FOREST MANAGEMENT PLAN

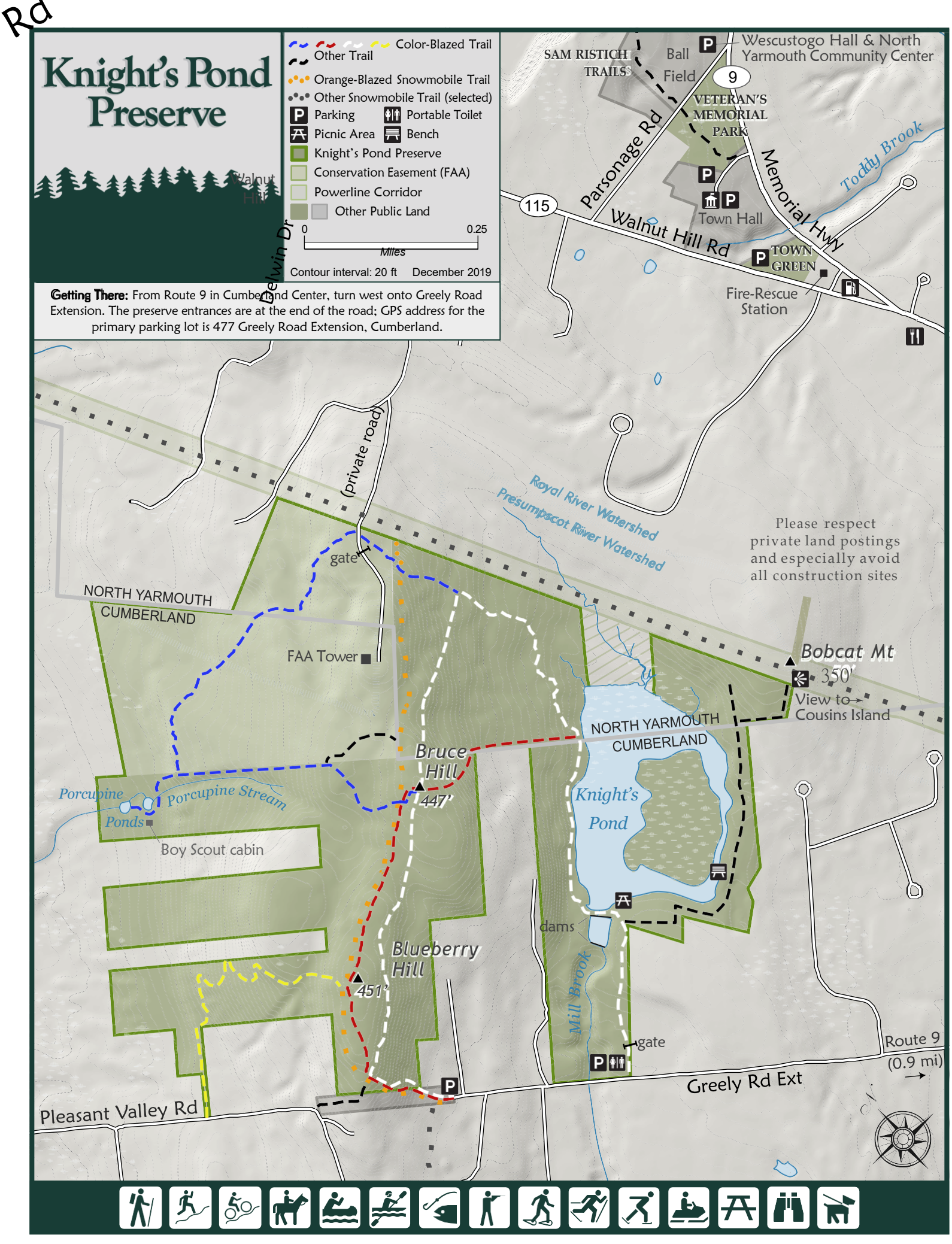
Property of:
Town of Cumberland
Town of North Yarmouth
290 Tuttle Road
Cumberland, Maine 04021
(207) 829-5559

Woodland Location
Town: Cumberland, Maine
County: Cumberland
Tax Map R08 Lots 10,11,13,14,15 & 18
Tax Map R06 Lots 29,32,33,35 and 38
Town of North Yarmouth
Tax Map 7 Lot 52
Royal River Conservation Trust
Tax Map 7 Lot 1-1
Total Acreage Town of Cumberland: 174.24+/- acres
Total Acreage Town of North Yarmouth: 45+/- acres
Total Acreage Royal River Conservation Trust: 9+/- acres
Forested Acreage: 201+/- acres
Non-Forested Acreage: 17.24+/- acres

Plan Prepared By:
Paul Larrivee – State of Maine LF#3306
207 Forestry Consulting Services, LLC
PO Box 181
New Gloucester, Maine 04260
Paul.larrivee@gmail.com
(207) 431-6153

Plan Date: September 20, 2021
Updated: September 22, 2022
Planning Period: September 2022 to September 2042

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


Knight's Pond Preserve
Color-Blazed Trail
Other Trail
Orange-Blazed Snowmobile Trail
Other Snowmobile Trail (selected)
Parking
Portable Toilet
Picnic Area
Bench
Knight's Pond Preserve
Conservation Easement (FAA)
Powerline Corridor
Other Public Land
0
0.25
Miles
Contour interval: 20 ft
December 2019
Getting There: From Route 9 in Cumberland Center, turn west onto Greely Road Extension. The preserve entrances are at the end of the road; GPS address for the primary parking lot is 477 Greely Road Extension, Cumberland.
SAM RISTICH TRAILS
Ball Field
Wescustogo Hall & North Yarmouth Community Center
9
VETERAN'S MEMORIAL PARK
Parsonage Rd
Memorial Hwy
Toddy Brook
115
Walnut Hill Rd
Town Hall
TOWN GREEN
Fire-Rescue Station
Selwin Dr
(private road)
Royal River Watershed
Presumpscot River Watershed
Please respect private land postings and especially avoid all construction sites
gate
NORTH YARMOUTH
CUMBERLAND
FAA Tower
Bobcat Mt
350'
View to Cousins Island
Bruce Hill
447'
Porcupine Ponds
Porcupine Stream
Boy Scout cabin
Knight's Pond
dams
Blueberry Hill
451'
Mill Brook
gate
Route 9
(0.9 mi)
Greely Rd Ext
Pleasant Valley Rd

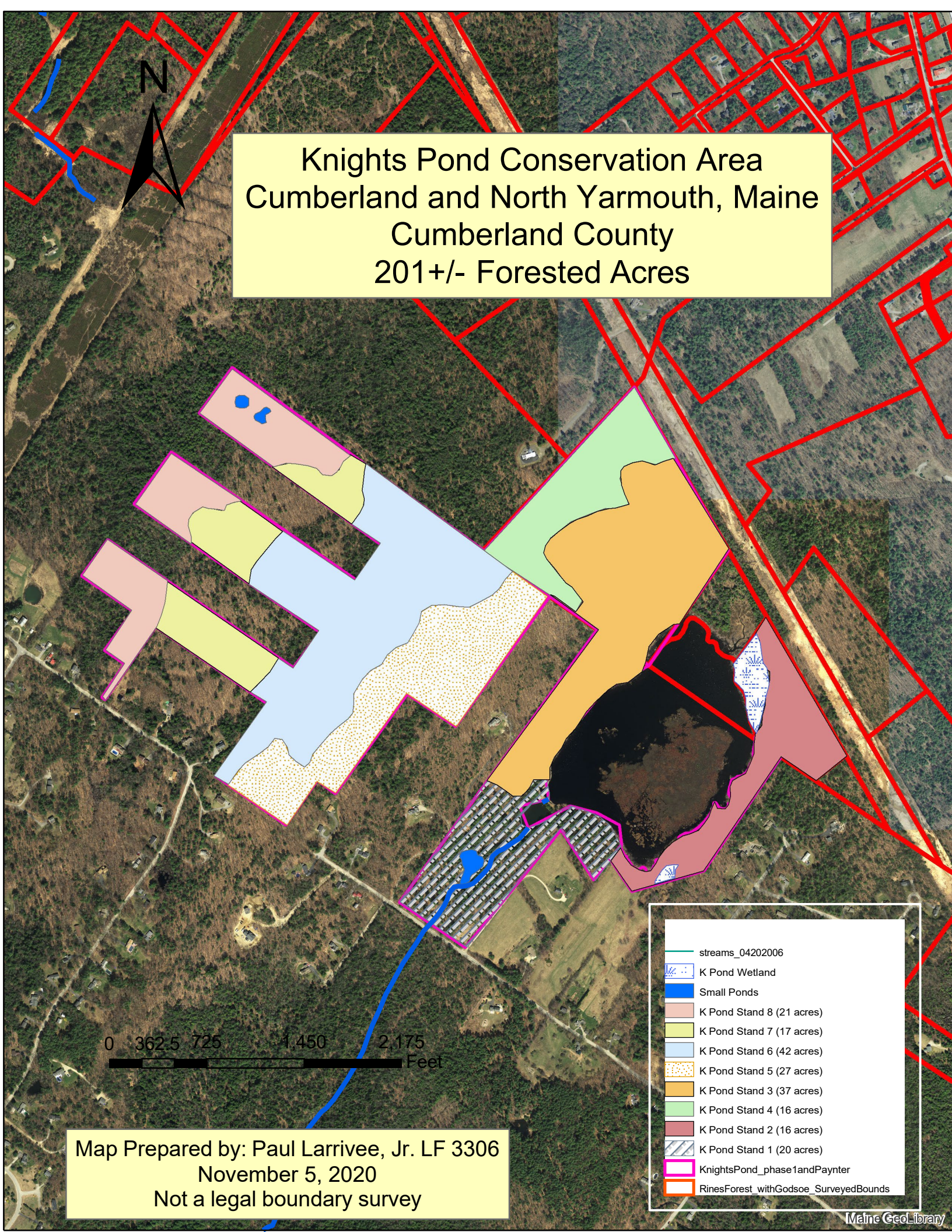

N
Knights Pond Conservation Area
Cumberland and North Yarmouth, Maine
Cumberland County
201+/- Forested Acres
0 362.5 725 1,450 2,175
Feet
streams_04202006
K Pond Wetland
Small Ponds
K Pond Stand 8 (21 acres)
K Pond Stand 7 (17 acres)
K Pond Stand 6 (42 acres)
K Pond Stand 5 (27 acres)
K Pond Stand 3 (37 acres)
K Pond Stand 4 (16 acres)
K Pond Stand 2 (16 acres)
K Pond Stand 1 (20 acres)
KnightsPond_phase1andPaynter
RinesForest_withGodsoe_SurveyedBounds
Map Prepared by: Paul Larrivee, Jr. LF 3306
November 5, 2020
Not a legal boundary survey
Maine GeoLibrary

Table of Contents

Schedule of Recommended Activities:

Activity Name	Extent	Recommended Time Frame	Stand Location	Cost/Income	Priority
Boundary Line Maintenance	5 – 6 miles	2022-2032	All	$700/mile	High
Examine Potential Vernal Pool	1	2022-2025	Stand 5	?	Moderate
Examine Potential Access and current erosion issues on Greely Rd Ext.	1000 feet	2022-2023	Greely Road Ext.	?	High
Potential Selection Harvest	40-50 acres	2022-2032	Stands 3,5 &7	$10,000 - $14,000	Moderate

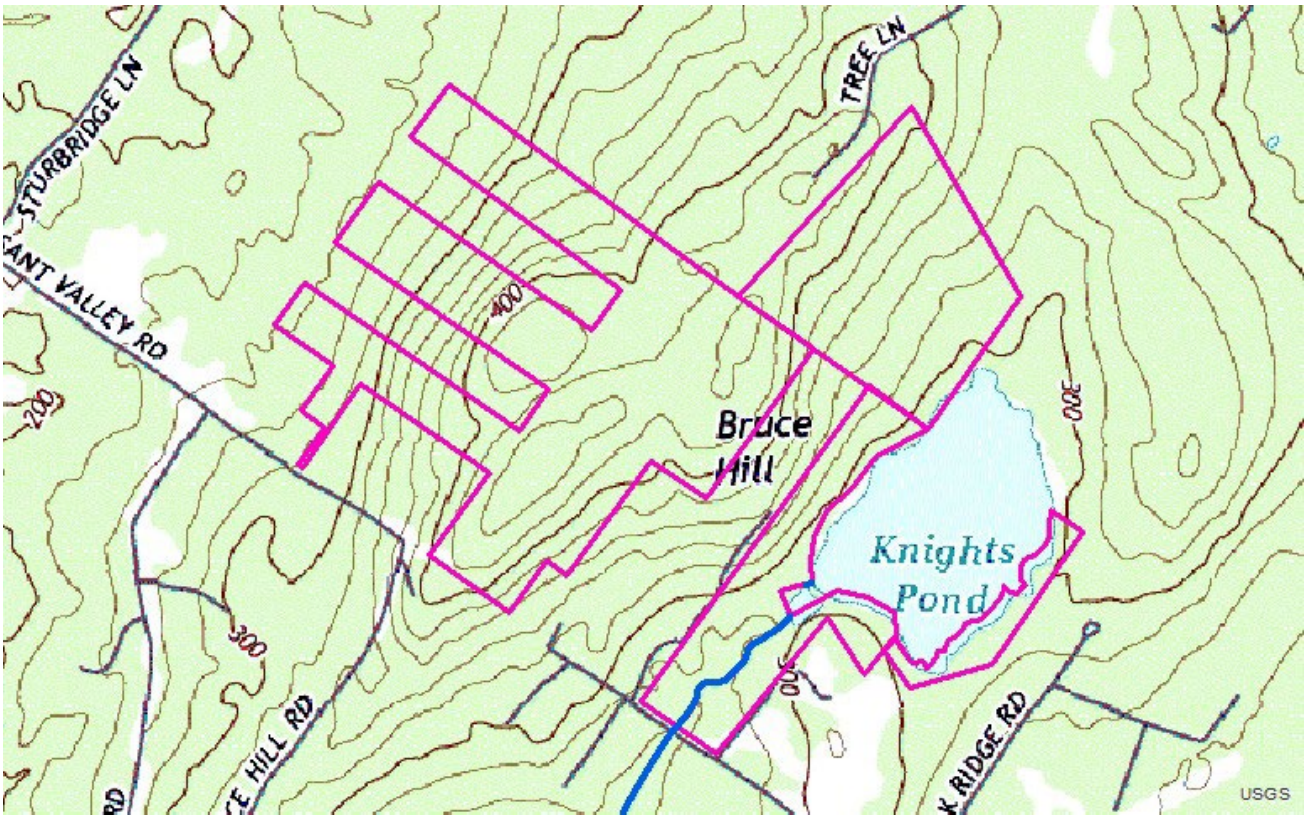
Introduction

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. This management plan is intended to cover forest management decisions on The Knights Pond Preserve in Cumberland and North Yarmouth, Maine for 20 years. There should be no need to update recommendations in this plan until 2032 unless the landowner's management objectives change or some natural disturbance occurs such as insect or disease.

