beauty, wildlife and varied ecosystems." The Easement states "The Protected Property shall be used only for conservation and low-impact outdoor recreation and educational activities that do not rely on substantial alteration to the natural resources." The Easement also states "...any cutting of trees should be done under the guidance of a forest management plan developed by a professional forester with input from a professional wildlife biologist. The forest management plan must include provisions for protecting soils, water quality and high value plant and animal habitat."

-Local ordinances: A permit is required from the Cumberland CEO prior to any timber harvesting.

-The Forest Practices Act defines clear cuts and regulates the size, shape and arrangement of them. A small timber harvest is recommended for solar reasons; therefore, a Forest Operation Notification (FON) must be submitted to the MFS prior to starting the operation. Forms may be obtained from the MFS, or from your Stewardship Forester. A Confidential Landowner Report of harvesting activities will be required at the end of each year from landowners who have an active/open FON. This management plan does not recommend any harvest activities which would result in clearcuts under the Chapter 20 definitions.

-The liquidation harvesting rules regulate the purchase of timberland followed by a timber harvest that removes most or all of the commercial timber and then the sale or offer of sale of the land or any portion of the land. None of the recommendations in this plan will lead to any potential liquidation law issues.

-Maine Forest Service Statewide Standards establishes statewide standards for timber harvesting and related activities in shoreland areas. In general, timber harvesting activities in shoreland areas must protect shoreline integrity and not expose mineral soil that can be washed into water bodies, including non-forested freshwater and coastal wetlands and tidal waters. Timber harvesting and related activities in shoreland areas below the 300-acre drainage point must leave windfirm stands of trees that provide adequate shade. If located in shoreland areas, roads used primarily for timber harvesting and related activities must be constructed and maintained to standards designed to minimize the chance of exposed soil washing into water bodies, including wetlands. Stream crossings must not disrupt the natural flow of water and must not allow sediment into water bodies. Mill Brook is zoned 75' streamside protection. This 75' zone is on the Milliken and Rines Parcels. A large wetland east of the Godsoe parcel is zoned under a 250' shoreland zone protection zone. This buffer lies partially on the Godsoe parcel.

-Erosion and Sediment Control is a basic act that requires landowners to prevent pollution (by soil, chemicals, debris, etc.) of Maine water bodies, such as streams, lakes, wetlands, and coastal areas. Landowners are also required to take measures that limit or contain the movement of soil, or erosion, on areas where soil is disrupted, including logging roads, trails and landings.

-The Natural Resource Protection Act regulates work done in, over, or next to any water body, as well as sand dunes, marshes and other wetlands and areas of designated significant wildlife habitat. In most cases, a landowner must obtain a permit from DEP or LURC before conducting activities in these areas.

-Protection and Improvement of Waters Law regulates activities that discharge or could potentially discharge materials (pollutants) into rivers, streams, brooks, lakes and ponds and tidal waters (waters of the State).

While not a law in the state of Maine, I recommend notifying neighbors prior to timber harvesting activities. In my experience it allows neighbors to review property line evidence and reduce the likelihood of conflict during the harvesting activities.

Property Tax Status

None of the parcel is enrolled in Maine Tree Growth Tax program. The landowners are municipal.

Field Methods Statement

Aerial photography, hydrology, and contour information for the property were obtained from the State of Maine GIS website and downloaded into Arc-View GIS mapping software. From this, an electronic map was generated and a systematic cruise grid was overlaid onto the map in the form of a shapefile. Several days were spent on the property scouting, finding boundary lines, evaluating timber types and cruising.

A formal inventory was conducted. 16 BAF 15 prism points were placed randomly across the ownership using ArcMap. The points were downloaded to a Garmin handheld and located in the field. Data was collected using Timber Pad software and timber volumes and carbon data were calculated using Tall Timber Software.

Non-Timber Resource Planning Considerations

Threatened and Endangered Species, and Rare or Exemplary Natural Communities

The Maine Department of Inland Fisheries & Wildlife and the US Fish and Wildlife Service were consulted when reviewing the Rines Forest. The full report is attached in the index of this plan. Below is a summary of the findings:

- “The parcel is within a focal area for New England Cottontail (State Endangered). Cottontails can be differentiated from the much more common snowshoe hare by their generally smaller size, and that they remain brown year-round; whereas hares change to white in winter. They rely on early-successional habitats such as dense, shrubby thickets or regenerating young forests, and such habitat is also valuable to species such as American woodcock, ruffed grouse, prairie warblers, brown thrashers, and many others. Good forestry practices can produce this habitat and provide for timber procurement.”

- “Mill Brook and its tributaries support populations of wild brook trout. Brook trout prefer cool, well-oxygenated waters that benefit from intact riparian corridors. Any forest management activities planned for riparian zones should closely follow the state’s Best Management Practices, including appropriate buffer distances, shade retention, and minimization of sediment runoff.”

- “Good management of these habitats is consistent with good forestry, and MDIFW’s regional wildlife and fisheries biologists are available to assist you in maintaining their integrity while allowing for forest management and timber procurement. According to the information currently in our files, there are no other rare species or important habitats documented within the property. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare features.”

Wildlife Habitat Elements

During the forestry field work for the management plan, it was apparent that the Rines Forest is well used by a variety of wildlife. Deer, raccoon, squirrel, coyote, turkey and a multitude of song birds were just a few of the species noted on the parcels. Future timber harvesting should strive to maintain and promote a source of mast (acorns, beech nuts) producing trees such as beech and oak, as well as providing areas of young herbaceous growth for browsing. Residual slash from future harvests could be piled in small piles to provide small dens for a variety of wildlife species.

Snag trees (standing dead trees) should be retained where feasible to provide valuable cavities for species such as woodpecker. Currently 5% of the standing basal area would be considered snags, which equates to 15+/- trees per acre. The majority of these snags are on the smaller end of the diameter distribution. During future management activities managers should identify and reserve larger legacy trees as future snag trees. Increasing the average diameter of snags would be beneficial in creating larger cavity trees and future down woody debris. Harvesters should also be encouraged to return some large woody debris from yard areas to the woods, which in turn will provide valuable habitat to a variety of invertebrates and vertebrates. Maintaining a diversity of tree species and age classes is the best way to provide the greatest good to the greatest variety of wildlife species.

The property’s highest wildlife value is the undeveloped travel corridor that it provides less than a mile from the centers of Cumberland and North Yarmouth. Large undeveloped tracts offer the greatest diversity of habitat for a multitude of species. The single biggest threat to habitat is the fragmentation of undeveloped forest blocks. The objectives put forth by the landowner recognize the importance of this feature and guidelines have been set to ensure its future.

Another threat to the habitat is the abundance of Buckthorn. Buckthorn has the ability to completely eliminate the possibility of a new age class of trees being established. Again, invasives have to be the top priority in future forest management decisions.

Historical, Cultural & Archaeological Sites

The Maine Historic Preservation Commission (MHPC) was contacted to check for any significant archaeological sites located on the property. The review indicated that no prehistoric (Native American) archaeological sites are known to exist on the property because no survey has been conducted. The report states that no historic archaeology sites are known or likely to exist based on historic information. The report concludes that there may be buildings or structures may exist on the property that have not been evaluated for National Register eligibility.

According to local and past landowner history, the Rines property had a house, two barns and a well. Stone walls still can be found in many areas as well as an old mill dam near the waterfall trail on the original Rines Purchase.

During any future timber harvesting activity these areas should be buffered. Timber management activities should preserve the existing stone walls to the maximum extent possible.

Recreation and Aesthetics

The lot is well used as a recreational destination. The trails are used by walkers, bikers, skiers, snowshoers, hunters and nature watchers regularly. The pond is actively used in the winter by skaters and hockey players. The trails committee is very active and monitors trail conditions regularly. During the 2020 Pandemic the trails and parking areas were used extensively. Some erosion was witnessed from the trails to Mill Brook. The trails committee works on trail hardening projects annually. The Committee regularly corresponds with the Forestry Committee on trail projects. This is very important as recreation trails should be avoided by harvesting equipment. However, often the recreation trails are placed at the best location for timber harvesting trails as well. The two can co-exist as long as the communication channels between the groups remains open.

It is important to note that under the Landowner Liability Law (Title 14, M.R.S.A Section 159-A) the landowner is protected from liability in the event that someone was injured while using the property for recreation. For more information on the Landowner Liability Law please visit the Maine Department of Inland Fisheries & Wildlife website.

Aesthetics are a priority for the Rines Forest and future timber harvests should strive to maintain them throughout the property. Slash piles returned to the woods should be spread so it is as close to the ground as possible and bumper trees used during the harvest should be removed prior to the completion of harvesting activities. Stump heights should be kept as low as possible. Log landings should be cleared of wood debris after completion of harvesting. Wood debris from the landing should be carried back into the woods if possible. Log landings should be seeded with a quality conservation mix that is certified not to contain invasive species. Slash should be kept well away from property lines and access road.

It is important to recognize, though, that “clean and neat” is not necessarily the same as “aesthetics” or good forest management. Brush, large woody debris, dead standing snags and future snags are important for a healthy forest. While the “park like” look may be aesthetically pleasing to the general public and most people, it does not equate with sustainable forest management. The Forestry Committee is aware that “messy” to the general public can also mean the forest is being managed for multiple benefits. It is also important to recognize that there is a difference between managing woodland for multiple benefits and poor-quality logging work. Aesthetics and well managed woodland are compatible.

Other Long-term resource considerations

-Protection from fire: Wildfire is rare in Maine, but can be quite devastating when it occurs. There is a lot you can do to reduce the risk of a wildfire on your woodlot and near your home. For more information on how you can make your home “Firewise,” please visit www.maineforestservice.gov or call the Division of Forest Protection at 207-

287-4990. Please be careful with all outdoor fires and observe all the open burning laws. If you see a wildfire or smell smoke during a high fire danger day, please call 911 or the Maine Forest Service at 1-800-750-9777.

-Soil & water quality protection: Activities in the woods that involve roads, log landings, and yarding or recreational trails, can sometimes contribute to rutting, soil movement and pollution of the watershed. Improperly conducted logging operations can also cause damage. Use of appropriate Best Management Practices (BMPs) greatly reduces this risk. For more information, see the booklet entitled “Best Management Practices for Water Quality,” available from the MFS by calling 1-800-367-0223 or visiting www.maineforestservice.gov, or contact your local MFS District Forester.

-Biodiversity: Forested landscapes are homes for more than just trees. No one parcel can provide habitat for all species. However, maintaining or improving existing woodland communities is a desirable goal. Elements of ecological structure such as snags, downed woody material, cavity trees, etc., can enhance biodiversity and a variety of wildlife habitat. For more information, contact the Maine Natural Areas Program at 207-287- 8044 or visit <http://www.maine.gov/doc/nrimc/mnap>; or contact your local MFS District Forester.

-Monitoring: The Cumberland Forestry Committee is encouraged to monitor Rines Forest. This can take the form of regularly scheduled boundary line maintenance, recreational activities such as walking or hiking, or following up after completing silvicultural activities to check results. Keeping in touch with your land can help prevent theft or trespass. It can also be rewarding on many levels. Consider keeping a photographic record of the changes your woods go through before, during and after harvests and other management activities.

-Forests of Recognized Importance (FORI): FORI are globally, regionally and nationally significant large landscape areas of exceptional ecological, social, cultural or biological values. These forests are evaluated at the landscape level, rather than the stand level and are recognized for a combination of unique values, rather than a single attribute. After careful consideration and research, the Maine Tree Farm Committee has determined that NO Forests of Recognized Importance (FORI) currently exist in the State of Maine.

-Carbon sequestration and climate change resilience: Among the many benefits provided by forests, removing carbon from the atmosphere and storing it in trees may have increasing significance in the years to come. For more information, visit www.maine.gov/doc/mfs/mfs/topics/carbon. As climate change increases the likelihood of severe weather events, the migration of both beneficial and invasive species and new risks to forest health and productivity, good woodland stewardship is the key to preparedness. For more information, check out the Climate Smart Land Network at <http://climatesmartnetwork.org/> . As part of the timber inventory, general carbon sequestration data was calculated and is included in the timber inventory report. Below is a summary of the metric tons of carbon sequestered by species and parts of the trees:

Per Acre Metric Tonnes of Carbon and CO₂eq for All Types or Stands Combined

<i>Prism BAF or Plot Size</i> =	15
<i>Estimated Acres</i> =	86
<i># of Plots</i> =	16

Scott's and Jenkins equations used for C.
For Merch. Cords, Smalian's equation.
85 Net Cubic Feet Per Merch. Cord.

Species	Ave BA/Ac	TPA	Roots C Tonnes/Ac	Stump C Tonnes/Ac	Bole C Tonnes/Ac	Top C* Tonnes/Ac	AG C Tonnes/Ac	AG CO ₂ eq Tonnes/Ac	Merch Cds/Ac
Hemlock	27.3	69.8	0.81	0.00	2.91	0.65	3.56	13.05	5.7
Red pine	23.8	31.6	1.02	0.00	3.64	0.82	4.47	16.38	7.9
Red spruce	2.6	3.1	0.12	0.00	0.43	0.10	0.53	1.93	0.9
White pine	16.7	29.6	0.67	0.00	2.42	0.53	2.95	10.82	5.3
Softwood	70.5	134.1	2.62	0.01	9.41	2.09	11.50	42.18	19.9
Aspen	14.3	33.9	0.78	0.00	3.01	1.03	4.04	14.83	4.1
Beech	1.7	1.9	0.11	0.00	0.42	0.13	0.55	2.03	0.6
Snags	8.1	15.4	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Paper birch	3.0	17.0	0.06	0.00	0.24	0.09	0.33	1.22	0.3
Red maple	20.9	85.4	0.72	0.00	2.72	0.97	3.69	13.52	4.7
Red oak	23.5	24.3	1.40	0.00	5.63	1.63	7.26	26.64	7.0
Sugar maple	1.7	4.9	0.09	0.00	0.35	0.14	0.48	1.78	0.4
White ash	1.2	2.8	0.08	0.00	0.30	0.11	0.41	1.51	0.4
Yellow birch	5.2	24.9	0.16	0.00	0.56	0.25	0.80	2.95	0.8
Hardwood	79.8	210.4	3.41	0.01	13.22	4.35	17.58	64.47	18.4
Totals	150.3	344.4	6.03	0.02	22.63	6.44	29.09	106.65	38.3

* Estimates of tree "Top" includes topwood and branches.

*These Carbon and Biomass reports, or data collection methods, are not suitable for high-level carbon inventories where offsets are to be sold in regulated carbon markets.

Long Range Silvicultural Objectives

In order to meet the Rines Forest overall management plan goals and the town of Cumberland's Guiding Principles, managers should strive to promote growth among long-lived high-quality species. Over time the lot should progress towards a late successional forest dominated by large diameter high quality white pine, red oak, hemlock and other hardwood species. Mast producing legacy trees such as beech and oak should be identified and some individuals preserved to provide mast for a variety of wildlife species. The management should include a combination of individual and group selection. This type of management will mimic the natural disturbance regime of these forests prior to the clearing of forests for agricultural development. The key will be to have multiple age classes of species growing high quality and healthy timber vigorously.

Management will guide the forest towards late successional conditions. The 2009 Forest Management Plan set aside a permanent reserve area on the Rines Forest. It also outlines areas for potential expansion of this area. This should be reviewed by the Forestry Committee.

Growth Estimates

Growth estimates were calculated using local information related to red pine stands and mixed forests. Current estimates are net growth rates of 0.75 cords per acre per year would provide a target estimate of approximately 65 cords of growth annually on the Rines II, Godsoe and Milliken Parcels. Over the next ten-year planning period the recommendations in this plan call for the potential removal of 250 – 300 cords of low-quality wood. The growth over that same period is estimated at 650 cords. Growth will far out-pace harvested volume recommendations prepared in this plan.

Individual Stand Descriptions and Prescriptions

For stand description purposes, data was grouped into three different forest segments (stands) In this situation the stands are the parcels that were added to the Rines Forest (Rines II, Godsoe and Milliken). Stand descriptions were not prepared for non-wooded areas. In the event of a natural disaster such as another ice storm, an insect or disease infestation, modified landowner objectives, poor weather or timber market conditions, recommendations made below can be altered with little effect on the long-term sustainable management of this parcel. It is important to let your forester know about changes so that the plan can be amended as necessary. None of the recommendations below should be implemented if poor timber markets or weather conditions exist, as this would have a negative effect on long term sustainable goals for the woodlot.

Results are presented for the following forest types and segments:

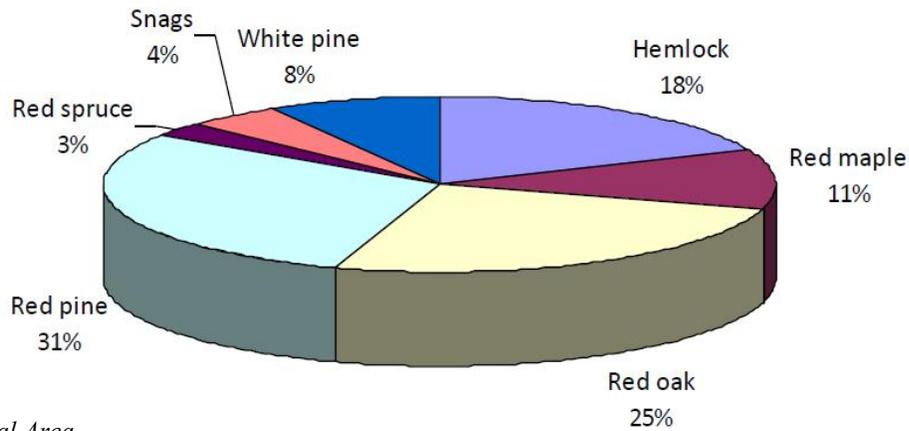
Forest Typing Key				
H- Hardwood Type				Treesize
S- Softwood Type				1 0 - 6' height
SH - Mixed - Softwood [>50%				2 1" - 3" diameter
HS- Mixed - Hardwood [> 50%				3 3" - 8" diameter
CS- Cedar Type				4 8"- 12" diameter
				5 12"+ diameter
A- Very Dense (overstocked)				
B- Medium Density				
C- Sparse (understocked)				
<u>Example:</u>				
Overstory	HS3B	Mixedwood	3"-8" diameter,	B density
		(Hardwood > 50%)		

Stand	Forest Type	Acres
Godsoe	HS4A	31
Rines II	SH4B	52
Milliken	H4B	4

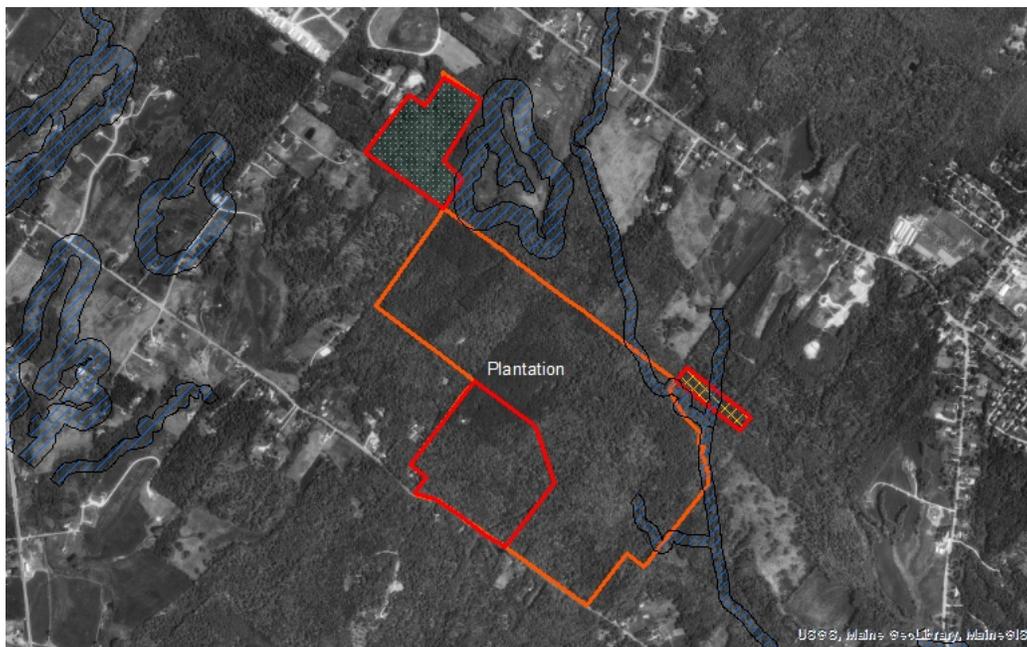
Stand: Rines II
52 acres
Overstory: SH4B



Dominant Species

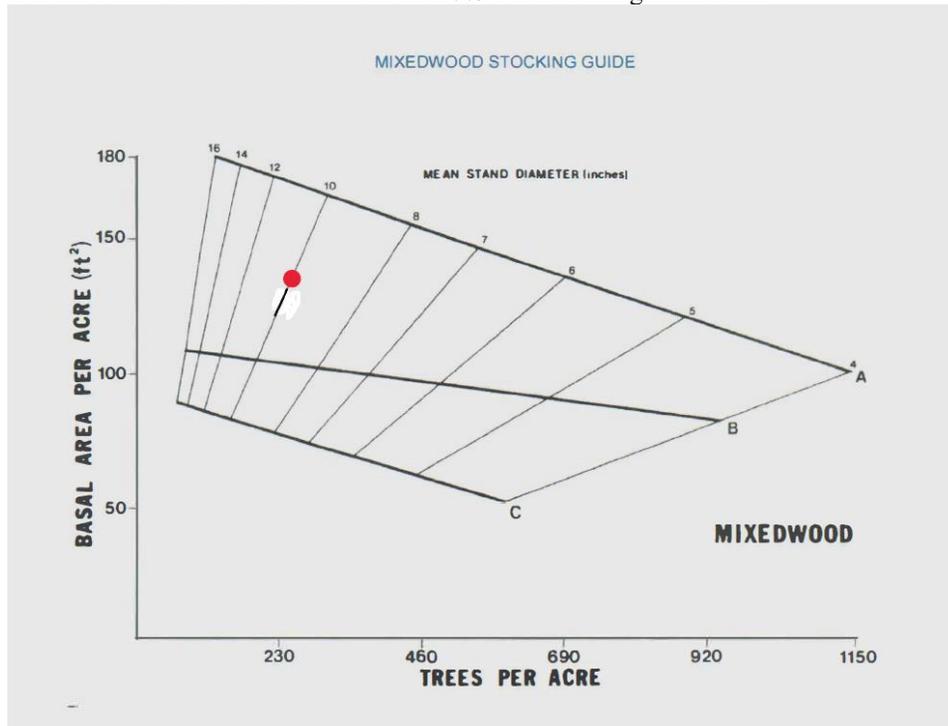


Rines II is the most recent addition to the Rines Forest is located between the Range Rd. and the 2003 216-acre Rines acquisition. The terrain is relatively flat with some gently rolling terrain near the un-named Mill Brook Tributary. The elevation of the stand ranges from about 120' to 160'. The most recent harvest was accomplished with a cable skidder in 2018 to thin portions of the lot, especially in the 18 acres of red pine plantation.



The lot has had multiple thinning operations over the decades which has led to a well-stocked stand of above average quality timber. The stand is considered uneven-aged. Current stocking levels would be considered “well stocked from a timber growth standpoint”. The quadratic mean stand diameter is 10.0” DBH, basal area is 133 sq. ft./acre and contains 37.3 cords/acre of volume (27.9 of the 37.3 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent.

The unnamed Mill Brook tributary is not zoned under Maine Forest Service Statewide Standards. The recommendation is to implement a streamside protection zone of 75' prior to any future harvesting. This 75' zone could be added to the Preserve area established in the 2009 Forest Management Plan.



Recommendations:

Based on the town of Cumberland’s Guiding Principles, the current recommendation is to allow the woodlot to grow for another ten-year planning period. The stocking guides place the stand between the A and B line. The woodlot should be allowed to grow for another ten years and re-examined for updated recommendations in 2032. However, no thinning should occur in 2032 unless the invasive species issues have been tackled. Future harvesting should continue transitioning the stand toward a late successional structure. Focus should be on reducing the red pine plantation component and transitioning the area towards a red oak-white pine- hemlock forest. This can be accomplished with continuing the individual tree and group selection management regime that has been occurring in the stand for decades.

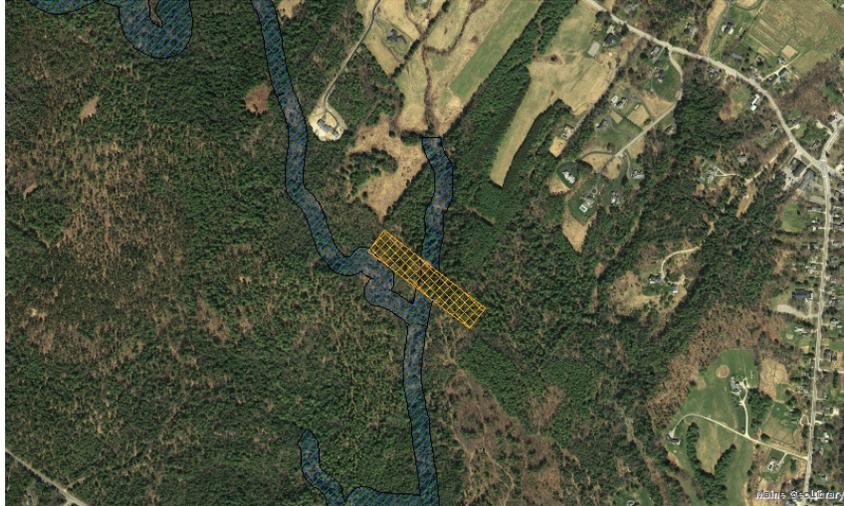
Per Acre Volume Estimates by Type or Stand

<i>Type or Stand</i>	Rines II
<i>Prism BAF or Plot Size =</i>	15
<i>Acres =</i>	52
<i># of Plots =</i>	8
<i>Acres Per Plot =</i>	6.5
<i>Quadratic Mean Diameter =</i>	10.0 in.

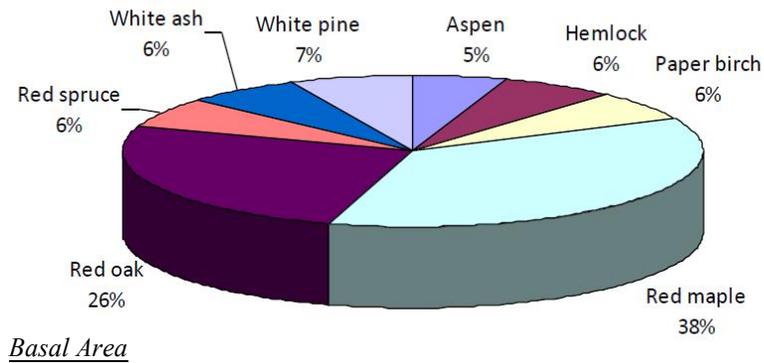
International 1/4" log rule.
 Smalian's equation.
 85 Net Cubic Feet Per Merch. Cord.

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Hemlock	24.4	50.4	0	535	0	0	0.0	5.0	6.0
Red pine	39.4	52.2	0	0	0	0	0.0	13.1	13.1
Red spruce	3.8	3.9	0	228	0	0	0.0	0.8	1.3
White pine	11.3	6.5	0	1,577	0	0	0.0	1.4	4.2
<i>Softwood</i>	78.8	113.0	0	2,341	0	0	0.0	20.4	24.6
Snags	5.6	9.1	0	0	0	0	0.0	0.0	0.0
Red maple	15.0	90.9	0	400	0	0	0.0	2.0	2.7
Red oak	33.8	32.6	0	2,497	0	0	0.0	5.5	10.0
<i>Hardwood</i>	54.4	132.6	0	2,897	0	0	0.0	7.6	12.7
Totals	133.1	245.6	0	5,237	0	0	0.0	27.9	37.3

Stand: Milliken
4 acres
Overstory: H4A



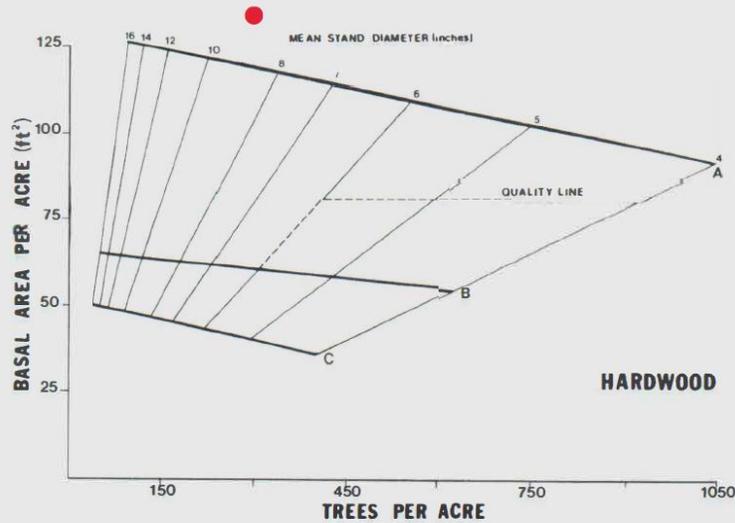
Dominant Species



The 4-acre Milliken Parcel is attached to the eastern edge of the Rines Parcel at a common corner. The parcel lies north-easterly of the old mill dam site location and is bisected by a 75' streamside protection zone associated with the Mill Brook tributary. The terrain is relatively flat with the exception of the ravine associated with the brook. Current stocking levels are considered over-stocked (above the A line) from a timber growth standpoint. The mean stand diameter is 8.7" DBH, basal area is 150 sq. ft./acre and contains 34.4 cords/acre of volume (29.7 of the 34.4 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to good.

NORTHERN HARDWOOD STOCKING GUIDE

Stocking guides for even-aged northern hardwoods, based on number of trees in the main canopy, average diameter, and basal area per acre. Stands above the A line are overstocked. Stands between the A and B lines are adequately stocked. Stands between the B and C lines should be adequately stocked within 10 years. And stands below the C line are definitely understocked.



Recommendations:

Based on Cumberland’s Guiding Principles, harvesting could occur that maintains “resilience of native biodiversity and ecosystem processes in the face of climate change. Increase resilience by managing for multiple age classes; managing for the forest types and species best suited to the site; avoiding conversion to other types (e.g., spruce-fir dominated to hardwood dominated); and using natural regeneration to retain and increase species diversity characteristic of the site and forest type, including the proportion of species predicted to be better adapted to future conditions, such as white pine and red oak. In addition, plan for high-volume runoff by using Stream Smart crossings.” However, the stand is only 4 acres in size and bisected by a zoned brook with a minimum required 75’ streamside protection zone. Harvesting in the Milliken parcel would have to be combined with harvesting in adjacent stands on the Rines Parcel. Adjacent areas had some light harvesting in 2011 and are not due for any additional work at this time. Additionally, the guiding principles state the management activities should be favored in areas with good access. The Milliken Parcel does not have good access for equipment.

The Forestry Committee has decided the Milliken Parcel will be added to the Rines Reserve Area.

Per Acre Volume Estimates by Type or Stand

<i>Type or Stand</i>	Milliken		
<i>Prism BAF or Plot Size</i> =		15	
<i>Acres</i> =		4	
<i># of Plots</i> =	2	<i>Acres Per Plot</i> =	2.0
<i>Quadratic Mean Diameter</i> =		8.7 in.	

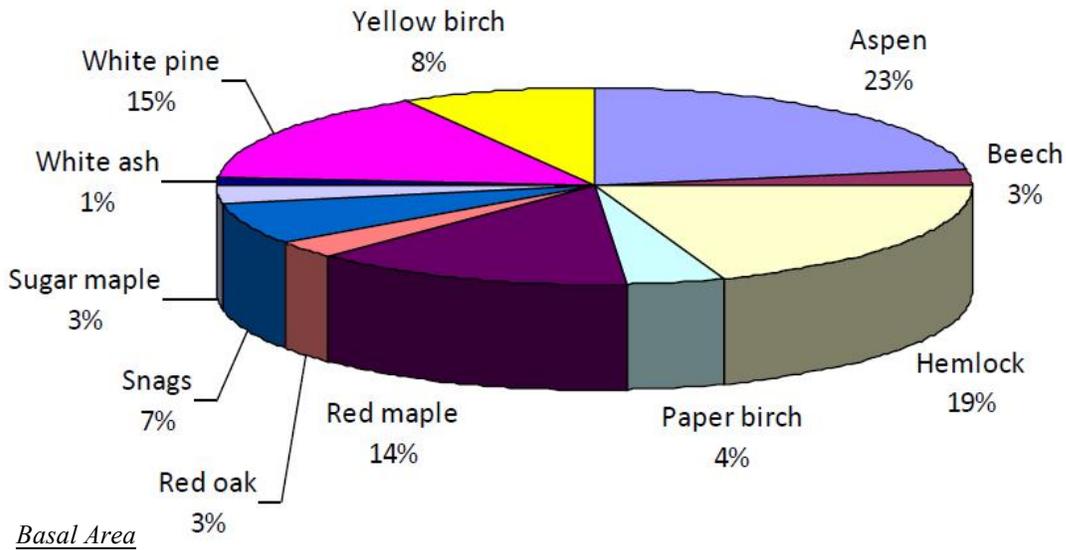
International 1/4" log rule.
Smalian's equation.
85 Net Cubic Feet Per Merch. Cord.

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Hemlock	7.5	4.2	0	386	0	0	0.0	1.6	2.2
Red spruce	7.5	17.0	0	525	0	0	0.0	1.1	2.2
White pine	7.5	7.0	0	370	0	0	0.0	1.8	2.4
Softwood	22.5	28.2	0	1,281	0	0	0.0	4.4	6.8
Aspen	7.5	38.2	0	0	0	0	0.0	1.8	1.8
Snags	7.5	28.1	0	0	0	0	0.0	0.0	0.0
Paper birch	7.5	21.5	0	0	0	0	0.0	2.1	2.1
Red maple	67.5	194.4	0	0	0	0	0.0	12.8	12.8
Red oak	30.0	39.7	0	1,247	0	0	0.0	6.5	8.8
White ash	7.5	17.0	0	0	0	0	0.0	2.2	2.2
Hardwood	127.5	338.9	0	1,247	0	0	0.0	25.3	27.6
Totals	150.0	367.1	0	2,528	0	0	0.0	29.7	34.4

Stand: Godsoe
31 acres
Overstory: HS4A



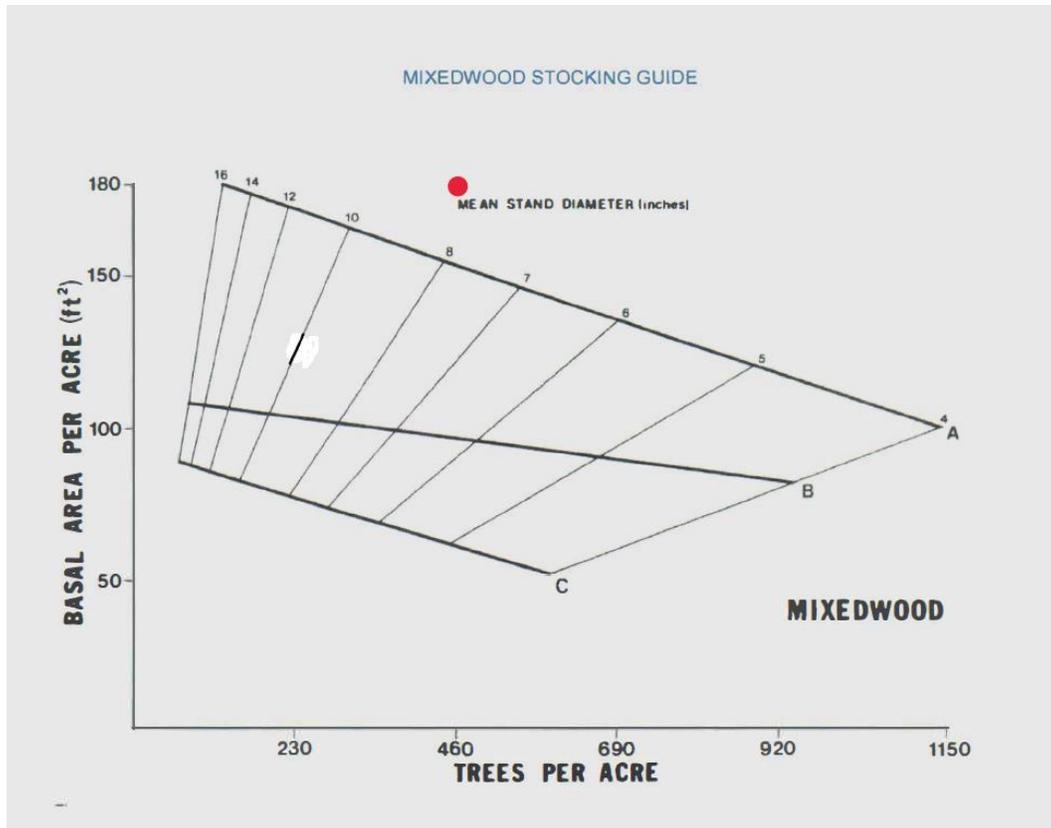
Dominant Species



The Godsoe property is well stocked, from a quality timber growth standpoint. One exception exists in the southern-most corner of the lot near the Rines common corner. This corner was harvested heavily from the south. The hemlock and pine were harvested heavily near the small brook that traverses near the boundary line. I believe this may have been a trespass from an abutting lot. The majority of the Godsoe parcel to the north is well stocked. However, boundary line evidence is not clear and it should be clarified as soon as possible.