This plan is intended to be a "living" document to guide forest management decisions in order to meet Knights Pond Preserve's Principles and Objectives as outlined in the management plan dated April 4, 2016. 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.

Parcel Location

As the largest undeveloped property in Cumberland, Knights Pond sits less than 12 miles from downtown Portland and less than one mile from the centers of Cumberland and North Yarmouth. When the property is combined with the land owned by Royal River Conservation Trust, it almost entirely surrounds the 46-acre Knights Pond. The property sits between Greely Road Extension in Cumberland and Route 115 in North Yarmouth.



Parcel History

The largest portion of the preserve was owned by Rebecca Leland Swiggett, who inherited the property from her parents Richard and Helen Knight. The Trust for Public Land, the Chebeague and Cumberland Land Trust, and the Royal River Conservation Trust, worked with the Town of Cumberland and Town of North Yarmouth, to purchase and preserve Knight's Pond Preserve in October 2015 (Reference is made to Book 32680 Page 207 in the Cumberland County Registry of Deeds). The eastern shore of Knights Pond appears to have been acquired from John Paynter (Reference is made to Cumberland County Registry of Deeds Book 34835 Page 179). Royal River Conservation Trust acquired their parcel from Richard Baston (Reference is made to Cumberland County Registry of Deeds Book 34852 Page 94). Royal River Conservation Trust's parcel is in the process of being transferred to the town of North Yarmouth.

Richard Knight assembled many parcels in the towns of Cumberland and North Yarmouth to create the current configuration of the preserve. Knights Pond was created from an impoundment built in the 1950s by Richard Knight. Mr. Knight encouraged local Boy Scout Troops and other youth groups to use the parcel to explore the outdoors. Cabins and privy existed on the Pond (some evidence still exists) and a lean-to and privy were built near the small ponds in the north-western corner of the lot (still standing).

Knights Pond Preserve is a typical forest for southern Maine; its composition shaped by past agricultural use, weather events and logging activity. Stonewalls 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 exhibits residual damage from the 1998 Ice Storm and appears to have been actively managed with selective harvests for decades. The forest management activities were well executed which has resulted in well stocked stands of higher-than-average quality timber. The woodland ranges from areas dominated by oak-northern hardwood, to the majority of the ownership which is dominated by Pine - Oak Forest. The property also has a beautiful stand designated as an Oak – Hickory Forest, which is ranked S1, rare.

Landowner's Goals and Objectives

The town of Cumberland has 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 pant 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 topo graphically 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 Knights Pond and discussing site specific objectives for Knights Pond Preserve. Those specific objectives are:

1. Address erosion issues related to the parcel at the end of Greely Road Extension. Discuss with town manager possibilities to stabilize the area.
2. Maintain a permanent, 100-foot-wide reserve/buffer around the pond perimeter to maintain water quality and protect the riparian area. This set aside would be approximately 12 acres in size. In areas beyond the 100' out to 250' riparian habitat values are best managed by maintaining intermediate and older stands throughout the majority of the outer zone.
3. Protect and set aside as a reserve the oak-hickory forest identified as a rare natural community by the Maine Natural Areas Program. This area makes up the bulk of Stand 4 which comprises 16 acres. Light silviculture entries might occur as needed - e.g., reduce hemlock competition with standing hickory. Gain more information of what types of disturbances, if any, help to maintain the oak-hickory forest type.
4. Undertake sustainable harvest of wood products on the northwest slope to enhance diversity and to re-balance the overstocked areas of Stands 5 and 7. This would involve low-impact harvesting equipment and the committee would like to use some of the forest products for local projects/markets.

Acreage Breakdown

The following table summarizes total acreage by land use classification:

Stand	Acres
KP1	20
KP2	21
KP3	37
KP4	16
KP5	27
KP6	42
KP7	17
KP8	21
Total	201

	Acres
Hrdwd	64
Mxwd	137
Forested	201

General Conditions of the Woodlot

General Woodland Description

Knights Pond Preserve woodland is above average for most woodland in southern-Maine. Past management activities have focused on improving the stocking of higher quality timber on the lot. The overall stocking is high only for optimum timber growth. Past removals were light and favored dominant trees. Regeneration exists in openings created during past harvests, though most areas would be considered closed canopy conditions. The wooded uplands of the Knights Pond Preserve would be considered the following types:

- Oak - Northern Hardwood: This broad upland forest type dominates stands KP2, 3, 5, and 8. 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. Approximately 106 acres of the Knights Pond Preserve would be considered this broad upland forest type.
- White Pine – Oak: This type is a closed canopy forest in which red oak or a mixture of oak and white pine dominate. Red Maple and Paper Birch can be common in younger stands. The Herb layer is very sparse but can feature bracken fern, low-bush blueberry and various herbaceous species. Mosses are common. This type dominates stand KP1, 20 acres.
- 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 Knights Pond Preserve this hemlock type is a mix with a beech-birch-maple forest type. The 42 acres of stand KP6 would be considered this hemlock – beech – birch – maple broad upland type.
- Oak – Hickory Forest: This dry forest type occurs as inclusions or patches amongst broader expanses of oak – pine forests. It's dominated by shagbark hickory and oaks. Canopy conditions are considered moderately open to closed throughout most of stand KP4. It is clear these acres were once old pastureland and usually result from a disturbance, such as fire. There is no research on this topic in Maine though. This forest type occupies at least 16 acres of Knights Pond Preserve.
- There is a tiny area of early successional forest located in Stand KP6 near the top of Blueberry Hill. This area was cleared for the creation of a view. It is located along a recreation trail. This is the only portion of the forest that has an early successional component. View cutting will likely continue here along the trail to maintain and enhance potential views.
- There is also an area of low-bush blueberry that the Cumberland Forestry Committee is interested in maintaining, potentially with the use of prescribed fire. A stand-alone plan should be developed for a future potential prescribed burn.

Boundary Lines & Monitoring

Property lines on the property are in ok to good condition. Based on limited research in the registry of deeds, I found a survey completed by Belding Survey, LLC (Cumberland County Registry of Deeds Plan Book 196, Page 395). This survey covers the land once owned by the Knights. It appears the land purchased from John Paynter was also surveyed.

The current boundary line evidence is as follows:

- The northern boundary line is a CMP power line corridor.
- The eastern boundary line east of the pond is a combination of stone walls, survey pins and old boundary paint.
- The southern boundary abuts Greely Extension Road on the maintained and un-maintained portions of the road.
- The western portion of the lot has many boundary lines. Survey pins were found in most corners and the lines have been blazed and painted. In some areas the neighbors have placed access restriction signs along the lines.

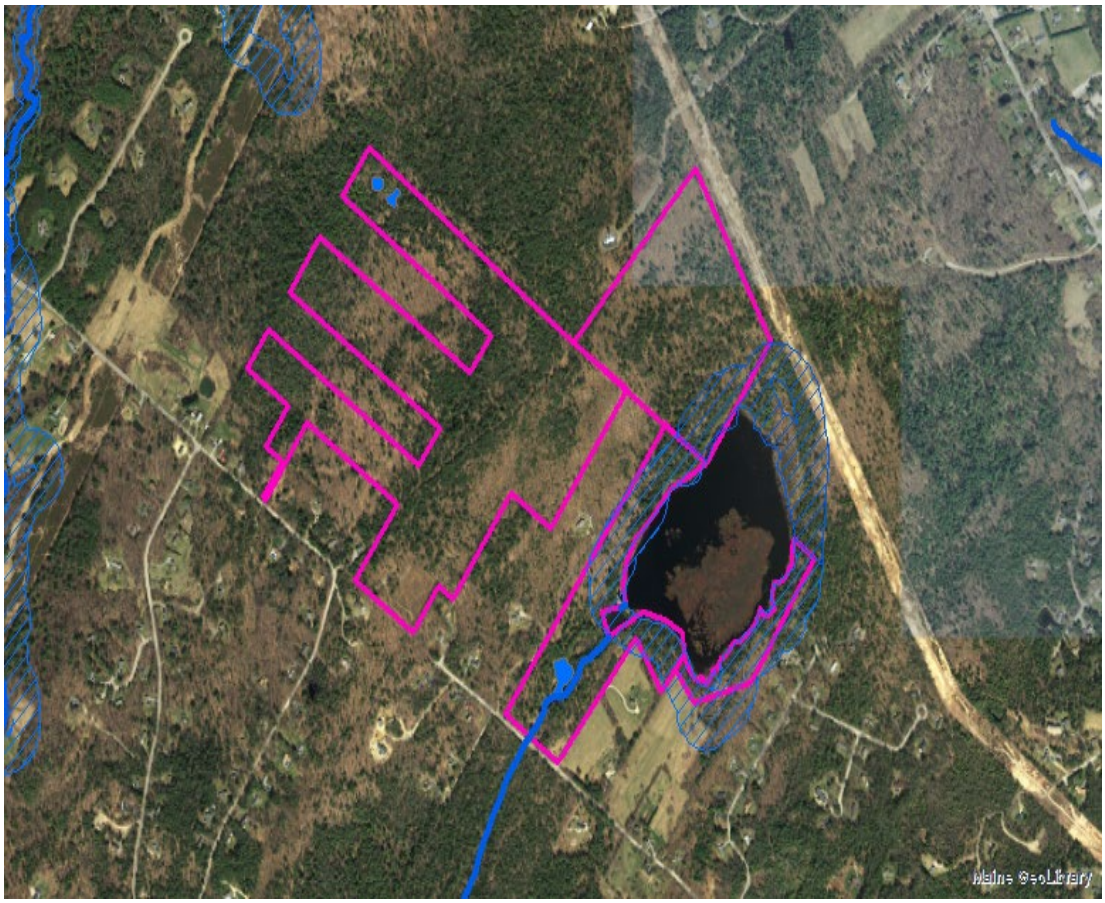
Although property lines are somewhat intact, it is advised that boundary lines be blazed, painted and maintained at 10-year intervals where applicable. Blazing and painting greatly reduces the likelihood of future expensive survey costs. Existing corner pins should be noted and highlighted with paint.

Terrain/Hydrology

The property offers a great deal of diversity in terrain and waterbodies. Beginning in the highest elevation of the lot at approximately 451’ in elevation on Blueberry Hill, the terrain slopes east gently towards Knights Pond and Mill Brook. The area east of the pond is relatively flat and rocky. To the north the terrain runs along a gentle ridge to the summit of Bruce Hill at 447’ in elevation. From the summits the property slopes west as well towards Porcupine Stream and Ponds and the location of the Boy Scout Cabins. In the higher elevation flat, we find at least one potential vernal pool that should have a 100' no-cut buffer during future timber harvesting and recreation trail construction. In the Amphibian life zone 100-400’ the desired management outcome should be to provide suitable upland habitat for pool-breeding amphibian populations by maintaining a partially closed canopy that offers shade, deep litter and woody debris. In all of these areas disturbance to the forest floor should be minimized.

Porcupine Stream and Mill Brook are located on the property as well, though are not regulate under Maine Forest Service Statewide Standards for Timber Harvesting. The only regulated water-body is Knights Pond itself. Maine Forest Service Statewide Standards for timber harvesting regulate harvesting activities adjacent to Knights Pond (see map below). It is recommended that a licensed forester mark timber for removal in these areas.

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.

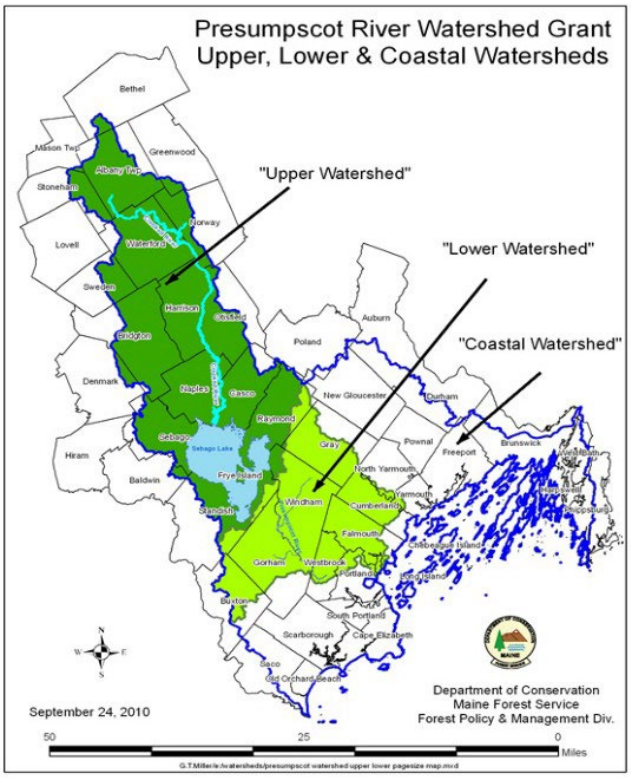


.

Watershed – Name/Positions

In taking a state wide watershed view, this parcel is located within the Presumpscot River Watershed. More specifically Knights Pond Preserve 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 towns of Cumberland and North Yarmouth 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 below soils information and attached Soils Map. Soils map and data extracted from the Natural Resource Conservation Service Web Soil Survey. The major classification is Lyman-Tunbridge complex, 8 to 15% slope, very 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. In general, the forest's ability to grow high quality and healthy trees is above average in most areas.

Soil Series	White Pine	Red Maple	Red Oak
BuB	-	-	-
DeA and DeB	-	-	-
HIB	61	-	49

HrC	56	-	53
HsC, HsE	56	-	53
PbB, PbC, PbD	66	-	53
PfB, PfD	66, 67	-	-
RbA	67	56	-
RgA	67	56	-
Sn	-	-	-
Sp	-	-	-
WsB	67	-	70

Factors Affecting Forest Management

Soil Series	Erosion Hazard	Soil Rutting Hazard	Windthrow Hazard
BuB	Moderate	Severe	Moderate
DeA and DeB	Slight to Moderate	Severe	Moderate
HIB	Moderate	Moderate	Slight
HrC	Severe	Moderate	Severe
HsC, HsE	Severe	Moderate	Severe
PbB, PbC, PbD	Moderate to Severe	Moderate	Moderate
PfB, PfD	Moderate to Severe	Moderate	Moderate
RbA	Slight	Severe	Moderate
RgA	Slight	Severe	Severe
Sn	Slight	Severe	Moderate
Sp	Slight	Severe	Severe
WsB	Moderate	Moderate	Moderate

Lamoine silt loams, 3 to 8 percent slopes (BuB) (+/- 3 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.

Deerfield loamy fine sand, 0 to 8 percent slopes, (DeA, DeB) (+/- 1 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 8 percent slopes, (LWD) (+/- 10 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. Cleared areas are used for hay, pasture, and silage corn. In the southern Connecticut River Valley, Hinckley soils are used for growing tobacco and truck crops and in eastern Massachusetts, truck crops. 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, 8 to 15 percent slopes, rocky (HrC) (+/-116 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.

Lyman-Abram complex, 8 to 35 percent slopes, very rocky (HsC, HsE) (+/-7 acres): The Lyman series consists of shallow, somewhat excessively drained soils on glaciated uplands. The Abram series consists of very shallow, excessively drained soils formed in a thin mantle of glacial till on ridges and mountains. Permeability is moderately rapid. Most areas are wooded. Common tree species include eastern white pine, jack pine, red spruce, white spruce, balsam fir, paper birch, gray birch, eastern hemlock, red oak, and eastern hophornbeam. Vegetation also includes shrubs, ferns, sedges, mosses, and lichens.

Paxton Fine Sandy Loams, 3 to 25 percent slopes (PbB, PbC, PbD) (+/- 5 acres): The Paxton series consists of well drained loamy soils formed in lodgment till. The soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level to steep soils on hills, drumlins, till plains, and ground moraines. Slope ranges from 0 to 45 percent. Many areas are cleared and used for cultivated crops, hay, or pasture. Scattered areas are used for community development. Some areas are wooded. Common trees are red, white, and black oak, hickory, sugar maple, red maple, gray and black birch, eastern white pine, and eastern hemlock.

Paxton Very Stony Fine Sandy Loams, 3 to 25 percent slopes (PfB, PfD) (+/- 25 acres): This soil is similar to the one described as representative of the series above, except that it has a thin surface mat of organic matter, a thinner surface layer, and a thicker subsoil. Many stones, as much as 2 feet in diameter, are on the surface of this soil, but the are somewhat less numerous with depth.

Ridgebury Fine Sandy Loam and Very Stony Fine Sandy Loam (RbA, RgA) (+/-3 acres): The Ridgebury series consists of very deep, somewhat poorly and poorly drained soils formed in lodgment till derived mainly from granite, gneiss and/or schist. They are commonly shallow to a densic contact. They are nearly level to gently sloping soils in depressions in uplands. They also occur in drainageways in uplands, in toe slope positions of hills, drumlins, and ground moraines, and in till plains. Slope ranges from 0 to 15 percent. Largely forested to gray birch, yellow birch, red maple, hemlock, elm, spruce and balsam fir. Cleared areas are used mainly for hay and pasture.

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.

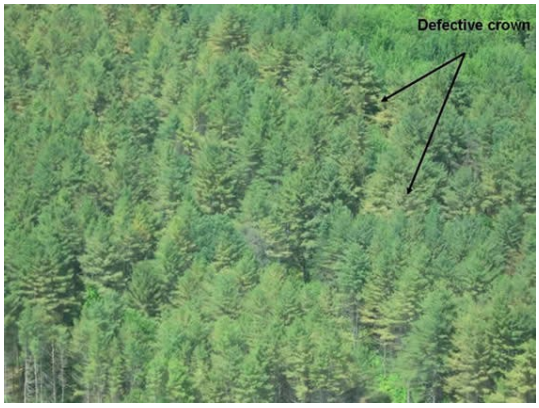
Sebago Mucky Peat (Sp) (+/- 3 acres): The Sebago series consists of very deep, very poorly drained soils formed in herbaceous and woody organic deposits more than 51 inches thick. They are in bogs and swamps. Slope is less than 2 percent. Permeability is moderately rapid. These soils are covered by vegetation primarily consisting of shrubs, cattails, and sedges, with scattered clumps of trees. The shrubs include leatherleaf, Labrador tea, highbush blueberry, bog cranberry, huckleberry, and sheep laurel. Common tree species include black spruce, balsam fir, tamarack, and red maple.

Woodbridge Very Stony Fine Sandy Loam, 0 to 8 percent slopes (WsB) (+/- 8 acres): The Woodbridge series consists of moderately well drained loamy soils formed in lodgment till. They are very deep to bedrock and moderately deep to a densic contact. They are nearly level to moderately steep soils on hills, drumlins, till plains, and ground moraines. Many areas are cleared and used for cultivated crops, hay, or pasture. Scattered areas are used for community development. Some areas are wooded. Common trees are red, white, and black oak, hickory, white ash, sugar maple, red maple, eastern hemlock, and eastern white pine.

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.

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.



(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 nectria 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 4% 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 (2% 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 21% of the lots basal area. Hemlock Adelgid continues to spread and managers should be diligent about current techniques to reduce the impact on hemlock in southern Maine.

During the field work, no invasive plants were witnessed on the lot. However, it is important to recognize that certain species are more likely to be found. The most likely species that could be found on this parcel would be honeysuckle, wild rose, bittersweet and barberry. If any invasive species are found a plan should be developed to guide the decision process around eliminating and reducing the likelihood of spread throughout the lot. No timber harvesting should occur until invasive species issues are resolved.

Access

Access to the Knights Pond portion of the property is sufficient from Greely Road Ext. on an existing access road that originates at the parking area. However, access to western portions of the preserve for logging purposes will need to be researched. Given the slope and the current erosion issues, access from the end of Greely Road Ext for logging is un-likely without a major and costly construction project.

Another option may be to examine access from the north. Would the FAA allow access for a logging operation from their land through their private access road in North Yarmouth? Perhaps a neighbor who had recent timber harvests would allow access? Based on discussions with the forestry committee any harvest operations will likely involve small equipment and trucks. Regardless of the access point, a log landing and truck turn around will need to be created. Once created, the landing should be maintained as a log landing for infrequent use in future operations. The opening for the landing should only be as big a necessary for a cable skidder and tri-axle log truck to turn around.

I did witness erosion problems on both current access points. Future meetings will be held to put together a plan for stabilizing these areas, especially at the end for Greely Road Ext. Because of the soils' vulnerability to ruts and erosion, all applicable local and state laws should be observed during future timber harvest operations. Future timber harvests should occur only when conditions are ideal, such as a very dry summer or the frozen conditions of winter. Future harvesting should utilize temporary bridges (steel and wooden panels) for any necessary stream crossings.

Interaction with Surrounding Properties

As the largest undeveloped property in Cumberland, Knights Pond sits less than 12 miles from downtown Portland and less than one mile from the centers of Cumberland and North Yarmouth. When the property is combined with the land owned by Royal River Conservation Trust, it almost entirely surrounds the 46-acre Knights Pond. The property sits between Greely Road Extension in Cumberland and Route 115 in North Yarmouth. Between the towns of Cumberland, North Yarmouth, Royal River Conservation Trust and an FAA Easement, the block encompasses roughly 350+/- acres of undeveloped forest.

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 Royal River Conservation Trust, there are several substantive steps that would be necessary before a timber harvest, especially the forestry provisions of the deeded covenants. These deeded covenants are related to the Land for Maine's Future project agreement and various conservation easements. The FAA parcel also has deeded limitations and conservation easement language that may regulate their ability to allow access for forest management activities. Before future harvests the language should be reviewed by the town attorney.

-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. An Forest Operation Notification (FON) must be submitted to the MFS prior to starting a timber harvesting operation. This must be filed on-line now and no paper copies will be accepted. 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.

-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. 65 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 Knights Pond Forest. The full report is attached in the index of this plan. Below is a summary of the findings:

-The property is associated with a moderate value Inland Waterfowl and Wading Bird Habitat (IWWH) at Knight's Pond. MDIFW recommends maintaining a 250-foot undisturbed (of permanent clearings, roads, etc.) buffer around the wetland. Within this buffer, any harvest activity should closely adhere to BMPs for water quality and wetland protection (e.g., harvest on frozen or dry soils only) and uneven-aged forest management should be used. Volume removal should not exceed 30% in a 15-year period, and a well-distributed overstory should be maintained. No trees should be cut within 75 feet of the shore. Throughout the 250-foot IWWH buffer MDIFW recommends that special consideration be given to implementing a plan to leave snags and live trees with cavities that will benefit cavity nesting waterfowl and many other wildlife species. The Forestry Subcommittee has decided the no harvest zone will be extended to 100' and out to 250' the canopy closure will be maintained at 60-70% with intermediate and older stands.

-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. The Forestry Subcommittee has no plans to create early-successional habitat at this time.

-The property includes two areas of Oak – Hickory Forest. This forest type is rare in Maine and provides important habitat for a wide variety of plants and animals. The more southerly area of this forest is very young and was previously harvested; there is abundant hickory development in the understory here. The more northerly area is regenerating from previous agricultural use and is dominated by red oak with a strong but variable component of shagbark hickory. MNAP recommends avoiding harvest in these areas and letting them mature. We recommend that any harvesting within the immediate vicinity of these areas (200 feet) be limited to selective harvest of no more than 30% of the canopy cover.

-Good management of these habitats is consistent with good forestry, and MDIFW's regional wildlife and fisheries biologists and MNAP ecologists 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 Knights Pond Preserve 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, the quadratic mean diameter of the trees is 8.4" dbh. Estimated mortality per year is roughly 20-30 cords over the entire preserve. During future management activities managers should identify and reserve 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.

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.

The property itself offers softwood cover, oak hickory forests, forested wetlands, potential vernal pools, forest edge along the powerline corridor and a 46-acre pond. All of these features will be preserved in any future harvesting activity.

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. However, they feel that within 50 yards of Knights Pond may be archaeologically sensitive. However, I believe that this may be limited based on the actual age of Knights Pond. 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. I am not aware of any buildings on Knights Pond Preserve other than the old Boy Scout Cabins.

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. The Cumberland Trails Committee is currently working on a trail relocation project to move the trail away from the pond. 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 Knights Pond Preserve 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 roads.

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 Knights Pond Preserve. 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.

-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:

Knights Pond Carbon Growth Estimations and Annual Sequestration:

-The Forestry Ecology Network estimates that a 65-year-old forest in Maine absorbs 1.6 metric tons of carbon per acre per year. Knights Pond is estimated to be absorbing around 1.0 Metric tons per year. The lower rate is likely due to an older average age and higher component of red oak.

- -Inventory data calculated in Tall Timber was exported directly to FVS to calculate the average annual growth. Current Gross Growth was calculated using site index numbers from the USDA Soil Survey for the parcel. Based on the forester's professional judgement, the site index numbers were slightly low. In discussions with Todd Caldwell, the site index numbers were adjusted upward slightly.

- Current estimated growth rates are 1.08 cords/ac/year gross and 0.98 cords/ac/year net.

- FVS was used to grow the timber forward for 40 years. No harvesting treatments were implemented. Estimates for 2061 gross growth was 0.99 cords/ac/year and 0.39 cords/ac/year net. Mortality had increased over the period from 0.10/cords/ac/year currently to 0.60 cords/ac/year in 2061.

- Based on that information an average growth rate for the next 30-year period was calculated at 0.90 cords/ac/year net.

- Estimate of growth for the parcel as a whole is 181 cords/year for bole growth.

- Estimate of 199 tons C/yr for the parcel.

- Estimate of 181 metric tons of carbon/year for parcel.

- Estimate of 664 metric tons of CO2 equivalents per year.

*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. The town of Cumberland may use a portion of the forestland land as a carbon reserve.

-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.

Long Range Silvicultural Objectives

In order to meet Knights Pond Preserve's 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.

The oak-hickory area should be researched and guidance developed for the best techniques to maintain this unique stand. I have concerns that over time the red oak will crowd the hickory from the stand.

Management will guide the forest towards late successional conditions. In order to sustain this condition in areas of the lot, it is recommended that the multiple riparian corridors be preserved to demonstrate late successional forest in its natural state. I recommend buffers on the wetlands, potential vernal pools and streams be established and managed for the preservation of late successional forest conditions. The Forestry Committee is already maintaining a 100' no harvest riparian preserves around Knights Pond and a 250' riparian management zone. Prior to any future timber harvesting activity, a harvest plan should be developed and address riparian corridor buffers and the management techniques that will be associated with each.