The parcel contains more early successional hardwood that is maturing. The goal in future management should be to capture the declining aspen, white birch and red maple in order to favor climax species such as hemlock, red oak, sugar maple, ash and white pine. It appears that the majority of the stand has not seen any recent harvesting in decades. The stand might be considered un-even aged, but the majority of it seems to be one aged. Current stocking levels are considered over-stocked (above the A line) from a timber growth standpoint. The mean stand diameter is 8.0" DBH, basal area is 180.0 sq. ft./acre and contains 40.4 cords/acre of volume (34.1 of the 40.4 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to excellent.

Godsoe contains a 250' Maine Forest Service Statewide Standards buffer zone along the eastern boundary. The standards require no cleared openings within 75' of the highwater mark. It also states that harvest removals are limited to no more than 40% of the volume, or basal area. Other options allow the retention of 60 sq. ft. of residual basal area. The zoned wetland is completely on the abutting parcel, however a portion of the 250' buffer crosses the boundary onto the Godsoe Parcel.



Recommendations:

The Godsoe parcel would offer an excellent opportunity to conduct a commercial thinning operation to favor red oak, white pine, hemlock, sugar and red maple and white ash. The goal would be to drop the overall stocking between the A and B lines and emphasize growth amongst the highest quality healthiest timber. The goal of the harvest should be to provide growing space for the dominant trees while maintaining all species and age classes that currently occupy the Godsoe Property. Individual tree selection and small group will most likely mirror natural selection while accomplishing silvicultural objectives. Creating small openings will allow the opportunity for new age classes to be established while adding valuable early successional habitat to the forest (aspen sprouts). Given the current pulp and sawtimber volumes, a harvest that removes mostly low-quality pulp stems from roughly 20 acres would yield approximately 250 – 300 cords of timber removed, worth \$5,000 - \$7,500 depending on market conditions. Residual volumes on the harvested acres would remain around 900 cords.

Currently there is no access to the Godsoe Parcel for timber harvesting purposes. The guiding principles state; “Focus long-rotation silvicultural efforts on stands and compartments with productive soils, good access and of reasonable size and quality. Long-term goals may include increasing structural and species diversity, emphasizing the growth of high-quality sawlogs of commercially important species, promoting the continued sequestration of carbon, and contributing to the local wood products market.” Also, just south of the Godsoe Parcel on the Rines Parcel in the red pine plantations, the buckthorn is well stocked and 10’-15’ tall in the areas harvested in 2011. No harvesting should occur in Godsoe until invasive species work is conducted on Rines and access is achieved. The portion of the 250’ shoreland buffer should be maintained during any potential future harvesting projects.

Per Acre Volume Estimates by Type or Stand

<i>Type or Stand</i>	Godsoe		
<i>Prism BAF or Plot Size</i> =	15		
<i>Acres</i> =	30		
<i># of Plots</i> =	6	<i>Acres Per Plot</i> =	5.0
<i>Quadratic Mean Diameter</i> =	8.0 in.		

International 1/4" log rule. Smalian's equation. 85 Net Cubic Feet Per Merch. Cord.

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Hemlock	35.0	112.2	0	868	0	0	0.0	4.2	5.8
White pine	27.5	72.6	0	1,492	0	0	0.0	4.9	7.7
<i>Softwood</i>	62.5	184.8	0	2,360	0	0	0.0	9.1	13.4
Aspen	40.0	92.0	0	0	0	0	0.0	11.5	11.5
Beech	5.0	5.5	0	0	0	0	0.0	1.6	1.6
Snags	12.5	24.5	0	0	0	0	0.0	0.0	0.0
Paper birch	7.5	46.0	0	0	0	0	0.0	0.7	0.7
Red maple	25.0	61.3	0	1,014	0	0	0.0	5.2	7.1
Red oak	5.0	7.8	0	115	0	0	0.0	1.4	1.7
Sugar maple	5.0	13.9	0	0	0	0	0.0	1.3	1.3
White ash	2.5	5.7	0	0	0	0	0.0	0.9	0.9
Yellow birch	15.0	71.3	0	0	0	0	0.0	2.3	2.3
<i>Hardwood</i>	117.5	328.0	0	1,129	0	0	0.0	24.9	27.0
Totals	180.0	512.8	0	3,489	0	0	0.0	34.1	40.4

Landowner: Towns of Cumberland
 Town: Cumberland

<u>Species</u>	<u>Sawlog Bd.</u> <u>Ft.</u>	<u>Stumpage</u>	<u>Stumpage</u>	<u>Pulp</u>	<u>Stumpage</u>	<u>Stumpage</u>	<u>Total</u>
		<u>\$/MBF</u>	<u>Value</u>	<u>Cords</u>	<u>\$/Cord</u>	<u>Value</u>	<u>by Species</u>
Hemlock	55,401	\$60.00	\$3,324.06	395	\$5.00	\$1,975	\$5,299.06
White Pine	128,246	\$200.00	\$25,649.20	227	\$4.00	\$908	\$26,557.20
Red Spruce	13,980	\$150.00	\$2,097.00	47	\$4.00	\$188	\$2,285.00
Red Pine	0	0	0	683	\$4.00	\$2,732	\$2,732.00
Beech	0	0	0	48	\$20.00	\$960	\$960.00
Aspen	0	0	0	353	\$20.00	\$7,060	\$7,060.00
Red Oak	138,294	\$300.00	\$41,488.20	358	\$20.00	\$7,160	\$48,648.20
Red maple	51,205	\$150.00	\$7,680.75	311	\$20.00	\$6,220	\$13,900.75
Sugar Maple	0	0	0	38	\$20.00	\$760	\$760.00
White Ash	0	0	0	35	\$20.00	\$700	\$700.00
Paper Birch	0	0	0	30	\$20.00	\$600	\$600.00
Yellow Birch	0	0	0	70	\$20.00	\$1,400	\$1,400.00
<u>Totals</u>	<u>387,125</u>		<u>\$80,239.21</u>	<u>2,594</u>		<u>\$30,663.00</u>	<u>\$110,902.21</u>

* At the time of this inventory, markets are very volatile. Landowner should talk with their forester about current market conditions prior to conducting a timbersale.

*The total timber value represents all of the merchantable timber on the lot. Not only is it *not recommended* to remove all of the merchantable timber from the lot, it is likely not legal.

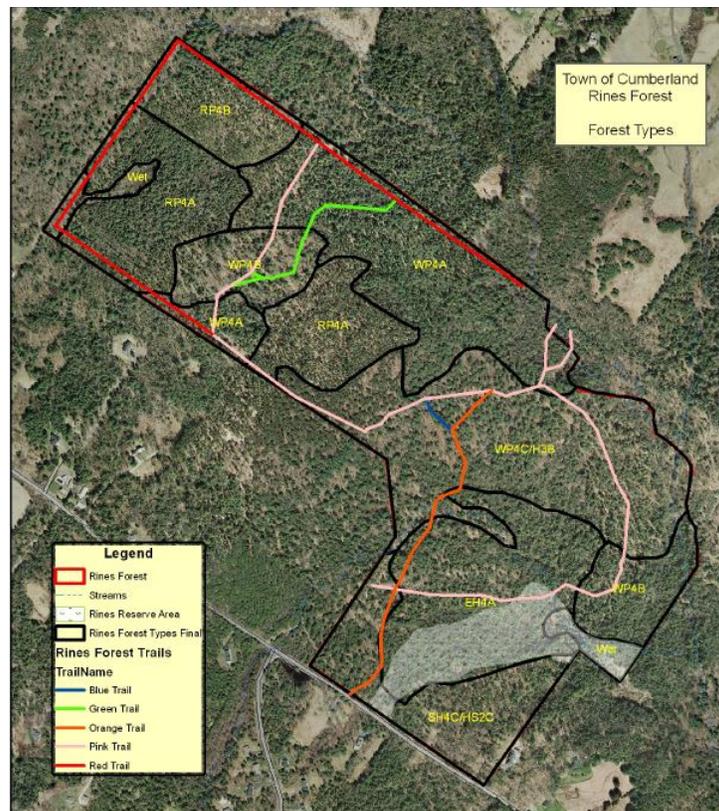
*16 variable radius points were randomly placed using ArcGis and a GPS receiver across 87 forested acres.

Rines Forest Update

Introduction

This management plan update was prepared to update the ten-year recommendations for the 2009 Forest Management Plan that was prepared by IFM for the Rines Forest (attached). A new management plan is not needed but the recommendations need to be updated based on the conditions of the forest. A new management plan will likely be needed in 2032. Updates may be necessary if objectives change or some natural disturbance occurs such as insect or disease. This management plan is intended to cover forest management decisions on the original 216-acre Rines Forest.

This plan is intended to be a “living” document to guide forest management decisions in order to meet the Rines Forest Principles and Objectives as outlined in the management plan dated December 14, 2020. It is important to remember that conditions may change, such as major storms, insect or disease, or new regulations, that require modification of this plan during the planning period (next ten years). Having the best written forest management plan is no replacement for having a good working relationship with a forester.



Updated Goals and Objectives

The town of Cumberland developed Management Guiding Principles for Town Forests which may be appropriate for active forest management activities. These principles were adopted by the Cumberland Town Council on December 14, 2020. Cumberland’s Guiding Principles State:

“The Town of Cumberland owns multiple properties that are forested and may be appropriate for active forest management. Below is a list of forest management goals for all primary town-owned forest sites, including as of

2020 the Town Forest, Rines Forest, Knights Pond, and Twin Brook. This list refers specifically to forest management and related activities and not to all other management considerations that are pertinent to each site, such as what types of use are allowed. That will be covered in the other parts of the Management Plan for each property. A site-specific Forest Management Plan shall be developed for each primary forest site that is consistent with these guiding principles and is designed to protect and reflect the unique characteristics of each of the town's forested properties (such as landscape setting, geography, important natural resources, and public use). The Town will strive to manage the town's forests as models of a well-managed community forest.

- Maintain and protect productive soils and water quality, including using Stream Smart crossings, with a particular emphasis on the Mill Creek and Presumpscot River watersheds (see Maine Forest Service 2017 Water Quality BMPs).
- Protect special ecological features and functionality intrinsic to each Forest (i.e., rare plant or animal sites, wetlands, riparian areas, vernal pools, deer wintering areas, rare or exemplary natural communities, late successional forests, dead and downed wood, etc.).
- Manage forest stands in a manner that maintains or improves habitat and the overall biodiversity of native plant communities and fish and wildlife species to the extent possible. Particular emphasis will be on maintaining and expanding structurally complex, mature portions of the forest, balanced by special and unique areas, small gaps of early successional habitat, and reserve areas. Two programs that can help guide this approach are Focus Species Forestry and Forestry for Maine Birds.
- Identify and protect reserve areas as forest stands or compartments which express the following attributes: large blocks of forest, older forest, unusual natural areas (e.g., streams, wetlands, riparian areas, rare natural communities), presence of legacy trees, and topographically or geologically diverse or interesting areas.
- Focus long-rotation silvicultural efforts on stands and compartments with productive soils, good access and of reasonable size and quality. Long-term goals may include increasing structural and species diversity, emphasizing the growth of high-quality sawlogs of commercially important species, promoting the continued sequestration of carbon, and contributing to the local wood products market.
- Maintain resilience of native biodiversity and ecosystem processes in the face of climate change. Increase resilience by managing for multiple age classes; managing for the forest types and species best suited to the site; avoiding conversion to other types (e.g., spruce-fir dominated to hardwood dominated); and using natural regeneration to retain and increase species diversity characteristic of the site and forest type, including the proportion of species predicted to be better adapted to future conditions, such as white pine and red oak. In addition, plan for high-volume runoff by using Stream Smart crossings.
- The actual balance of forest type, age, and silvicultural treatment recommended within each forest should be determined in consideration of the habitat matrix of the surrounding landscape. This would include an analysis of the extent and age-class structure of habitats in the surrounding lands as well as opportunities for maintaining and enhancing both terrestrial and aquatic habitat connections and recreational trail connections; and management opportunities across all town forests. In other words, different properties may be managed for different site-specific goals as long as the sum of the whole meets the overall town's forest management goals.
- Make every reasonable effort to control invasive plant species in the forest while reaching out to adjacent landowners to encourage the same.
- Implement exemplary forest management that is consistent with sustainable forestry standards such as those provided by the Forest Stewardship Council (FSC).
- Strive to keep forest harvesting activities revenue neutral over the long run (this is separate from the cost of managing other activities in the forests such as reducing invasive species, building and maintaining trails, and providing educational signs, etc.).
- Offer quality aesthetic, educational and recreational opportunities to the community for the benefit of the public as long as it doesn't detract from above goals. All trails should be built and maintained to minimize soil erosion and compaction and limit disturbance to fish and wildlife.
- Conduct all harvests in a manner that minimizes impacts to soil, water, and fish and wildlife, including avoiding or minimizing the use of new roads and road-stream crossings; using Stream Smart crossings where crossings are needed; putting unused roads to bed; giving preference to harvesting on frozen ground or dry-soil conditions; avoiding harvesting during peak amphibian and bird nesting times (April 1- July 31); and using appropriate equipment given the silvicultural goals".

The Cumberland Forestry Committee and town forester have spent time exploring Rines Forest while discussing site specific objectives. Those specific objectives are:

1. Focus on the invasive species issue, especially buckthorn. Do not promote timber harvesting with the existing invasive species component.
2. Potentially expand the amount of the Rines Forest in Reserve, especially on steep slopes and riparian corridors.
3. Future timber harvesting should utilize low impact equipment and only be conducted after a comprehensive invasive species strategy is developed.
4. Work with the trail committee regarding trail hardening and other maintenance projects.

Recommendations in 2009

The 2009 management plan called for specific harvesting recommendations in certain stands. The recommendations included a mechanical harvest in areas with 15'-20' tall buckthorn in order to make future chemical treatment more feasible. Below is a chart of the recommendations.

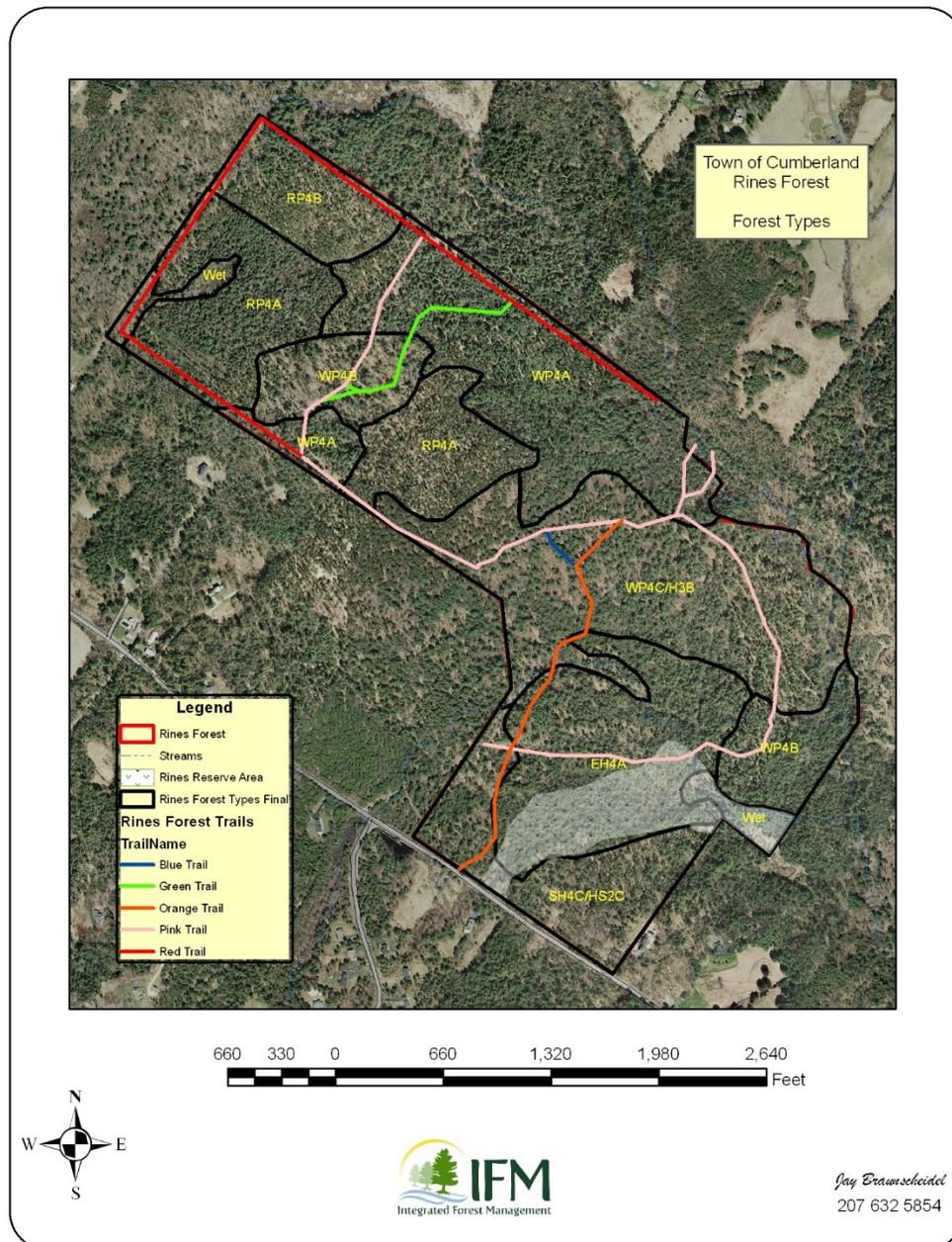
Table 1.

2010 Treatment Schedule					
Stand	Type	Description	Acres	Next Treatment	Approximate % Removal
1	RP4A	Red Pine Plantation	48	2nd Entry, Long Shelterwood	30-40%
1	RP4B	Red Pine Plantation	24	Grow	
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood	20-30%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	5	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
4	EH4A	Hemlock	15	Grow	
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	
6	WP4B	White Pine, B Density	5	Grow	

Objectives of Initial Entry

- Given that much of the forest is in a mature condition, take measures that create some early successional habitat, in small forest openings, while fostering the continued development of the mature portions of the Forest.

- Look for opportunities to foster any inclusions of classic northern hardwood patches. Create opportunities to initiate new hardwood stands to balance the proportion of softwood found on the Forest.
- Generate revenue sufficient to cover the cost of management planning and implementing the first phase of Buckthorn as outlined in the Integrated Pest Management plan (IPM).
- Establish access points and landings for long term management



In 2011 harvesting occurred as prescribed with 56 acres being harvested with a mechanical logging crew and 34 acres were harvested with a cable skidder. Below are the results of the harvest:

Chipping Crew	Pine Logs	Pallet Pine	Hemlock Logs	Spruce Logs	Hardwood Logs	HD Pallet	Pulp/Fwood	Chips	Total
Revenue	\$ 2,972.70	\$ 3.50	\$ 2,731.30	\$ 30.75	\$ 53.71	\$ 3.75	\$ 1,394.57	\$ 167.92	\$ 7,358.20
Volume (bf or tons)	18,655.0	70.0	109,250.0	410.0	280.0	50.0	537.7	167.9	1298.1
Volume (tons)	85.8	0.3	502.6	1.9	1.6	0.3	537.7	167.9	1298.1
Percent Volume	7%	0%	39%	0%	0%	0%	41%	13%	100%
Percent Revenue	40%	0%	37%	0%	1%	0%	19%	2%	100%

Hand Crew	Pine Logs	Pallet Pine	Hemlock Logs	Spruce Logs	Hardwood Logs	HD Pallet	Pulp/Fwood	Chips	Total
Revenue	\$ 5,456.94	\$ 9.90	\$ -	\$ -	\$ -	\$ -	\$ 2,071.36	\$ -	\$ 7,538.20
Volume (bf or tons)	29,570.0	550.0	0.0	0.0	0.0	0.0	462.4	0.0	600.96
Volume (tons)	136.0	2.5	0.0	0.0	0.0	0.0	462.4	0.0	600.96
Percent Volume	23%	0%	0%	0%	0%	0%	77%	0%	100%
Percent Revenue	72%	0%	0%	0%	0%	0%	27%	0%	100%

Chipping Crew

Revenue	\$7,358
Acres	56
\$/ac	\$131.40
tn/ac	23.2

Hand Crew

Revenue	\$7,538
Acres	34
\$/ac	\$221.71
tn/ac	17.7

Combined

Revenue	\$14,896
Acres	90
\$/ac	\$165.52
tn/ac	21.1

After the harvesting was complete a comprehensive plan for managing the invasives was supposed to be ongoing. It appears that something happened and the treatment did not happen or was not ongoing as was supposed to be. In portions of the harvest area the buckthorn is again 15'+ tall. The harvesting has caused the invasives issue to worsen.

Recommendations for 2020

The 2009 forest management plan makes the following recommendations for 2020:

Table 2. 2020 Treatment Schedule					
Stand	Type	Description	Acres	Next Treatment	Approx. % Removal
1	RP4A	Red Pine Plantation	48	Grow	
1	RP4B	Red Pine Plantation	24	2nd Entry, Long Shelterwood	30 - 40%

2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood	20- 30%
2	WP4A	Mature White Pine	5	1st Entry, Long Shelterwood	20- 30%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
4	EH4A	Hemlock	15	Selection	25%
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Selection	25%
6	WP4B	White Pine, B Density	11	Selection	25%
6	WP4B	White Pine, B Density	5	1st Entry, Long Shelterwood	20 - 30%

The 2020 harvest prescribed called for 100+/- acres of harvest utilizing shelterwood and individual tree selection. I have reviewed the area with the Forestry Committee and it makes no sense to conduct anymore harvesting until we develop a more thorough plan for handling the invasives. Conducting more harvesting will only make the problem worse. It is recommended that harvesting recommended for 2020 be suspended.

Recommendations 2025-2030

The 2009 forest management plan makes the following recommendations for 2025-2030:

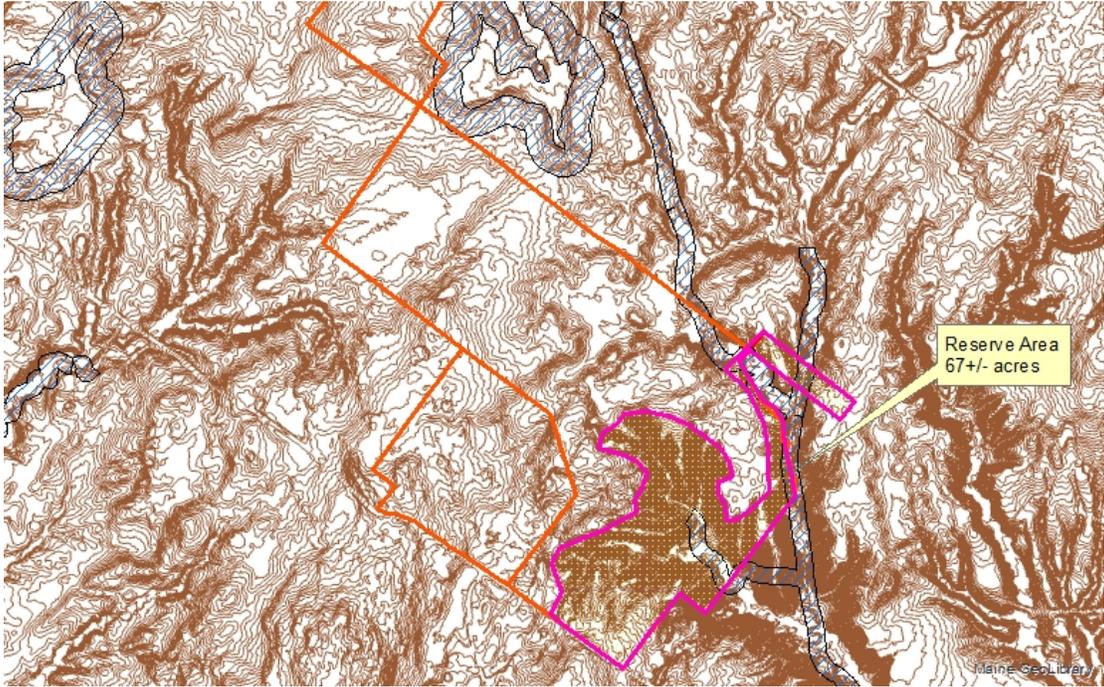
Stand	Type	Description	Acres	Next Treatment	Approx. % Removal
1	RP4A	Red Pine Plantation	48	Shelterwood w Reserves	40 - 50%
1	RP4B	Red Pine Plantation	24	Grow	
2	WP4A	Mature White Pine	20	2nd Entry, Long Shelterwood	30 - 40%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	5	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
4	EH4A	Hemlock	15	Grow	
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	

6	WP4B	White Pine, B Density	5	Grow
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The 2025-2030 harvest prescribed called for 93+/- acres of harvest utilizing shelterwood and individual tree selection. Again, it makes no sense to conduct anymore harvesting until we develop a more thorough plan for handling the invasives. Conducting more harvesting will only make the problem worse. It is recommended that harvesting recommended for 2025-2030 be suspended.

Reserve Area

A reserve area was set aside in the creation of the 2009 forest management plan. There are additional areas within the Rines Forest that qualify for Reserve Status. The Forestry Sub-Committee has decided expanding the reserve area is desired based on Cumberland’s Guiding Principles. Below is a map of additional riparian areas that will be set-aside for Reserve Status.



Invasive Species

A plan should be developed that includes some mechanical and chemical methods of controlling and reducing the component of Buckthorn in the Rines Forest. A mini-excavator with a forestry mulcher would be well suited to re-establish the skid trails that were created in the 2011 timber harvest. Below is the IPM that was developed with the 2009 Rines Forest Management Plan. This should be updated by the Forestry Committee ASAP and a plan for implementation developed.

Integrated Pest Management Plan (IPM)

*Field observations have confirmed the presence of a major infestation of common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*Frangula alnus*). In some cases, this invasive species has completely taken over large portions of the understory, choking out all other species. The outbreaks seem to be associated both with soil condition (wet areas) and light treatment. Given the widespread nature of this infestation a significant, multi-measure control plan should be considered at this time. Currently, there are no known biological control measures available for buckthorn control as is the case for Purple Loosestrife. The control plan should include a means of mechanically cutting the well-established stems, some of which are 20' tall. Plants this tall cannot be adequately controlled, and increases the risk of applying chemicals off target, if a chemical approach is selected. Further I have identified smaller populations of the significantly less insidious Japanese barberry (*Berberis vulgaris*). These populations should be addressed during the entries where Buckthorn will be the primary target.*

IPM Action Plan

Mechanically remove as much buckthorn as possible as part of harvest plan (winter 2009)

Treat by hand those stems that were missed during harvest. (early spring 2010)

Chemically treat sprouts with a quality sub-contractor (fall 2010)

Hand pull remaining individual (summer 2011)

Monitor and hand pull (ongoing)

Please note that the IPM is a living document and will be completed in conjunction with an independent vegetation control expert. Please see the following pages for more information on buckthorn.

Legal Obligations Update

Since the last management plan was prepared the state of Maine has implemented Statewide Standards for Timber Harvesting in the shoreland zone. The town of Cumberland chose to be a "Statewide Standards" town under Maine Forest Service jurisdiction. However, the town of Cumberland requires a permit be filed with the CEO prior to beginning any timber harvesting activities in Cumberland.

-Maine Forest Service Statewide Standards establishes statewide standards for timber harvesting and related activities in shoreland areas. In general, timber harvesting activities in shoreland areas must protect shoreline integrity and not expose mineral soil that can be washed into water bodies, including non-forested freshwater and coastal wetlands and tidal waters. Timber harvesting and related activities in shoreland areas below the 300-acre drainage point must leave windfirm stands of trees that provide adequate shade. If located in shoreland areas, roads used primarily for timber harvesting and related activities must be constructed and maintained to standards designed to minimize the chance of exposed soil washing into water bodies, including wetlands. Stream crossings must not disrupt the natural flow of water and must not allow sediment into water bodies. Mill Brook is zoned 75' streamside protection. This 75' zone is on the Milliken and Rines Parcels. A large wetland east of the Godsoe parcel is zoned under a 250' shoreland zone protection zone. This buffer lies partially on the Godsoe parcel.

-Easements: The Property is governed by a permanent Conservation Easement held by the Chebeague and Cumberland Land Trust (CCLT) to "protect the Forest's natural beauty, wildlife and varied ecosystems." The

Easement states "The Protected Property shall be used only for conservation and low-impact outdoor recreation and educational activities that do not rely on substantial alteration to the natural resources."

The Easement also states "...any cutting of trees should be done under the guidance of a forest management plan developed by a professional forester with input from a professional wildlife biologist. The forest management plan must include provisions for protecting soils, water quality and high value plant and animal habitat."

Historical, Cultural & Archaeological Sites

The Maine Historic Preservation Commission (MHPC) was contacted to check for any significant archaeological sites located on the property. The review indicated that no prehistoric (Native American) archaeological sites are known to exist on the property because no survey has been conducted. The report states that no historic archaeology sites are known or likely to exist based on historic information. The report concludes that there may be buildings or structures may exist on the property that have not been evaluated for National Register eligibility.

According to local and past landowner history, the Rines property had a house, two barns and a well. Stone walls still can be found in many areas as well as an old mill dam near the waterfall trail on the original Rines Purchase.

During any future timber harvesting activity these areas should be buffered. Timber management activities should preserve the existing stone walls to the maximum extent possible.

Recreation and Aesthetics

The lot is well used as a recreational destination. The trails are used by walkers, bikers, skiers, snowshoers, hunters and nature watchers regularly. The pond is actively used in the winter by skaters and hockey players. The trails committee is very active and monitors trail conditions regularly. During the 2020 Pandemic the trails and parking areas were used extensively. Some erosion was witnessed from the trails to Mill Brook. The trails committee works on trail hardening projects annually. The Committee regularly corresponds with the Forestry Committee on trail projects. This is very important as recreation trails should be avoided by harvesting equipment. However, often the recreation trails are placed at the best location for timber harvesting trails as well. The two can co-exist as long as the communication channels between the groups remains open.

It is important to note that under the Landowner Liability Law (Title 14, M.R.S.A Section 159-A) the landowner is protected from liability in the event that someone was injured while using the property for recreation. For more information on the Landowner Liability Law please visit the Maine Department of Inland Fisheries & Wildlife website.

Aesthetics are a priority for the Rines Forest and future timber harvests should strive to maintain them throughout the property. Slash piles returned to the woods should be spread so it is as close to the ground as possible and bumper trees used during the harvest should be removed prior to the completion of harvesting activities. Stump heights should be kept as low as possible. Log landings should be cleared of wood debris after completion of harvesting. Wood debris from the landing should be carried back into the woods if possible. Log landings should be seeded with a quality conservation mix that is certified not to contain invasive species. Slash should be kept well away from property lines and access road.

It is important to recognize, though, that "clean and neat" is not necessarily the same as "aesthetics" or good forest management. Brush, large woody debris, dead standing snags and future snags are important for a healthy forest. While the "park like" look may be aesthetically pleasing to the general public and most people, it does not equate with sustainable forest management. The Forestry Committee is aware that "messy" to the general public can also mean the forest is being managed for multiple benefits. It is also important to recognize that there is a difference between managing woodland for multiple benefits and poor-quality logging work. Aesthetics and well managed woodland are compatible.

Town of Cumberland Rines Forest Management Plan



Jay Braunscheidel, LPF#3283
1071 D Auburn Road
Turner, ME 04282
2009

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Town of Cumberland Forest Management Goals

Below is a list of forest management goals set forth by the Rines Forest Committee. These guideposts should be consulted during any decision making process for the Forest.

- Influence forest stands to enhance habitat to the extent that is possible by maintaining and expanding mature portions of the forest while adding balance by creating some early successional habitat in small forest openings.
- Protect biological features and functionality intrinsic to the Rines Forest (i.e. riparian zones and wetlands, forest structure, etc.).
- Manage and realistically maximize the biological diversity using the focus species forestry approach.
- Make every reasonable effort to control invasive plant species on the Rines Forest while reaching out to adjacent landowners to encourage the same.
- Implement exemplary forest management that is certified to the highest globally accepted standard, Forest Stewardship Council (FSC). See Appendix 10, page 76 for further information about FSC certification.
- Manage the Rines Forest as a model of a well managed forest.
- Strive to keep forest management activities revenue neutral over the long run.

Plan Methodology

The following pages contain the detailed stand descriptions, silvicultural recommendations and rationale for each forest stand as depicted on the forest type map. These pages represent my conclusions and are based significant thoughtful analysis. The details of some of this analysis can be found in the body of the plan as well as in the appendix to this plan and include:

- Forest typing including GPS'd stand boundaries, see map section, page 21.
- A more detailed definition/ discussion of the silvicultural methods prescribed for the Rines Forest, see Definitions on page 26.
- Exploration of the history, origins and past treatments conducted on the Rines Forest, see Appendix 1, page 29.
- Analysis of the current soils found on the forest including discussion of the most relevant types, their influence on productivity and species composition and operability, see Appendix 2, page 30.
- Details of the resource inventory cruise, see Appendix 3, page 34.
- A copy of the site review prepared by the Maine Natural Areas Program (MNAP), see Appendix 4, page 35.
- Synthesis of the most critical and readily applied management concepts for enhancing biodiversity in the forests of Maine, adapted from: Biodiversity in the Forests of Maine: Guidelines for Land Management (Flatebo, Foss & Pelletier, 1999), see Appendix 5, page 39.
- An Integrated Pest Management (IPM) plan for control of Buckthorn, and other invasive species found on the forest, see Appendix 6, page 47.
- A review of some of the more relevant forestry regulations concerning timber harvesting in the State of Maine, see Appendix 8, page 51.
- An application of Focus Species Forestry, including examination of the 2,000 acre zone that surrounds the Forest, see Appendix 9, page 54.

Stand Descriptions, Silvicultural Objectives and Recommendations

Table 1. 2010 Treatment Schedule					
Stand	Type	Description	Acres	Next Treatment	Approximate % Removal
1	RP4A	Red Pine Plantation	48	2nd Entry, Long Shelterwood	30-40%
1	RP4B	Red Pine Plantation	24	Grow	
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood	20-30%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	5	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
4	EH4A	Hemlock	15	Grow	
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	
6	WP4B	White Pine, B Density	5	Grow	

****Tables for proposed 2020 and 2025 – 2030 treatments appear in the appendix**

Objectives of Initial Entry

- Given that much of the forest is in a mature condition, take measures that create some early successional habitat, in small forest openings, while fostering the continued development of the mature portions of the Forest.
- Look for opportunities to foster any inclusions of classic northern hardwood patches. Create opportunities to initiate new hardwood stands to balance the proportion of softwood found on the Forest.
- Generate revenue sufficient to cover the cost of management planning and implementing the first phase of Buckthorn as outlined in the Integrated Pest Management plan (IPM).
- Establish access points and landings for long term management

Stand 1, RP4A and RP4B

The current collection of stands is dominated by planted red pine (*Pinus resinosa*). Originally a much larger area of pasture was reverted back to a forested condition. Due mostly to variations in soil types and hydrology, small pockets of the plantation did not survive and regenerated naturally. The naturally regenerated species include Eastern white pine (*Pinus strobus*) and northern red oak (*Quercus rubra*). Basal areas in this stand average 127 ft² per acre. In general, this stand is comprised of larger diameter (12" dbh on average) stems with about 255 trees per acre. Most of the poorly formed trees were addressed during previous entries or had succumbed and fallen out of the stand. With that said there still represents a dichotomy in the overstory; well formed, larger diameter trees, and smaller, lower vigor individuals. This second group should be targeted for removal at this time.

The regeneration in this stand is mixedwood in nature with a good representation of eastern white pine, some red pine and balsam fir (*Abies balsamea*), with red oak and American beech (*Fagus grandifolia*) making up the hardwood component. There is also a significant and expanding population of buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Frangula alnus*). Where regeneration is free from buckthorn it is vigorous, where buckthorn is abundant little or no regeneration exists.

Recommended action: 2nd entry of a long shelterwood on A density stands

Timeframe: 2010

Rational: Regenerate natural stands

Goals of treatment:

- Create early successional habitat for:
 - Eastern Towhee
 - Chestnut-sided warbler
- Capture potential mortality
- Initiate a new, naturally regenerated, cohort of trees
- Where such regeneration already exists, foster it's development
- Retain mast producing species like red and white oak as well as American beech
- Provide mechanical control of Buckthorn (see IPM plan for Buckthorn control, Appendix 6, page 47)

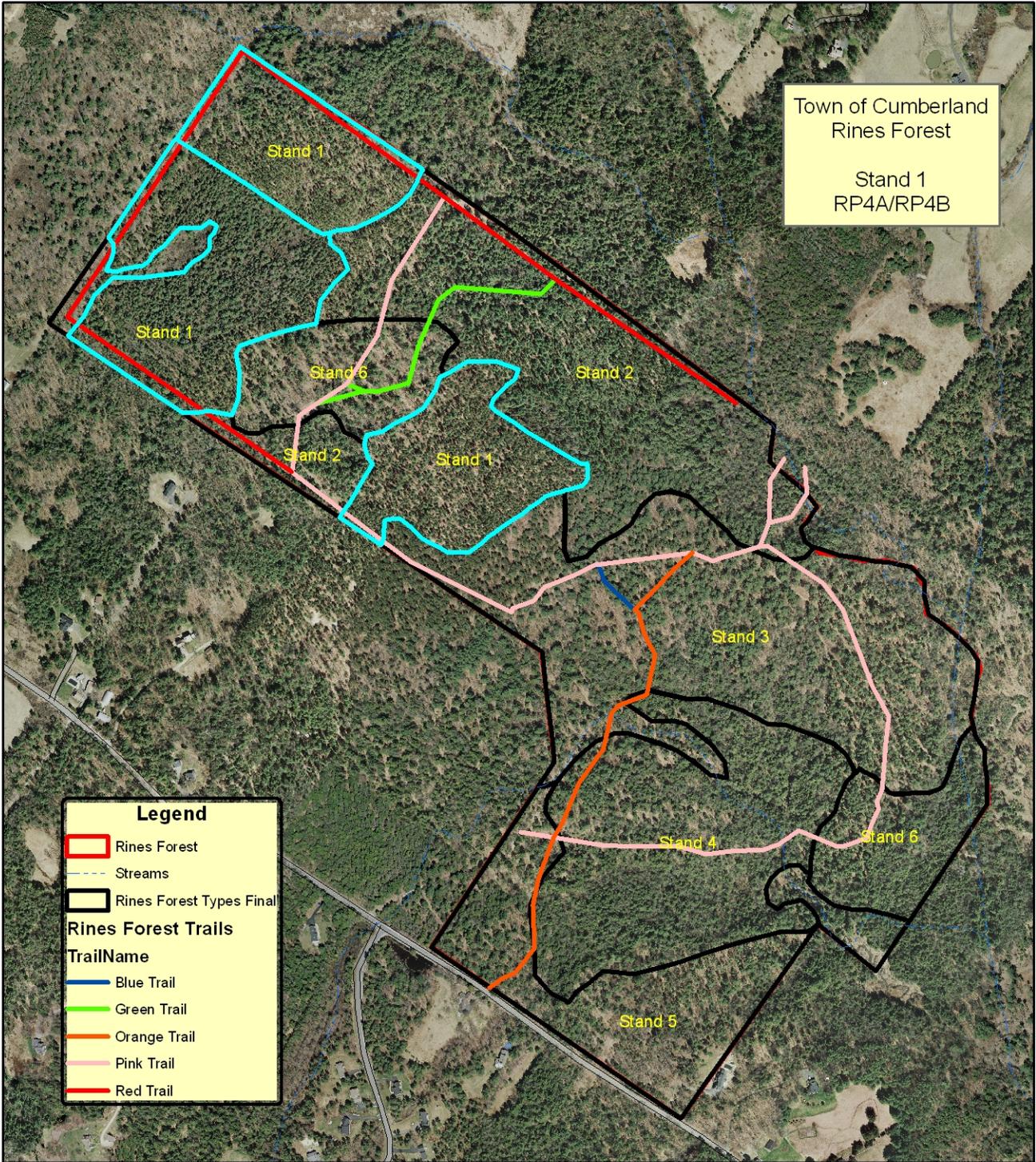
Based on much discussion from the Rines Forest Committee, and sound silvicultural and ecological criteria, I recommend that the A density portion of this area be treated at this time. Given the interest in creating some early successional, I recommend that this stand be managed under an even-aged model, employing a shelterwood method. This next entry would be the second entry of a long shelterwood (modified) and can be implemented in either a uniform (individuals removed across the entire stand) or a patch (small groups up to an acre in size) design.

If a patch method is chosen, opt to center patches in areas where advance regeneration exists. The idea here is to remove about 30% of the current stand volume. A traditional second entry would remove about half of the volume and I believe this is too intense a treatment.

This entry should happen as soon as is practical and should be coordinated with the plan to control buckthorn where the timing is of paramount importance. Typically, where recreation is important to a landowner, I recommend that activity be scheduled so as to not interfere with such activities. Given the near year round use of the property, it will be difficult to avoid some interface. However, a winter harvest will minimize ground disturbance and this should trump any conflict with recreational use of the property.

Also please note, and this goes for all treatment recommendations in all stands, that the not every acre in this stand needs nor should receive treatment. The prescription is more outcome based focusing on the stated goals for the stand. That is why it is imperative that the stand be marked by a careful practitioner and the harvest be carefully supervised.

The B-density portion of this stand should be allowed to grow for 10 more years and then receive a similar treatment.



Jay Braunscheidel
207 632 5854

Stand 2, WP4A (two separate blocks, c. 40 acres north, and 5 acres south)

This stand is characterized by large diameter, mature white pine and hemlock, with scattered inclusions of planted red pine. The average diameter exceeds 14" dbh across this expansive stand. Additional overstory components include species like red oak and a mixture of northern hardwoods like yellow birch (*Betula Alleghaniensis*), red maple (*Acer rubrum*) and American beech. However, all these secondary components do not exceed 25% of the composition and that is the reason for the pure pine designation. In general, this stand is fully stocked averaging 152 ft² per acre with about 250 trees per acre. However, individual pockets far exceed this average stocking.

The understory is somewhat patchy and in general has a composition similar to that of the overstory. As you would expect, where the density is higher regeneration is scarce with the exception of a few scattered shade tolerant hemlocks. Where more light has been allowed to reach the forest floor, more advance regeneration is present but is still suppressed. Because of this deprived condition, it is unlikely that this cohort will make up the next generation of trees. There are also scattered sections where the regenerating understory is composed of shade tolerant hardwoods like American beech, red and white oak, and balsam fir. None of this is of significant consequence as we are not at a point where it is critical to be regenerating the stand. At this point the objective is to tend the stand.

Recommended action: 1st entry of a long shelterwood on c. 50% of the stand area

Timeframe: 2010

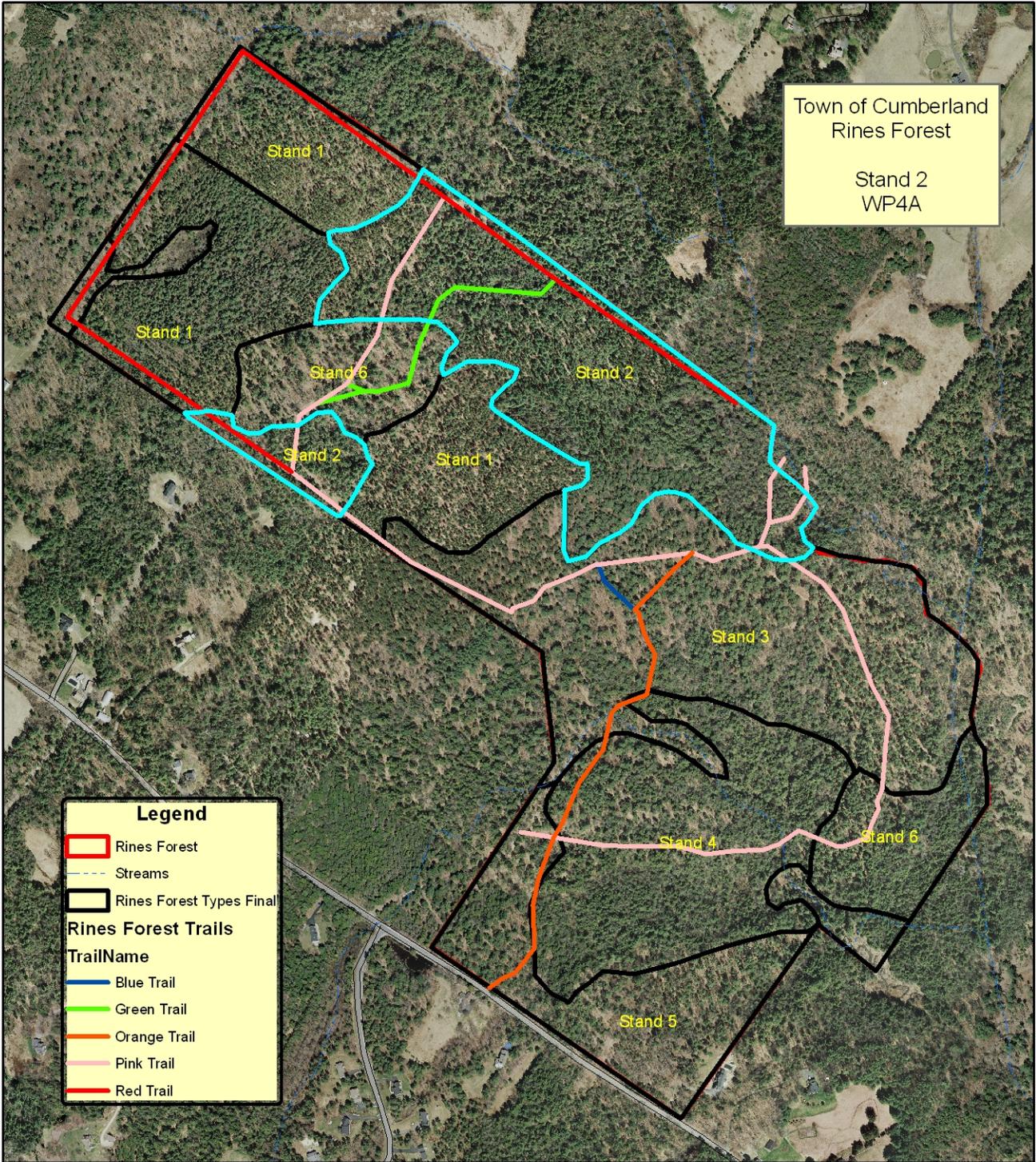
Rational: Tend high volume portions, choose and retain crop trees

Goals of treatment:

- Allow much of the stand to mature fostering habitat for our focus species:
 - Pileated woodpecker
 - Barred Owl
 - Wood Thrush
 - Pine Warbler
 - Redback Salamander
- Capture potential mortality
- Tend the stand, concentrating site resources on most ecologically and economically valuable trees
- Foster and expand hardwood inclusions. Retain:
 - Red and white oak (*Quercus alba*)
 - Sugar maple (*Acer saccharum*)
 - Yellow birch
 - Healthy beech
- Foster and expand mature pockets of hemlock

- Thin red pine pockets to a density that is more consistent with natural mixed softwood stands. Note: *natural* stands of red and white pine are ranked as S3, or Rare in Maine (20-100 occurrences) by MNAP.

Given the interest in eventually creating early successional habitat in this stand, I recommend that this stand be managed under an even-aged model, employing a shelterwood method. Note that this entry is not designed to initiate a new cohort of trees, but is designed to tend the stand. So the early successional habitat creation in this stand will commence during the next entry, the 2nd entry of a long shelterwood. This current entry should cover about half of the stand. The balance should be allowed to grow for 10 – 20 years, unless monitoring of the stand discovers a reason to treat earlier. The decision regarding which 50% should be based on current conditions. The idea is to treat areas that were not treated during the last entry. So which 25 acres will be up to the forester who marks the stand. One factor to keep in mind is that it may make sense to “attach” the uncut portion to the riparian zone and the portion of the neighboring stand that is scheduled to grow during this entry as well.



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Stand 3 WP4C/H3B

This stand is at least a two aged stand with pockets that are developing a third age class. It represents a significant portion of the forest and is well poised for active, but low intensity forestry. As the typing suggests, the primary overstory component is relative well spaced large diameter white pine. However it is not uncommon to see small assemblages of eastern hemlock (*Tsuga canadensis*) or even red oak. In general this component is comprised of well formed individuals, which is not unexpected given the careful and disciplined tending it has received in the past. The second age class is predominantly shade tolerant hardwoods, similarly well spaced and of favorable composition. It is curious that only a small fraction of this second age class is softwood given it's abundance in the overstory. This would lead one to conclude that this is truly a hardwood site and that the softwood in the overstory arose as a result of past agricultural practices. However, the soils analysis (see appendix 2, page 30) for this area suggests other wise. One remaining explanation is that the previous silvicultural treatments did not allow sufficient light to reach to forest floor to regenerate the less shade tolerant eastern white pine. This fact should be considered when applying the prescribed treatment. Basically, make certain that we create at least some patches large enough to regenerate white pine. It would be a shame to lose this component altogether.

When taken as an aggregate, this stand boasts the highest average basal area on the property at 167 ft² per acre with trees per acre in excess of 300. Further the majority of the stems are fairly well formed and average about 17" dbh. This is likely the result of careful, disciplined previous entries.

Recommended action: Selection entry (single tree and groups) c. 50% of the stand

Timeframe: 2010 or 2011

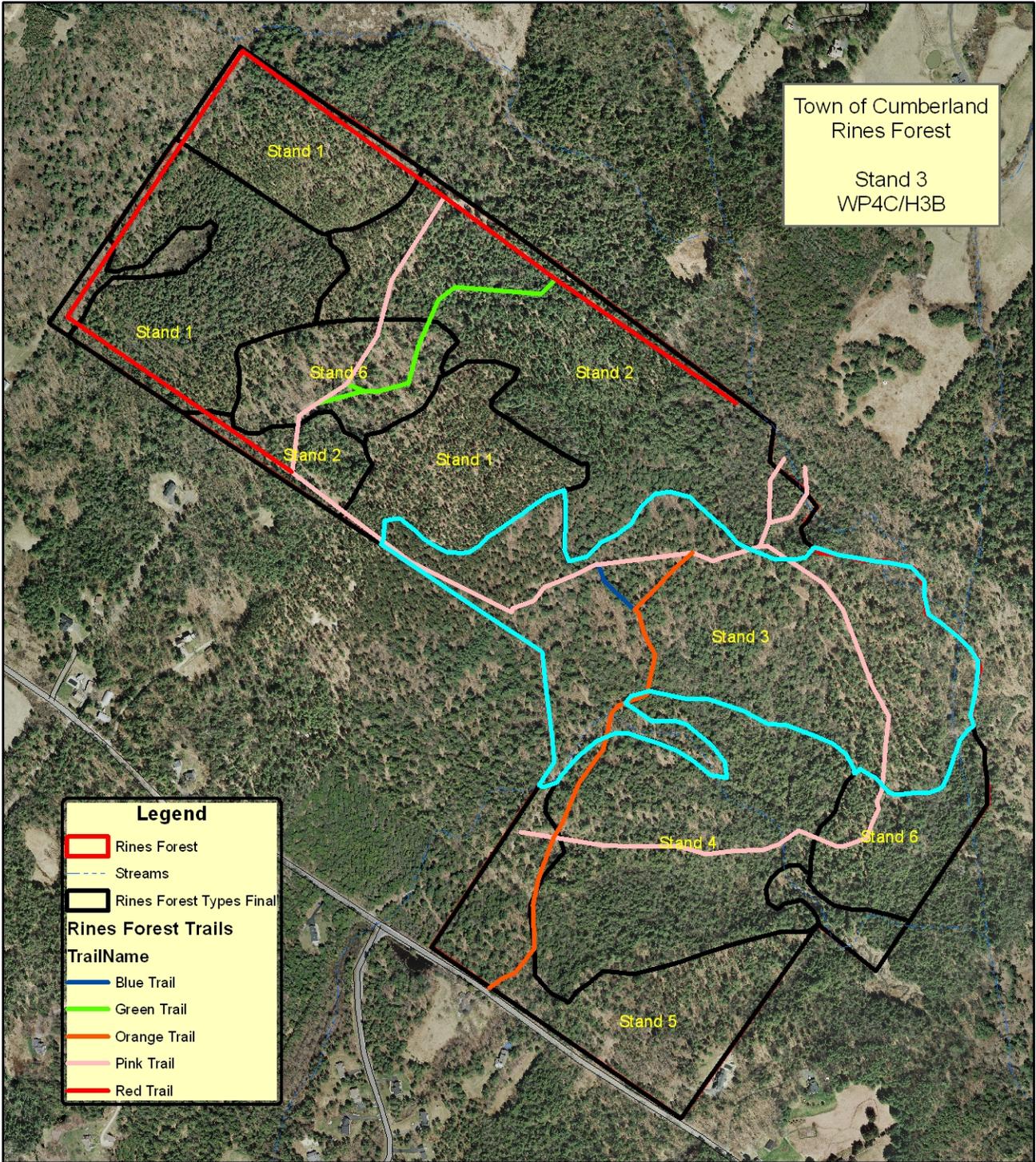
Rational: Shift to uneven aged management

Goals of treatment:

- Initiate new age class
- Tend the intermediate size/age classes, by capturing potential mortality
- Retain mature condition in perpetuity

This stand marks the separation point between that portion of the forest that is to be managed under an even-aged system and that which is to be more lightly tended under an uneven aged method. This will allow for a buffer around the Rines Reserve area where a more diffuse treatment will be applied. The mature condition we find today will be maintained and enhanced with harvest treatments and intervals that more closely mimic natural disturbance.

With that said, this stand should be encouraged to develop multiple age classes and be managed under an uneven aged management system. A selection harvest, both single tree and groups (here we are talking about ¼ acre patches or smaller) are appropriate for portions of this stand at this time. This treatment should be applied to about 50% of the area focusing on areas not treated during the last entry and opportunities to either release well formed sapling cohorts or create new classes. In the oak and white pine dominated portions of the stand, a light single tree approach will likely result in a significant change in species composition. So keep in mind the desire to regenerate these species and other desirable yet less shade tolerant species.



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Stand 4, EH4A

This stand is comprised of a nearly pure core of eastern hemlock and mixes with other softwoods and hardwoods as it fans out from the center. The basal area ranges from 150 ft² to over 200 ft² near the brook. The hemlock portion is composed of predominantly eastern hemlock in the 12 to 14" (dbh) range. There is a scattering of dominant red oak with the hemlock, and a minor component of other northern hardwoods like red maple, yellow birch and white birch mostly in the intermediate and suppressed crown positions. These tend to be smaller diameter and poorly formed. The understory is absent at the center where the nearly complete crown closure precludes light from reaching the soil. As you approach the edges where light from the last entry makes it's way to the forest floor, a sapling component composed of mostly hardwood exists.

Within this stand are some significant riparian features that warrant special attention leading to my recommendation that this area contain the Rines Forest Reserve, or at least part of it.

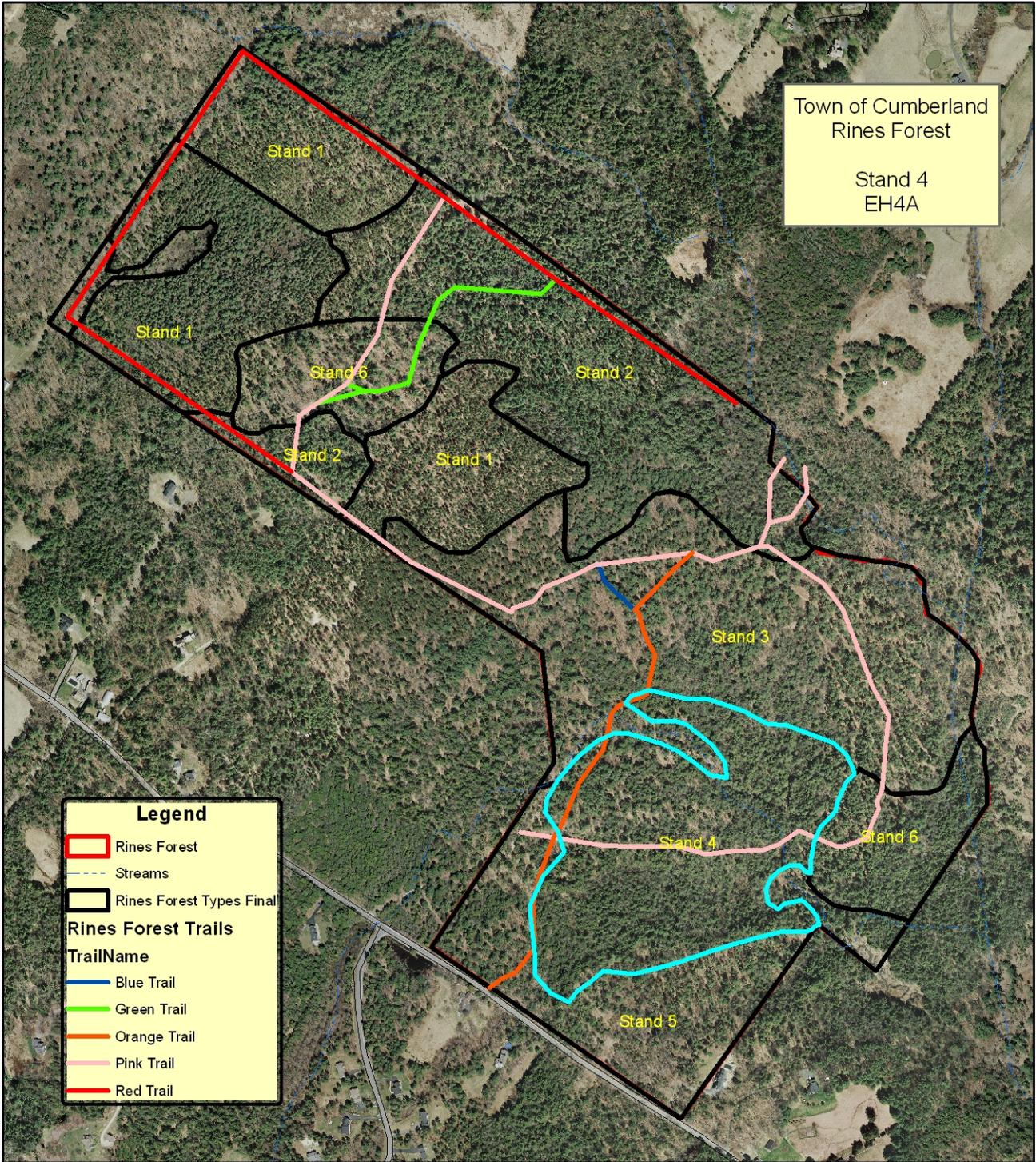
This stand should be treated in two ways. A portion should be placed in a Reserve and the balance of this stand should be allowed to grow. This second portion will be considered for a selection entry in 2020.

Recommended action: Reserve 20-40+ acres, Grow balance

Rational: Allow mature hemlock to approach late successional conditions while buffering the reserve with an area that maintains a mature condition.

Goals of treatment:

- Expand, maintain and foster habitat for:
 - Fisher
 - Pileated woodpecker
 - Barred Owl
 - Wood Thrush
 - Redback salamander



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Stand 5, SH4C/HS2C

This area is similar to Stand 4 in that it is at least two aged. The reason it is being treated separately here is that it has a lower stocking level and was either entered more recently or more volume was removed during the previous entry if they were in fact conducted simultaneously. The average basal area ranges from 90 ft² to 135 ft² and the average diameters are in the 9 to 12" (dbh) range. In contrast to Stand 4, the overstory composition here includes to a greater degree, eastern hemlock as well as red spruce (individuals) and balsam fir, and therefore the mixedwood designation SH (more softwood than hardwood). A further contrast is that the second cohort contains more softwood, and that both age classes are less well stocked.

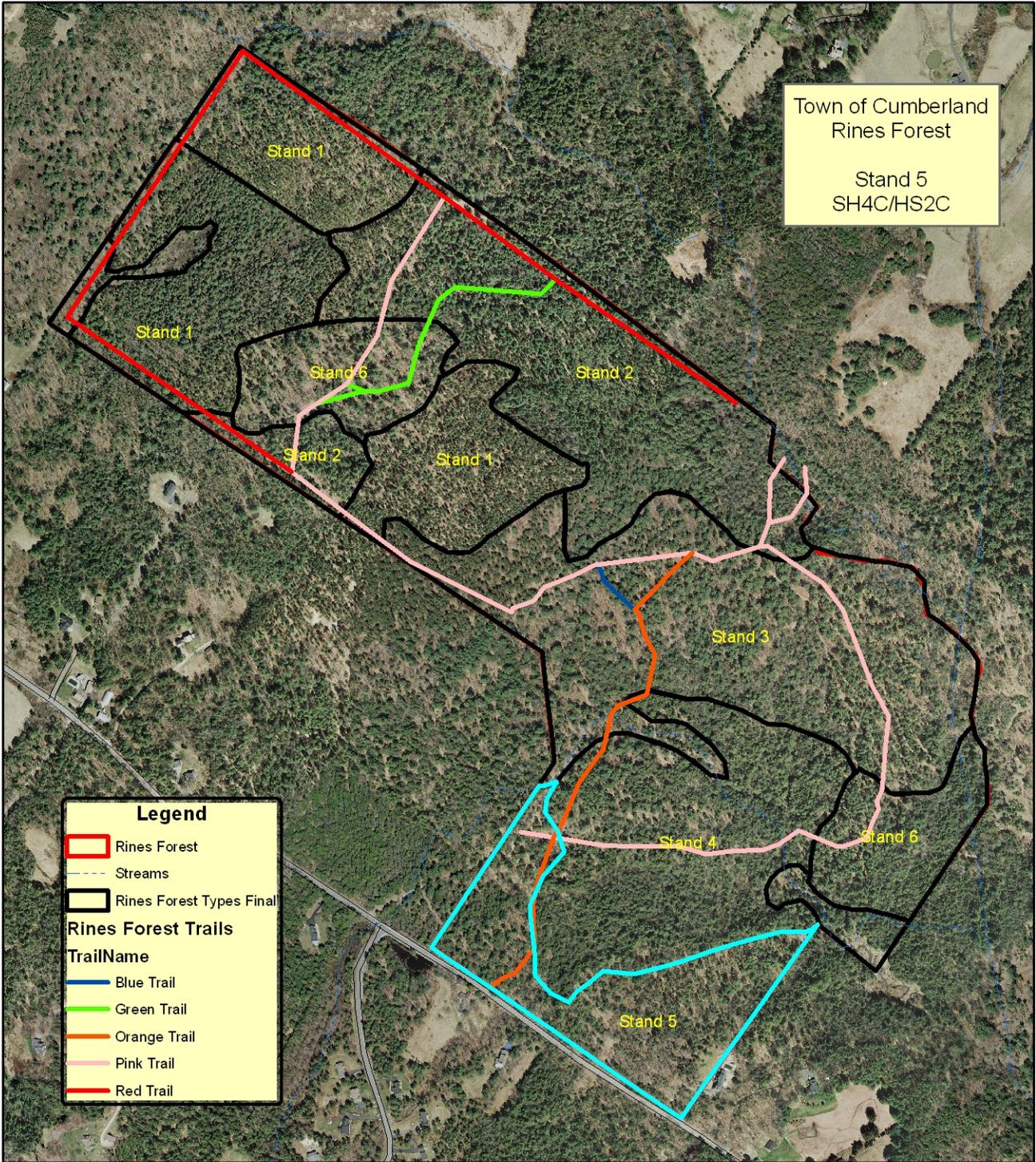
There are some small pockets present in this stand that contain very large diameter hemlock and white pine with a very advanced large sapling cohort that is mostly hardwood. This section of the forest has not been treated for many years yet still does not warrant an entry at this time and is grouped into this stand for that reason.

Recommended action: Grow

Rational: Allow stand to recover and mature from last treatment

Goals of treatment:

- Increase stocking level allowing stand to mature
- Balance the forest in terms of treatment timing
- "Buffer" the Reserve area



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Stand 6, WP4B (two separate blocks, c. 11 acres west, and c. 10 acres east)

These two blocks are composed of B density eastern white pine and were harvested during the last entry. The overstory is composed of relatively well formed sawlog sized white pine. The stocking here is a bit lighter than we see on the balance of the property running at an average basal area of about 110 ft² per acre with an average of 300 trees per acre and a mean diameter of approximately 14" DBH.

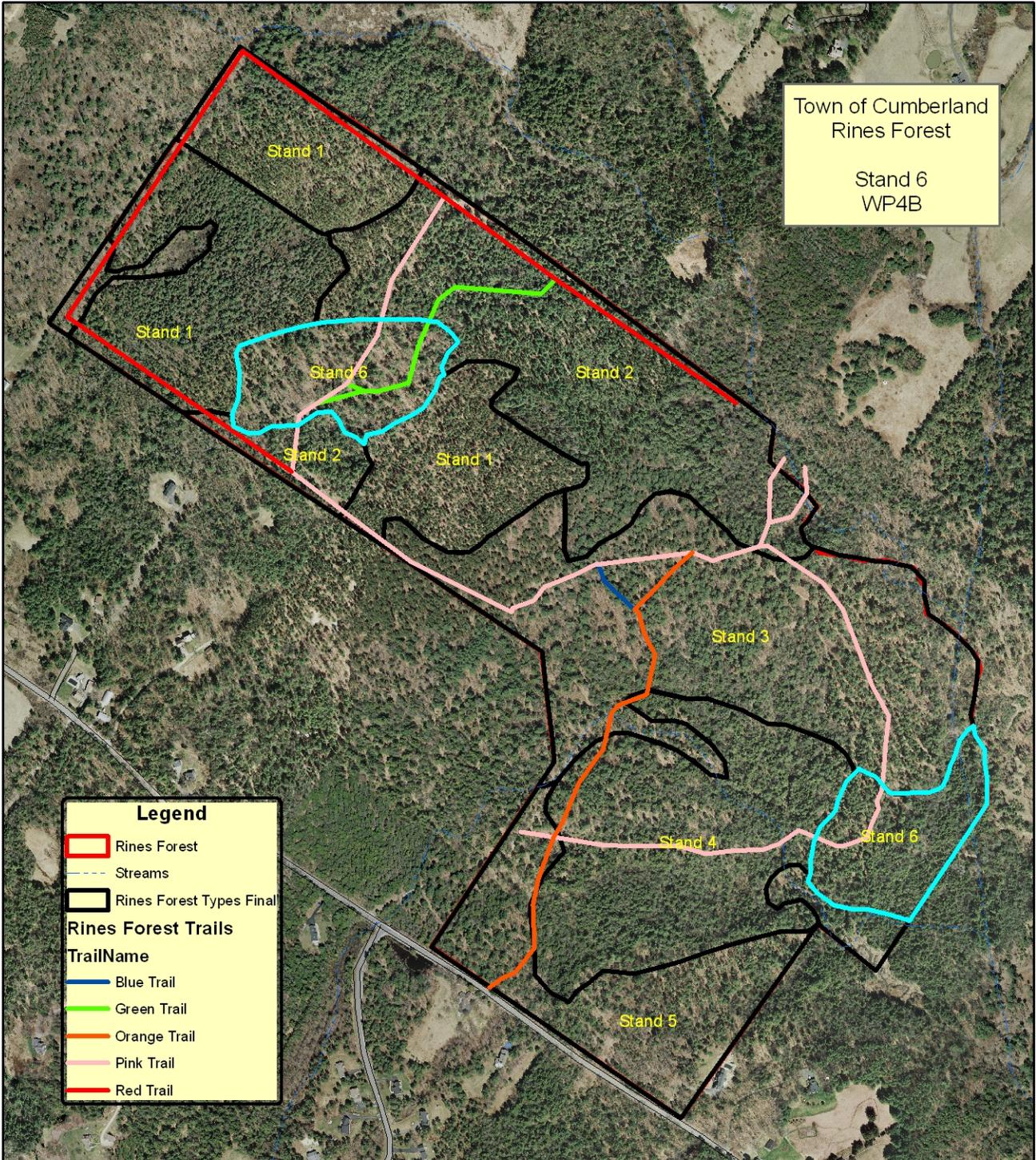
Despite the near uniform overstory of white pine, the understory is nearly all hardwood. The last harvest entry was likely both low intensity and conducted in the winter. The resulting low light penetrating the residual canopy and the lack of soil scarification led to the lack of pine regeneration. If subsequent entries are designed to regenerate white pine (and oak), both of these conditions must be reversed. However, given the lower density of this stand it is likely prudent to forestall any treatment at this time.

Recommended action: Grow

Rational: Allow stand to recover and mature from last treatment

Goals of treatment:

- Increase stocking level
- Balance the forest in terms of treatment timing
- "Buffer" the Reserve area



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Rines Forest Reserve Area

The concept for the Rines Forest Reserve is to designate an area that would remain free from treatments into perpetuity. This area should be centered on some biologically important features and range in size between 20 and 40+ acres. As outlined in the description for stand 4 above, a significant portion of this reserve will be located in stand 4. This portion of the forest is comprised of nearly mature trees and encompasses two very important riparian zones. The first is a major stream leaves a culvert under Range road and leads into this area eventually emptying into a forested wetland near the corner of the property. This wetland expands as it exits the Rines forest into a larger wetland before draining back into Mill Brook. The second is the riparian that crosses Range road to the south west and eventually feeds the large protected vernal pool on the southern side of the road.