Growth Estimates

Growth estimates were calculated using the FVS Northeast Variant model. Current estimates are a gross growth of 1.08 cords per acre per year with a mortality rate of 0.10 cords per acre per year. Therefore, net growth rates of 0.98 cords per acre per year would provide a target estimate of approximately 200 cords of growth annually at Knights Pond Preserve. Over the next ten-year planning period the recommendations in this plan call for the potential removal of 400 – 500 cords of low-quality wood. The growth over that same period is estimated at 2000 cords. Growth will far out-pace harvest volume recommendations prepared in this plan.

Individual Stand Descriptions and Prescriptions

For stand description purposes, data was grouped into eight different forest segments (stands). Stand descriptions were not prepared for non-wooded areas. Descriptions include basic forestry information including stocking guides. Stocking guides are used in the growth of timber. For the purpose of this management plan, stocking charts are being used as a snapshot of the current structure of the forest and not a guide for forest management. As stated earlier in the plan, prior to any timber harvesting a more specific harvest plan should be created.

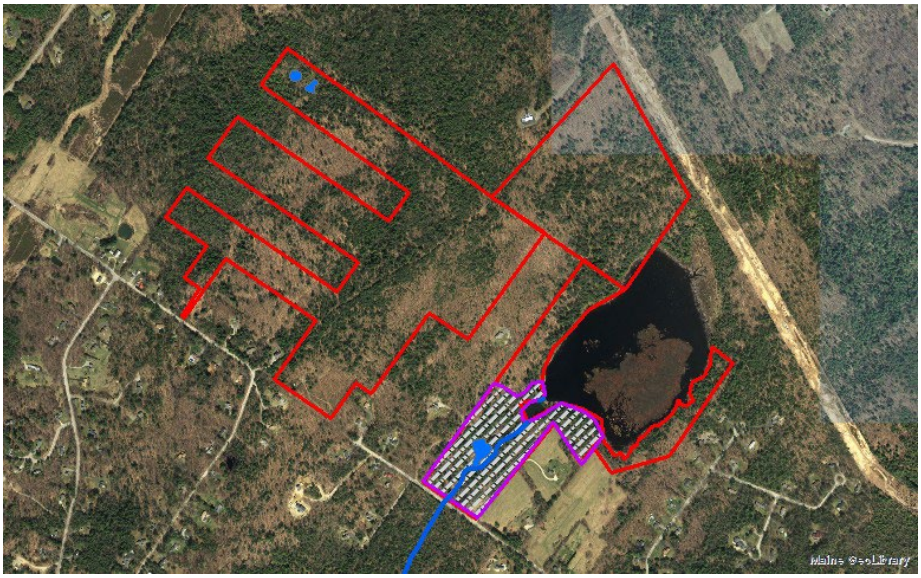
In the event of a natural disaster such as another ice storm, an insect or disease infestation, modified landowner objectives, poor weather or timber market conditions, recommendations made below can be altered with little effect on the long-term sustainable management of this parcel. It is important 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:

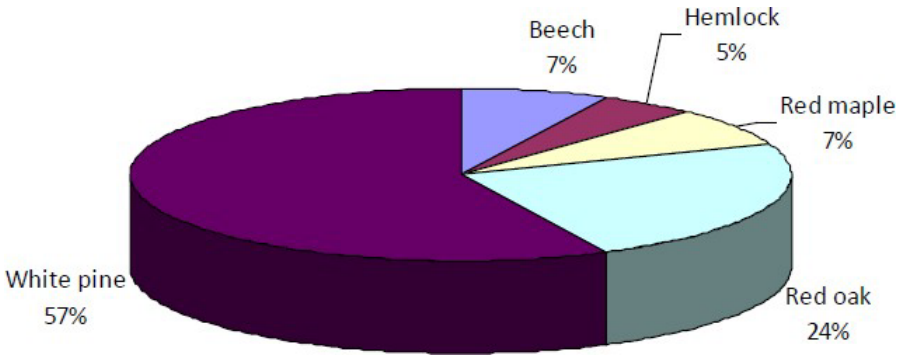
Forest Typing Key							
H- Hardwood Type						Treesize	
S- Softwood Type					1	0 - 6' height	
SH - Mixed - Softwood D		>50%			2	1" - 3" diameter	
HS- Mixed - Hardwood D		> 50%			3	3" - 8" diameter	
CS- Cedar Type					4	8"- 12" diameter	
					5	12"+ diameter	
A- Very Dense (overstocked)							
B- Medium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

Stand	Forest Type	Acres
KP1	SH4A	20
KP2	H4A	21
KP3	HS4A	37
KP4	H4A	16
KP5	H4A	27
KP6	HS4B	42
KP7	HS3A	17
KP8	HS4B	21

Stand: KP1
20 acres
Overstory: SH4A



Dominant Species

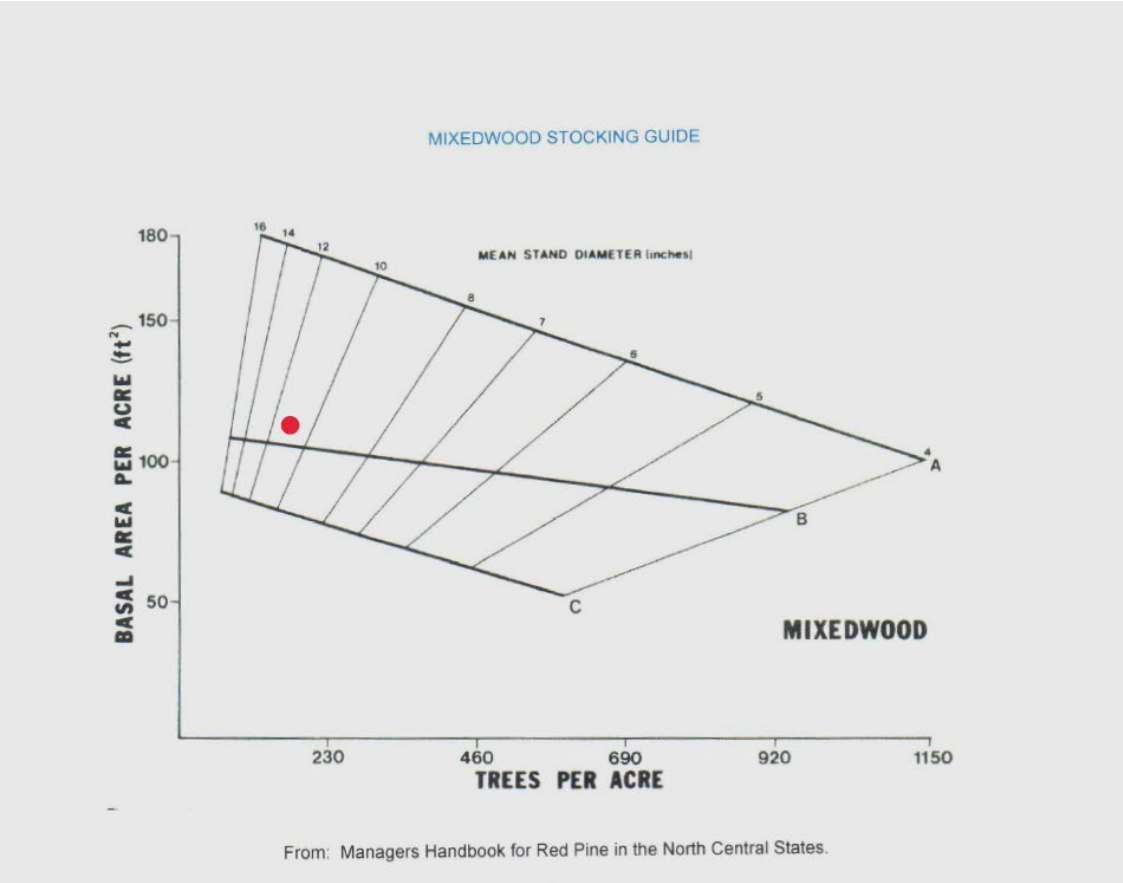


Basal Area

Stand 1 is located between the dam area of Knights Pond and Greely Road Ext. in the southern portion of the lot. The terrain is rolling with some short steep slopes and Mill Brook traversing the length of the entire stand. Stand one

contains significant frontage on Knights Pond and includes walking trails. Evidence of past harvesting exists in most of the stand. Cable skidders harvested marked timber at some point approximately 20+/- years ago. Multiple old stream crossings were witnessed while traversing the stand. The stand is considered uneven-aged. Current stocking levels would be considered "well stocked". The quadratic mean stand diameter is 10.2" DBH, basal area is 105 sq. ft./acre and contains 26.5 cords/acre of volume (15.4 of the 26.5 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent.

Stand 1 contains a 250' Maine Forest Service Statewide Standards buffer zone. 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.



From: Managers Handbook for Red Pine in the North Central States.

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 objective is to have a 100' no cut buffer along the shore of Knights Pond. This area will have no active forest management activities. Based on the current stand diameter and basal area, the stand would be considered adequately stocked for optimum growth of high-quality timber. Prior harvests focused growing space on the dominant, high-quality stems. Allowing them to continue to grow should be the priority at this point. In 2031 the stand should be re-examined and recommendations updated.

Total Volume Estimates by Type or Stand

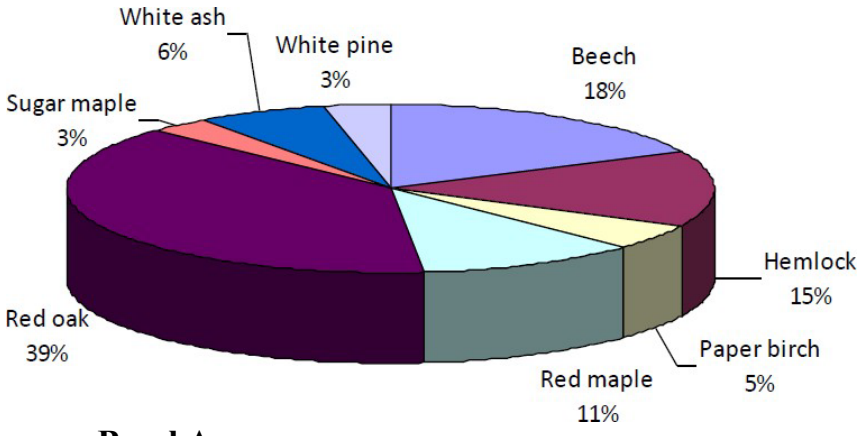
KP1	
Prism BAF or Plot Size =	15
Acres =	20
# of Plots =	6
Acres Per Plot =	3.3

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	2,422	0	0	0	17	22
White pine	0	99,022	0	0	0	166	347
Softwood	**0**	**101,444**	**0**	**0**	**0**	**183**	**368**
Beech	0	0	0	0	0	12	12
Red maple	0	0	0	0	0	34	34
Red oak	0	18,927	0	0	0	78	116
Hardwood	**0**	**18,927**	**0**	**0**	**0**	**124**	**162**
Totals	**0**	**120,370**	**0**	**0**	**0**	**307**	**530**

Stand: KP2
16 acres
Overstory: H4A

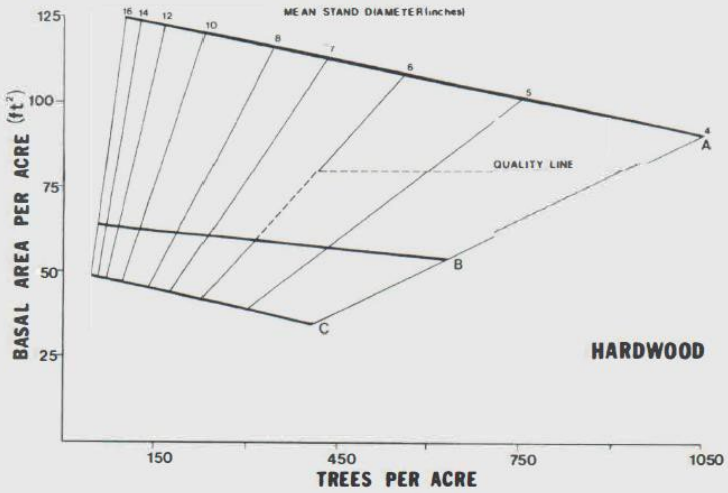
Dominant Species



Basal Area

Stand 2 is located along the eastern edge of the preserve. The stand encompasses the entire eastern shoreline of Knights Pond. It lies north of the town line in North Yarmouth and south in Cumberland. The stand is comprised of the former Paynter Parcel and the current parcel owned by Royal River Conservation Trust. The stone walls throughout the stand indicate most of the stand was agricultural land. Most recent harvesting activities removed some of the more valuable white pine timber from the parcel. Current stocking levels are considered over-stocked (above the A line). The mean stand diameter is 9.4" DBH, basal area is 186 sq. ft./acre and contains 47.4 cords/acre of volume (32 of the 47.4 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to good.

Stand 2 contains a 250' Maine Forest Service Statewide Standards buffer zone. 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.



From: A Silvicultural Guide for Northern Hardwoods in the Northeast.
33

Recommendations:

Based on the current objectives of the Forestry Committee, no harvesting shall occur within 100' of Knights Pond. This results in no harvesting on the southern portion of this stand which lies in the town of Cumberland. The Royal River Conservation Trust (North Yarmouth) piece is well to overstocked and was accessed from the north (powerlines) when harvesting last occurred. With the 100' no cut buffer to the south along the pond, it is likely access would be needed from the north for harvesting. It appears from discussions and research that Royal River Conservation Trust does not engage in forest management activities. Therefore, no recommendations will be made for their portion of this stand. It is highly unlikely any timber harvesting will occur in Stand 2.