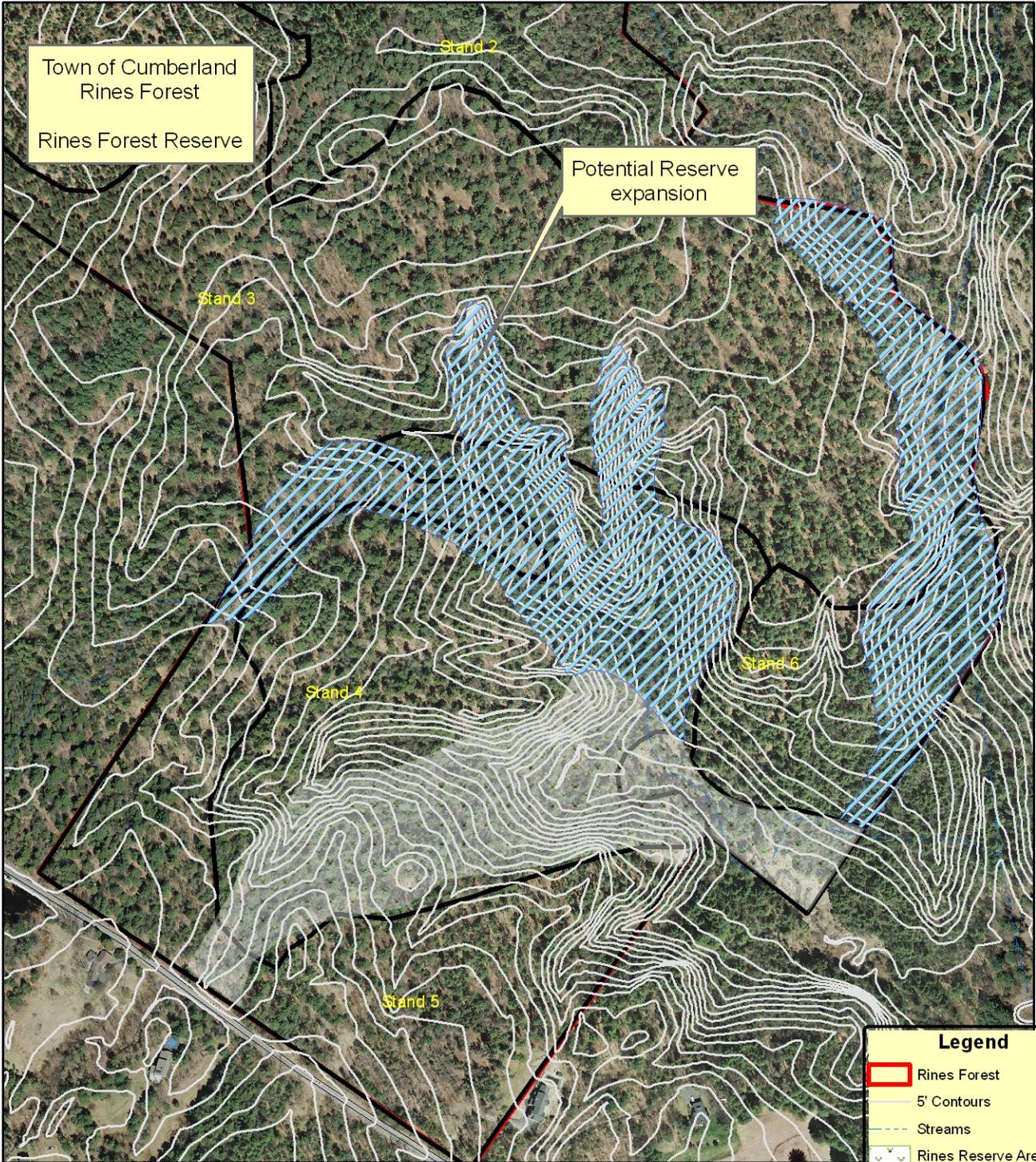
This Reserve area should contain the entire portion of the nearly pure hemlock stand, the forested wetland to the north, and the riparian corridor leading from Range Road (see map for recommended layout). The Reserve will be further expanded to include the steep slopes and the stream zones that run north and west of the Reserve.

Recommended action: Preserve

Rational: This portion of the State lacks forest blocks of this size that are allowed to grow and mature undisturbed.

Goals of treatment:

- Develop late successional conditions in this nucleus
- Expand, maintain and foster habitat for:
 - Fisher
 - Pileated woodpecker
 - Barred Owl
 - Wood Thrush
 - Redback salamander



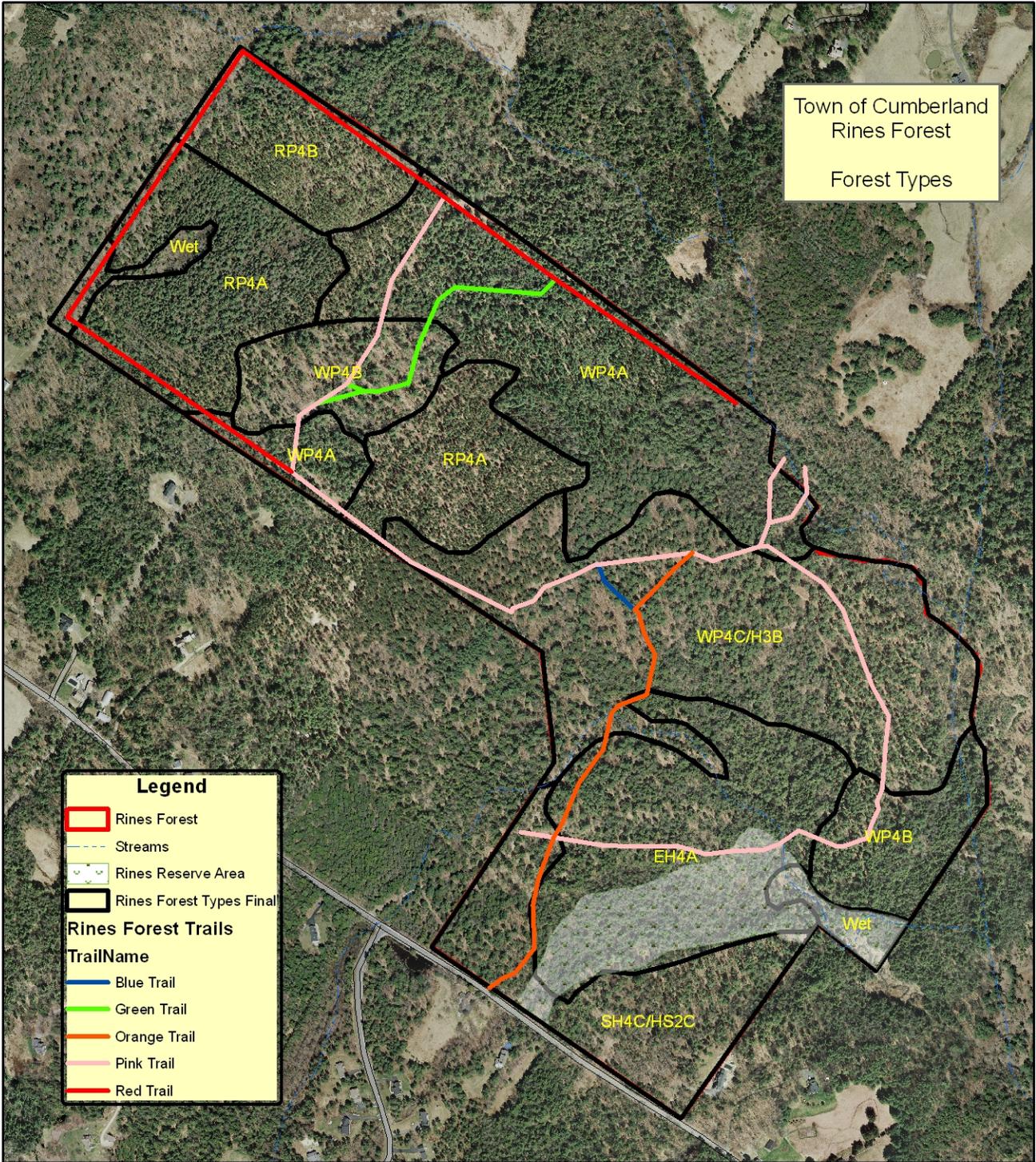
Legend

- Rines Forest
- 5' Contours
- Streams
- Rines Reserve Area
- Rines Forest Types Final



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Maps



Town of Cumberland
Rines Forest
Forest Types

Legend

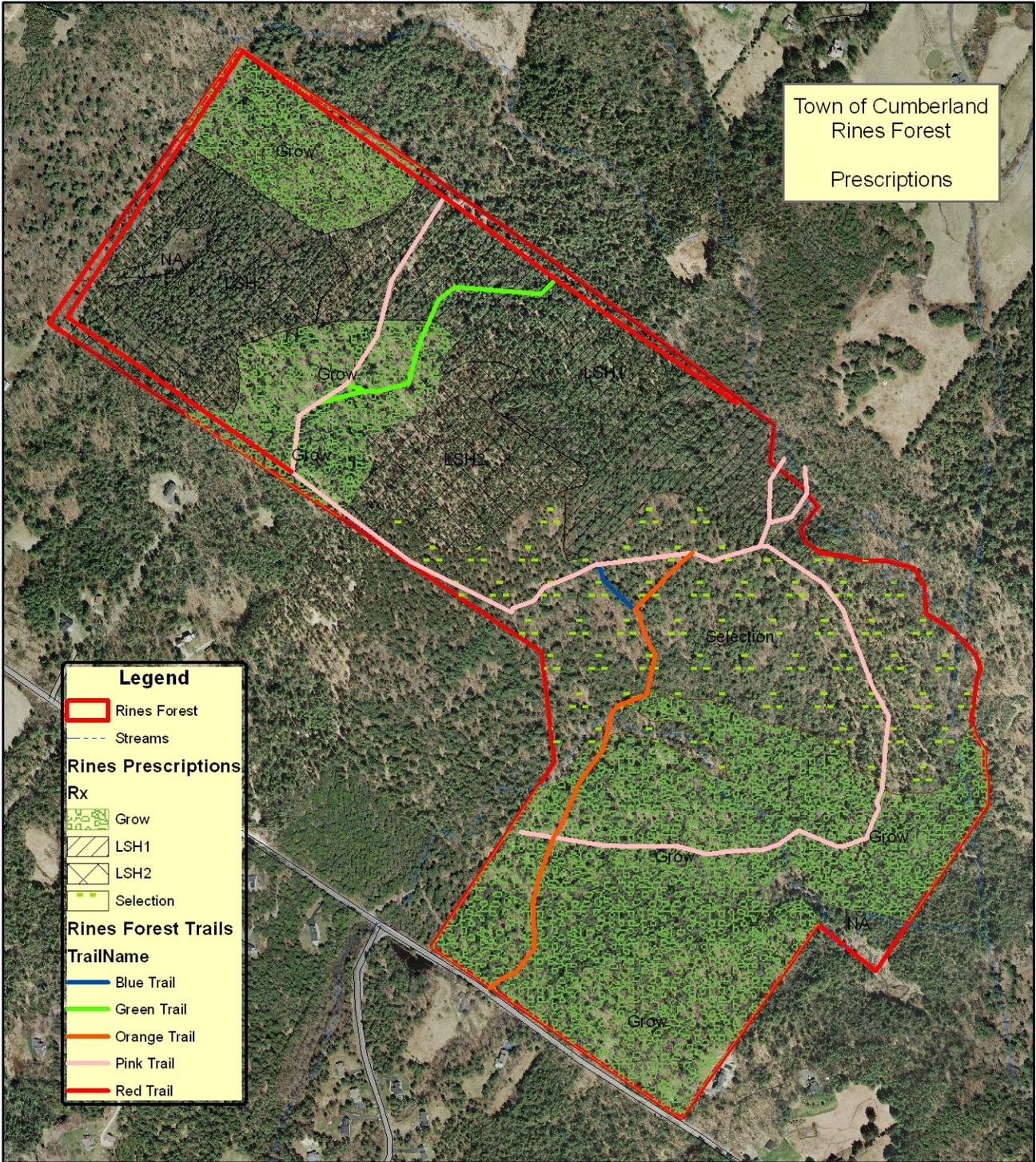
- Rines Forest
- Streams
- Rines Reserve Area
- Rines Forest Types Final

Rines Forest Trails

TrailName	
Blue Trail	
Green Trail	
Orange Trail	
Pink Trail	
Red Trail	



Jay Braunscheidel
207 632 5854



Town of Cumberland
Rines Forest
Prescriptions

Legend

- Rines Forest
- Streams

Rines Prescriptions

Rx

- Grow
- LSH1
- LSH2
- Selection

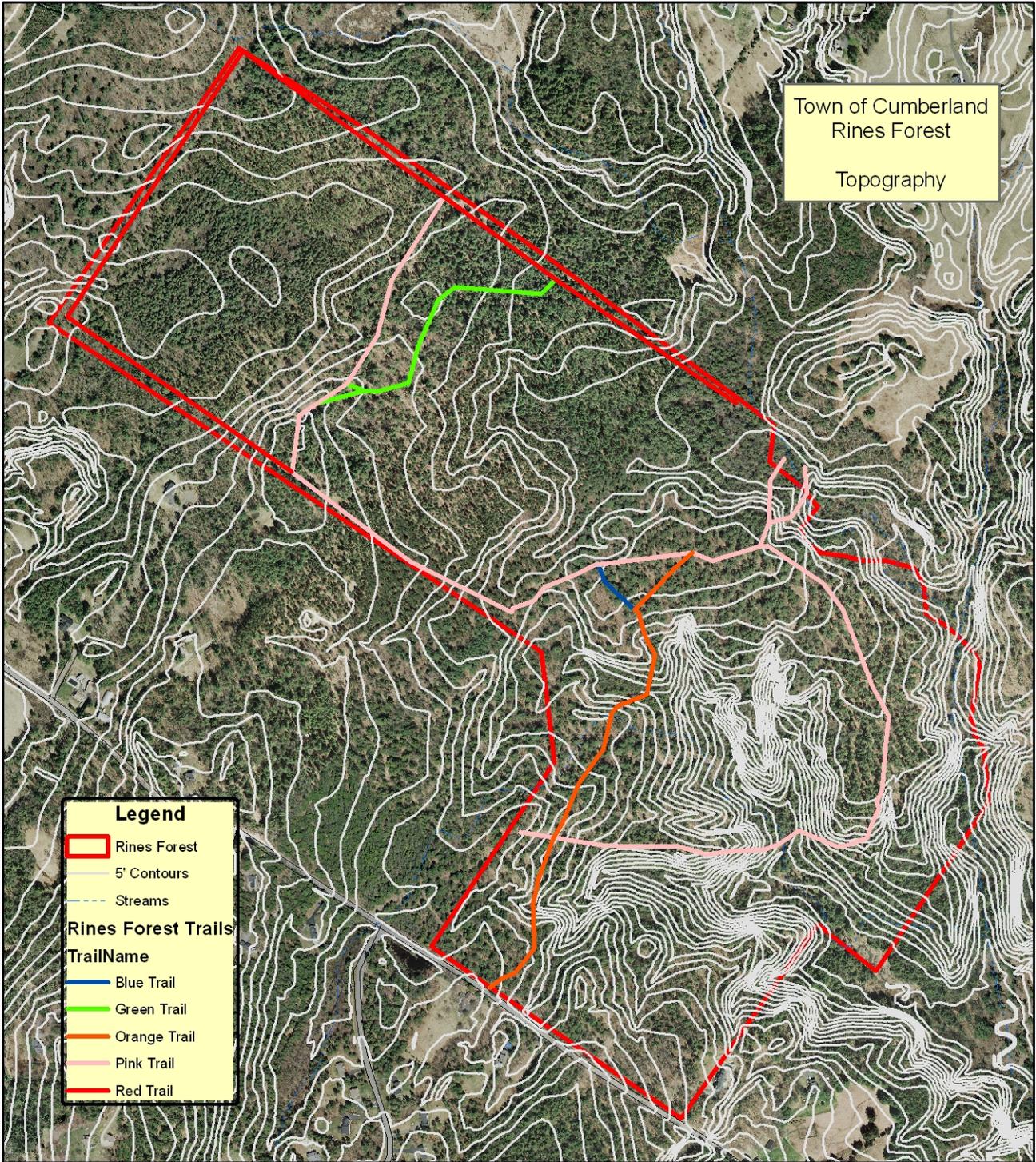
Rines Forest Trails

TrailName

- Blue Trail
- Green Trail
- Orange Trail
- Pink Trail
- Red Trail

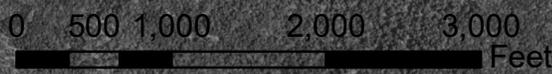
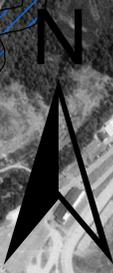


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207 632 5854

Rines Forest
 Rines II, Godsoe and Milliken Parcels
 Cumberland, Maine
 Cumberland County
 87+/- Forested Acres



	SWS_Buffer__Cumberland
	Godsoe 31 acres HS4A
	Milliken 4 acres H4A
	Rines II 52 acres SH4B
	RinesForest_withGodsoe_SurveyedBounds
imageryBaseMapsEarthCoverMaine_Orthoimagery_Aggregate	
RGB	
	Red: Red
	Green: Green
	Blue: Blue

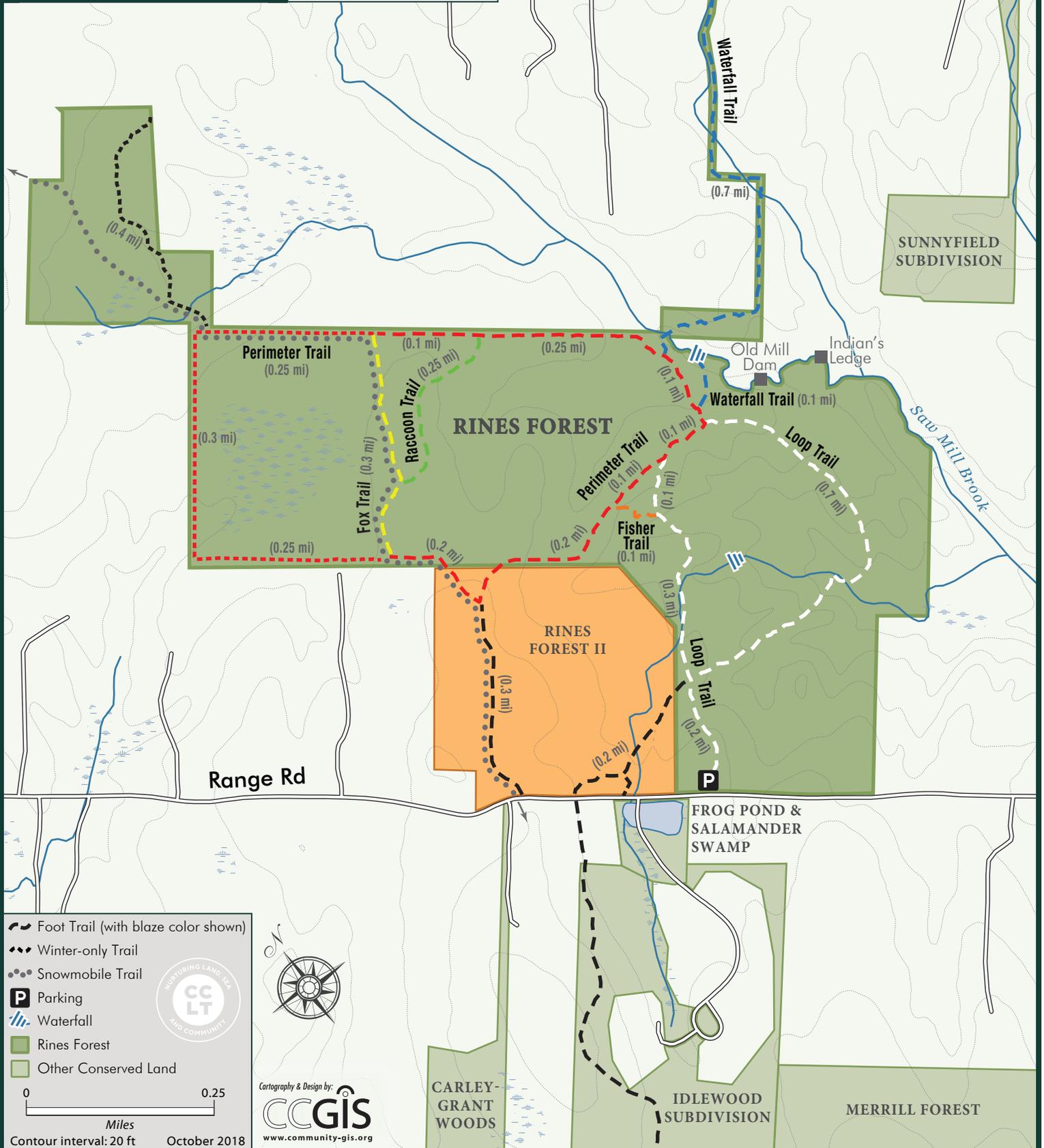
Map Prepared by: Paul Larrivee, Jr. LF 3306
 November 5, 2020
 Not a legal boundary survey

Rines Forest



Getting There: Head south on Route 9 from Cumberland Center, turn right onto Winn Road and then right onto Range Road. Rines Forest entrance is 1.2 miles down Range Road.

Chebeague & Cumberland Land Trust



- Foot Trail (with blaze color shown)
- Winter-only Trail
- Snowmobile Trail
- Parking
- Waterfall
- Rines Forest
- Other Conserved Land

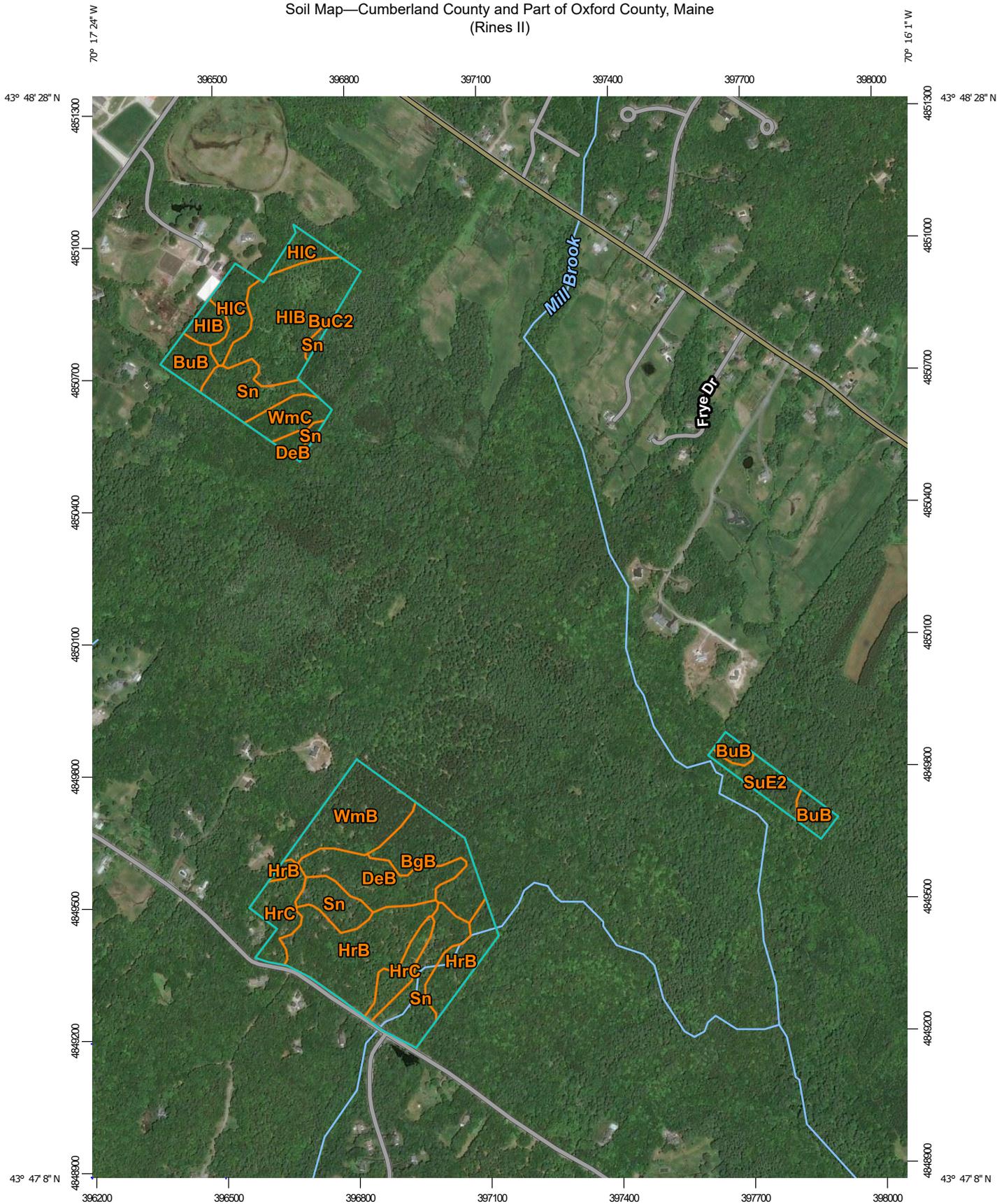


Cartography & Design by:
CCGIS
 www.community-gis.org

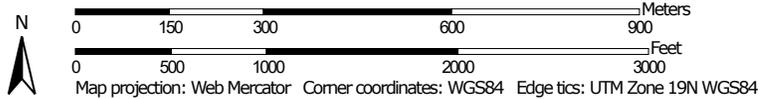
0 0.25
 Miles
 Contour interval: 20 ft
 October 2018



Soil Map—Cumberland County and Part of Oxford County, Maine
(Rines II)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



Soil Map—Cumberland County and Part of Oxford County, Maine
(Rines II)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BgB	Nicholville very fine sandy loam, 0 to 8 percent slopes	7.1	8.1%
BuB	Lamoine silt loam, 3 to 8 percent slopes	4.7	5.4%
BuC2	Buxton silt loam, 8 to 15 percent slopes	0.0	0.0%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	7.7	8.8%
HIB	Hinckley loamy sand, 3 to 8 percent slopes	13.6	15.5%
HIC	Hinckley loamy sand, 8 to 15 percent slopes	4.7	5.4%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	16.0	18.2%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	6.0	6.9%
Sn	Scantic silt loam, 0 to 3 percent slopes	13.7	15.7%
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	2.8	3.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	8.4	9.6%
WmC	Windsor loamy sand, 8 to 15 percent slopes	2.9	3.3%
Totals for Area of Interest		87.7	100.0%



STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY

177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

August 12, 2020

Denny Gallaudet, Forestry Committee Town of Cumberland
Via email: denny.gallaudet@gmail.com

Re: Forest Management Plan Review

Dear Mr. Gallaudet:

In response to your request received on August 10, 2020, I have searched our data system for information on rare or unique botanical features, rare animal populations, and essential or significant wildlife habitats in the vicinity of the Town of Cumberland's Rines Forest in Cumberland.

For individual parcel reviews, we use a simple checklist that summarizes our findings. The enclosed checklist includes our review of several data sets, some of which are maintained by the Maine Natural Areas Program (MNAP) and others that are maintained by the Maine Department of Inland Fisheries and Wildlife (MDIFW), and the U.S. Fish and Wildlife Service (USFWS). If a parcel intersects with a data set maintained by MDIFW or USFWS, please contact the appropriate biologist indicated on the checklist for additional information.

The parcel is within a focal area for New England Cottontail (State Endangered). Cottontails can be differentiated from the much more common snowshoe hare by their generally smaller size, and that they remain brown year-round; whereas hares change to white in winter. They rely on early-successional habitats such as dense, shrubby thickets or regenerating young forests, and such habitat is also valuable to species such as American woodcock, ruffed grouse, prairie warblers, brown thrashers, and many others. Good forestry practices can produce this habitat and provide for timber procurement. For more information, please see the Landowners Guide to New England Cottontail Habitat Management, available at <http://www.newenglandcottontail.org/>, or contact MDIFW regional wildlife biologist Cory Stearns (287-5759) or Maine's New England cottontail Restoration Coordinator Jeff Tash (646-9226). In some cases, financial assistance may be available from the Natural Resources Conservation Service (NRCS) to assist in managing for young forest habitat. Please contact Jeremy Markuson (990-9571) for more information about NRCS programs.

Mill Brook and its tributaries support populations of wild brook trout. Brook trout prefer cool, well-oxygenated waters that benefit from intact riparian corridors. Any forest management activities planned for riparian zones should closely follow the state's Best Management Practices, including appropriate buffer distances, shade retention, and minimization of sediment runoff. Please see the attached fact sheet for more information about brook trout in Maine.

Good management of these habitats is consistent with good forestry, and MDIFW's regional wildlife and fisheries biologists are available to assist you in maintaining their integrity while allowing for forest management and timber procurement. According to the information currently in our files, there are no other rare species or important habitats documented within the property. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare features.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
90 BLOSSOM LANE, DEERING BUILDING



PHONE: (207) 287-8044
WWW.MAINE.GOV/DACF/MNAP

Letter to Denny Gallaudet
Comments RE: Rines Forest, Cumberland
August 12, 2020
Page 2 of 4

Thank you for using the MNAP in the forest management planning process. If you have questions about the MNAP, or if you would like more information about this site, please feel free to contact me. You can also visit us on the web at www.maine.gov/dacf/mnap.

Sincerely,

Lisa St. Hilaire

Information Manager | Maine Natural Areas Program
maine.nap@maine.gov | Phone: (207) 287-8044 | Fax: (207) 287-8040

cc: Cory Stearns, Brian Lewis, MDIFW

Forest Management Plan Review

Forester: *Denny Gallaudet* Landowner: *Town of Cumberland* Lot Name: *Rines Forest*
 Date Received: *8.10.2020* Town: *Cumberland* County: *Cumberland* MDIFW Region: *A*

PLANT, ANIMAL, AND HABITATS	Documented to occur at the site? YES NO		Contact the following biologist to discuss conservation considerations	
Plants: rare, threatened and/or endangered <i>If yes, see attached summary table.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Natural Communities: rare and/or exemplary <i>If yes, see attached summary table.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Animals: rare, threatened, or endangered <i>If yes, see attached summary table.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MDIFW Assistant Regional Wildlife Biologist Cory Stearns, 287-5759	
Mapped Essential Wildlife Habitats: Roseate tern Piping plover and Least tern	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		
Mapped Significant Wildlife Habitats: Deer wintering area Inland waterfowl and wading bird habitat Tidal waterfowl and wading bird habitat Significant vernal pool Shorebird feeding/roosting area	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		
Wild brook trout habitat	Yes <input checked="" type="checkbox"/>	Unknown <input type="checkbox"/>	MDIFW Assistant Regional Fisheries Biologist Brian Lewis, 287-5760	
Atlantic Salmon: Salmon critical habitat Salmon stream habitat	Yes <input type="checkbox"/> Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Canada lynx: The town & parcel may provide habitat for lynx	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
LANDSCAPE CONTEXT			YES	NO
Does parcel intersect with a Beginning with Habitat Focus Area? Focus Area Name: Additional information on this focus area may be available at www.maine.gov/dacf/mnap/focusarea			<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the parcel adjacent to or on Conservation Lands? Owner: Tow of Cumberland Ownership type: <input checked="" type="checkbox"/> Fee <input type="checkbox"/> Easement Area Name: Rines Forest			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is the parcel within an area identified by MNAP as a potential inventory site for undocumented rare plants or exemplary natural communities? If so, MNAP will contact the landowner for permission prior to any inventory work.			<input type="checkbox"/>	<input checked="" type="checkbox"/>

Review completed by: LRS
 Date: 8.12.2020
 MNAP #: 2020.08.12.LS.02

Forester: *Denny Gallaudet* Landowner: *Town of Cumberland* Lot Name: *Rines Forest*

Summary Table: Plants, natural communities, and animals documented to occur at the site

Feature Name	State Status ^a	State Rank ^b	Global Rank ^c	SGCN Priority ^d	Additional Information
New England Cottontail	E	S2	G3	1	Focal Area

^a **State Status (please note that all species with E, T, or SC status are listed as Species of Greatest Conservation Need in the State Wildlife Action Plan)**

- E** Endangered; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** Threatened; Rare and, with further decline, could become endangered; or federally listed as Threatened.
- SC** Special concern; A species that does not meet the criteria for E or T, but is particularly vulnerable and could easily become a Threatened, Endangered, or Extirpated Species.

^b **State Rank (State Rarity Rank)**

- S1** Critically imperiled in Maine because of extreme rarity or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine.
- S4** Apparently secure in Maine, includes **S4B** for breeding birds and **S4N** for nesting birds.
- S5** Demonstrably secure in Maine.

^c **Global Rank (Global Rarity Rank)**

- G1** Critically imperiled globally because of extreme rarity or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity or because of other factors making it vulnerable to further decline.
- G3** Globally rare.
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.

^d **SGCN Priority**

Describes the prioritization of Species of Greatest Conservation Need based primarily on risk of extirpation, population trend, endemism, and regional conservation responsibility. **Priority 1** is Highest Priority; **Priority 2** is High Priority; **Priority 3** is Moderate Priority. For more information, please visit Maine’s State Wildlife Action Plan (SWAP) – 2015, http://www.maine.gov/ifw/docs/2015%20ME%20WAP%20All_DRAFT.pdf.

^e **EO Rank (Element Occurrence Rank)**

Describes the quality of a rare plant population or natural community based on size, condition and landscape context. Ranks range from A-E, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank.