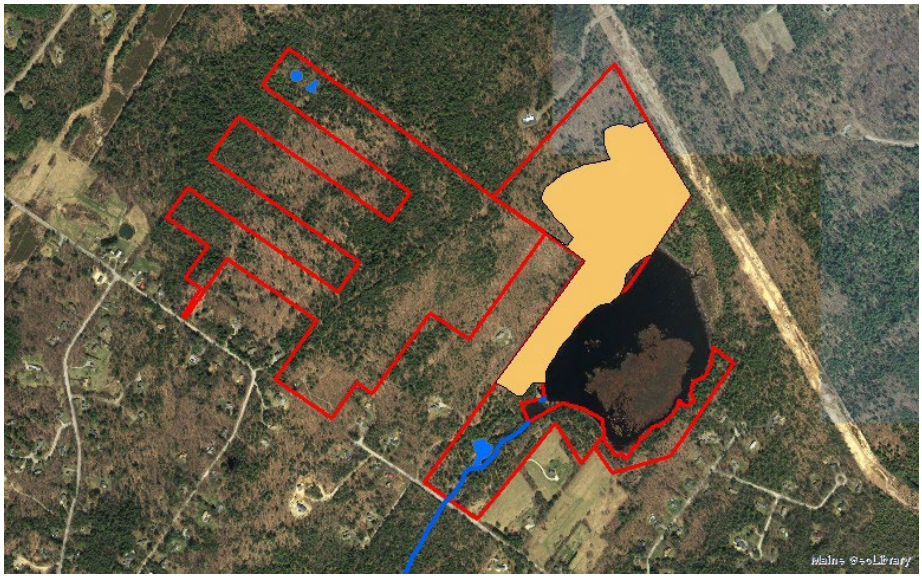
Total Volume Estimates by Type or Stand

KP2	
Prism BAF or Plot Size =	15
Acres =	21
# of Plots =	5
Acres Per Plot =	4.2

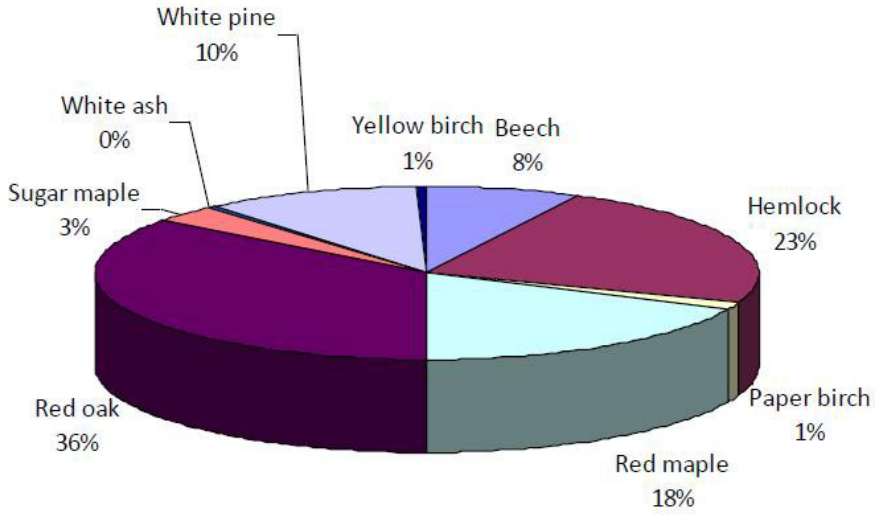
International 1/4" log rule.
Smalian's equation.
85 Net Cubic Feet Per Merch. Cord.

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	39,143	0	0	0	81	157
White pine	0	0	0	0	0	10	10
Softwood	**0**	**39,143**	**0**	**0**	**0**	**91**	**167**
Beech	0	20,319	0	0	0	125	162
Paper birch	0	0	0	0	0	58	58
Red maple	0	0	0	0	0	91	91
Red oak	0	95,709	0	0	0	227	418
Sugar maple	0	0	0	0	0	32	32
White ash	0	10,812	0	0	0	48	68
Hardwood	**0**	**126,839**	**0**	**0**	**0**	**580**	**829**
Totals	**0**	**165,982**	**0**	**0**	**0**	**671**	**995**

Stand: KP3
37 acres
Overstory: HS4A



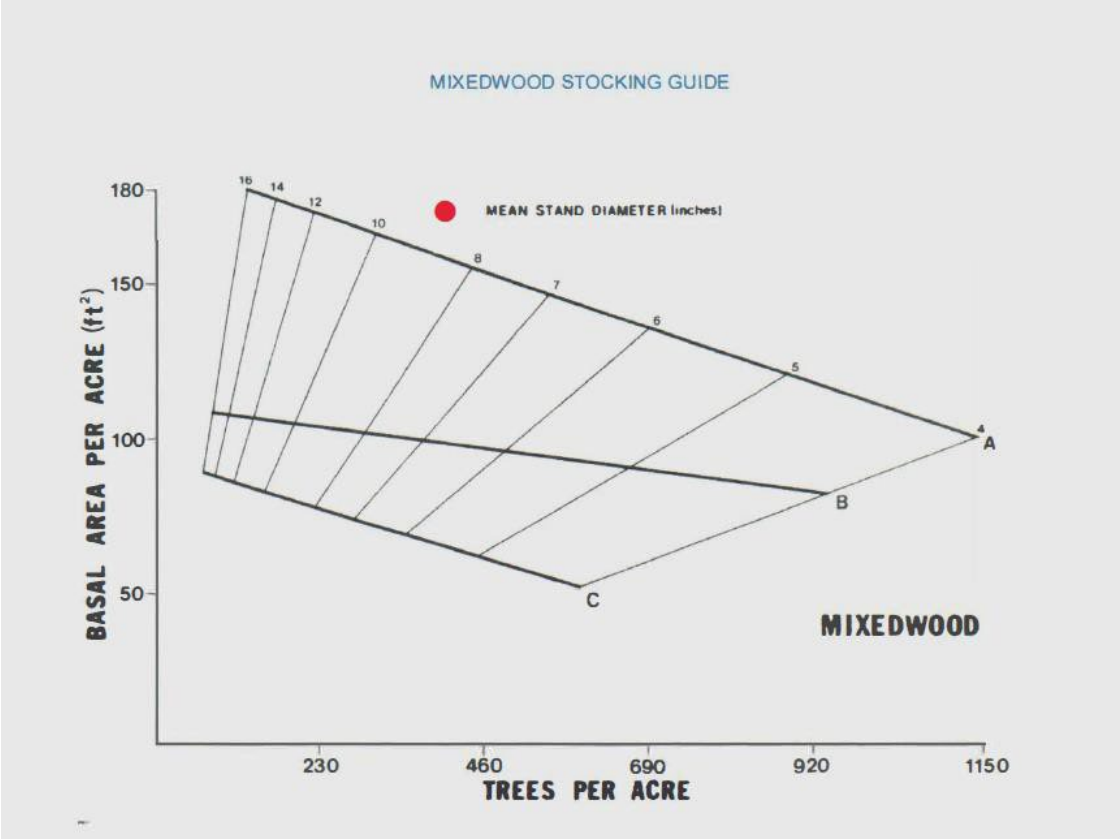
Dominant Species



Basal Area

Stand 3 encompasses the entire western shore of Knights Pond. The Stand carries north across the town line into North Yarmouth. Approximately 2/3rds of North Yarmouth's ownership would fall within this stand. The stand is dominated by red oak and hemlock. Some spotty regeneration was witnessed, though was mostly low-quality beech and suppressed with pine. The stand is considered un-even aged. Current stocking levels are considered over-stocked (above the A line). The mean stand diameter is 8.5" DBH, basal area is 171.6 sq. ft./acre and contains 40.2 cords/acre of volume (28 of the 40.2 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to excellent.

Stand 3 contains a 250' Maine Forest Service Statewide Standards buffer zone. 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.



Recommendations:

Again a 100' no harvest buffer should be maintained along the shore of Knights Pond. In areas north of the pond timber harvesting could greatly benefit the overall quality and health of the timber. Reducing stocking levels between the A and B lines would 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 stand 3. 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. Given the current pulp and sawtimber volumes, a harvest that removes mostly low-quality pulp stems from roughly 20 acres would yield approximately 200 – 250 cords of timber removed, worth $5,000 - $7,500 depending on market conditions. Residual volumes on the harvested acres would remain at 600 plus cords.

The challenge to harvesting will be access. Access will need to be established from Greely Road Ext. or from North Yarmouth. Again, if access from the FAA parcel could be achieved it would provide valuable access with the least impact. Harvesting equipment should be low-impact skidder/tractor or in woods processor and forwarder. However, this will also depend on access availability and skidding distance limitations of equipment.

Total Volume Estimates by Type or Stand

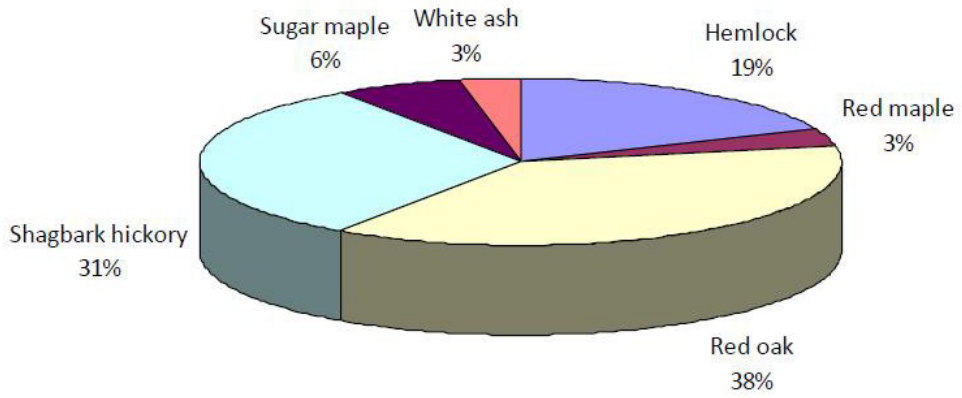
KP3	
Prism BAF or Plot Size =	15
Acres =	37
# of Plots =	16
Acres Per Plot =	2.3

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	71,319	0	0	0	208	344
White pine	0	35,716	0	0	0	91	156
Softwood	**0**	**107,035**	**0**	**0**	**0**	**299**	**500**
Beech	0	18,454	0	0	0	79	112
Paper birch	0	0	0	0	0	21	21
Red maple	0	18,306	0	0	0	229	266
Red oak	0	83,970	0	0	0	360	527
Sugar maple	0	10,534	0	0	0	29	50
White ash	0	0	0	0	0	5	5
Yellow birch	0	0	0	0	0	8	8
Hardwood	**0**	**131,265**	**0**	**0**	**0**	**731**	**990**
Totals	**0**	**238,300**	**0**	**0**	**0**	**1,030**	**1,489**

Stand: KP4
16 acres
Overstory: H4A

Dominant Species



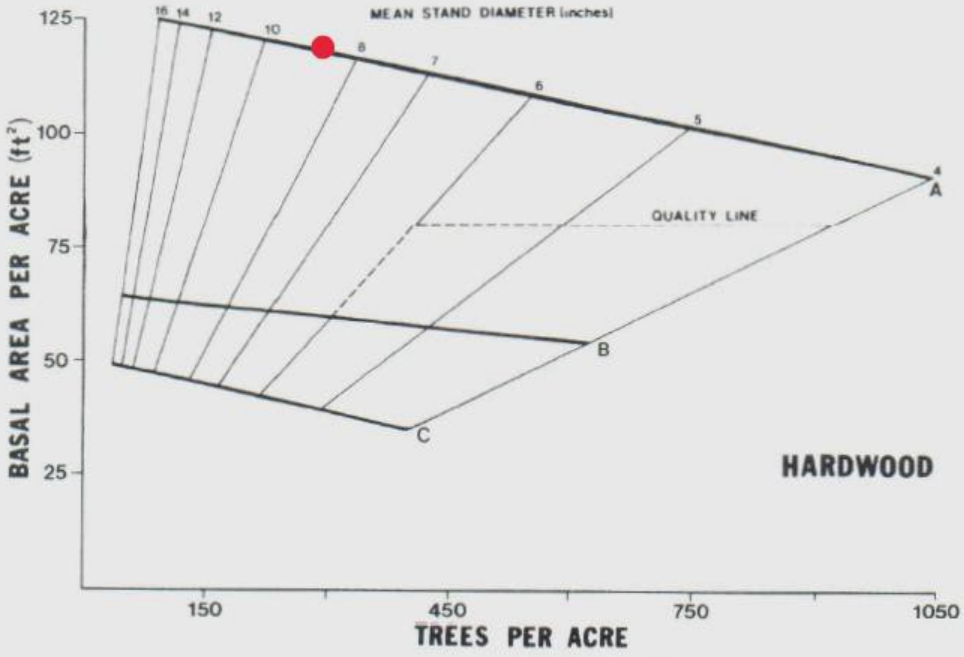
Basal Area

Stand 4 encompasses the north-west portion of the North Yarmouth Parcel. The stand slopes gently towards Knights Pond on a south east facing slope. This is a unique Red Oak – Shagbark Hickory stand, ranked S1 by Maine Natural Areas Program. S1 indicates "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". This forest type is "Apparently and Demonstrably secure globally".

Hickory requires a moderately moist seedbed for satisfactory seed germination and early establishment. Shagbark hickory sprouts prolifically. As the stumps increase in size, the number of stumps that produce sprouts decreases and the proportion of root suckers increases. Shagbark Hickory is classified as moderately tolerant and suppressed trees recover rapidly when released. It is usually considered a climax species in the timber types in which it occurs. It is extremely susceptible to fire damage.

The stand is considered single-aged. Current stocking levels are considered fully to overstocked (A line). The quadratic mean stand diameter is 8.7" DBH, basal area is 120 sq. ft./acre and contains 29.5 cords/acre of volume (24.3 of the 29.5 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent. Some sugar maple, red maple, hemlock and white ash exists amongst the oak and hickory in this stand.



From: A Silvicultural Guide for Northern Hardwoods in the Northeast.
33

Recommendations:

This stand falls within the town of North Yarmouth. I encourage the landowner to reach out to the Maine Forest Service and the University of Maine to discuss the best course of action to sustain the current stand composition. My concern is over time the red oak will continue to overtop and dominate the shagbark hickory within the stand. Red oak appears to be regenerating in areas, but not Hickory. I think this would be a great stand to conduct some research on regeneration methods for Shagbark Hickory in southern Maine. The current stocking levels allow some time to gather and discuss options for future management. Given Cumberland's Guiding Principles, I would recommend no commercial timber harvesting as this time until some research and outreach is conducted.

Total Volume Estimates by Type or Stand

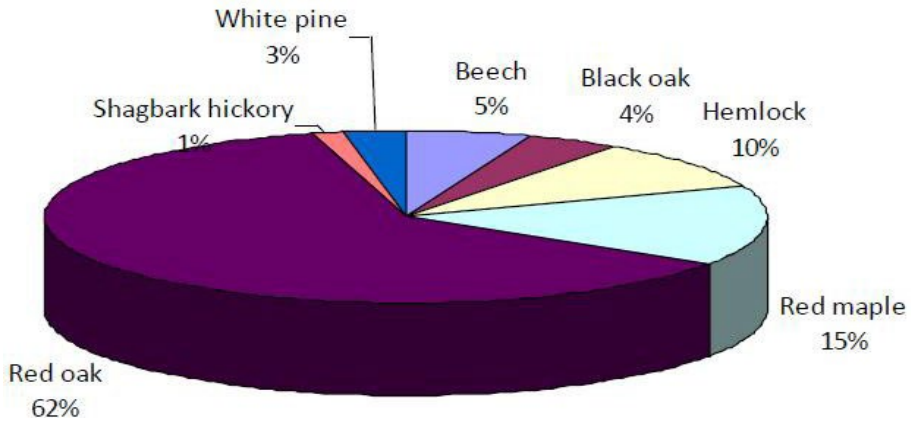
KP4	
Prism BAF or Plot Size =	15
Acres =	16
# of Plots =	4
Acres Per Plot =	4.0

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	10,293	0	0	0	72	92
Softwood	**0**	**10,293**	**0**	**0**	**0**	**72**	**92**
Red maple	0	0	0	0	0	9	9
Red oak	0	31,818	0	0	0	111	175
Shagbark hickory	0	0	0	0	0	157	157
Sugar maple	0	0	0	0	0	24	24
White ash	0	0	0	0	0	15	15
Hardwood	**0**	**31,818**	**0**	**0**	**0**	**316**	**380**
Totals	**0**	**42,111**	**0**	**0**	**0**	**389**	**472**

Stand: KP5
27 acres
Overstory: H4A

Dominant Species



Basal Area

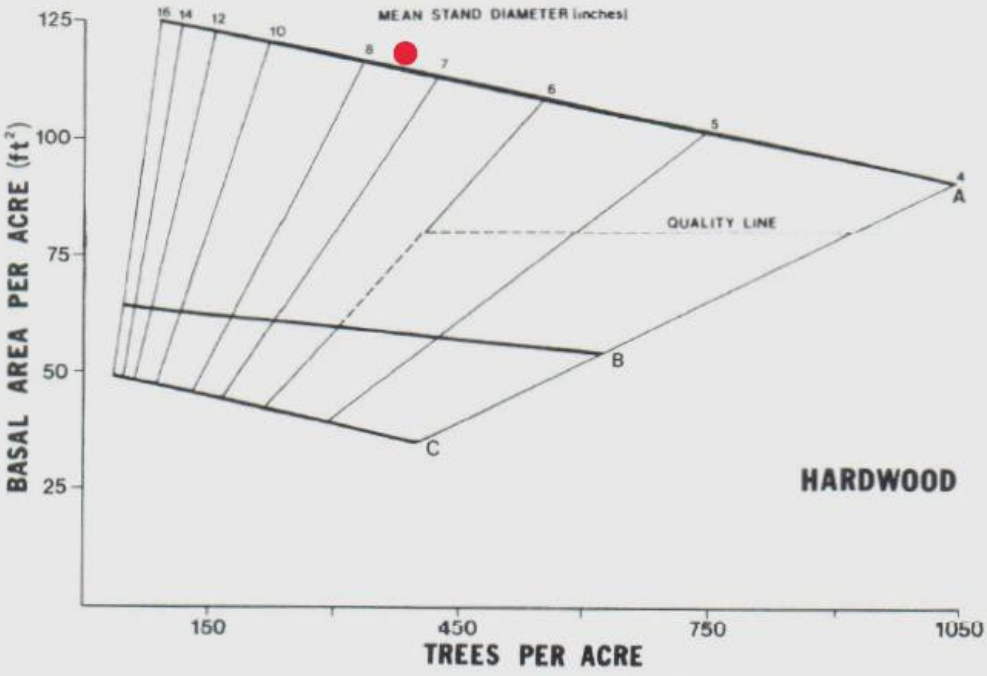
Stand 5

Stand 5 encompasses the peak of Bruce Hill and the east and south-east facing slopes of Bruce Hill. The stand slopes gently towards Knights Pond from approximately 447' in elevation at the top of Bruce Hill to approximately 300' at the edge of Knights Pond. Red oak dominates the stand, though some shagbark hickory is present here as well.

This hardwood stand would be considered a small sawlog/large pole timber stand. Stocking of sawtimber is primarily red oak. Given the average diameter of the stand, high quality sawlog volumes will continue to grow as the stand grows.

The stand has a beautiful potential vernal pool that should be reviewed. It is well hidden and not near any of the recreation trails.

The stand is considered single-aged. Current stocking levels are considered fully to overstocked (above A line). The quadratic mean stand diameter is 7.6" DBH, basal area is 121.7 sq. ft./acre and contains 25.6 cords/acre of volume (21.4 of the 25.6 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent. Some sugar maple, red maple, hemlock and white ash exists amongst the oak and hickory in this stand.



From: A Silvicultural Guide for Northern Hardwoods in the Northeast.
33

Recommendations:

Given the current average diameter, stocking levels and pulp market conditions, a commercial harvest is not warranted. However, if pulp markets change or a local low-impact harvester that could harvest firewood quality trees is found, a very low volume removal (100-125 cords) could be accomplished within the next ten years. Ultimately, pulp or firewood sized suppressed and co-dominant trees of low quality could be removed in favor of higher quality red oak, white pine, hemlock and shagbark hickory trees. The value of the removal would be low, likely $2000 - $3000 dollars in firewood or pulp sales. However, access will need to be improved to be able to conduct any harvesting in this stand.

Implementing Vernal Pool Habitat Management Guidelines (HMGs) to protect the vernal pool in future harvesting would include maintaining a relatively closed canopy between the vernal pools. Recommended HMGs for conserving vernal pools and adjacent forested habitat apply to three management zones: the depression, the protection zone and the amphibian life zone. Within the depression, no harvesting equipment should enter and slash and sediment should be kept out. In the 100' protection zone around the pool the canopy should remain relatively closed. This will provide shade, deep leaf litter and larger woody debris around the pool. In the Amphibian life zone, 100-400', the desired management outcome should be to provide some suitable upland habitat for pool-breeding amphibian populations by maintaining a partially closed canopy that offers shade, deep litter and woody debris. In all of these areas disturbance to the forest floor should be minimized.

Total Volume Estimates by Type or Stand

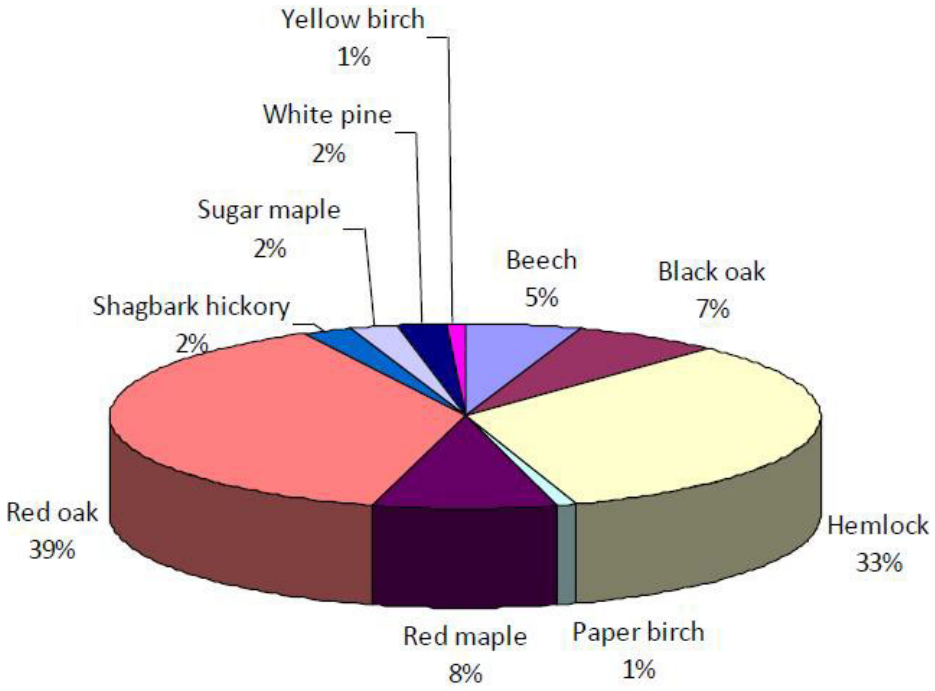
KP5	
Prism BAF or Plot Size =	15
Acres =	27
# of Plots =	9
Acres Per Plot =	3.0

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	0	0	0	0	43	43
White pine	0	0	0	0	0	18	18
Softwood	**0**	**0**	**0**	**0**	**0**	**61**	**61**
Beech	0	3,770	0	0	0	28	35
Black oak	0	6,879	0	0	0	10	23
Red maple	0	0	0	0	0	99	99
Red oak	0	48,663	0	0	0	378	473
Shagbark hickory	0	0	0	0	0	0	0
Hardwood	**0**	**59,311**	**0**	**0**	**0**	**516**	**631**
Totals	**0**	**59,311**	**0**	**0**	**0**	**577**	**692**

Stand: KP6
42 acres
Overstory: HS4B

Dominant Species

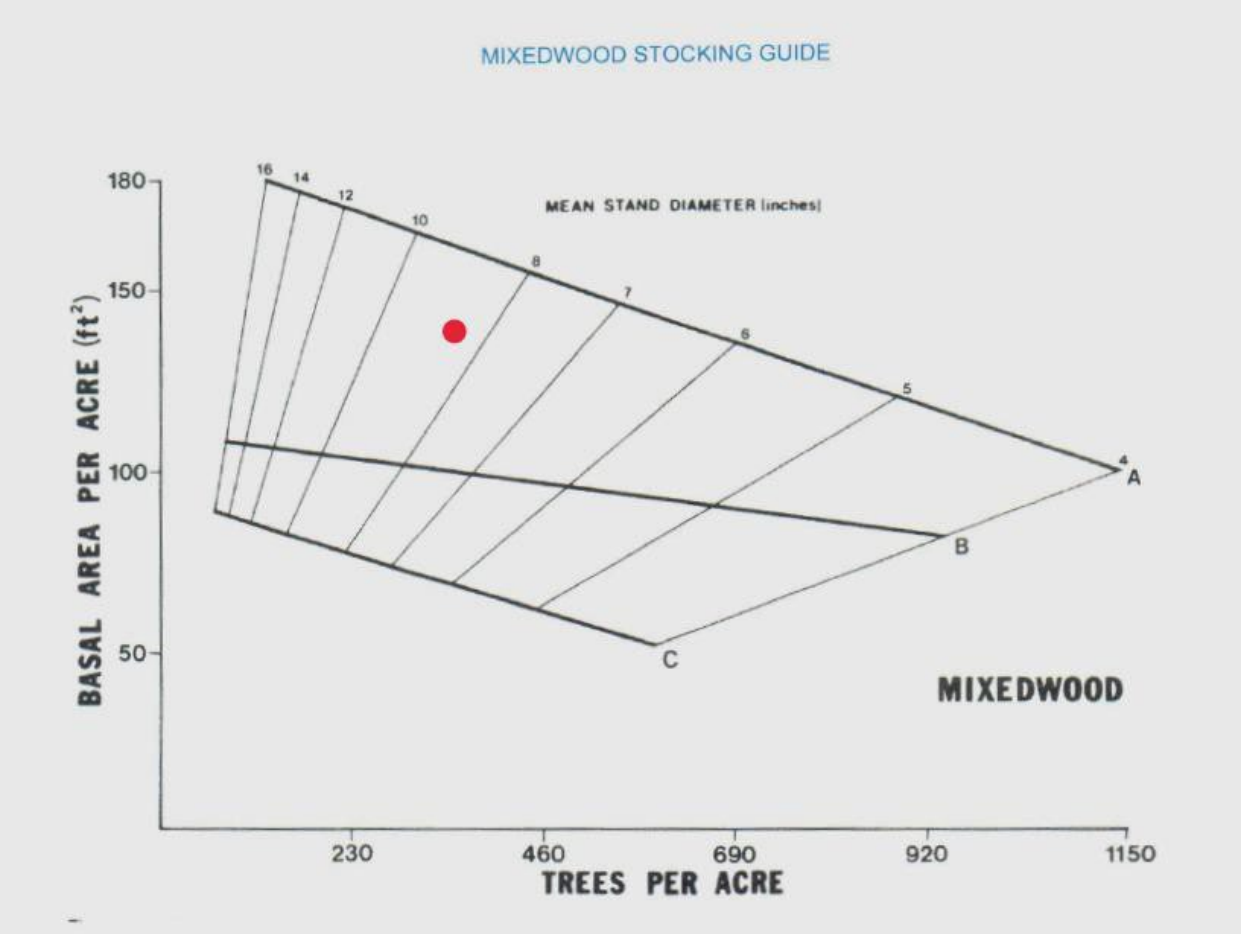


Basal area

Stand 6

Stand 6 encompasses the peaks of Blueberry Hill and Bruce Hill and has north-west and south-east facing slopes. The stand occupies the center of the preserve and is traversed by several recreation trails and the snowmobile trail. This is the largest stand and has had active management for years. Portions of this stand were marked for a timber harvest for the former owner. It appears the forester was marking low-grade trees and some high-grade sawlogs. A little shagbark hickory and sugar maple was witnessed. The majority of the stand is red oak and hemlock. Red oak and hemlock comprise 76% of all the sawtimber volume within this stand. A very small amount of early successional forest exists in this stand and was created for a view from the recreation trail. Some of the regeneration that was witnessed was Shagbark Hickory. Managers will have to decide if the view is more important than the early successional component of this stand, as it appears some have begun to re-establish the view in areas.