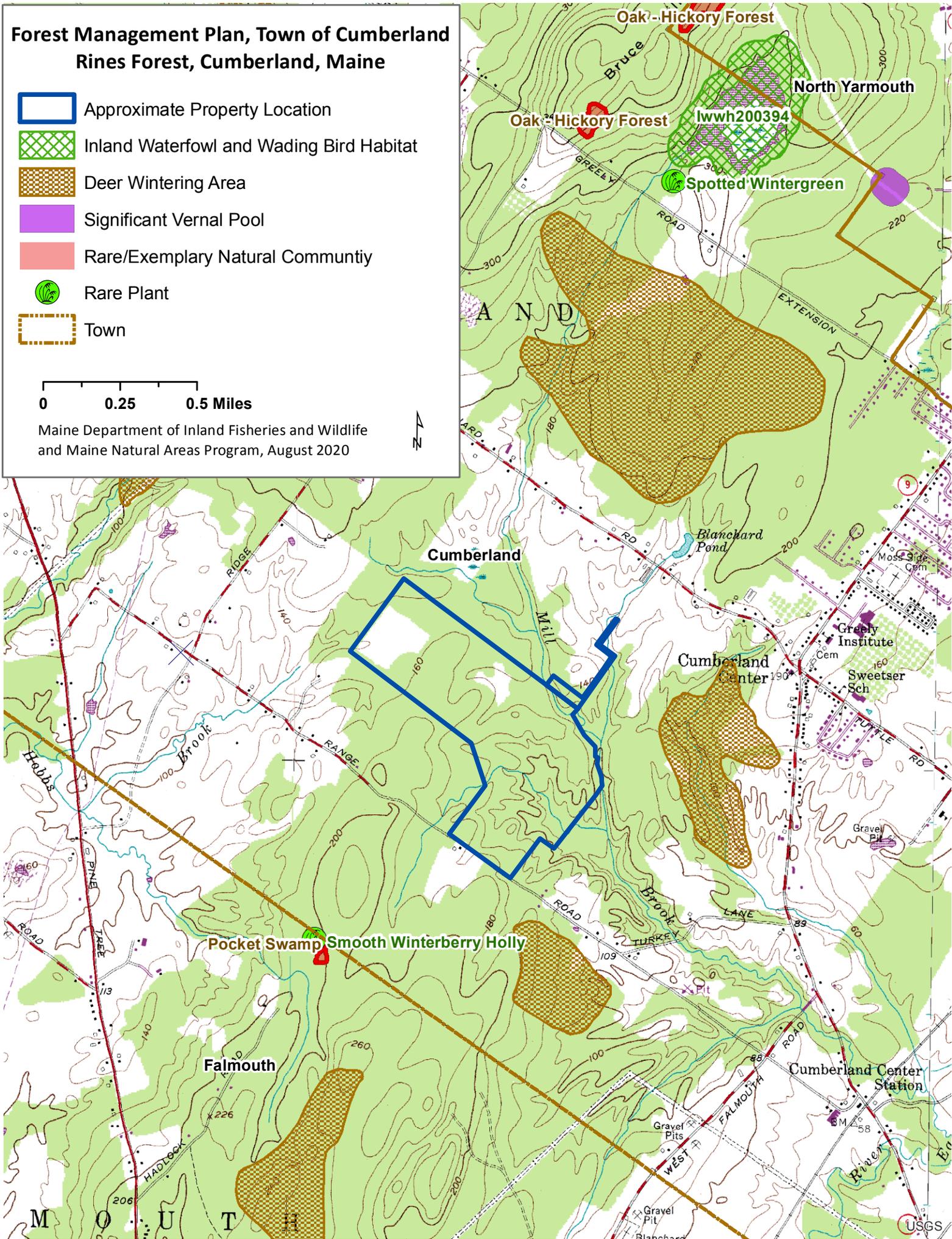
Forest Management Plan, Town of Cumberland

Rines Forest, Cumberland, Maine

-  Approximate Property Location
-  Inland Waterfowl and Wading Bird Habitat
-  Deer Wintering Area
-  Significant Vernal Pool
-  Rare/Exemplary Natural Community
-  Rare Plant
-  Town

0 0.25 0.5 Miles

Maine Department of Inland Fisheries and Wildlife
and Maine Natural Areas Program, August 2020



Forest Management Plan, Town of Cumberland

Rines Forest, Cumberland, Maine

-  Approximate Property Location
-  Deer Wintering Area
-  Rare/Exemplary Natural Community
-  Rare Plant
-  Town

0 0.25 0.5 Miles

Maine Department of Inland Fisheries and Wildlife
and Maine Natural Areas Program, August 2020



Cumberland

Falmouth  Smooth Winterberry Holly
Pocket Swamp



New England Cottontail

Sylvilagus transitionalis

Disappearing rabbit trick

Why would a rabbit, the epitome of prolific breeding, be considered for protection under the Endangered Species Act? The New England cottontail is in just this predicament. Its population numbers are declining. As recently as 1960, New England cottontails were found east of the Hudson River in New York, across all of Connecticut, Rhode Island and Massachusetts, north to southern Vermont and New Hampshire, and into southern Maine. Today, this rabbit's range has shrunk by more than 75 percent. Its numbers are so greatly diminished that it can no longer be found in Vermont and has been reduced to only five smaller populations throughout its historic range.

Where the bunnies are

The New England cottontail prefers early successional forests, often called thickets, with thick and tangled vegetation. These young forests are generally less than 25 years old. Once large trees grow in a stand, the shrub layer tends to thin, creating habitat that the New England cottontail no longer finds suitable.

Active at dawn and at dusk or night, the New England cottontail feeds on grasses and plant leaves in spring and summer and eats bark and twigs in winter. Home ranges vary from one-half to 8 acres, with adult males having larger home ranges than females. Research has shown that New England cottontails on patches of habitat larger than 12 acres are healthier than those on patches less than 7 acres. Presumably, rabbits on small patches of habitat deplete their food supply sooner and have to eat lower quality food, or may need to search for food in areas where there is more risk of being killed by a predator.



Anne Brown

New England cottontail

Why are their numbers declining?

Biologists believe the reduced extent of thicket habitat is the primary reason for the decline in numbers and range of New England cottontails. Prior to European settlement, New England cottontails were probably found along river valleys where floods and beavers created the disturbances needed to generate its preferred habitat. Forest insect outbreaks, large storms like hurricanes and ice storms, and wild fire also created disturbances in the forest that promoted thicket growth. During colonial times, much of the New England forest was cleared for agriculture and then subsequently abandoned during the early 1900s. This abandoned farmland allowed for a great deal of early successional habitats to develop. Today, these habitats are aging while others have been developed and are no longer suitable for the New England cottontail.

The introduction of exotic invasive species, such as multiflora rose, honeysuckle bush and autumn olive, in the last century has changed the type of habitat available to New England cottontails. These plants form the major component of many patches where cottontails can be found. It may be that stands dominated by non-native species do not provide rabbits with the food resources that native plant species do.

Today white-tailed deer are found in extremely high densities throughout the range of New England cottontails. Deer not only eat many of the same plants but also affect the structure and density of many understory plants that provide thicket habitat for New England cottontails.

Introduced competitor

In the early 1900s until the 1960s, hunting clubs and some eastern states introduced another species of rabbit, the eastern cottontail, into New England. Eastern cottontails appear able to thrive in a greater variety of habitats than New England cottontails through its ability to detect predators sooner. This helps eastern cottontails forage more safely in relatively open cover, while New England cottontails risk predation whenever they leave the security of their dense thicket habitats. The slightly better ability to avoid predators enables eastern cottontails to live in more diverse habitats, such as fields, farms and forest edges, and they are gradually replacing New England cottontails in many habitat patches.

Identity is more than skin deep

It is nearly impossible to distinguish a New England cottontail from an eastern cottontail by looking at them. The minor differences of ear length, body mass, and presence or absence of a black spot between the ears and a black line on the front of each ear are subtle enough to be missed and are not 100 percent accurate. Scientists used to rely on examining the rabbits' skulls for positive identification, but can now use DNA analysis of fecal pellets. Since rabbits drop fecal material all around their territory, the extracted DNA from pellets collected throughout the region can provide a picture of where the New England cottontail is found.

Helping the cottontail

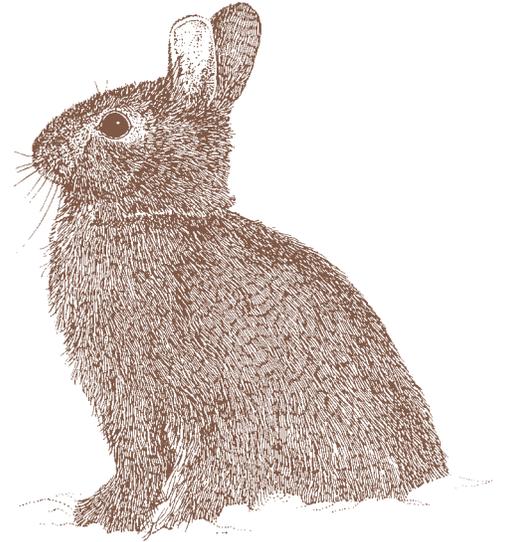
The New England cottontail is the subject of research and habitat management in New York and the New England states. Halting the decline of scrub and brushland habitat is paramount, as is identifying potential habitat free of competing eastern cottontail to which New England cottontails could be restored. The U.S. Fish and Wildlife Service shares the concern for the future of New England's only native cottontail. Working together, states and federal agencies may help improve the chances of survival for the New England cottontail.

**Northeast Region
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035
413/253 8200
<http://northeast.fws.gov>**

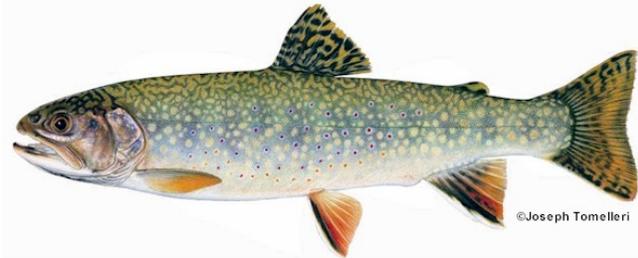
**Federal Relay Service
for the deaf and hard-of-hearing
1 800/877 8339**

**U.S. Fish & Wildlife Service
1 800/344 WILD
<http://www.fws.gov>**

August 2006



MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE



Forest Management Recommendations for Brook Trout

Background

Brook trout (*Salvelinus fontinalis*), commonly referred to as squaretail, brookie, and speckled trout, are native to Maine. This colorful fish is the most preferred sport fish sought by Maine anglers. Size may vary, depending on water temperature, productivity, and food sources, but 3 year-old brook trout in Maine lakes may range from 7.5 to 17.5 inches long. Stream populations are typically slower growing where lengths of 6 to 10 inches are more common place, although some populations mature and reproduce at lengths smaller than 6 inches.

Maine is the last stronghold for brook trout in the eastern United States. There are more than twice as many watersheds supporting brook trout in Maine than all of the other 16 states within the eastern brook trout range combined. Maine is also the only state with extensive intact lake and pond dwelling populations of wild brook trout.

Brook trout require clean, cool, well oxygenated water and are very sensitive to changes in habitat and water quality. Rivers and streams typically provide spawning and nursery habitat. Adults are commonly resident in streams, but migrate throughout and between drainages to meet seasonal life history requirements.

Stream habitat suitability is maintained by the presence of intact, stable, mature wooded riparian corridors that: conserve forest soils, provide shade to reduce stream warming, protect stream water quality, provide cover for fish, provide a source of woody debris and leaf litter from mature trees that maintain critical in-stream habitat for fish and the aquatic insects they feed upon (leaves provide the energy source that drives productivity in streams). Floodplain and fringe wetlands associated with streams are a significant source of springs and groundwater discharge that maintain stream flows and cool temperatures during warm low flow summer periods. Protection of these important riparian and wetland functions insures that the overall health of the stream habitat and watershed is maintained.

Maine brook trout fisheries are unique and highly valuable, but vulnerable to habitat alteration that may be caused by poorly planned and implemented land management activities, including road and trail construction, as well as timber harvesting. However, well planned

forestry operations can protect habitat and help ensure that forests remain as forest, which is the most beneficial land use for brook trout and many other fish and wildlife.

Management Recommendations

Brook trout are not afforded any special state or federal regulatory protection, and as such provided management recommendations are advisory.

The MDIFW recommends following Best Management Practices (BMPs) during all road and trail building activities, as well as timber harvesting. BMPs are detailed in the booklet entitled “[Best Management Practices for Forestry](#)”, which offers guidance on managing and protecting water quality, installing road-stream crossings, and providing fish passage. This information is available at:

www.maine.gov/dacf/mfs/publications/handbooks_guides/bmp_manual.html or contact the Maine Forest Service at 1-800-367-0223).

Potential harmful impacts to fish and wildlife may be further minimized by designating “low impact riparian protection areas” adjacent to streams and stream-associated fringe and floodplain wetlands in forest management and harvest plans. Smaller streams may be greatly influenced by land management practices; these systems benefit the most from well-managed and intact riparian corridors.

The MDIFW also recommends limiting the harvest of trees and alteration of other vegetation within 100 feet of streams and their associated fringe and floodplain wetlands to maintain an intact and stable mature stand of trees, characterized by heavy crown closure and resistant to wind-throw. In some situations wider buffers should be considered where severe site conditions (i.e., steep slope, vulnerable soils, poor drainage, snow pack, etc) increase risk to soil and stand instability. Any harvest within the riparian buffer zone should be selective and less valuable trees may remain uncut to enhance stand integrity and maturity.



JANET T. MILLS
GOVERNOR

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

KIRK F. MOHNEY
DIRECTOR

ARCHAEOLOGY AND HISTORIC RESOURCES REVIEW
FORESTRY PLAN

MHPC # F071-20
Forester TOWN OF CUMBERLAND
Parcel KNIGHTS POND AND RINES FOREST

Date Received 8/13/2020

Township CUMBERLAND

*****This worksheet was completed for informational purposes only*****

Prehistoric (Native American) Archaeology (for further information: arthur.spieess@maine.gov)

- No prehistoric archaeological sites known. Based on location, soils and topography, none are expected.
- No prehistoric archaeological sites known because no survey has been conducted. However, the following area is archaeologically sensitive. within 50 yards of Knights Pond
- The property includes known sites of archaeological importance. (See attached info)

Historic Archaeology (e.g. 1800s farms, etc.) (for further information: leith.smith@maine.gov)

- No sites are known, and none are expected (based on historic maps and documents).
- There are possible sites from former houses, barns, and outbuildings shown on maps from 1850 to 1920, now possibly recognizable as foundations or cellar holes. (See attached map.)
- The property contains known sites of archaeological importance. (See attached info)

Historic Buildings or Structures (for further information: megan.m.rideout@maine.gov)

- No historic buildings or structures are known or expected on the property (based on 7.5' USGS topographic maps and MHPC records).
- Buildings or structures may exist on the property that have not been evaluated for National Register eligibility. Our office will provide an assessment if a request letter, photos of any buildings over fifty years of age that are on the subject parcel, and a 7.5' USGS topographic map with all photos keyed to it are submitted to our office.
- Buildings or structures exist on the property that are either listed in or eligible for nomination to the National Register of Historic Places. (See attached info)

The information on this worksheet is being provided for Forestry Management Planning purposes only.

If any construction or ground disturbing activities on these properties will utilize federal funding, permitting or licensing, initiation of Section 106 review with the Maine Historic Preservation Commission is required pursuant to the National Historic Preservation Act of 1966.

67 Range Road
Cumberland ME 04021
August 10, 2020



Maine Historic Preservation Commission
55 Capitol Street
65 State House Station
Augusta, ME 04333-0065

To Whom It May Concern:

As described in the attached narrative, the Town of Cumberland is preparing management plans for two newly acquired forest parcels: Knight's Pond and Rines Forest.

We hereby request for these parcels a review of historic preservation implications.

Regards,

Denny Gallaudet

Vice Chair - Forestry Committee
Town of Cumberland Maine

NARRATIVE

In its 2009 Comprehensive Plan as updated, the vision of the Town of Cumberland includes preserving the community's rich agricultural heritage and implementing programs to assure environmental sustainability. The Plan notes that "there are approximately 6,800 acres of forested land in Town, of which 1,800 acres are enrolled in Tree Growth. A key goal of this plan is to encourage the preservation of land that is available for agricultural and forestry use."

In the years since 2009 the Town has implemented that key goal in part by adding to its ownership of forest land so that the total is approximately 1000 acres. Responsibility for the stewardship of this forest land falls to the Forestry Sub-Committee of the Lands and Conservation Commission.

In support of its work the Sub-Committee in 2019 retained Paul Larrivee, Licensed Maine Forester. His contract was awarded after a competitive bidding process.

A goal of the Sub-Committee is to have complete and up-to-date forest management plans on all of the Town's forest land including an inventory to guide future harvesting of wood products. Also, the Town is now embarking on a Climate Action Plan with the goal of substantially reducing greenhouse gas emissions by 2050. Therefore the inventory will include a carbon stocking analysis and a growth/yield estimate of the carbon sequestration of the Town's forest land.

The purpose of the requested Project Canopy grant to defray the cost of professional services for forest management plans for two significant recent forest land acquisitions. These are the Knights Pond and Rines Forests.

Knight's Pond Forest at 163 acres is one of the largest undeveloped parcels in Town. It is conserved under an easement with the Chebeague and Cumberland Land Trust (CCLT) In consists of forested upland, a 46 acre pond with two smaller ponds, emergent wetlands, streams and many vernal pools. It abuts 50 additional acres in North Yarmouth conserved by that Town and the Royal River Conservation Trust. The terrain is sloping with a ridgeline and elevation of approximately 500 feet that affords views of Casco Bay and Mount Washington.

Recreational opportunities abound on the property which has traditionally been used for timber harvesting, hunting, snowmobiling and hiking. An established trail network has helped the Forest become a central component of a regional recreation corridor. The trails along Blueberry Hill pass through an oak/hickory forest community which is rare for this region.

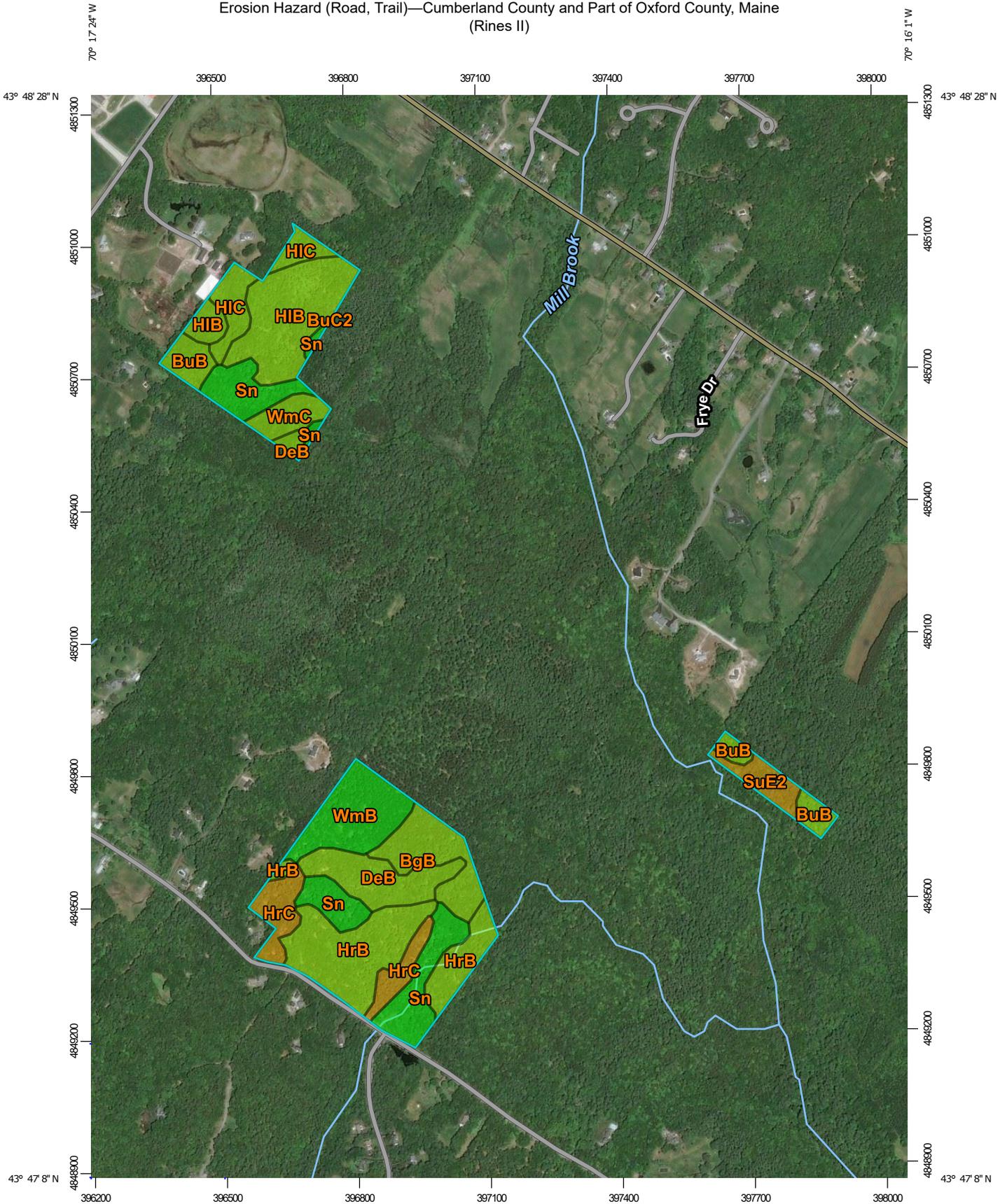
Rines Forest is a magnificent 268 acre woodland in the heart of Town. It protects a healthy forest with diverse wildlife, vernal pools, waterfalls and streams that flow to the East Branch of the Piscataqua River, a major tributary of the Presumpscot River. Rines Forest is a keystone property in an important conservation corridor and is located within the largest forested area remaining in Cumberland.

The Town purchased 216 acres of the property in 2003 from the Rines family and in 2005 signed a conservation easement with CCLT to ensure that the forest would remain a natural area managed for wildlife habitat and environmentally sensitive timber management. In 2019 the Rines family sold an

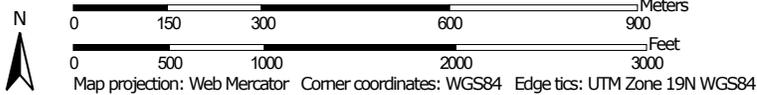
additional lot to the Town, also conserved with CCLT, bringing the total up to 268 acres. The Rines family purchased the property in 1918 to be used as pasture for their cattle which they walked to Cumberland each spring from their farm in Gorham for grazing. In 1941 they decided to return the property to forest. Today few signs of human intrusion are evident apart from an occasional rock wall or skidder trail. The Forest has been actively managed for wood products up to the present day.

Below are maps of the two forests. Delineated boundaries can be provided if needed.

Erosion Hazard (Road, Trail)—Cumberland County and Part of Oxford County, Maine
(Rines II)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 Very severe
 Severe
 Moderate
 Slight
 Not rated or not available

Soil Rating Lines

 Very severe
 Severe
 Moderate
 Slight
 Not rated or not available

Soil Rating Points

 Very severe
 Severe
 Moderate
 Slight
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways

 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
 Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Road, Trail)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BgB	Nicholville very fine sandy loam, 0 to 8 percent slopes	Moderate	Nicholville (85%)	Slope/erodibility (0.50)	7.1	8.1%
BuB	Lamoine silt loam, 3 to 8 percent slopes	Moderate	Lamoine (85%)	Slope/erodibility (0.50)	4.7	5.4%
BuC2	Buxton silt loam, 8 to 15 percent slopes	Severe	Buxton (85%)	Slope/erodibility (0.95)	0.0	0.0%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Moderate	Deerfield (85%)	Slope/erodibility (0.50)	7.7	8.8%
HIB	Hinckley loamy sand, 3 to 8 percent slopes	Moderate	Hinckley (85%)	Slope/erodibility (0.50)	13.6	15.5%
HIC	Hinckley loamy sand, 8 to 15 percent slopes	Moderate	Hinckley (85%)	Slope/erodibility (0.50)	4.7	5.4%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	Moderate	Lyman (50%)	Slope/erodibility (0.50)	16.0	18.2%
			Tunbridge (30%)	Slope/erodibility (0.50)		
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Severe	Lyman (45%)	Slope/erodibility (0.95)	6.0	6.9%
			Tunbridge (40%)	Slope/erodibility (0.95)		
Sn	Scantic silt loam, 0 to 3 percent slopes	Slight	Scantic (85%)		13.7	15.7%
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	Severe	Suffield (85%)	Slope/erodibility (0.95)	2.8	3.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	Slight	Windsor (85%)		8.4	9.6%
WmC	Windsor loamy sand, 8 to 15 percent slopes	Moderate	Windsor (85%)	Slope/erodibility (0.50)	2.9	3.3%
Totals for Area of Interest					87.7	100.0%

Rating	Acres in AOI	Percent of AOI
Moderate	56.7	64.7%
Slight	22.1	25.2%
Severe	8.8	10.1%
Totals for Area of Interest	87.7	100.0%

Description

The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," or "severe." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

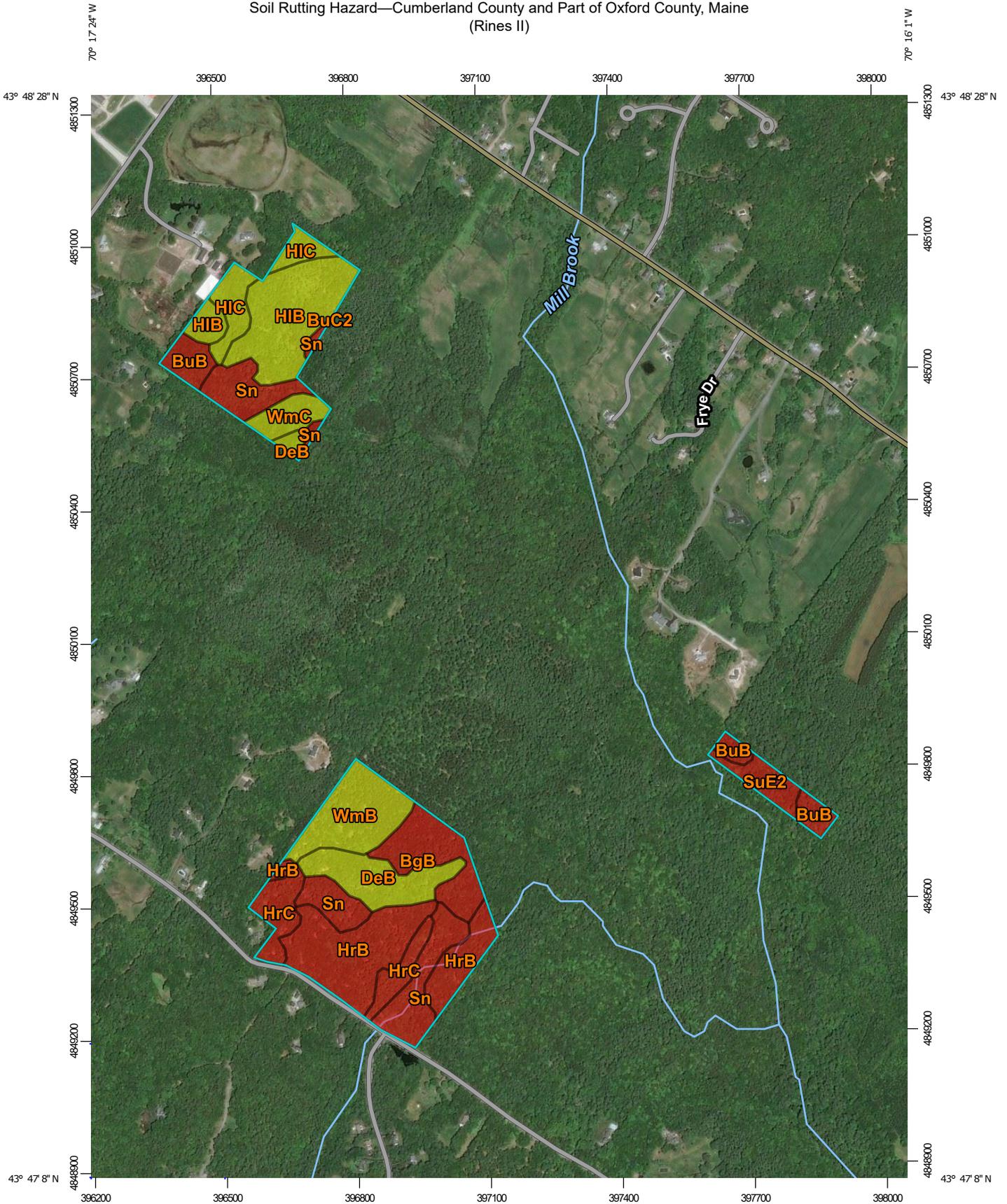
Rating Options

Aggregation Method: Dominant Condition

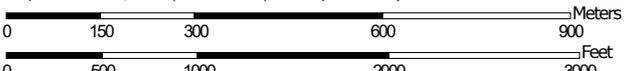
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Rutting Hazard—Cumberland County and Part of Oxford County, Maine
(Rines II)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



MAP LEGEND

Area of Interest (AOI)		Background	
	Area of Interest (AOI)		Aerial Photography
Soils			
Soil Rating Polygons			
	Severe		
	Moderate		
	Slight		
	Not rated or not available		
Soil Rating Lines			
	Severe		
	Moderate		
	Slight		
	Not rated or not available		
Soil Rating Points			
	Severe		
	Moderate		
	Slight		
	Not rated or not available		
Water Features			
	Streams and Canals		
Transportation			
	Rails		
	Interstate Highways		
	US Routes		
	Major Roads		
	Local Roads		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Soil Rutting Hazard

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BgB	Nicholville very fine sandy loam, 0 to 8 percent slopes	Severe	Nicholville (85%)	Low strength (1.00)	7.1	8.1%
BuB	Lamoine silt loam, 3 to 8 percent slopes	Severe	Lamoine (85%)	Low strength (1.00)	4.7	5.4%
BuC2	Buxton silt loam, 8 to 15 percent slopes	Severe	Buxton (85%)	Low strength (1.00)	0.0	0.0%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Moderate	Deerfield (85%)	Low strength (0.50)	7.7	8.8%
HIB	Hinckley loamy sand, 3 to 8 percent slopes	Moderate	Hinckley (85%)	Low strength (0.50)	13.6	15.5%
HIC	Hinckley loamy sand, 8 to 15 percent slopes	Moderate	Hinckley (85%)	Low strength (0.50)	4.7	5.4%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	Severe	Lyman (50%)	Low strength (1.00)	16.0	18.2%
			Tunbridge (30%)	Low strength (1.00)		
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Severe	Lyman (45%)	Low strength (1.00)	6.0	6.9%
			Tunbridge (40%)	Low strength (1.00)		
Sn	Scantic silt loam, 0 to 3 percent slopes	Severe	Scantic (85%)	Low strength (1.00)	13.7	15.7%
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	Severe	Suffield (85%)	Low strength (1.00)	2.8	3.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	Moderate	Windsor (85%)	Low strength (0.50)	8.4	9.6%
WmC	Windsor loamy sand, 8 to 15 percent slopes	Moderate	Windsor (85%)	Low strength (0.50)	2.9	3.3%
Totals for Area of Interest					87.7	100.0%

Rating	Acres in AOI	Percent of AOI
Severe	50.3	57.4%
Moderate	37.3	42.6%
Totals for Area of Interest	87.7	100.0%

Description

The ratings in this interpretation indicate the hazard of surface rut formation through the operation of forestland equipment. Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with rutting.

Ratings are based on depth to a water table, rock fragments on or below the surface, the Unified classification of the soil, depth to a restrictive layer, and slope. The hazard is described as slight, moderate, or severe. A rating of "slight" indicates that the soil is subject to little or no rutting. "Moderate" indicates that rutting is likely. "Severe" indicates that ruts form readily.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

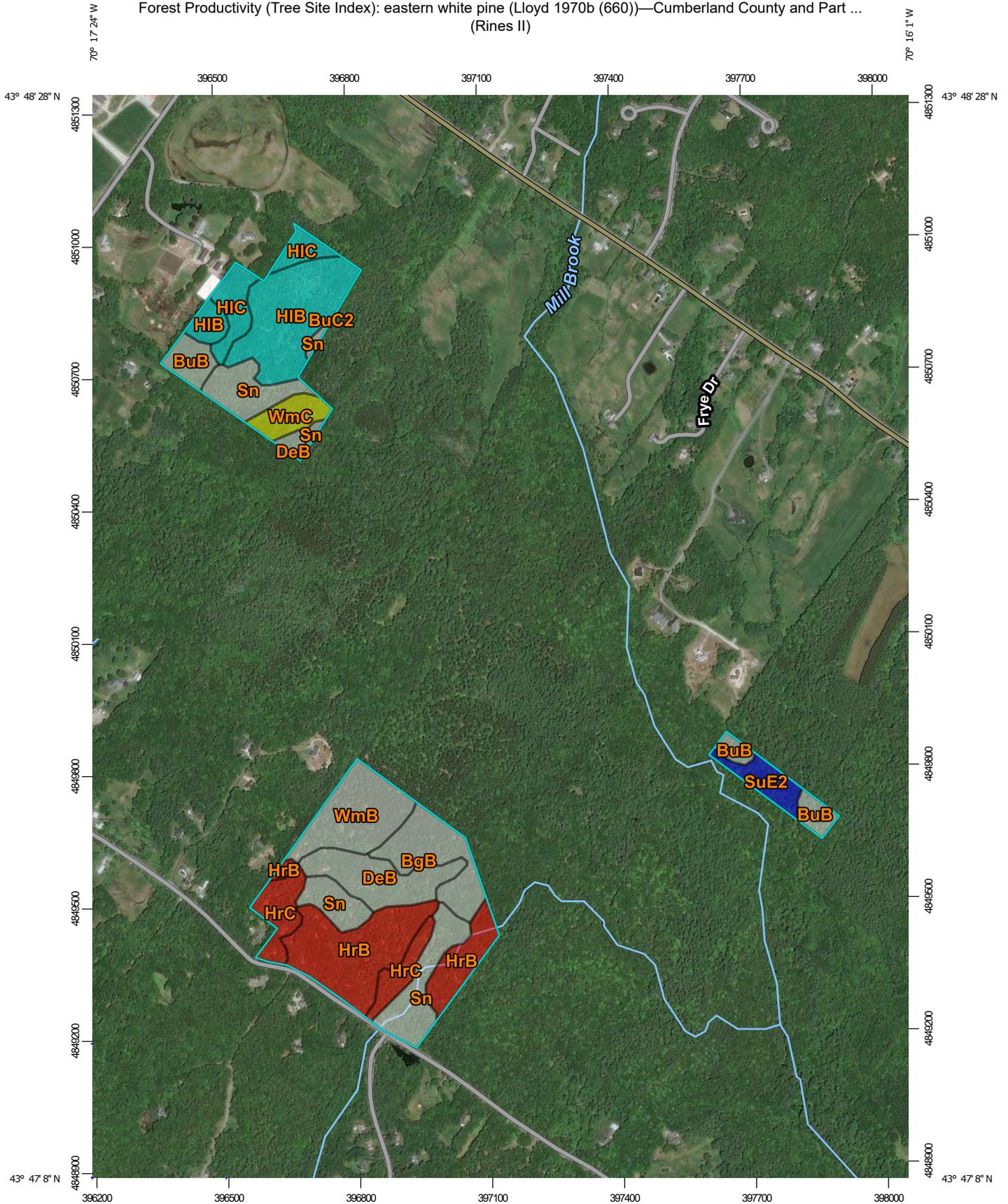
Rating Options

Aggregation Method: Dominant Condition

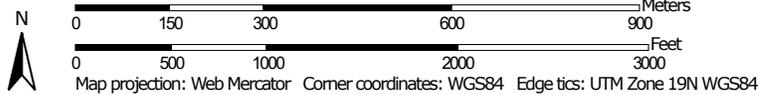
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Forest Productivity (Tree Site Index): eastern white pine (Lloyd 1970b (660))—Cumberland County and Part ... (Rines II)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 ≤ 56
 > 56 and ≤ 57
 > 57 and ≤ 61
 > 61 and ≤ 62
 Not rated or not available

Soil Rating Lines

 ≤ 56
 > 56 and ≤ 57
 > 57 and ≤ 61
 > 61 and ≤ 62
 Not rated or not available

Soil Rating Points

 ≤ 56
 > 56 and ≤ 57
 > 57 and ≤ 61
 > 61 and ≤ 62
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways

 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
 Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Forest Productivity (Tree Site Index): eastern white pine (Lloyd 1970b (660))

Map unit symbol	Map unit name	Rating (feet)	Acres in AOI	Percent of AOI
BgB	Nicholville very fine sandy loam, 0 to 8 percent slopes		7.1	8.1%
BuB	Lamoine silt loam, 3 to 8 percent slopes		4.7	5.4%
BuC2	Buxton silt loam, 8 to 15 percent slopes		0.0	0.0%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes		7.7	8.8%
HIB	Hinckley loamy sand, 3 to 8 percent slopes	61	13.6	15.5%
HIC	Hinckley loamy sand, 8 to 15 percent slopes	61	4.7	5.4%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	56	16.0	18.2%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	56	6.0	6.9%
Sn	Scantic silt loam, 0 to 3 percent slopes		13.7	15.7%
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	62	2.8	3.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes		8.4	9.6%
WmC	Windsor loamy sand, 8 to 15 percent slopes	57	2.9	3.3%
Totals for Area of Interest			87.7	100.0%

Description

The "site index" is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this attribute, only the representative value is used.