The stand is considered multi-aged. Current stocking levels are considered adequately stocked (between the A and B line). The quadratic mean stand diameter is 8.5" DBH, basal area is 133 sq. ft./acre and contains 32 cords/acre of volume (22 of the 32 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent.



Recommendations:

Given the current average diameter, stocking levels and pulp market conditions, a commercial harvest is not recommended. Given Cumberland's Guiding Principles, I would suggest scheduling any thinning activity in this stand after the next ten-year period. At that point the stocking should be approaching the A line or be overstocked. At that time more of the dominant trees will have emerged allowing recommendations of silvicultural activities that align with the Guiding Principle, "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.

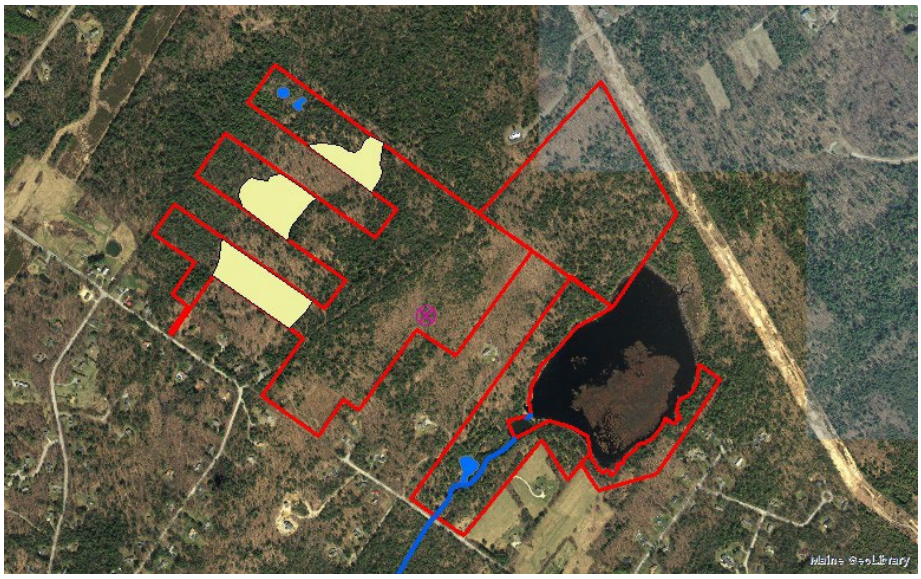
Total Volume Estimates by Type or Stand

KP6	
Prism BAF or Plot Size =	15
Acres =	42
# of Plots =	15
Acres Per Plot =	2.8

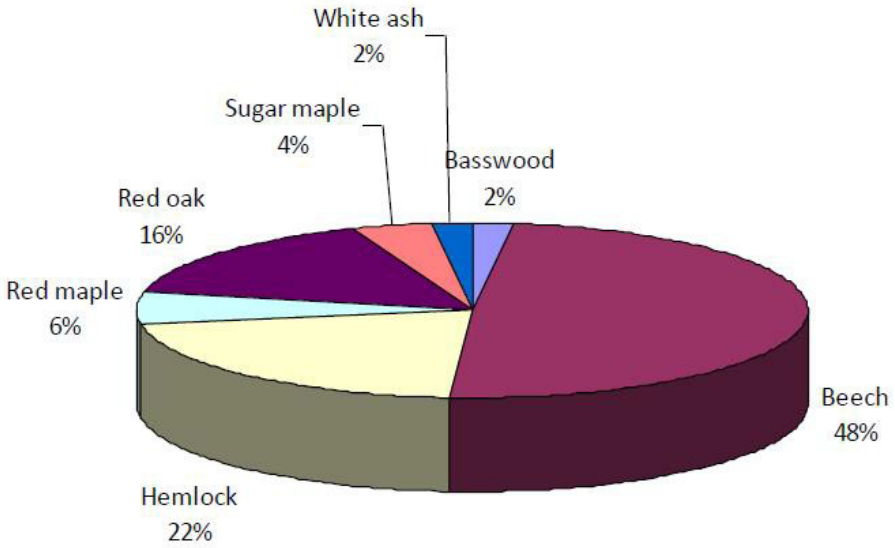
International 1/4" log rule.
Smalian's equation.
85 Net Cubic Feet Per Merch. Cord.

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	63,814	0	0	0	287	413
White pine	0	18,819	0	0	0	10	45
Softwood	**0**	**82,633**	**0**	**0**	**0**	**298**	**457**
Beech	0	11,182	0	0	0	56	76
Black oak	0	21,902	0	0	0	64	109
Paper birch	0	0	0	0	0	12	12
Red maple	0	0	0	0	0	75	75
Red oak	0	99,590	0	0	0	362	561
Shagbark hickory	0	0	0	0	0	27	27
Sugar maple	0	0	0	0	0	11	11
Yellow birch	0	0	0	0	0	6	6
Hardwood	**0**	**132,673**	**0**	**0**	**0**	**614**	**877**
Totals	**0**	**215,306**	**0**	**0**	**0**	**911**	**1,334**

Stand: KP7
17 acres
Overstory: HS3A



Dominant Species

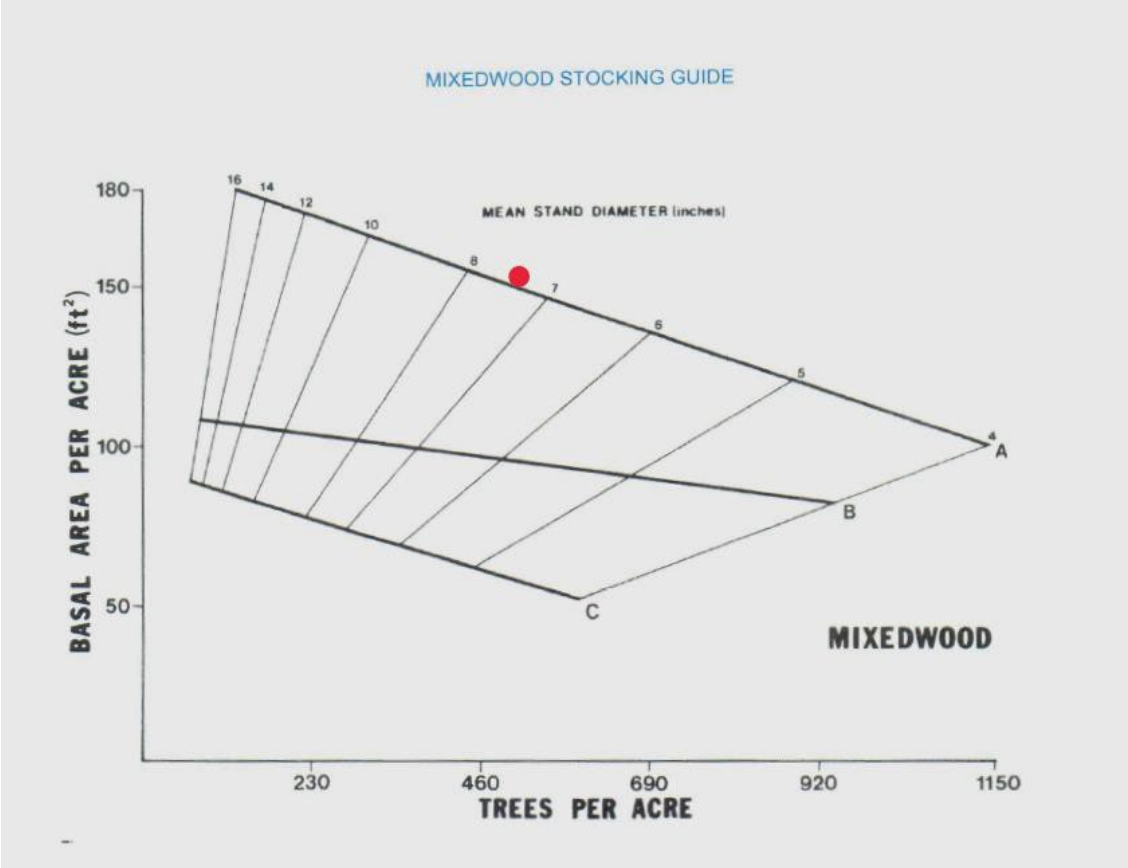


Basal Area

Stand 7

Stand 7 encompasses the western slope of the Blueberry Hill and the slopes face north-west. The stand occupies the center of each of the western fingers of the preserve. Approximately 80% of this stand is hardwood though 48% of the hardwood is American beech. This stand would be considered a large pole timber sized stand with some scattered red oak and hemlock sawtimber sized trees. What is impressive about this stand is that there is a small sugar maple component that should be favored in future management decisions. Regeneration is somewhat present, though mostly beech and small hemlock.

The stand is considered multi-aged. Current stocking levels are considered over stocked (above the A line). The quadratic mean stand diameter is 7.4" DBH, basal area is 153 sq. ft./acre and contains 36 cords/acre of volume (26 of the 36 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to excellent.



Recommendations:

Given the current average diameter, stocking levels and pulp market conditions, a light commercial harvest could occur. When walking with the Forestry Committee, this was the area we discussed a light low-impact logging operation. Most of the product would be hardwood pulp or firewood, which could be sold locally. The harvesting should utilize individual tree and small group selection to slowly reduce the component of beech while increasing red oak and sugar maple. Current crop tree red oaks and scattered hemlock should be favored for wildlife and future timber benefits. Porcupine Stream traverses the northern portion of this stand. During future operations that equipment should avoid crossing this stream. Equipment should traverse near the top of the hill near the current blue recreation trail. Porcupine stream has no buffer requirement under Maine Forest Service Statewide Standards though shoreline integrity must be maintained. It is recommended a minimum 75' limited removal buffer be placed during future harvest operations. Removals should only be those trees necessary for recreation safety and forest health reasons. The exact buffer width and removal standards should be outlined in a harvest plan prior to any harvesting.

A small cable skidder or farm tractor with winch could be utilized during the harvest. Finding small skidders and harvester with tractors is becoming more difficult, as an alternative a forwarder and processor may be utilized. However, 17 acres of harvest would likely not attract many processor operators as it is just too small of an operation. Regardless of equipment the access will need to be improved greatly before a harvest could occur.
A harvest would likely yield 100-150 cords of low-grade pulpwood or firewood. Some beech may be larger enough for the current mat market (which would increase overall revenue). Revenue would likely be around $3000 for the thinning operation. The following Guiding Principles are referenced, though all would apply:

- Manage forest stands in a manner that maintains or improves habitat and the overall biodiversity of native pant 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
- 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.
- "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.

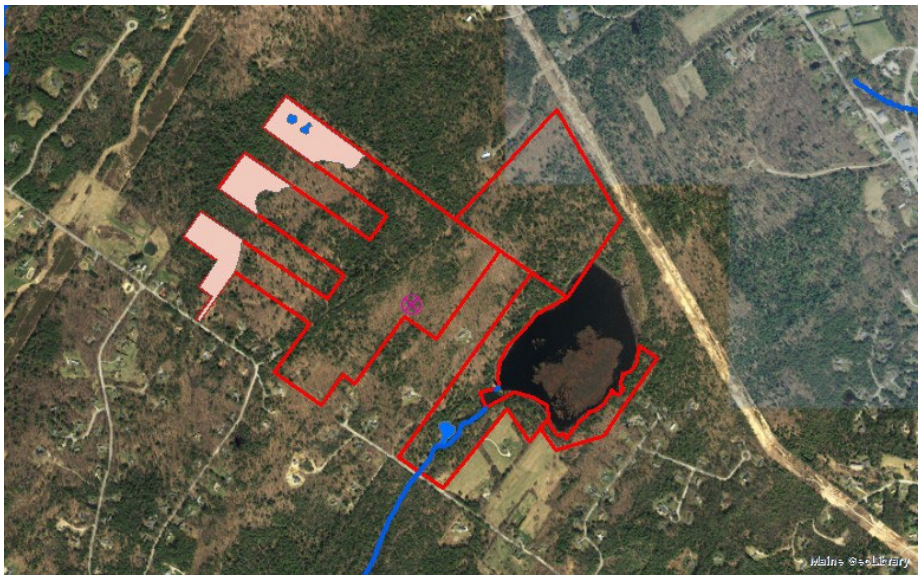
Total Volume Estimates by Type or Stand

KP7	
Prism BAF or Plot Size =	15
Acres =	17
# of Plots =	5
Acres Per Plot =	3.4

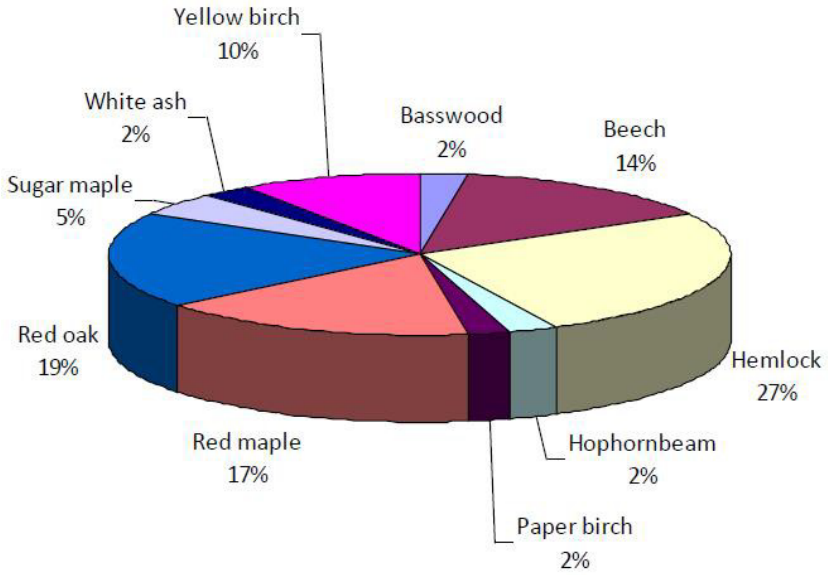
International 1/4" log rule.
Smalian's equation.
85 Net Cubic Feet Per Merch. Cord.