Rating Options

Units of Measure: feet

Tree: eastern white pine

Site Index Base: Lloyd 1970b (660)

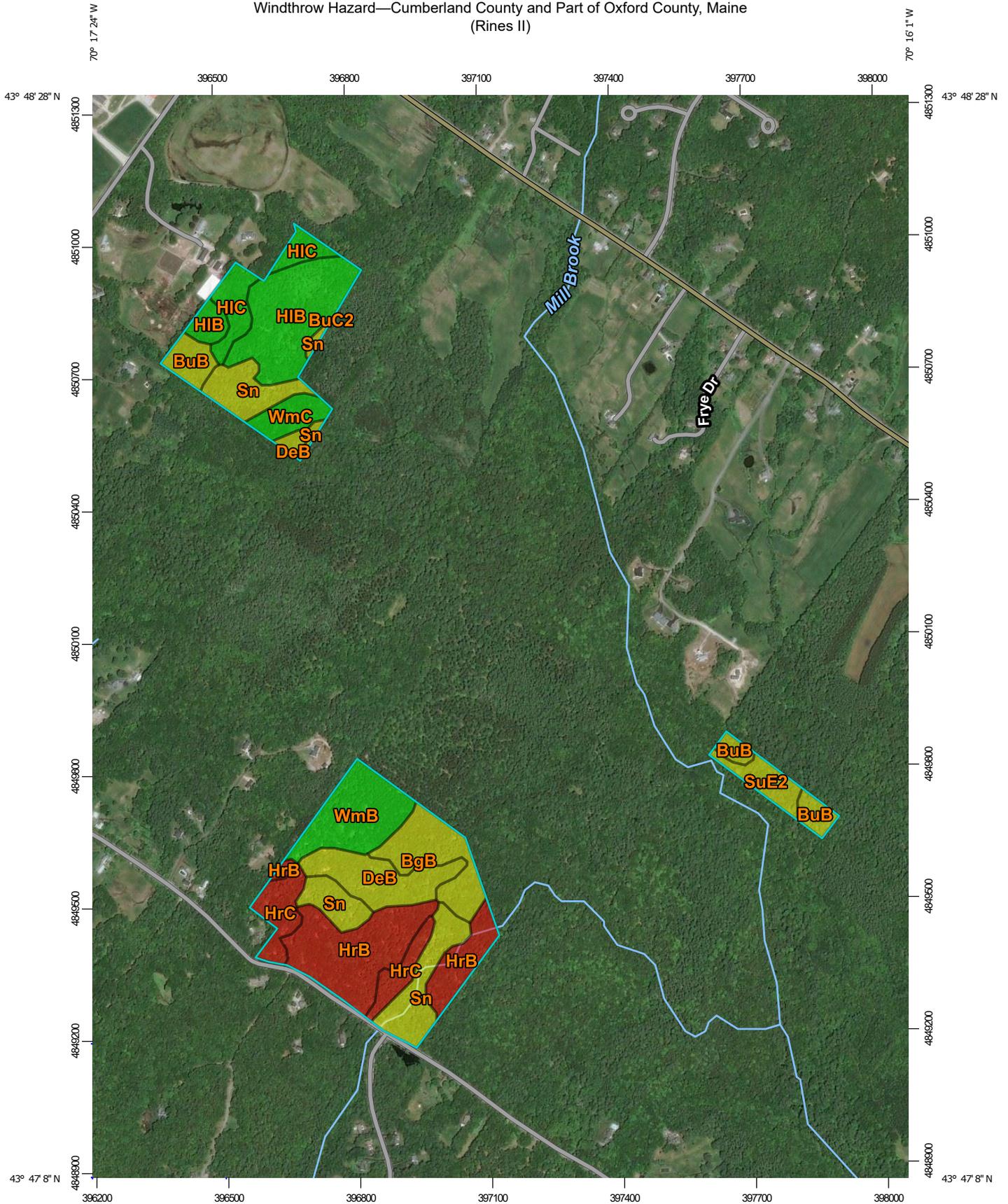
Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

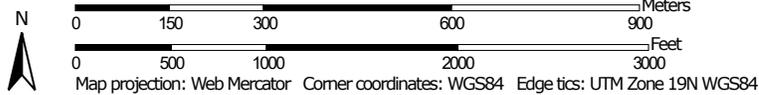
Tie-break Rule: Higher

Interpret Nulls as Zero: No

Windthrow Hazard—Cumberland County and Part of Oxford County, Maine
(Rines II)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Severe
-  Moderate
-  Slight
-  Not rated or not available

Soil Rating Lines

-  Severe
-  Moderate
-  Slight
-  Not rated or not available

Soil Rating Points

-  Severe
-  Moderate
-  Slight
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Windthrow Hazard

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BgB	Nicholville very fine sandy loam, 0 to 8 percent slopes	Moderate	Nicholville (85%)	Low cohesion (1.00)	7.1	8.1%
				Hillslope position (0.75)		
				Water table depth (0.10)		
BuB	Lamoine silt loam, 3 to 8 percent slopes	Moderate	Lamoine (85%)	Water table depth (1.00)	4.7	5.4%
				Hillslope position (0.30)		
BuC2	Buxton silt loam, 8 to 15 percent slopes	Moderate	Buxton (85%)	Hillslope position (0.75)	0.0	0.0%
				Water table depth (0.59)		
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Moderate	Deerfield (85%)	Hillslope position (0.30)	7.7	8.8%
				Water table depth (0.12)		
HIB	Hinckley loamy sand, 3 to 8 percent slopes	Slight	Hinckley (85%)	Low cohesion (1.00)	13.6	15.5%
				Hillslope position (0.50)		
HIC	Hinckley loamy sand, 8 to 15 percent slopes	Slight	Hinckley (85%)	Hillslope position (1.00)	4.7	5.4%
				Low cohesion (1.00)		
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	Severe	Lyman (50%)	Depth to root restriction (1.00)	16.0	18.2%
				Low cohesion (1.00)		
				Hillslope position (0.75)		
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Severe	Lyman (45%)	Depth to root restriction (1.00)	6.0	6.9%
				Low cohesion (1.00)		
				Hillslope position (0.75)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
Sn	Scantic silt loam, 0 to 3 percent slopes	Moderate	Scantic (85%)	Water table depth (1.00)	13.7	15.7%
				Hillslope position (0.30)		
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	Moderate	Suffield (85%)	Hillslope position (0.75)	2.8	3.2%
				Water table depth (0.03)		
WmB	Windsor loamy sand, 0 to 8 percent slopes	Slight	Windsor (85%)	Hillslope position (0.30)	8.4	9.6%
WmC	Windsor loamy sand, 8 to 15 percent slopes	Slight	Windsor (85%)	Hillslope position (0.50)	2.9	3.3%
Totals for Area of Interest					87.7	100.0%

Rating	Acres in AOI	Percent of AOI
Moderate	36.1	41.1%
Slight	29.6	33.8%
Severe	22.0	25.1%
Totals for Area of Interest	87.7	100.0%

Description

Windfirmness is the ability of a tree to resist overturning. It is a function of the balance between the anchorage or strength of the root/soil mass and the wind drag and gravitational forces applied on the tree crown. Windthrow is one type of wind damage. It is the uprooting of a tree by pivoting on the outer edge of a mass of soil, rock, and roots. Windthrow occurs when the horizontal forces on a tree (wind drag) are transmitted down the trunk and create a torque that exceeds the resistance to turning of the root and soil system (Stathers et al., 1994). The process varies depending on silvicultural practices, wind, tree species, site, and soil type. For example, individual tree characteristics contribute to windthrow. Trees with large, dense canopies are more susceptible to windthrow than those with open canopies. The strength and elasticity of the bole, branches, and leaves also contribute. The characteristics of the stand can influence the susceptibility to windthrow as well. Stand height and stand density are major factors; shorter and denser stands are more resistant to windthrow than tall, open stands. The rooting habits of the tree species impact the risk of windthrow; deeper-rooted trees are more resistant to the effects of wind than shallow-rooted species (Stathers et al., 1994).

Soil and site factors are also important. According to most windthrow studies, the soil factors that control rooting depth contribute most significantly to the risk of windthrow. Rooting depth in soil can be restricted by a variety of features. Indurated, strongly cemented, and cemented layers, such as unweathered bedrock and duripans, are more or less root impenetrable. Some noncemented layers, such as fragipans, can also curtail root penetration. Persistent anoxic layers, such as a stagnant shallow water table, can act like an impervious layer. Wetness also has a deleterious effect on the shear strength of the soil, decreasing windfirmness. The weight of the soil over the roots adds a stabilizing anchoring influence. The shape of the land surface is also a factor in windthrow. While the effects are complex, the trees on certain exposed portions of the landscape are more subject to high windspeeds under most circumstances. Windspeed increases as wind streamlines are compressed by flowing through narrowing valleys, over hills and ridges, or around shoulder slopes. Wind direction is also a factor. In general, ridgetops, shoulder slopes, and backslopes tend to increase windspeed. This interpretation is intended to indicate those soil components on which the trees would be prone to windthrow.

The soil and site criteria that are considered in this soil interpretation are those that have the greatest effect on windthrow. They include the depth to a root-limiting layer, the position of the tree on the landscape, the shape of the landscape, and the cohesiveness of the soil in which the tree is rooted.

Each soil and site criterion is assigned a numerical rating between 0 and 1. For this interpretation, a rating of 1 represents the least favorable soil and site characteristics and 0 represents the most favorable soil and site characteristics. Windthrow hazard is an indicator of the relative susceptibility of trees growing on a soil component to being blown over by wind. Soil and site factors, while important, are not the only factors that need to be considered in the process of windthrow. Silvicultural practices, tree species, and climatic variables are also involved.

Rating classes are defined as follows:

Severe (numerical rating of 1): Soils and sites where windthrow is likely to occur under conditions of high winds and decreased shear strength.

Moderate (numerical rating of 0.01 to 0.99): Soils and sites where windthrow may occur only under conditions of extreme windspeeds and decreased shear strength.

Slight (numerical rating of 0): Soils and sites where windthrow may occur only under conditions of very extreme windspeeds and decreased shear strength.

Not Rated: Miscellaneous areas.

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Reference:

Stathers, R.J., T.P. Rollerson, and S.J. Mitchell. 1994. Windthrow Handbook for British Columbia Forests. British Columbia Ministry of Forests, Victoria. Working Paper 9401.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Definitions

Advance Regeneration:

Seedlings and saplings present in the understory.

Basal Area:

An estimate of the cross-sectional areas of trees at 4.5 feet above the ground.

Canopy/Overstory:

The uppermost layer of a forest (includes branches and leaves/needles). Trees with tops reaching into this layer are referred to as “canopy trees”.

Cohort:

a group of individuals or vital statistics about them having a statistical factor in common, such as age class. A group of trees developing after a single disturbance, commonly consisting of trees of similar age.

Conservation: Wise, disciplined and sustainable use of natural resources to meet the objectives of the landowner.

Epicormic Branching:

A type of branching that occurs when dormant buds embedded in the trunk of a tree are exposed to light conditions favorable to growth. Epicormic branches can reduce the commercial value of a tree by creating knots.

Even aged Stand:

A stand of trees composed of a single age class in which the range of tree ages is usually +/- 20 percent of rotation.

Forestland:

State of Maine def: land used primarily for growth of trees to be harvested for commercial use; may be seedlings, pole timber, or sawlog stands. Forestland does not include ledge, marsh, open swamp, bog, water and similar areas that are unsuitable for growing a forest product or for harvesting for commercial use even though these areas may exist within forestlands.

Hardwood Stand:

State of Maine def: forests in which maple, birch, beech, oak, elm, basswood, aspen and ash, singularly or in combination, comprise 75% or more of the stocking.

Mast:

The fruiting bodies of plants (e.g., nuts, acorns, and berries). A major source of food for many wildlife species.

Mixedwood Stand:

State of Maine def: forests in which neither hardwoods or softwoods comprise 75% of the stand but are a combination of both.

Overstory (Overwood): That portion of the trees forming the uppermost canopy in a two-aged forest.

Preservation: an area of the forest that will remain forever wild with not management at any time for any reason.

Regeneration:

The offspring of mature trees. Trees can be regenerated by seeding into an area, or new trees may sprout from existing stumps or root systems.

Rotation:

In even aged systems, the period between regeneration establishment and final cutting.

Shelterwood System: an *even aged* method of regenerating forest stands where the overstory is removed in intervals roughly 15 years apart.

Long shelterwood method- a forest is regenerated in three entries:

- First entry is designed to tend the stand, removing at risk and poorly formed trees. Crop trees are identified, retained, and thinned around to focus site resources on the best growing stock. This is a fairly light entry removing about 1/3 of the growing stock. The establishment of regeneration is not an objective
- The Second Entry is designed to initiate regeneration by removing about 1/2 of the stand volume. This can be accomplished evenly throughout the stand, or in small groups that vary in size relative to the stand conditions and species composition.
- The last entry, some 15 or so years after the Second Entry, is designed to release the regeneration established during the second entry. This entry is often referred to as an overstory removal as the balance of the mature stand is harvested. Some overwood can be retained to facilitate habitat or structural objectives of the landowner.

Short Shelterwood method- a method whereby the forest is regenerated in two entries, basically the second entry, and overstory removal entry described above under Long shelterwood method.

Softwood Type:

State of Maine def: forests in which pine, spruce, fir, hemlock, cedar and larch, singularly or in combination, comprise 75% or more of the stocking.

Stand:

A contiguous area where the species, size, age, and general condition of the trees is uniform enough to be distinguished from adjacent areas (Beattie et al., 1993).

Stocking Chart/Guide:

Visual representation indicating growing space occupancy relative to a pre-established standard; showing basal area and number of trees per acre and quadratic mean stand diameter.

A-Line: fully stocked condition; generally undisturbed stand.

B-Line: target stocking after thinning; max. growth potential of residuals.

C-Line: minimum stocking of stand.

Succession:

the gradual supplanting of one community of plants by another. **Early successional habitat** is the first community to become established after a disturbance.

Understory:

Generally the shrub layer beneath a taller layer (also includes regenerating trees).

Uneven aged Stand:

a stand with trees of three or more age distinct age classes, either intimately mixed or in small groups.

Uneven aged Management:

a planned sequence of treatments (single tree selection to group selection or a combination) designed to establish and maintain a forest stand with at least three distinct age classes.

- Single tree selection: individual trees of all size classes are removed more less uniformly throughout the stand to promote the growth of the remaining trees and to provide space for regeneration.
- Group Selection; trees are removed and new age classes are established in small groups.

Appendices

Appendix 1

Rines Forest Location, Access, and Forest Management History

The entirety of the Rines Forest is contained in a single block lying north east of Range Road in the town of Cumberland, Maine. There are three main access points that could serve forest management activities (see attached map for additional details). The first is a small landing just off of Range road near the south east corner of the property. A well stabilized trail leads from the back and accesses a small segment of the parcel. This trail terminates at a steep ravine that is impractical to cross.

Next is a historic access point in the vicinity of the current trail head. Given the infrastructural improvements in this area, it is unlikely to offer a realistic option for machinery access. A trail parallel to Range Road may allow a seasonally timed operation an opportunity to utilize the more southern landing.

The third and most critical access is across the land n/f owned my Dale Rines. There are a few small landings on this adjacent parcel, as well as on the Rines Forest itself. Further, this accesses the woods road that that leads to two internal landings that would facilitate work on the entire northwest of the property. Rights to access should be sought in a more formal arrangement if feasible.

The boundary lines of the property are well blazed and painted with yellow paint. However, this is a temporary condition and will need to be vigilantly maintained. It is the legal obligation of the landowner to clearly identify all property lines prior to the commencement of any forest management that includes harvesting of trees. I recommend re-blazing and painting every 7- 10 years or so as conditions warrant.

The Rines Forest has seen numerous periodic low-intensity harvests since about the mid 1960's. In general, these entries appear to have been well thought out and very disciplined giving rise to the well stocked forest we see today. The red pine plantations have been thinned allowing for the initiation of new cohorts of trees. Often times, this new cohort is a mixture of species including white pine, red oak, American beech and natural red pine.

Throughout the forest, Eastern hemlock has been selected against in favor of more commercially attractive species like northern red oak and eastern white pine. Hemlock still exists throughout the forest and pockets of older groups should be retained when possible. In general, this initial management quite successfully emulated first and second entries of a shelterwood system. Where possible this system should be maintained. Lastly, some of these intermediate treatments have created conditions that have given rise to two and possibly three aged stands. Uneven aged management should be considered in these patches if feasible.

Appendix 2

Soils

Soil Characteristics (from the USDA Soil Survey; Cumberland County, Maine)

There are several soils types that influence the vegetative characteristics, productivity, operability, and habitat available on the Rines forest. In some instances the forest types mirror a particular soil type, while elsewhere a particular forest type spans several different soils. For that reason, I will consider soils here separately. Please refer to the included soils map for a better understanding of the location and distribution of the soils that make up the Rines Forest. The list of soils found on the Rines Forest is as follows and is ranked in order of relative abundance:

- Suffield, SuD2
- Belgrade, BgB
- Hollis, HrB and HrC
- Hartland, HfC2
- Scantic, Sn
- Elmwood, EmB
- Swanton, Sz
- Windsor, WmB
- Melrose, MeC
- Hinkley
- Minor components (less that 1 acre in size):
 - Buxton, BuB
 - Deerfield, DeB

I will provide some further details on the most abundant types as described by Natural Resource Conservation Service. These details can be somewhat technical, but should shed some light on where to focus treatments, as well as seasonality and timing. They also shed light on composition and allow us to know if we are growing the right trees on a particular acre.

SuD2, Suffield silt loam, 15-25% slopes, eroded, approximately 76 acres

The Suffield series consists of very deep, well drained soils formed in lacustrine or marine sediments. They are mainly on gently sloping to very steep dissected plains. They typically have silt loam A and B horizons over a silty clay 2C horizon. Permeability is moderate in the solum and slow or very slow in the substratum. Slope ranges from 3 to 45 percent. Mean annual precipitation is 42 inches and the mean annual temperature is 51 degrees F. Suffield soils are gently sloping to very steep soils on the tops and sides of ridges in dissected marine and lacustrine plains.

Mostly areas are cleared and are used for growing grass and legume hay, pasture, and corn silage. Common forest trees are sugar maple, oak, elm, white pine, and hemlock.

BgB, Belgrade very fine sandy loam, 0-8% slopes, approximately 46 acres

The Belgrade series consists of very deep, moderately well drained soils formed in glaciolacustrine material. They are nearly level to moderately steep soils on terraces. Slope ranges from 0 to 25 percent. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum. Mean annual precipitation is about 44 inches, and the mean annual temperature is about 49 degrees F.

Common trees typically found are white, red oak, sugar maple, red maple, ash, black birch, yellow birch, beech, white pine, and hemlock.

BrB and HrC, Hollis fine sandy loam 3 – 15% slopes, approximately 43 acres

The Hollis series consists of shallow, well drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from gneiss, schist, and granite. They are nearly level to very steep upland soils on bedrock-controlled hills and ridges. Slope ranges from 0 to 60 percent. Permeability is moderate or moderately rapid. Depth to hard bedrock ranges from 10 to 20 inches.

Mostly forested. Small areas with few rock outcrops are cleared of stones and used for cultivated crops, but most cleared areas are in hay or pasture. Scattered areas are used for community development. Common trees are red, white, black, and chestnut oak, hickory, white pine, hemlock, and gray and black birch.

HfC2, Hartland very fine sandy loam, 8 – 15% slopes, eroded, approximately 22 acres

The Hartland series consists of very deep, well drained soils on terraces and glacial lake plains. They formed in silty eolian or glaciolacustrine deposits. Saturated hydraulic conductivity is moderately high or high throughout the mineral soil. Slope ranges from 0 to 50 percent. Mean annual temperature is 48 degrees F, and the mean annual precipitation is 38 inches. The thickness of the solum ranges from 14 to 40 inches. Depth to bedrock is greater than 60 inches.

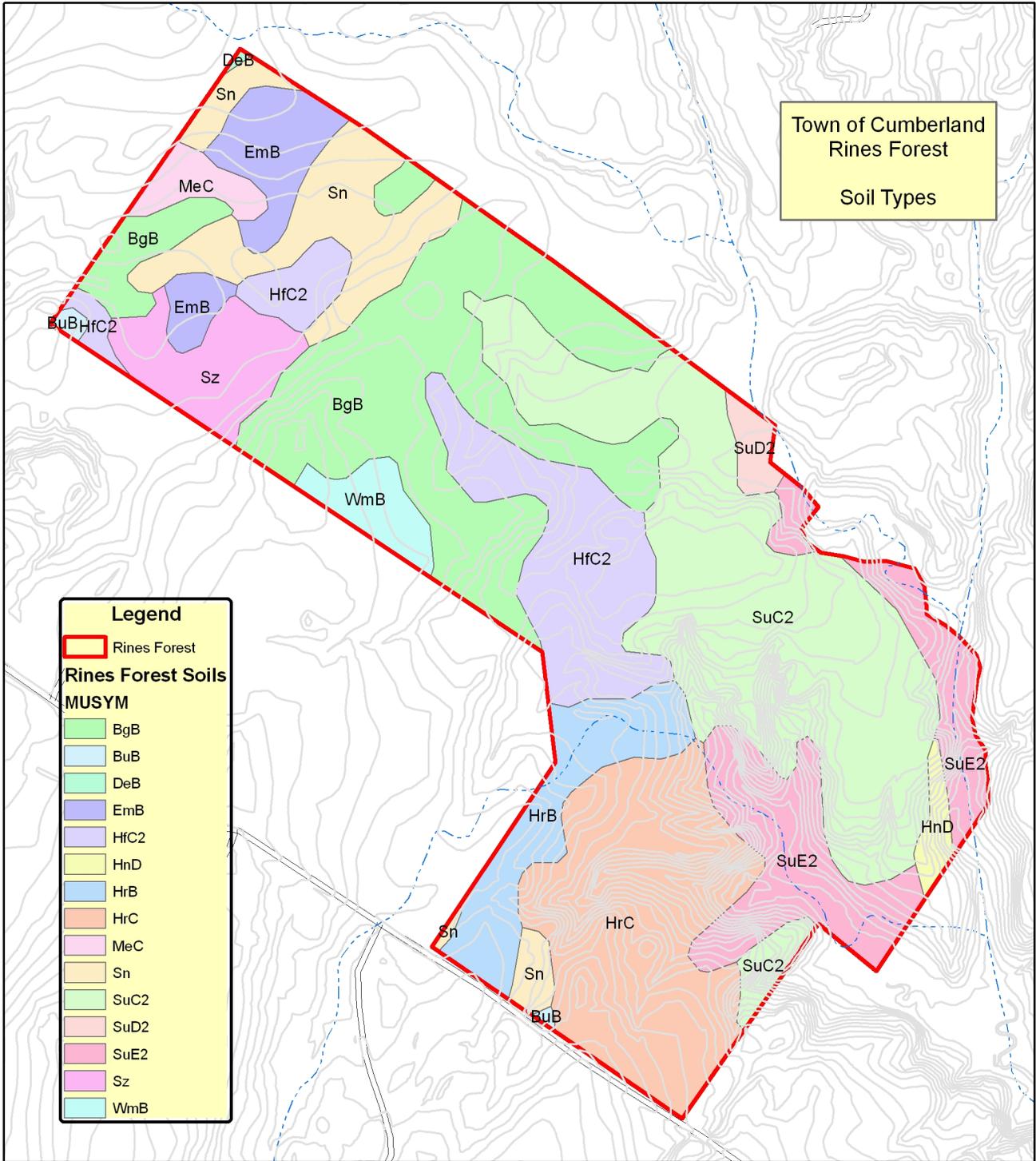
Most of the areas of less than 15 percent slope are used for hay, pasture, and corn. Some areas are used for potatoes, sweet corn, vegetables, tobacco, and other cash crops. Most areas of more than 15 percent slope are wooded. Common trees are white pine, white

oak, red oak, black oak, sugar maple, hickory, ash, black birch, yellow birch, and white birch, beech, and hemlock.

Sn, Scantic silt loam, 0- 8% slopes, approximately 17 acres

The Scantic series consists of very deep, poorly drained soils formed in glaciomarine or glaciolacustrine deposits on coastal lowlands and river valleys. Slope ranges from 0 to 8 percent. Permeability of the surface and subsurface horizons is moderate or moderately slow and it is slow or very slow in the subsoil and substratum. Mean annual temperature is about 44 degrees F, and mean annual precipitation is about 46 inches at the type location.

Mostly idle or woodland, some areas are used for growing hay and pasture. Common tree species include red maple, elm, gray birch, white ash, balsam fir, red and white spruce, tamarack, and some eastern white pine.



Jay Braunschield
207 632 5854

Appendix 3

Inventory summary

Table 4		
Total Standing Volume		
Sawlogs		
White Pine		Volume (Mbf)
	Select	135
	Grade 1	687
	Grade 2	590
	Pallet	291
		1,704
Red Pine	Sawlog	314
Hemlock	Sawlog	56
Red Oak		
	Veneer	25
	Sawlogs	37
	Pallet	18
		79
Pulpwood		
		Volume (Ton)
Pine		3,125
Hemlock		977
Hardwood		1,893
		5,995

Note: See separate cruise report for further details

Appendix 4

Maine Natural Areas Program Review

MNAP Review

This lot has been evaluated by both the Maine Natural Areas Program and the Maine Department of Inland Fisheries and Wildlife (See report included in an appendix). There are a few important habitats that we need to consider in our management planning process. First, this parcel abuts Inland Waterfowl and Wading Bird Habitat. There is also a deer wintering Area to the west and South of the property, and New England Cottontail (*Sylvilagus transitionalis*) to the west.

All need to be considered in the management planning process, but the New England Cottontail is the most significant as it is listed as an S2 species by the State of Maine and is globally listed as a G3 (globally rare) species. We will work in conjunction with the Regional Biologist from the Department in Inland Fisheries and Wildlife to further understand these critical habitats and to develop appropriate management guidelines.



STATE OF MAINE
DEPARTMENT OF CONSERVATION
93 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

June 24, 2008

Jay Braunscheidel
Integrated Forest Management
1071-D Auburn Road
Turner, ME 04282

Re: Forest Management Plan Review

Dear Mr. Braunscheidel:

I have searched the Maine Natural Areas Program's (MNAP) files in response to your request of June 24, 2008 for information on the presence of important habitats documented from the vicinity of the Rines Forest parcel in Cumberland, Maine.

For individual parcel reviews, we have started using a simple checklist that summarizes our findings. The checklist includes our review of several data sets, some of which are maintained by MNAP and others that are maintained by the Maine Department of Inland Fisheries and Wildlife (MDIFW). If a parcel intersects with a data set maintained by MDIFW, please contact the appropriate regional biologist indicated on the checklist for additional information. This parcel abuts Inland Waterfowl and Wading Bird Habitat. There is Deer Wintering Area to the east and south and a rare animal, the New England Cottontail, to the west.

Thank you for using the MNAP in the forest management planning process. Please do not hesitate to contact me if you have further questions about the MNAP or about important habitats at this site.

Sincerely,

A handwritten signature in black ink, appearing to read "Douglas Suitor", written over a faint, larger version of the same signature.

Douglas Suitor
Associate Information Manager
Maine Natural Areas Program
207-287-8044
douglas.suitor@maine.gov

Enclosures

cc: Scott G. Lindsay, MDIFW Regional Biologist

MNAP Forestry Notification and Forest Management Plan Checklist

Date Received: June 24, 2008

Designated Agent:

Landowner: Rines Forest

Licensed Forester: Jay Braunscheidel

Harvester:

Notification #:

Town: Cumberland

County: Cumberland

Have Rare, Threatened and/or Endangered Plants been documented to occur at site? Yes No

Have Rare and/or Exemplary Natural Communities been documented to occur at site? Yes No

Have Rare, Threatened and/or Endangered Animals been documented to occur at site? Yes No
(If yes, contact MDIFW regional biologist, Scott G. Lindsay 657-2345)

Have MDIFW Significant Habitats been documented to occur at site? Yes No
(If yes, contact MDIFW regional biologist, Scott G. Lindsay 657-2345)

Does the parcel intersect with Atlantic salmon habitat?
(If yes, please contact the Atlantic Salmon Commission for potential impacts.)

Yes, within salmon watershed
 Yes, adjacent to spawning habitat
 Yes, adjacent to rearing habitat
 No

Does the parcel occur in a town that may provide habitat for lynx?
(If yes, please contact Mark Stadler, Director of Wildlife Division, Maine Dept. of Inland Fisheries and Wildlife, 41 State House Station, Augusta, ME 04333)

Yes No

Summary List of Known MNAP/MDIFW Features

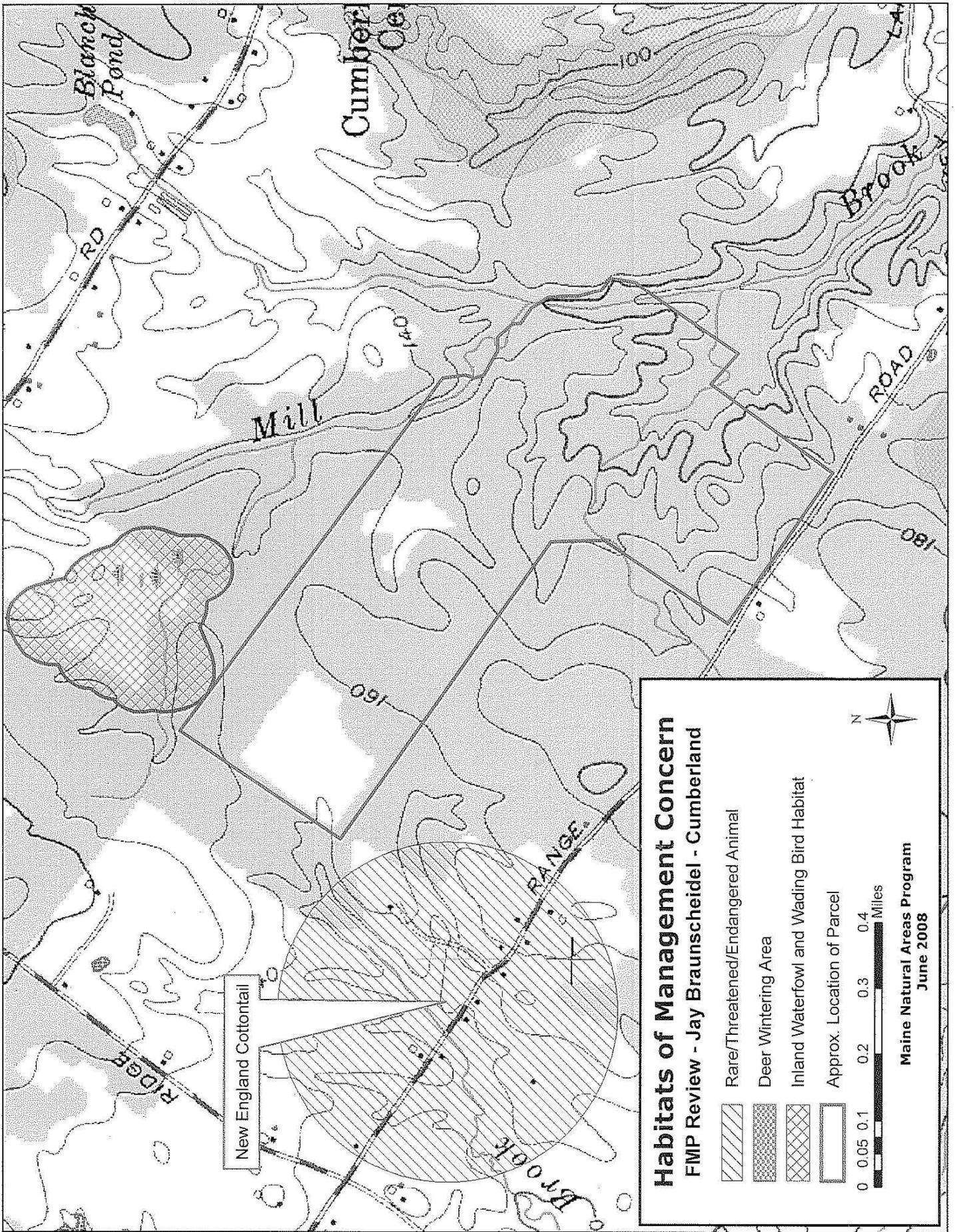
Feature Name	Common Name	Last Seen	SRank	GRank	EO Rank	Conservation Considerations
Sylvilagus transitionalis	New England Cottontail	1998	S2	G3		To west of site
Inland Waterfowl and Wading Bird Habitat						Abuts site to north
Deer Wintering Area						To south and east of site

Does parcel intersect with MNAP land trust focus area? Yes No
 Comments:

Has parcel been targeted by MNAP for inventory? Yes No
 Comments:

Initial review completed by: DGS
 Date: 06/24/2008 Time spent: 20 min.

Additional review completed by MNAP or IFW staff (circle one):
 Reviewer: Date: Time spent:



Appendix 5

Wildlife Habitat and Biodiversity

This section contains a series of broad-based management ideas, principles and philosophies regarding the management of woodlands for the conservation or enhancement of biodiversity. Species biodiversity pertains to the broad array of organisms found throughout our forests from the smallest single celled types to the largest mammals. In managing a diverse forest structure, we inherently manage for a diverse wildlife population creating a healthy ecosystem that offers a wide array of habitats. These concepts will be directly described and applied in a separate section covering Focus Species Forestry. This section is based on the guide, *Focus Species Forestry, A Guide to Integrating Timber and Biodiversity Management in Maine* by Robert Bryan et al.

These principles are not site specific instructions on how to manage the forest, but concepts that, if applied appropriately and with proper planning, will enhance the long-term diversity, health and richness of the forests we manage. The application of these principles will also vary greatly with landowner objectives. These ideas are adapted from *Biodiversity in the Forests of Maine: Guidelines for Land Management* (Flatebo, Foss & Pelletier, 1999), and a more thorough explanation of these practices and their rationale may be found there.

Vertical Structure and Crown Closure

Diversity in vertical structure provides an integrated habitat from the forest floor to the canopy for a wide variety of species. Additionally, openings in the canopy regulate light, heat, and other variables throughout the forest further adding to the range of microclimates key to maintaining and enhancing species biodiversity in a stand. Bearing these principles in mind, the following guidelines will help create and/or maintain a vertical structure during forest management activities that will, in turn, help promote a diverse forest.

- When harvesting, attempt to thin trees from all layers of the strata. Maintain a healthy herb, shrub, understory and overstory structure for maximum richness whenever possible.
- Retain trees of differing species, size and age, balancing each group appropriately throughout the stand.
- Promote softwood areas in hardwood stands and vice versa.
- Encourage varying vertical structure at the landscape level as well as the stand level to ensure a diverse structure beyond the immediate area.

Native Tree Species Composition

Recognizing that differing habitats exist within and around different tree species, it is important to maintain healthy tree diversity throughout a stand. Furthermore, recognizing the native species composition and its influence on the characteristics of the whole forest is essential to maintaining and promoting rich, healthy forest stands. To help promote these ideas:

- Rare or uncommon species should be identified and retained in stands where they are found. Additionally, make conditions more suitable for their regeneration where appropriate.
- Avoid converting stands from their natural composition and age structure or eliminating any species from a stand where it is found.
- Naturally uniform stands occurring because of soil or site conditions may be valuable to maintain over the landscape.

Downed Woody Material, Snags and Cavity Trees

Standing and downed woody material provides essential habitat for many of our smaller plants and animals including insects, mosses, lichens and liverworts to name a few. Additionally, downed woody debris, snags and cavity trees provide a special area for hundreds of species to rest, nest, den, forage, perch, display and bask. The breakdown of woody material provides nutrients to the soil and aquatic component of the forest as well as serving as important function in the structure of streams and brooks. The following guidelines can help to promote downed woody debris, snags and cavity trees during management activities.

- Allow downed woody material to remain on site following harvesting. Also avoid damaging existing downed woody debris.
- Logs greater than 12in diameter and 6ft in length are especially rare and should be left or possibly created wherever practical.
- Snags should be left where possible, especially those currently being used as nesting or den sites. Also leave trees that will become snags and consider leaving a retention area around snags and potential snags.

Mast

Mast, defined as nuts, seeds, berries or fruit produced by trees, plants or shrubs, is a critical food source for many wildlife species. Of particular value is what is known as hard mast; highly nutritional nuts produced by about 16 of Maine's trees. In order to promote species diversity it is critical to maintain plants that produce the wide range of food source these creatures depend on. To promote the production of mast in forest stands:

- Promote a variety of mast producing trees and shrubs in stands as they are managed to create an equal variety of actual mast.
- Oak and Beech are the most common mast producers and mature trees should be retained during thinnings to continue mast production. Select healthy trees to leave as they will likely produce healthy, mast producing offspring in the future.
- Black cherry and apple trees are rare and should be managed carefully to encourage the production of fruit and potentially offspring.
- Small openings to encourage pin cherry, raspberry and a productive herb layer are a good idea.

Forest Soil, Forest Floor and Site Productivity

Soil health is the keystone to ensuring a healthy and productive forest. Recognizing soil types, drainage characteristics and subsurface biological activities will help to understand site productivity as well as guide management to enhance or preserve soil health. We must recognize that more fertile soils will generally lend to a more diverse forest (at all vertical levels) while more infertile soils may harbor rarer species. Some guidelines to help protect soil quality, quantity and productivity are listed below. Additionally please refer to the "Soil Characteristics" section of this management plan for a more detailed analysis of soils and soil types found on these lots. Additionally, note the connection between soils management and Best Management Practices.

- Understand soil types and conditions on site through inspections and soil maps.
- Promote the appropriate harvesting equipment for soil conditions and time of year for all harvests. For instance, more poorly drained soils should be harvested during frozen conditions to avoid rutting, compaction and general disturbance.
- Use current harvesting technology to protect the organic layer and reduce mineral soil exposure whenever practical.
- Consider leaving brush and slash on-site, especially on less productive soils.
- Avoid conditions that lead to erosion or potential erosion (like rutting or skidding long distances parallel with grades) over the entire site.

The following considerations refer to site-specific conditions where “Special Habitats and Ecosystems make unique contributions to biodiversity.”

Riparian and Stream Ecosystems

Riparian areas are some of the most productive and species rich areas in the landscape. They serve to buffer aquatic plants and animals from disturbance and well as offer protection to wetlands and water quality. To ensure the function and integrity of riparian areas is protected:

- Establish buffer areas around streams, ponds, lakes and wetlands where limited harvesting maintains more continuous forest cover. This helps promote shade for forest streams as well as ensuring a supply of organic matter into water bodies essential to aquatic food chains. Additionally, these buffer areas will serve as filter strips protecting water quality and wetland health.
- Buffer strips should vary in size and take into account the size and structure of the riparian area.
- Stream and wetland crossings should be limited to as few as possible. Use careful harvest layout to establish this and use Best Management Practices before, during and following harvesting activities to ensure the least possible impact.
- Avoid disturbing the mineral soils wherever possible in these areas.

Vernal Pools

Vernal pools qualify as a significant habitat as they are essential to the reproduction of several types of amphibians, reptiles and invertebrates. These pools further add to biodiversity by providing foraging habitat for a number of animal species. Recommendations to support vernal pool habitats and the pools themselves include:

- ✓ Identify and document vernal pools in the spring when they contain water and wildlife. The presence of indicator species (tree frogs, yellow spotted

salamander etc.) helps to identify and differentiate vernal pools from other aquatic ecosystems.

- ✓ Maintain a buffer around the pool with a deep litter layer, plenty of downed woody material and shade in and around the pool itself.
- ✓ Avoid depositing slash and other logging debris in the pool, disturbing the organic layer and water flow systems of the pool and disturbing the pool floor or depression.

Beaver Influenced Ecosystems

Flowages created by beavers are home to a great variety of plant and animal diversity. The natural cycle or progression of these systems is in itself a diverse ecosystem as it changes from newly formed ponds, to meadow to forested wetland and beyond. To help protect, maintain or even encourage beaver habitat and ecosystems:

- ✓ Determine the limits of acceptable flooding within a watershed based on historical activity and outline potential sites that may be more acceptable for both Beaver and the landowner.
- ✓ Use water control devices to control flooding where excessive tree mortality or road damage may become a concern.
- ✓ Design and construct new roads and plan other management activities away from potential flood areas.

Maine's Department of Inland Fisheries and Wildlife is an excellent source of information for Beaver control and mitigation.

Woodland Seeps and Springs

Seeps and springs can provide a unique feature and are valuable to many species of wildlife in several ways. Areas that remain unfrozen in the winter provide a water source for many animals and may serve as a hibernation area for small amphibians. Additionally, these areas may allow for green vegetation earlier in the spring as well as support insect and invertebrate populations important to mammals and migrating birds.

- Identify seeps and springs in the spring or early summer when they are more apparent and easier to differentiate.
- Maintain a 50-ft buffer to limit equipment around the edge of seeps and springs wherever possible.
- Avoid depositing brush and slash in seeps and springs
- Consider using seeps and springs as the focal point of retention areas and further limiting disturbance to the subsurface flow to the extent .

Nesting Areas for Colonial Wading Birds _____

Maine is host to some eight species of tree-nesting colonial wading birds, seven of which are near or at their northern limit for breeding. These birds form an important link between terrestrial and aquatic ecosystems and represent a unique component of bird diversity. To help protect these populations:

- Map known locations of wading-bird colonies on stand maps and consult abutters and MDIFW biologists when working within 1500-ft of nests.
- Avoid human activity within 330-ft of active heron colonies during the breeding season.

**** Identified as proximate to the Rines Forest**

Deer Wintering Areas _____

Deer Wintering Areas (DWAs) are essential to the survival of white-tailed deer during the winter months of deep snow. These areas additionally provide important habitat to other species including fisher and over 40 bird species, five of which are rare or uncommon in Maine and 12 that require softwood forests.

- LURC maps and zoning maps are excellent sources for identifying current DWAs and should be used to identify these areas on the ground.
- Identify additional DWAs through scouting and cruising and designate them on stand maps.
- MDIFW biologists should be consulted when planning harvests in DWAs to help develop a collaborative plan that takes all needs and objectives into account.
- There are many considerations when harvesting in DWAs, including protecting softwood regeneration, protecting riparian travel corridors and leaving an intact softwood overstory through at least one-half the area of deer habitat.
- Schedule harvests in DWAs in the winter months whenever possible.

**** Depending on the source, DWA's are identified as proximate to the Rines Forest, or existing on the Rines Forest.**

Nest Sites for Woodland Raptors

There are several species of raptors that nest and breed in Maine, including hawks, owls, eagles, falcons and vultures. These birds are important members of the ecosystem and may have particular nesting needs within a forest for successful breeding. In order to help maintain suitable nesting sites across the forest and protect nesting pairs:

- Consult MDIFW for recent maps of bald eagle nest sites and further consult biologists with the department if planning forest management activities near bald eagle nests.
- Retain trees with large stick nests and inspect suitable trees (large white pine and some hardwoods) for additional nesting sites when cruising or scouting.
- Avoid forest management activities within a quarter-mile of known nesting raptors during the breeding season (February to July).
- Leave an uncut buffer of about 66-ft around known raptor nest trees and additionally, maintain about 75% crown closure within 200-ft of nests in closed canopy forests.
- Leave large “supercanopy” trees in clearcuts and along rivers and ponds as recruitment trees for future nest building.

Old Growth and Primary Forest

Old growth, primary and late successional forests offer a unique habitat that is not only uncommon, but important to many species of flora and fauna. A great deal of research has been done and continues to be done to understand the complex relationships that may occur in these areas and how they may differ from conditions in more managed stands. While defining an old growth stand may remain up for debate, some ideas to help identify and protect old growth, primary and late successional forests include:

- Use scouting and any old land records that may be available to help identify old growth areas on your ownership and consider a no-management option in areas that are identified on your land.
- Smaller stands with old growth conditions should be buffered with larger stands of mature forest wherever possible.
- Identify areas that may be good candidates for restoring old growth conditions. Areas near existing old growth stands are more likely to experience successful transition as species migrate.

Rare Plants or Animal Sites

Plants and animals that occur rarely in Maine are intrinsically valuable to biological diversity. Areas where rare plants and animals occur should be considered for protection as they may be especially vulnerable to changes in the landscape. Helping to protect rare plant and animal communities starts with the ability to recognize and identify them.

- The MDIFW and MNAP are excellent sources of information to help identify sites where known rare plants and animals exist, and can further assist in developing management plans that may protect or enhance these areas.
- Become familiar with rare plants and animals to the extent possible and keep an eye out for them when scouting and cruising.

NOTE: This management plan includes a MDIFW and MNAP review for existence of rare plants and animal.

Rare Natural Communities

Maine has several natural community types that occur throughout the state. These communities are areas that represent defined criteria which make them unique in their own way. The Maine Natural Areas Program (MNAP) lists 10 closed-canopy (of 25) and 7 (of 9) partial-canopy community types as rare or very rare. Conservation at the community level helps preserve and protect all biological functions and interaction in that particular ecosystem, thus helping to preserve the natural biodiversity of the site.

- The MNAP is an excellent source of information in helping to identify these rare or uncommon natural communities as well as a source of maps depicting known communities on the ground.
- Become familiar with these rare community types and contact MNAP for management ideas and identification tips

NOTE: This management plan includes an MNAP review for existence of rare natural community types.

Appendix 6

Integrated Pest Management Plan

Integrated Pest Management Plan (IPM)

Field observations have confirmed the presence of a major infestation of common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*Frangula alnus*). In some cases this invasive species has completely taken over large portions of the understory, choking out all other species. The outbreaks seem to be associated both with soil condition (wet areas) and light treatment. Given the widespread nature of this infestation a significant, multi-measure control plan should be considered at this time. Currently, there are no known biological control measures available for buckthorn control as is the case for Purple Loosestrife.

The control plan should include a means of mechanically cutting the well established stems, some of which are 20' tall. Plants this tall can not be adequately controlled, and increases the risk of applying chemicals off target, if a chemical approach is selected.

Further I have identified smaller populations of the significantly less insidious Japanese barberry (*Berberis vulgaris*). These populations should be addressed during the entries where Buckthorn will be the primary target.

IPM Action Plan

- Mechanically remove as much buckthorn as possible as part of harvest plan (winter 1009)
- Treat by hand those stems that were missed during harvest. (early spring 2010)
- Chemically treat sprouts with a quality sub-contractor (fall 2010)
- Hand pull remaining individual (summer 2011)
- Monitor and hand pull (ongoing)

Please note that the IPM is a living document and will be completed in conjunction with an independent vegetation control expert. Please see the following pages for more information on buckthorn.

Appendix 7

Stand Treatment Schedule 2010-2035

Table 1. 2010 Treatment Schedule					
Stand	Type	Description	Acres	Next Treatment	Approx. % Removal
1	RP4A	Red Pine Plantation	48	2nd Entry, Long Shelterwood	30- 40%
1	RP4B	Red Pine Plantation	24	Grow	
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood	20- 30%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	5	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
4	EH4A	Hemlock	15	Grow	
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	
6	WP4B	White Pine, B Density	5	Grow	

**Table 2.
2020 Treatment Schedule**

Stand	Type	Description	Acres	Next Treatment	Approx. % Removal
1	RP4A	Red Pine Plantation	48	Grow	
1	RP4B	Red Pine Plantation	24	2nd Entry, Long Shelterwood	30 - 40%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood	20- 30%
2	WP4A	Mature White Pine	5	1st Entry, Long Shelterwood	20- 30%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
4	EH4A	Hemlock	15	Selection	25%
4	EH4A	Hemlock	20	Reserve	NA
5	SH4C/HS2C	2 Aged Mixedwood	20	Selection	25%
6	WP4B	White Pine, B Density	11	Selection	25%
6	WP4B	White Pine, B Density	5	1st Entry, Long Shelterwood	20 - 30%

**Table 3.
2025 - 2030 Treatment schedule**

Stand	Type	Description	Acres	Next Treatment	Approx. % Removal
1	RP4A	Red Pine Plantation	48	Shelterwood w Reserves	40 - 50%
1	RP4B	Red Pine Plantation	24	Grow	
2	WP4A	Mature White Pine	20	2nd Entry, Long Shelterwood	30 - 40%
2	WP4A	Mature White Pine	20	Grow	
2	WP4A	Mature White Pine	5	Grow	
3	WP4C/H3B	2 Aged Mixedwood	25	Selection	25%
3	WP4C/H3B	2 Aged Mixedwood	25	Grow	
4	EH4A	Hemlock	15	Grow	NA
4	EH4A	Hemlock	20	Reserve	
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	
6	WP4B	White Pine, B Density	5	Grow	

Appendix 8

Forestry Regulations

Forestry Regulations

Several state and municipal laws regulate forestry and forest products harvesting operations on forestland in Maine. This plan will provide a brief overview of some of the more pertinent regulations. Prior to beginning any timber harvesting or any other alteration to the current use of a woodlot, checks should be made to ensure that the proposed activity is in compliance with all State and local laws and ordinances.

Prior to harvesting a “Notification of Intent to Harvest” form must be filed with the Maine Forest Service, Department of Conservation. Prior to January 31 of the year following a harvest, a stumpage report must be filed with the State. This report states volumes harvested and stumpage prices paid to the landowner. On harvest operations that cover ten acres or more, and occur within 200 feet of the boundary, the boundary lines must be clearly identified. The above regulations are, by law, the responsibility of the landowner. These responsibilities can be transferred to a second party such as a forester or managing agent by contractual agreement.

Following a harvest no slash can remain within fifty feet of a town road or twenty-five feet of a boundary line. Slash cannot be deposited in a stream channel, or below the high water mark of a waterway. It is unlawful to deposit silt in a watercourse.

In addition to the laws mentioned above, there are a number of laws that deal with clear-cuts beginning at five acres in size. Another law establishes a “trip ticket” system used when transporting wood. Additional information can be obtained through the Maine Forest Service.

The town of Cumberland does regulate timber harvesting in its Shoreland Zoning Ordinance. An updated copy of the town’s Shoreland Zoning Ordinance will be consulted before any timber harvesting is to begin and all activities will comply fully with the restrictions and regulations therein.

Best Management Practices (BMP’S)

Best Management Practices are strategies and actions that, when properly applied, help protect water and soil quality through all phases of timber harvesting. A detailed examination of current accepted BMP’s can be found in Best Management Practices for

Forestry: Protecting Maine's Water Quality. A publication released by the Maine Forest Service, Maine Department of Conservation in 2004.

These BMP's include practices such as water-barring of completed skid trails to prevent or minimize soil erosion, building proper bridges or fords when crossing brooks with equipment and constructing landings and roads to standards that minimize long term impact, to name a few. It is recommended that these BMP's be implemented wherever and whenever possible to maintain water quality while operating on Town of Cumberland Property.

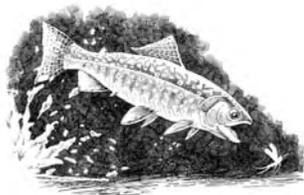
Appendix 9

Focus Species Forestry

Focus Species Forestry is a methodology developed by Rob Bryan (Maine Audubon) and many others that seeks to integrate timber and biodiversity management into single prescription. I applied the principals outlined in this methodology to formulate the individual stand recommendations outlined in the main body of this document. The following pages are excerpts from the Focus Species Forestry document that pertain to the habitat and Focus Species found in the Rines Forest as well as the worksheets developed specifically for the Rines Forest.

Focus Species Forestry

A Guide to Integrating Timber and Biodiversity Management in Maine



Robert R. Bryan
Forest Ecologist and Licensed Forester
Maine Audubon

Third Edition—March 2007
Published by Maine Audubon in cooperation with:

Maine Department of Conservation
Professional Logging Contractors of Maine, Master Logger Program
Small Woodland Owners Association of Maine

MAINE 
AUDUBON



Acknowledgements

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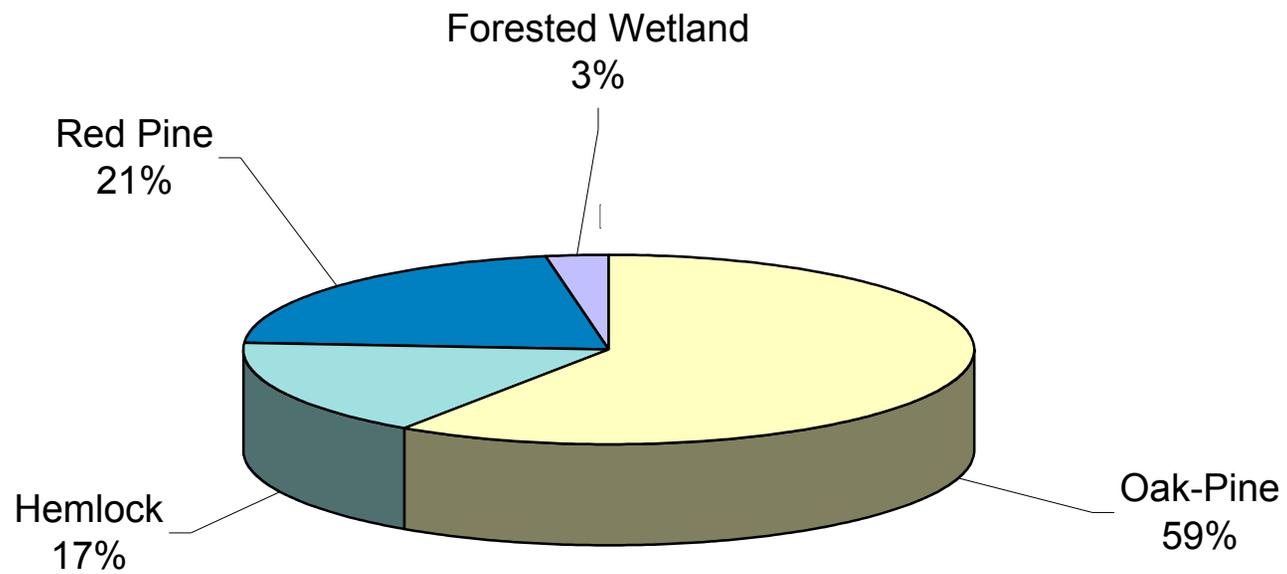
Focus Species Forestry Advisory Committee

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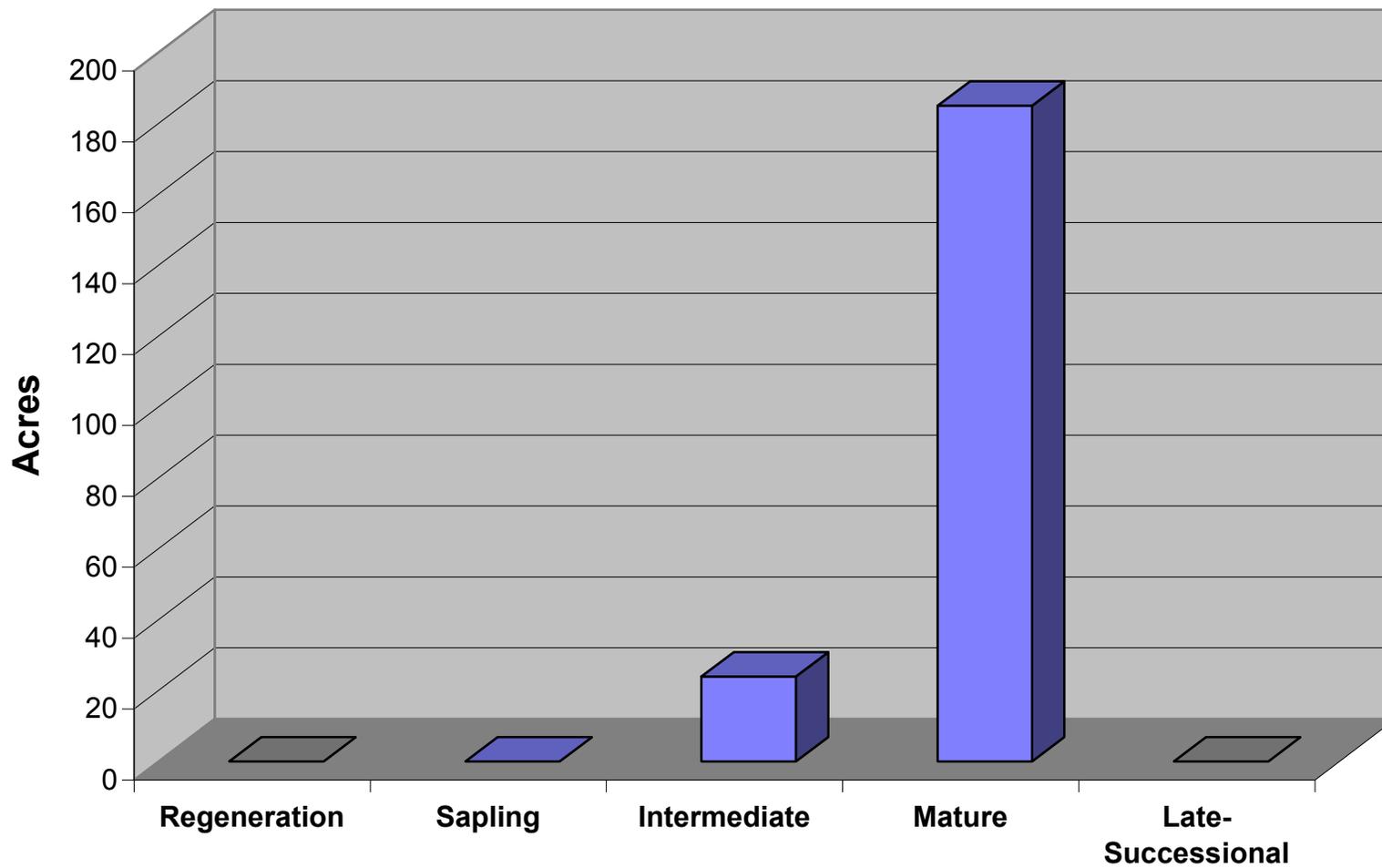
In addition to the advisory committee, the following individuals generously provided helpful comments on the manual:

Dan Harrison	University of Maine (American marten)
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Rines Forest Ecosystem Summary



Rines Forest Stand Development Stage Summary



Dev. Stage	Species & (Region)	Focus Species?	Check if ecosystem or special-value habitat present or enter acres (focus habitats shaded)							Summary of Management Objectives and Recommendations	
			A-B	NH	O-P	HE	S-F	NWC	R&W		VP
Early Succession	Ruffed grouse	?	F	F	P						<ul style="list-style-type: none"> • CSW, possible • ET, yes • SH, no...maybe long term
	Chestnut-sided warbler	?	F	F	P						
	Eastern towhee (S)	Y			C/P						
	Snowshoe hare		F	F			F				
Mature	Northern goshawk				P						<ul style="list-style-type: none"> • NG, yes • PW, yes • BO, yes • WT, present and recorded • BTBW, no • RB S, yes
	Pileated woodpecker	Y			C	C			C		
	Barred owl	Y			C/P	C/P					
	Wood thrush (S)	Y			C	C					
	Pine Warbler	Y			C/P						
	B.T. blue warbler										
	Redback salamander	Y			C/P	C/P					
	Fisher (S)				C/P	C/P					
LS	Late-successional lichens				?	?		?			
Riparian & Wet	Beaver										<ul style="list-style-type: none"> • Beaver, not really • WT • BT • NDS, yes
	Northern waterthrush										
	Wood turtle										
	Brook trout								P		
	N. Dusky salamander	Y									
VP	Spotted salamander										<ul style="list-style-type: none"> • Yes, if VP's found
	Wood frog										

Legend	Habitat Key	A-B: Aspen-Birch; NH: Northern hardwoods; O-P: Oak-Pine; HE: Hemlock; S-F: Spruce-Fir; NWC: Northern White Cedar; R&FW: Riparian and Forested Wetland; VP: Vernal Pool.
	Focus Species	C: currently present or potentially present as indicated by habitat; F: Future, through long-term habitat management; P: Potentially present if targeted management actions taken by landowner. D – may decline if habitat management not implemented Management for Focus Species will benefit other species and ecological conditions associated with these ecosystem types and development stages.

Focus Species Management	
Overview	Obtaining adequate regeneration in oak-pine forests usually requires some form of shelterwood management or group-selection harvesting. In the case of white pine, timing harvests to coincide with an abundant seed year is recommended, while maintaining partial shade through the sapling phase is important to minimize weevil damage. In mixed oak-pine stands, white pine regenerates well, due in part to the light shade offered by oak canopies and perhaps the digging action of gray squirrels. On moist and rich soils, where red maple and hemlock tend to be more aggressive, maintaining pine or oak dominance may be impossible.
Single-tree and Group Selection	<ul style="list-style-type: none"> ✓ Light single-tree selection is unlikely to maintain oak-pine except on very dry sites. ✓ Crop-tree management (see Appendix 3) focusing on the best trees combined with group selection may be used to maintain mature forest conditions. Locate groups where there are patches of advanced regeneration. Large groups will provide small patches of early successional habitat.
Shelterwood, Small Patch Cuts, and Clearcuts	<ul style="list-style-type: none"> ✓ The shelterwood system is probably the best method for regenerating and cultivating oak-pine. A regeneration harvest should occur approximately 30 years before crop trees are expected to mature. When regeneration is established, maintain the overstory below 40% crown cover to discourage shade-tolerant competitors but provide enough shade to limit pine weevil damage. A heavy shelterwood cut will also provide habitat for early successional species. ✓ Patch cuts (2-5 acres) and occasional small clearcuts will provide ideal nesting habitat for young-forest birds and browse for hare, rabbits, and deer. Low-value stands may be a good opportunity to use this approach.
Other	<ul style="list-style-type: none"> ✓ Maintain and encourage oak mast trees for bear, deer, turkey, squirrels, and mice. ✓ Follow recommendations for snags, cavity trees, and downed woody material and other stand-level guidelines (Section 7). ✓ Refer to landscape-level guidelines (Section 8). ✓ Mature hemlock is often indicative of sites that were not cleared for crops or permanent pasture. These sites add plant and wildlife diversity to the forest and should be maintained in a mixed-species composition if possible.

References: DeGraaf et al. 1992, DeGraaf and Yamasaki 2001, Flatebo et al. 1999, Lancaster et al. 1978, Sampson et al. 1983, Seymour 1994

Eastern Hemlock

Identification

Eastern hemlock in pure or mixed stands is the dominant species. Depending on the region of the state and surrounding forest type, associates may include red oak, white pine, birches, maples, spruce, cedar, or fir.

Ecology

Eastern hemlock typically occurs in patches of 50 acres or less within oak-pine, northern hardwood, and spruce-fir ecosystems. The hemlock wooly adelgid, an exotic insect that has devastated hemlock forests from Appalachia to central Massachusetts, has now spread into southern Maine.

Wildlife

Hemlock provides important food, cover, and nesting habitat for many species. Black bears use hemlock for denning and cubs climb them for escape cover. Hemlock stands provide important deer wintering cover in much of the Northeast. Blackburnian and black-throated green warblers are strongly associated with hemlock in mixed hemlock-hardwood forests.



Rare Species
None
Rare Natural Communities
None

Focus Species	
Mature Forest	Late-successional Forest
American marten (North region) Fisher (South region) White-tailed deer (North region) Pileated woodpecker Barred owl Wood thrush Redback salamander	No species currently known due to limited research

Eastern Hemlock

Focus Species Management	
Overview	Hemlock's greatest wildlife value is as a mature forest component of the landscape. Its deep crown provides excellent cover while frequent and profuse cone crops provide abundant food for many birds and small mammals. Management should strive to maintain stands in a mature condition through periodic light regeneration harvests. Individual trees and groups within northern hardwoods and oak-pine provide important food and cover and should be maintained and encouraged. Hemlock regenerates best on partly shaded, scarified soil.
Single-tree and Group Selection	<ul style="list-style-type: none"> ✓ Both approaches are well suited to maintaining mature forest conditions and are consistent with natural disturbance patterns. ✓ Small-group selection (0.1 acre or less) can be used to regenerate hemlock while creating within-stand patchiness.
Shelterwood and Clearcut	<ul style="list-style-type: none"> ✓ Researchers recommend a 2- or 3-stage shelterwood with 70-80% canopy cover with scattered gaps. ✓ If the shelterwood system is used, be sure to retain the overstory in a two-aged system or maintain mature hemlock cover nearby. ✓ Clearcutting is not recommended in hemlock forests.
Other	<ul style="list-style-type: none"> ✓ Follow recommendations for snags, cavity trees, and downed woody material and other stand-level guidelines (Section 7). ✓ Maintain hemlock inclusions in other forest types. In northern Maine it is not uncommon to find old-growth legacy trees in excess of 200 years old. ✓ Refer to landscape-level guidelines (Section 8). Use hemlock stands to help build and maintain mature and late-successional components of the landscape.

References: Carey 1993, DeGraaf et al. 1992, DeGraaf and Yamasaki 2001, Eyre 1980, Flatebo et al. 1999, Goerlich and Nyland 2000, Kenefic and Seymour 1999, U.S. Forest Service and Vermont Agency of Environmental Conservation 1973

Riparian and Wetland Forest

Identification

Riparian and wetland forests as defined here include forests that contain or are adjacent to seasonal or permanent standing water, including small pools, seeps, intermittent and perennial streams, rivers, ponds, lakes and coastal waters. Forest types may include wetland and floodplain communities as well as upland forest ecosystems described in this manual (e.g. oak-pine, northern hardwoods, spruce-fir) that border rivers, streams, and lakes.



Ecology

Riparian and wetland forests provide several major functions, including minimizing downstream flooding, filtering runoff and protecting water quality, maintaining cool water temperatures for fish, providing the energy for the base of the aquatic food web in the form of fallen leaves, and providing logs that create cover for fish and invertebrates and a substrate for aquatic algae.

Wildlife

These forests support an unusually high concentration of animals that includes tree-nesting waterfowl (wood duck, common goldeneye, hooded merganser, and common merganser) and other birds, as well as aquatic and semi-aquatic animals such as beaver, otter, mink, and moose. Large pines provide important nesting and loafing sites for bald eagle and osprey. Upland mammals such as deer, bobcat, coyote, and bats frequently use shorelands for denning, travel corridors, and feeding zones. In southern Maine’s developing landscape, wetland and shoreland forests often form the nucleus of large forest blocks and a network of travel corridors that are critical to many species. Up to 80% of Maine’s vertebrate wildlife species use riparian habitat during some or all of their life cycle.

Rare Species
Bald eagle, Blanding’s turtle, spotted turtle, box turtle, Atlantic salmon, bald eagle More than 20 rare plants, 4 insects, 2 freshwater mussels and 1 fish
Rare Natural Communities
Hardwood river terrace, hardwood seepage forest, silver maple floodplain forest, cedar-spruce seepage forest

Focus Species ¹
Beaver Pileated woodpecker Northern waterthrush Wood turtle Northern dusky salamander Brook trout

¹ Focus species vary with water body type. See management table on following page.

Vernal Pools

Rare Species
<ul style="list-style-type: none"> • Blanding's turtle (Maine threatened) and spotted turtle (Maine endangered) may be found in vernal pools in York and Cumberland counties • Four-toed salamander, ribbon snake, and wood turtle (all Maine special concern) may also be found in vernal pools statewide • Several rare plants are associated with vernal pools in southern Maine



Apply the following guidelines at minimum when two or more indicator species or more than 20 egg masses have been observed.

Focus Species Management ¹		
Vernal Pool Depression	Vernal Pool Protection Zone 0-100 ft.	Amphibian Life Zone 100-400 ft.
<ul style="list-style-type: none"> ✓ Identify and flag the pool boundary during the spring wet season or by using dry-season indicators. ✓ Do not disturb the pool depression with equipment, slash, or sediment. 	<ul style="list-style-type: none"> ✓ Maintain an average 75% canopy cover of trees over 20-30 ft. tall to protect young amphibians leaving the pool. ✓ Harvest in frozen or dry conditions to prevent rutting and protect habitat of soil-dwelling salamanders. ✓ Maintain abundant coarse woody debris used as feeding habitat and cover by amphibians. 	<ul style="list-style-type: none"> ✓ Maintain a minimum of 50% canopy cover of trees over 20-30 ft. tall and keep openings below one acre. ✓ Harvest in frozen or dry conditions to minimize soil disturbance. ✓ Maintain abundant coarse woody debris.

¹ For more information on identification and management of vernal pools see: *Maine Citizens Guide to Locating and Describing Vernal Pools* and *Forestry Habitat Management Guidelines for Vernal Pool Wildlife in Maine*. Both are available from Maine Audubon, Conservation Department (207-781-2330).

References: Calhoun, A.J.K. 2003; Calhoun, A.J.K. and P. deMaynadier 2004

Focus Species Forestry

Habitat Use: The habitat-use chart³ identifies the specific ecosystems and development stages that are focus habitats for the species as well as and other habitats that it uses.

Focus Habitat: For most species listed, a focus habitat is one that provides the best overall habitat conditions for the species. For a few, the focus habitat is one that is used for only part of the year but is essential for the species’ survival. Examples of the latter include wintering areas for deer in northern Maine and vernal pools that are used seasonally by wood frogs and spotted salamanders.

- ✓ Where a species focus habitat includes two or more development stages, attempt to provide at least half of the area in the older development stages.
- ✓ Small-diameter intermediate stands may provide early successional habitat, while larger-diameter intermediate stands are likely to provide habitat for many mature-forest species.
- ✓ Although all mature forest species will do equally well in late-successional habitat, late successional is only listed as a focus habitat when it is a required habitat for a species.

Other Habitat: “Other habitat” is habitat commonly used by a species, but it is used less frequently or is less critical (e.g. non wintering habitat for deer) than a focus habitat. The “other habitat” needs of a given species are taken care of by other focus species. For example, spruce-fir is listed as “other habitat” for pileated woodpecker. Management for black-backed woodpecker and American marten, both spruce-fir focus species, will also provide habitat for the pileated woodpecker in that forest type.

Habitat Use Modifiers: Some species are most likely to be found in certain forest types only when certain habitat conditions are found.

Habitat Use Modifiers	
Mx	A coniferous component in hardwood forests or deciduous component in softwood forests is important
U	Identifies when a species requires understory saplings or shrubs
C	Requires or is strongly associated with snags or cavity trees

³ The format of the habitat use chart was adapted from charts that first appeared in the U.S. Forest Service publication *New England Wildlife: Habitat, Natural History, and Distribution* (DeGraaf and Rudis, 1986). Habitat uses in this guide represent the author’s synthesis of current literature and input from the advisory committee.

Barred Owl

Distribution: Alberta to Newfoundland, south to Florida and east Texas; also British Columbia, south to northwestern California

Maine Focus Region: Statewide

Home Range: 200-900 acres

Food: Primarily mice; also other small mammals, birds, snakes, salamanders, frogs, and crayfish. Hunts from low branches, often at edge of forest openings.

Special Habitat Needs: Extensive mature deciduous or mixed forest with large (>20 in.) cavity trees

Management:

- ✓ Maintain a landscape with extensive mature forest; uneven-aged management is probably best unless long even-aged rotations are used to create large areas of mature forest.
- ✓ Manage for large snags and cavity trees.
- ✓ Small openings may attract foraging owls.



Comments: The barred owl’s “*Who cooks for you, who cooks for you-all?*” may be heard throughout the year but is most common during the late winter/early spring breeding season. Managing for the large cavity trees and forest-dominated landscapes used by barred owls will help ensure adequate habitat for other species that prefer mature deciduous forests.

Habitat Use:

Forest Ecosystems																	Special-value Habitats													
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock			Spruce-Fir				N. White Cedar			Riparian/Wetland Forest	Vernal Pool					
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L	I	M	L			
						C	C	C			C	C	C			C	C			C	C	C	C	C	C	C	C	C	C	

- | | | | | | |
|---|----------------------------|----|-------------------------|--|---------------|
| R | Regeneration and seedlings | Mx | Mixed conifer-deciduous | | Focus habitat |
| S | Saplings and small poles | U | Understory present | | Other habitat |
| I | Intermediate-aged forest | C | Cavity tree or snag | | Little/no use |
| M | Mature forest | | | | |
| L | Late-successional forest | | | | |

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Sibley 2000, Terres 1991

Pileated Woodpecker

Distribution: British Columbia to Nova Scotia, south to Florida, east Texas, and northern California

Maine Focus Region: Statewide

Home Range: 100-200 acres

Food: Insects in decaying wood, particularly carpenter ant colonies in decaying trees

Special Habitat Needs: Large (>20 in. diameter) cavity trees for nesting; dead or decaying deciduous trees or conifers for feeding

Management

- ✓ Maintain mature forest stands.
- ✓ Maintain an abundance of large snags and live trees with decaying wood in managed stands (see Section 7).



Comments: Pileated woodpeckers frequently excavate large rectangular feeding cavities (2-3 in. wide by 4-6 in. high) in live trees, often low on the bole where ants are present in decayed wood. This large, crow-sized woodpecker with black body, white underwings, and loud “*kuk kuk kuk kuk*” call is readily identified by sight, sound, or sign of feeding activities. Because the pileated, like most other woodpeckers, usually excavates a new nest cavity every year, an abundance of potential cavity trees is important. Bats, marten, fisher, barred owls, flying squirrels, raccoons, and other animals will benefit from cavities excavated by pileated woodpeckers. Wood ducks, goldeneyes, hooded mergansers, and common mergansers nest in large cavities excavated by pileated woodpeckers near streams and ponds.

Habitat Use:

Forest Ecosystems																			Special-value Habitats										
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock				Spruce-Fir					N. White Cedar			Riparian/Wetland Forest	Vernal Pool		
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L	I	M	L		
			C			C	C	C			C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	

- | | | | | | |
|---|----------------------------|----|--|--|---------------|
| R | Regeneration and seedlings | Mx | Mixed conifer-deciduous | | Focus habitat |
| S | Saplings and small poles | U | Understory present | | Other habitat |
| I | Intermediate-aged forest | C | Cavity trees, snags, or decaying trees | | Little/no use |
| M | Mature forest | | | | |
| L | Late-successional forest | | | | |

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Sibley 2000, Terres 1991

Wood Thrush

Distribution: Breeding-season resident of eastern deciduous woodlands from southern Quebec to the Gulf Coast

Maine Focus Region: South

Territory: Up to 7 acres

Food: Predominantly insects in summer, plus berries and other small fruits in fall, winter, and spring

Special Habitat Needs: Cool, moist, mature closed-canopy deciduous and mixed forests with well developed shrub-sapling layer. Found at greatest densities in forest patches greater than 200 acres, with a sharp decline in abundance in patches less than 100 acres in size.



Management:

- ✓ Maintain mature northern hardwood and oak-pine forest and encourage understory development with group or single-tree selection.
- ✓ On large ownerships shelterwood management may be appropriate if mature forest goals are met at the landscape level. See landscape management guide (Section 8).

Comments: This robin-sized thrush with spotted breast and rusty head is readily identified by its distinct flute-like “*ee-o-lay-ee*” call on spring and summer evenings or in the early morning. It is frequently seen in low shrubs or scratching in the leaf litter for insects and other food. Numbers observed during the breeding season in Maine are declining. Nesting success increases with the percent of forest in the landscape. The wood thrush winters in Mexico and Central America. Many mammals and plants characteristic of extensive mature forest will benefit from wood thrush management. Because the wood thrush feeds mostly on or near the ground, it is vulnerable to predation by domestic cats. The hermit thrush, which is characteristic of mixed hardwood-conifer forest throughout Maine, has similar habitat requirements and is also negatively impacted by habitat loss and fragmentation.

Habitat Use:

Forest Ecosystems																Special-value Habitats										
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock		Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L		

- R Regeneration and seedlings
- S Saplings and small poles
- I Intermediate-aged forest
- M Mature forest
- L Late-successional forest
- Mx Mixed conifer-deciduous
- U Understory present
- C Cavity tree or snag
- Focus habitat (dark grey)
- Other habitat (light grey)
- Little/no use (white)

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Hagan et al. 1997, Rosenburg et al. 2003, Sauer et al. 2003, Sibley 2000, Terres 1991

Focus Species Forestry

Chestnut-sided Warbler

Distribution: Alberta to New Brunswick, south along the Appalachians to Georgia

Maine Focus Region: Statewide.

Territory: 1-3 acres

Food: Insectivorous; prefers caterpillars and fly larvae

Special Habitat Needs: Dense early successional hardwoods up to 10 ft. tall with less than 35% overstory canopy closure. Prefers forest patches in excess of 250 acres.



Management:

- ✓ Use group selection to create patches averaging 1 acre in size, or shelterwood or clearcut harvests, to create nesting habitat for chestnut-sided warblers.
- ✓ Balance early successional habitat with requirements of mature-forest species at the property or landscape level. See landscape management guidelines (Section 8).

Comments: Males defend their territory by singing from tall saplings and residual overstory trees while the female incubates 4-5 eggs in the brush below. John James Audubon considered this one of the rarest birds in the east during the early 1800s, but timber harvesting and regrowth of farmland have made it a relatively common species. Management for the chestnut-sided warbler will benefit other species that use early successional hardwoods, such as moose, woodcock, white-tailed deer, nighthawk, willow flycatcher, eastern bluebird, Tennessee warbler, and mourning warbler. The chestnut-sided warbler’s loud “*pleased pleased pleased to meet-ya*” may be confused with the magnolia warbler during the spring and early summer breeding season when the two species may be found together in mixed hardwood-conifer stands.

Habitat Use:

Forest Ecosystems																Special-value Habitats										
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock		Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L		

- R Regeneration and seedlings
- S Saplings and small poles
- I Intermediate-aged forest
- M Mature forest
- L Late-successional forest
- Mx Mixed conifer-deciduous
- U Understory present
- C Cavity tree or snag
- Focus habitat (dark grey box)
- Other habitat (light grey box)
- Little/no use (white box)

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Hagan et al. 1997, King 2003, Sauer et al. 2003, Sibley 2000, Terres 1991

Pine Warbler

Distribution: Southern Ontario and southwest Quebec, south to Texas and Florida

Maine Focus Region: Statewide

Territory: 1-3 acres, possibly larger with low pine density

Food: Adult and insect larvae, spiders

Special Habitat Needs: Stands with relatively mature to mature white pine or pitch pine

Management:

- ✓ Manage for intermediate or mature white pine or pitch pine in pure or mixed stands as a component of the forest.



Comments: The irregular trill of the pine warbler may be heard high in the canopy during the spring breeding season from late April through July. The only vertebrate in our region that is dependent on pines, pine warbler density declines as the percent of hardwood increases in the canopy or the understory. White pines also make good roost trees for wild turkeys in oak-pine forests. Long-eared and northern saw-whet owls, red-breasted nuthatch, hermit thrush, solitary vireo and red squirrel may also be found in stands where pine warblers are present.

Habitat Use:

Forest Ecosystems																Special-value Habitats										
Aspen -Birch				Northern Hardwoods					Oak-Pine					Hemlock		Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L	M,L	
																									WP	

- R Regeneration and seedlings
 - S Saplings and small poles
 - I Intermediate-aged forest
 - M Mature forest
 - L Late-successional forest
 - Mx Mixed conifer-deciduous
 - WP White pine required
 - U Understory present
 - C Cavity tree or snag
- Focus habitat
 Other habitat
 Little/no use

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Hagan et al. 1997, Sauer et al. 2003, Sibley 2000, Terres 1991, <http://www.natureserve.org/explorer/>

Focus Species Forestry

Eastern Towhee

Distribution: Breeding-season resident from Minnesota and southern Quebec to southern Maine, south to the Gulf of Mexico

Maine Focus Region: At its northern range limit in Maine, this species is a priority species only in the South

Territory: 1-6 acres

Food: Scratches in leaf litter for seeds, insects and snails

Special Habitat Needs: Prefers dry, early successional or regenerating forests with a dense, brushy understory



Management:

- ✓ Adaptable to a range of management techniques that result in dense regeneration, including heavy selection, shelterwood, or clearcut harvests.

Comments: The eastern towhee is declining due to loss of the brushy, early successional forest that they prefer. This large sparrow with rusty sides is often heard scratching in the dry leaves of pine-oak forests. In the spring and early summer the male announces his presence with a loud “*DRINK your teeeeeee.*” Its call is a loud “*che-WINK.*” Towhees winter from southern New England to the Gulf of Mexico. Other early successional species such as ruffed grouse, eastern and New England cottontail rabbits, and chestnut-sided warblers may be found in young stands inhabited by eastern towhees.

Habitat Use:

Forest Ecosystems																Special-value Habitats										
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock		Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L		
											U	U	U													

- R Regeneration and seedlings
 - S Saplings and small poles
 - I Intermediate-aged forest
 - M Mature forest
 - L Late-successional forest
 - Mx Mixed conifer-deciduous
 - U Understory present
 - C Cavity tree or snag
- Focus habitat
 - Other habitat
 - Little/no use

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Hagan et al. 1997, Sauer et al. 2003, Sibley 2000, Terres 1991

Focus Species Forestry

Northern Dusky Salamander

Distribution: Southern Quebec, south to Alabama; apparently absent northeast of Presque Isle, Maine

Maine Focus Region: Statewide

Home Range: Variable, 15-500 sq. ft.

Food: Feeds mainly at night on small aquatic or terrestrial insects, crustaceans and other invertebrates

Special Habitat Needs: Cool, clear seeps; intermittent streams or small perennial streams. Found under rocks or logs at water's edge or in the bed of nearly dry streams.



Management:

- ✓ Use Maine Forest Service Best Management Practices to avoid stream sedimentation and maintain streamside vegetation for shade, cover, and habitat for adult forms of aquatic insects.
- ✓ See riparian and wetland forest recommendations (Section 5).

Comments: Dusky salamanders are found high in the watershed above the range of brook trout and other fish. They are about 2.4-4.3 in. long, gray or brown, and frequently mottled. Duskies are frequently found in the company of two-lined salamanders but, unlike the two-lined, are intolerant of warm water and sediment. In the western mountains region, northern spring salamanders may be encountered more frequently than duskies in headwater streams. Dusky salamanders winter 12-20 in. below ground near streams. Insects associated with these small streams are prey for birds, and the cool, clear water sustains streams lower in the watershed that are critical for trout and other fish.

Habitat Use

Forest Ecosystems																Special-value Habitats										
Aspen-Birch				Northern Hardwoods				Oak-Pine				Hemlock				Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L		

- R Regeneration and seedlings
- S Saplings and small poles
- I Intermediate-aged forest
- M Mature forest
- L Late-successional forest
- Mx Mixed conifer-deciduous
- U Understory present
- C Cavity tree or snag
- Focus habitat (dark gray box)
- Other habitat (medium gray box)
- Little/no use (white box)

References: Barbour et al. 1969, DeGraaf and Yamasaki 2001, Maine Forest Service 1992, Markowski 1999

Focus Species Forestry

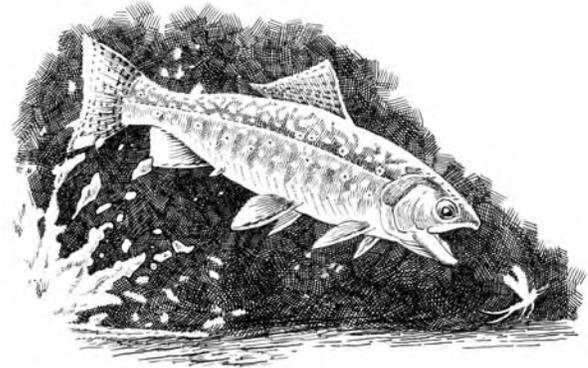
Brook Trout

Distribution: Newfoundland to Manitoba, south along the Appalachians to Georgia

Maine Focus Region: Statewide

Food: Aquatic insect larvae and adults, especially when young, shifting to a higher percentage of fish with maturity

Special Habitat Needs: Cool, silt-free, and well-oxygenated water below 65° F



Management

- ✓ Use Maine Forest Service Best Management Practices to avoid stream sedimentation and maintain streamside vegetation for shade, cover, and habitat for adult forms of aquatic insects.
- ✓ See riparian and wetland forest recommendations (Section 5).

Comments: This brightly colored native fish is an indicator of good water quality. Maine’s wild brook trout fishery, the best in the United States, is threatened by development, illegal fish stocking, increased access to remote streams and ponds, and poor harvesting practices.

Habitat Use:

Forest Ecosystems																Special-value Habitats										
Aspen-Birch				Northern Hardwoods					Oak-Pine					Hemlock		Spruce-Fir				N. White Cedar		Riparian/Wetland Forest	Vernal Pool			
R	S	I	M	R	S	I	M	L	R	S	I	M	L	I	M	L	R	S	I	M	L	I	M	L		

- | | | |
|------------------------------|----------------------------|---------------|
| R Regeneration and seedlings | Mx Mixed conifer-deciduous | Focus habitat |
| S Saplings and small poles | U Understory present | Other habitat |
| I Intermediate-aged forest | C Cavity tree or snag | Little/no use |
| M Mature forest | | |
| L Late-successional forest | | |

References: Boone and Krohn 1998, DeGraaf and Yamasaki 2001, Maine Forest Service 1992, Witham 1999

Appendix 10
Forest Stewardship Council
Background



Why FSC is the best forest management certification system

Forest Stewardship Council (FSC) certification is the best available forest conservation and market linkage tool. Of the over 90 options available worldwide for forest management certification, FSC is the most rigorous, credible, and valuable system. Here are the reasons why.

FSC THE BRAND

The promise to consumers

The reason FSC is the most trusted label in the certification marketplace is the history of credibility related to claims made within the FSC system. FSC has the most rigorous and consistently implemented chain-of-custody program in the world. This system ensures, through independent auditing, that product claims can be verified from the forest to the customer. The integrity of FSC's promise to customers makes FSC the gold standard.

Global reach

Wood is traded all over the world and FSC has certified forest management operations, manufacturing facilities, and distributors in over 70 countries. With offices in over 30 countries, FSC has set regional standards that reflect local conditions in both developed and developing countries. Thousands of companies worldwide participate in the program providing the full range of wood and paper products to markets everywhere. No other system has this kind of reach, with locally relevant and accepted consensus-based standards combined with global brand recognition that guarantees the rigor and integrity of those standards. Certification systems that focus only on North America or Europe miss some of the most important issues that are happening on the ground in forests around the globe even though this wood is bought and sold around the world every day.

Recognition by credible non-profits trusted by consumers

Other certification systems rest their credibility on expensive ad campaigns supported by the very companies who stand to benefit from customers buying products with that label. While FSC companies also advertise, they are advantaged by an army of stakeholders who publicly endorse and actively market FSC-certified products. Major global environmental organizations have programs where staff members spend their days building demand for FSC-certified products. These organizations include National Wildlife Federation, World Wildlife Fund, Forest Ethics, Rainforest Action

Network, Rainforest Alliance, Green Press Initiative, Tropical Forest Trust, and many others. This kind of advocacy can only be generated by a system that these organizations trust and are willing to rest their own brands on in the market. Market campaigns by NGOs routinely feature FSC as part of the demand placed on campaign targets. Other types of NGOs show their support for FSC through partnerships where companies are urged to move to FSC certification. This community is unique. No other system has generated such broad and deep support.

Used by major brands to protect their own brands

When a major consumer brand chooses to co-brand itself with something like a certification label it becomes either an enhancement or vulnerability. Companies who seek to express their environmental and social values by using forest products from responsible sources increasingly see FSC as a brand enhancement. Whether it's an on product label on an item of furniture, recognition of FSC in a green building standard, or the placement of the FSC logo on an annual report cover, FSC is strengthening brands all over the world. As green building grows, builders and architects proudly specify FSC-certified wood to express their own values that reflect well on their company. The world's largest paper and wood buyers are committing to increasing levels of FSC-certified products in their purchasing practices.

You can find the FSC label on catalogues, reports, marketing materials, consumer products, product packaging, and within the walls of the world's largest retail stores. Even financial institutions are using the FSC tool to guide their investment and lending policies—by screening forestry companies using FSC certification, banks and lenders can reduce their risk by placing their money in responsible businesses and avoiding others who act illegally or destructively.

"We believe that FSC is the gold standard when it comes to forest products certification systems. FSC certification is a key component in our ongoing efforts to deliver on our commitment to our employees, customers and shareholders to operate in an environmentally sound manner."

- Pat Connolly, Executive Vice President and Chief Marketing Officer for Williams-Sonoma, Inc.



FSC THE SYSTEM

Recognition of Social Values

Over 90% of the 1.2 billion people living in extreme poverty around the globe depend on forests for some part of their livelihood. In addition, thousands of people are enslaved in the cattle and timber industry in Brazil. Only FSC explicitly balances the very important social impacts of logging with the environmental outcomes and economic values that well managed forests provide. Not only are social and community values and labor rights reflected in FSC standards, but indigenous peoples and civil society organizations are represented in the FSC membership. Bringing these voices to the table is a distinctive feature of the FSC system. Fundamental issues of resolving who owns the land and full community engagement in decision-making are attributes reflected in FSC's process of stakeholder engagement.

Transparency at every stage

All processes and decisions of the Forest Stewardship Council are open for public review and comment. Even non-members are engaged in the refinement of new policies and standards. Certification assessments are subjected to public review before they become finalized. Transparency is a core value of the system and one of its unique strengths.

Stakeholder diversity and membership

FSC's standards reflect the holistic nature of the membership that comprises the organization—balancing environmental, social and economic concerns in the management of the world's forests.. Major global environmental groups, native tribes, forest products manufacturers, foresters, scientists, and advocates for human and civil rights all contribute to the governance of the FSC system. By bringing this array of perspectives into the fold, FSC strengthens its standards and creates an army of committed individuals and organizations prepared to advocate for the importance of the system in the marketplace.



FSC'S STANDARDS

Protection of high conservation values

FSC standards include set asides and special measures related to managing forests with high conservation values. The most significant forested eco-systems are identified in every certified operation and care is taken to ensure that values such as biodiversity, sensitive aquatic habitats, unique species and plant and animal communities are all protected. The model put forth by FSC is so strong that major wood and paper buyers often require their suppliers to implement a high conservation value forest inventory in the areas where they operate, even where they are not seeking FSC certification. The rigor of this system is so widely recognized that other certification systems incorporate similar models. Unfortunately, no other system has reached the levels of protection afforded by FSC.

Conservation of natural forests

In the last 50 years we have done more damage to natural forests than in the previous 80 centuries of human activity. FSC certification is not provided to forest management operations that have converted natural forest stands to ecologically simplified "plantations" since 1994 (FSC's first implementation year.) No other certification system precludes this practice from being certified. FSC holds that conservation and management of natural forests is a priority. Existing (before 1994) plantations can only be certified where they meet high performance standards for protecting and encouraging the restoration of native biodiversity.

Performance versus intent

There are certainly specific differences among certification systems in terms of their on-the-ground requirements. Many systems require policies or plans for dealing with issues like chemical use or worker's rights. FSC requires actual performance against standards, not just on-paper intention. Differences exist in types and size of buffer areas that cannot be harvested near streams, the size of areas allowable for clear-cut logging, the requirements for mapping and documenting procedures and so on. The bottom line is, when added up with all of the differences noted above, there are no "apples to apples" comparison between FSC and any other system. FSC is the largest, oldest, strongest, and most visible system ever devised for linking responsible forestry to markets.

For more information, visit www.fscus.org.

Our mission:

Create a marketplace that promotes well-managed forests by ensuring forestry practices that are environmentally responsible, socially equitable, and economically viable.

FOREST STEWARDSHIP COUNCIL-US

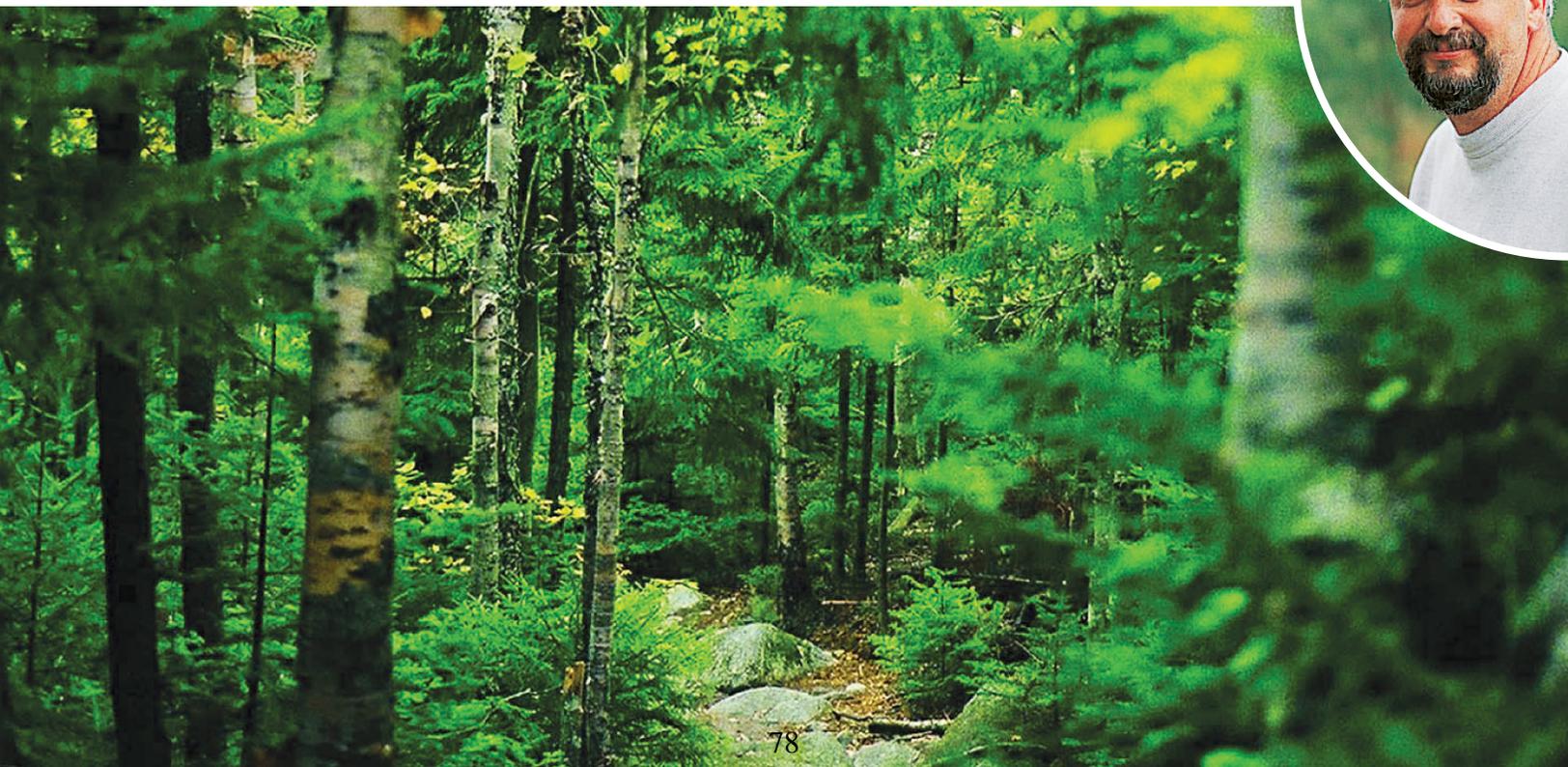
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SmartWood Forest Management Certified Forestry for the Future

Foster growth, stability and pride in your industry and in its future. Invest in the Rainforest Alliance's SmartWood Forest Management Certification today. While rich in resources, the world's forests are vulnerable to mistreatment and misuse. An industry-wide approach to sustainable forestry is in each and every operation's own best interest. Ensure a healthy supply of forest resources for generations to come and access consumers, retailers, manufacturers and developers interested in sustainably produced wood products.

Help commercial forestry balance economic, environmental and social interests and needs.



The Health of Forests, The Wealth of an Industry

SmartWood Forest Management Certification is widely hailed as the global benchmark for sustainable forestry management. As the world's first global timber certification program, a founder of the Forest Stewardship Council (FSC) and among the first to be accredited by the FSC, the Rainforest Alliance's SmartWood program is based on a pragmatic and scientific model that comprehensively evaluates forests on operational, environmental, social and economic levels.

SmartWood assesses each forestry operation on its own terms, while ensuring that they meet internationally recognized standards of excellence. Our guidelines can apply to both natural forests and plantations. While the universal goal is sustainability, the benefits reach well beyond ecology: SmartWood certification distinguishes your operation's stewardship services, adds value to your lands, improves the general public perception of forestry and often helps surrounding communities to prosper economically. Sustainable harvesting ensures high quality wood and a wealth of natural resources for generations to come.

The Rainforest Alliance's SmartWood program is the independent, third-party certifier, a distinction that brings your company credibility, respect, recognition... and a profitable market niche. As a founding member of the Forest Stewardship Council, the Rainforest Alliance is respected worldwide not just for its reputable SmartWood forestry program, but also for its innovative sustainable agriculture and tourism initiatives, in which scores of companies — from the largest multinationals to modest, local operations — are involved.

Guidelines and Requirements: Region-Specific, Far-Reaching Benefits

Because every forest is unique, SmartWood certification criteria incorporate FSC regional guidelines, which take into account a number of significant variables, including habitat, climate and forest type. The following requirements must be met:

- All forest operations must maintain environmental functions, including watershed stability, conservation of resources and the protection of wildlife habitat.
- Planning and implementation must incorporate sustainable harvest levels.
- Operations must have a positive impact on the longterm social and economic well-being of communities.
- The forest manager must demonstrate a measurable and ongoing commitment to improving forestry practices.

For a copy of the Forest Management Certification guidelines, visit www.smartwood.org, or contact your local representative.



Nine Steps to Forest Management Certification:

1. Candidate submits certification application.
2. SmartWood sends assessment budget proposal for candidate approval.
3. SmartWood assembles a multi-disciplinary team that may include a forester, sociologist, ecologist and forest economist.
4. Assessment team reviews on-the-ground history and evaluates existing management plan.
5. Team develops report outlining needs and goals of operation.
6. Applicant evaluates draft report.
7. Qualified, independent peer reviewers assess report.
8. SmartWood and client establish five-year certification contract.
9. SmartWood conducts annual audits.



FSC-ACC-004. FSC Trademark ©1996 Forest Stewardship Council A.C.
FSC accredited certification shows that the forest meets the FSC Principles and Criteria for forest stewardship.



SmartWood USA Region

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Forest Terminology

Below is a glossary of useful forestry terms and other descriptions:

Acre: A unit of land containing 43,560 square feet. If it is a square, it would have a side of 208 feet by 208 feet.

American Tree Farm System: a program designed to sustaining forests, watershed and healthy habitats through private stewardship. Their mission is to “promote the growing of renewable forest resources on private lands while protecting environmental benefits and increasing public understanding of all benefits of productive forestry”. To date, enrolled tree farms are certified to the PEFC standard.

Basal Area: Cross-sectional area of a tree, measured at DBH. Typically known as a measure of stand density, expressed in square feet/acre.

Best Management Practices (BMP’s): BMPs are designed to protect water quality during forest harvests, and are developed to mimic and/or protect the natural functions of forests. It is a collection of techniques in all aspects of operations, such as road building, stream crossings, how to correctly install bridges and culverts, trails, water diversions, log landings, etc.

Biofuels: organic material such as wood, waste, and alcohol fuels, as well as gaseous and liquid fuels produced from these feedstocks when they are burned to produce energy.

Board Foot: Unit of measure, a 1” by 1’ by 1’ board. Used in scaling sawlogs and veneer.

Boreal Forest: a region in North America that consists of mostly coniferous forest land. Also called “taiga”, this type is the coldest forest zone in the northern hemisphere and covers a 1,000 km wide band over the continent.

Buffer Zone: A transitional zone between two distinct habitats, a buffer zone can act to protect sensitive areas from degradation and may provide additional diversity within a landscape. Generally used along water bodies or around dwellings.

Chain: a Surveyor’s unit of measure equaling 66 feet. Commonly used in deed descriptions.

Chain of Custody (CoC): is the process by which certified forest products are verified to come from properly managed, sustainable sources. Organizations wishing to become CoC certified must meet the minimum requirements in product traceability, storage and handling, invoicing, and record keeping. An on-site audit by an accredited third-party verifier is necessary before an organization can become CoC certified.

Cord: A unit of measure for stacked wood encompassing 128 cubic feet of wood, bark and air space (4’ by 4’ by 8’)

Crop Tree: Those trees in a stand left after thinning and destined to form the “final” crop, usually the highest in quality and value of all the trees in a stand.

DBH: Diameter at breast height, measure 4.5 feet above the ground.

Den Tree: A tree with a cavity or cavities used by wildlife.

Dominant Tree: A tree which usually has a large healthy crown that is part of the overstory. This tree will dominate its immediate area. It receives full light from above and partly from the sides.

Edge: The place in the environment where two distinct habitats meet. And edge often provides resources needed by a variety of wildlife, like food and cover.

Epicormic Branching: Branches arising from buds in the bark along main stem, most commonly occurring in trees under crown stress.

Forest Stewardship Council: in terms of the FSC scheme, there are two types of certification. In order for land to achieve FSC endorsement, its forest management practices must meet the FSC's ten principles and other assorted criteria. For manufacturers of forest products, including paper manufacturers like Sappi, Chain of Custody (CoC) certification involves independent certification of the supply chain, which identifies and tracks the timber through all stages of the production process from source to end product.

Forest type/stand: A group of trees, occupying a specific area and uniform in composition, species, age arrangement and condition, as to be distinguished from other adjoining forested areas.

Geographic Information Systems (GIS): Integrates hardware, software and data in order to manage, analyze, and display a variety of information.

Girdle: The removal or killing of a ring of bark around the tree stem so that the flow of nutrients from the crown to roots is blocked. The roots die and the whole tree is killed.

Greenhouse gases (GHGs): the GHGs included in the Kyoto Protocol are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

Intermediate Tree: A tree shorter than a dominant stem but extends into the crown cover formed by dominant and co-dominant trees. They receive some direct sunlight from above but none from the sides.

Landing: A place where logs and pulp are assembled for loading and transportation to a mill. Other names include header, yard, and deck.

Liquidation Harvesting: The Maine legislature has defined this as “the purchase of timberland followed by a harvest that removes most or all commercial value in standing timber, without regard for long-term forest management principles, and the subsequent sale or attempted resale of the harvested land within 5 years.”

Management Plan: A management plan is a document that contains the landowners' goals and objectives, current physical descriptions of the property, harvest plans for the present and future, identifies cultural and environmental areas of interests, etc. A current management plan is required if you are enrolled into Tree Growth Tax Law or under the American Tree Farm System.

Mast: Any nut, seed, or fruit produced by woody plants and consumed by wildlife.

MBF: Thousand board feet, standard unit of measure for sawlogs.

Overstory Removal (OSR): Is the last phase in a Shelterwood system, where the mature trees are completely removed and the younger stand takes over as the dominant canopy.

Overtopped/Suppressed: Trees with crowns entirely below the general level of the canopy (dominant and co-dominant trees), receiving no direct light either from above or from the sides.

PEFC: Programme for the Endorsement of Forest Certification. The world's largest forest certification system, PEFC is focused on promoting sustainable forest management. Using multi-stakeholder processes, the organization develops forest management certification standards and schemes which have been signed by 37 nations in Europe and other inter-governmental processes for sustainable forestry management around the world.

Raptor: Predatory birds such as hawks and eagles.

Regeneration: Young forest trees produced naturally from seed of mature trees.

Renewable Energy: energy generated from natural resources, such as sunlight, wind, water, wood, geothermal, etc, which are naturally replenished.

Residual Stand: Those trees remaining uncut following a harvesting operation.

Riparian Area: An area adjacent to a water body such as a stream or pond, also acts as the transitional zone between aquatic habitats and dry or upland habitats. Riparian areas are very important in the protection of water quality and have many values for wildlife.

Sapling: A small tree less than four inches at dbh, and over 4.5 feet tall. These are usually, but not always young trees.

Sawlog: A portion of a tree that meets minimum standards of diameter, length, and defect for sawmills. Usually at least 8' long, sound and straight, and with minimum diameters specified by specific sawmills. Boards are sawn from sawlogs to be made into furniture, flooring and construction lumber, etc.

Scarification: The disturbance of the forest floor to expose areas of mineral soil. This is done to prepare a seedbed and encourage establishment of desired species of tree seedlings, i.e. white pine or northern hardwoods.

Seed Tree System: The removal of the mature stand in one entry, except for a few individuals which will act as the seed source to regenerate the forest floor.

Shelterwood System: Is when in a timber management, a new stand of trees is started in the environment before the older one is removed.

Site index: The height to which a tree species will grow in 50 years on a given site.

Slash: The tops, branches and non-merchantable parts of trees left on the forest floor after a harvesting job.

Snags: Dead standing trees, often with tops broken off; which serve as perches, lookouts, foraging, and home sites for wildlife. They are also considered extremely hazardous by O.S.H.A.

Species Diversity: Maintaining a number of wildlife and/or tree species; requires diversity of habitats.

Spring Pole: Saplings or smaller trees that are bent over by a larger felled tree. They can be under extreme tension and are dangerous if not cut properly.

Stocking: The degree of occupancy of the growing space of land by trees, measured in stems/acre.

Sprouts: Regeneration of stems coming from the stump of a harvested tree. Trees that commonly do this are red maple and beech.

Stem Exclusion: Where trees start to compete with each other for nutrients; vigorous stems survive and weaker ones die.

Stumpage: A term used to describe the value of standing timber.

Suckers: Regeneration of stems coming from the roots of a harvested tree. Trees that commonly do this are poplars.

Sustainable Forestry Initiative ®: the SFI program is a comprehensive system of objectives and performance measures which integrate the sustained growing and harvesting of trees and the protection of plants and animals

Topography: The characteristic of the land determined by surface features; usually expressed as flat, rolling, gently rolling, or mountainous.

Tree Farm: See American Tree Farm System.

Tree Growth Tax Law: This law of 1972 was designed to assist forest landowners in maintaining their parcels as productive forests by helping reduce taxes per acre of land. To enroll, you must have at least 10 acres of land managed for forest products and a management plan.

TSI: Timber stand improvement. Pre-commercial or noncommercial thinning, weeding, and/or crop tree release.

Veneer Logs: Usually a very high quality product. Veneer is peeled or sliced for paneling, furniture, and other uses.

Vernal Pool: A seasonal water body that has no permanent inlet, no viable population of fish, provides breeding ground, and is habitat for endangered and rare animals. Vernal Pools can contain up to 4 ‘indicator’ species, which gives an idea of how healthy and significant the pool is. The four species are wood frogs, blue spotted salamanders, yellow spotted salamanders, and fairy shrimp. Since fall of 2007, significant vernal pools became protected under the Natural Resources Protection Act (NRPA). In order to be considered significant, a pool needs to meet certain criteria over an extended period of time.

Vigor: Ability of a tree to transform environmental resources into its own substances in large quantities and at a rapid pace.

Wildlife Habitat: Four basic components of habitat are food, water, cover, and space. Specific requirements for each of these components will vary with species, season of year, and the age and sex of the animal.

Wolf Trees: Usually large in size, limby, and poorly formed with little timber value. Same function as snags, except the tree is still alive and possibly producing mast.