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	28,065	0	0	0	90	144
Softwood	**0**	**28,065**	**0**	**0**	**0**	**90**	**144**
Basswood	0	0	0	0	0	18	18
Beech	0	17,251	0	0	0	216	248
Red maple	0	0	0	0	0	35	35
Red oak	0	34,027	0	0	0	56	123
Sugar maple	0	3,861	0	0	0	19	27
White ash	0	7,783	0	0	0	4	19
Hardwood	**0**	**62,922**	**0**	**0**	**0**	**348**	**470**
Totals	**0**	**90,987**	**0**	**0**	**0**	**438**	**614**

Stand: KP8
21 acres
Overstory: HS4B



Dominant Species



Basal Area

Stand 8

Stand 8 is comprised of the north-western portion of all three western fingers of the preserve. The terrain is wetter, relatively flat and the lowest elevations of the preserve. Stand 8 contains Porcupine Stream and the Boy Scout Cabins near the small ponds. Approximately 70% of this stand is hardwood and the hardwood is a wide diversity of species. This stand would be considered a small sawtimber sized stand with some scattered red oak and hemlock sawtimber trees that contain log volume. What is impressive about this stand is the diversity of hardwood species that should be discussed in future management decisions. Regeneration is somewhat present, though mostly beech and small hemlock.

The stand is considered multi-aged. Current stocking levels are considered adequately stocked (between the A and B line). The quadratic mean stand diameter is 8.7" DBH, basal area is 126 sq. ft./acre and contains 33 cords/acre of volume (24 of the 33 cords is considered pulpwood sized). The timber quality in this stand ranges from poor to excellent.

Recommendations:

Given the current average diameter, stocking levels and pulp market conditions, a commercial harvest is not recommended. Given Cumberland's Guiding Principles, I would suggest scheduling any thinning activity in this stand after the next ten-year period. At that point the stocking should be approaching the A line or be overstocked. At that time more of the dominant trees will have emerged allowing recommendations of silvicultural activities that align with the Guiding Principles.

- 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.

Total Volume Estimates by Type or Stand

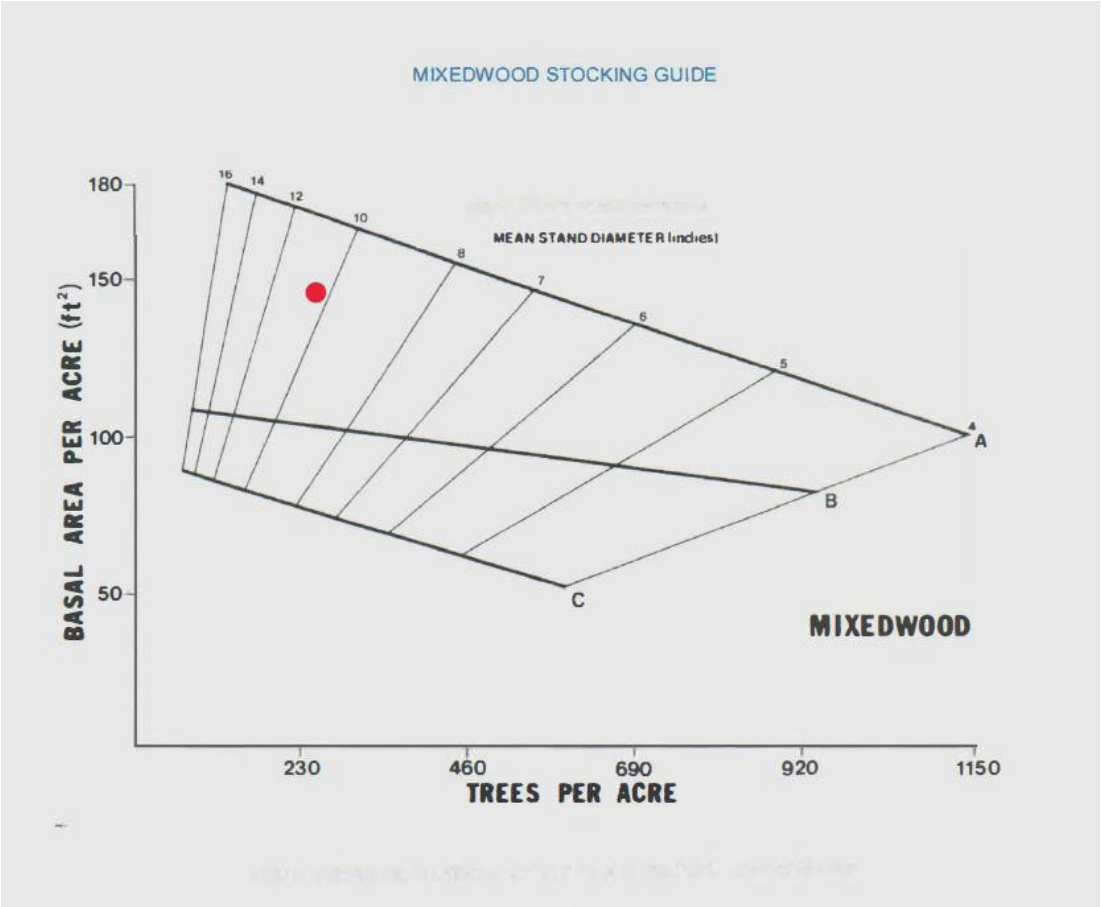
KP8	
Prism BAF or Plot Size =	15
Acres =	21
# of Plots =	5
Acres Per Plot =	4.2

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	35,556	0	0	0	120	190
Softwood	**0**	**35,556**	**0**	**0**	**0**	**120**	**190**
Basswood	0	0	0	0	0	21	21
Beech	0	21,100	0	0	0	62	102
Hophornbeam	0	0	0	0	0	0	0
Paper birch	0	0	0	0	0	15	15
Red maple	0	5,922	0	0	0	100	110
Red oak	0	25,917	0	0	0	99	146
Sugar maple	0	4,951	0	0	0	25	35
White ash	0	3,214	0	0	0	15	20
Yellow birch	0	0	0	0	0	54	54
Hardwood	**0**	**61,106**	**0**	**0**	**0**	**391**	**503**
Totals	**0**	**96,662**	**0**	**0**	**0**	**511**	**693**

Total Timber Stocking, Volumes and Values

Whole Woodland
201 acres
Overstory: HS4A



Total Volume Estimates for All Types or Stands Combined

Prism BAF or Plot Size =	15
Acres =	201
# of Plots =	65
Acres Per Plot =	3.1

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

Species	Veneer Bd Ft	Sawlog Bd Ft	Pallet/Tie Bd Ft	Boltwood Bd Ft	Potential Log Cords	Pulp Cords	Total Mer. Cords
Hemlock	0	250,613	0	0	0	919	1,402
White pine	0	153,557	0	0	0	295	575
Softwood	**0**	**404,170**	**0**	**0**	**0**	**1,214**	**1,978**
Basswood	0	0	0	0	0	40	40
Beech	0	92,075	0	0	0	578	748
Black oak	0	28,780	0	0	0	74	132
Hophornbeam	0	0	0	0	0	0	0
Paper birch	0	0	0	0	0	106	106
Red maple	0	24,228	0	0	0	672	720
Red oak	0	438,620	0	0	0	1,671	2,539
Shagbark hickor	0	0	0	0	0	184	184
Sugar maple	0	19,347	0	0	0	140	178
White ash	0	21,809	0	0	0	87	128
Yellow birch	0	0	0	0	0	68	68
Hardwood	**0**	**624,860**	**0**	**0**	**0**	**3,620**	**4,843**
Totals	**0**	**1,029,030**	**0**	**0**	**0**	**4,835**	**6,820**

Landowner: Towns of Cumberland and North Yarmouth, Royal River Conservation Trust

Town: Cumberland and North Yarmouth

Species	Sawlog Bd. Ft.	Stumpage $/MBF	Stumpage Value	Pulp Cords	Stumpage $/Cord	Stumpage Value	Total Stumpage by Species
Hemlock	250,613	$60.00	$15,036.78	919	$5.00	$4,595	$19,631.78
White Pine	153,557	$200.00	$30,711.40	295	$4.00	$1,180	$31,891.40
Beech	92,075	$180.00	$16,573.50	578	$20.00	$11,560	$28,133.50
Black Oak	28,780	$250.00	$7195.00	74	$20.00	$1,480	$8,675.00
Red Oak	438,620	$300.00	$131586.00	1671	$20.00	$33,420	$165,006.00
Red maple	24,228	$150.00	$3,634.20	672	$20.00	$13,440	$17,074.20
Sugar Maple	19,347	$300.00	$5804.10	140	$20.00	$2,800	$8,604.10
White Ash	21,809	$200.00	$4361.80	87	$20.00	$1,740	$6,101.80
Basswood	0	0	0	40	$20.00	$800	$800.00
Hophornbeam	0	0	0	0	$20.00	$0	$0.00
Paper Birch	0	0	0	106	$20.00	$2120	$2,120.00
Shagbark Hickory	0	0	0	184	$20.00	$3,680	$3,680.00
Yellow Birch	0	0	0	68	$20.00	$1,360	$1,360.00
Totals	***1,029,030***		***$214,902.78***	***4,835***		***$78,175.00***	***$293,077.78***

* 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.

*65 variable radius points were randomly placed using ArcGis and a GPS receiver across 201 forested acres.

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.

Overstocked: the situation in which trees are so closely spaced that they compete for resources and do not reach full growth potential. Relates to optimizing timber growth per acre.

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.

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 Knight's Pond Preserve 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 property is associated with a moderate value Inland Waterfowl and Wading Bird Habitat (IWWH) at Knight's Pond. MDIFW recommends maintaining a 250-foot undisturbed (of permanent clearings, roads, etc.) buffer around the wetland. Within this buffer, any harvest activity should closely adhere to BMPs for water quality and wetland protection (e.g. harvest on frozen or dry soils only) and uneven-aged forest management should be used. Volume removal should not exceed 30% in a 15-year period, and a well-distributed overstory should be maintained. No trees should be cut within 75 feet of the shore. Throughout the 250-foot IWWH buffer MDIFW recommends that special consideration be given to implementing a plan to leave snags and live trees with cavities that will benefit cavity nesting waterfowl and many other wildlife species.

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.

The property includes two areas of Oak – Hickory Forest. This forest type is rare in Maine and provides important habitat for a wide variety of plants and animals. The more southerly area of this forest is very young and was previously harvested; there is abundant hickory development in the understory here. The more northerly

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

maine DEPARTMENT OF Agriculture Conservation & Forestry

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

area is regenerating from previous agricultural use and is dominated by red oak with a strong but variable component of shagbark hickory. MNAP recommends avoiding harvest in these areas and letting them mature. We recommend that any harvesting within the immediate vicinity of these areas (200 feet) be limited to selective harvest of no more than 30% of the canopy cover. Please see the attached factsheets for more information about this forest type.

Good management of these habitats is consistent with good forestry, and MDIFW's regional wildlife and fisheries biologists and MNAP ecologists 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.

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

MAINE NATURAL AREAS PROGRAM
(207)287-8044 or maine.nap@maine.gov

Forest Management Plan Review

Forester: *Denny Gallaudet* Landowner: *Town of Cumberland* Lot Name: *Knight's Pond*
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 *If yes, see attached summary table.*	☐	☒	
Natural Communities: rare and/or exemplary *If yes, see attached summary table.*	☒	☐	MNAP Ecologist Don Cameron, 287-8041
Animals: rare, threatened, or endangered *If yes, see attached summary table.*	☒	☐	MDIFW Assistant Regional Wildlife Biologist Cory Stearns, 287-5759
Mapped Essential Wildlife Habitats:			
Roseate tern	☐	☒	
Piping plover and Least tern	☐	☒	
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	☐	☒	
Wild brook trout habitat	Yes ☒	Unknown ☐	MDIFW Assistant Regional Fisheries Biologist Brian Lewis, 287-5760
Atlantic Salmon:	Yes	No	
Salmon critical habitat	☐	☒	
Salmon stream habitat	Yes ☐	Unknown ☒	
Canada lynx: The town & parcel may provide habitat for lynx	☐	☒	

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	☐	☒
Is the parcel adjacent to or on Conservation Lands? Owner: **Tow of Cumberland** Ownership type: ☒ Fee ☐ Easement Area Name: **Knight's Pond**	☒	☐
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.	☐	☒

Review completed by: LRS
Date: 8.12.2020
MNAP #: 2020.08.12.LS.01

MAINE NATURAL AREAS PROGRAM
(207)287-8044 or maine.nap@maine.gov

Forester: *Denny Gallaudet* Landowner: *Town of Cumberland* Lot Name: *Knight's Pond*

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
Oak – Hickory Forest	N/A	S1	G4G5	N/A	Knight's Pond Occurrence Rank = BC Good to Fair

[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)

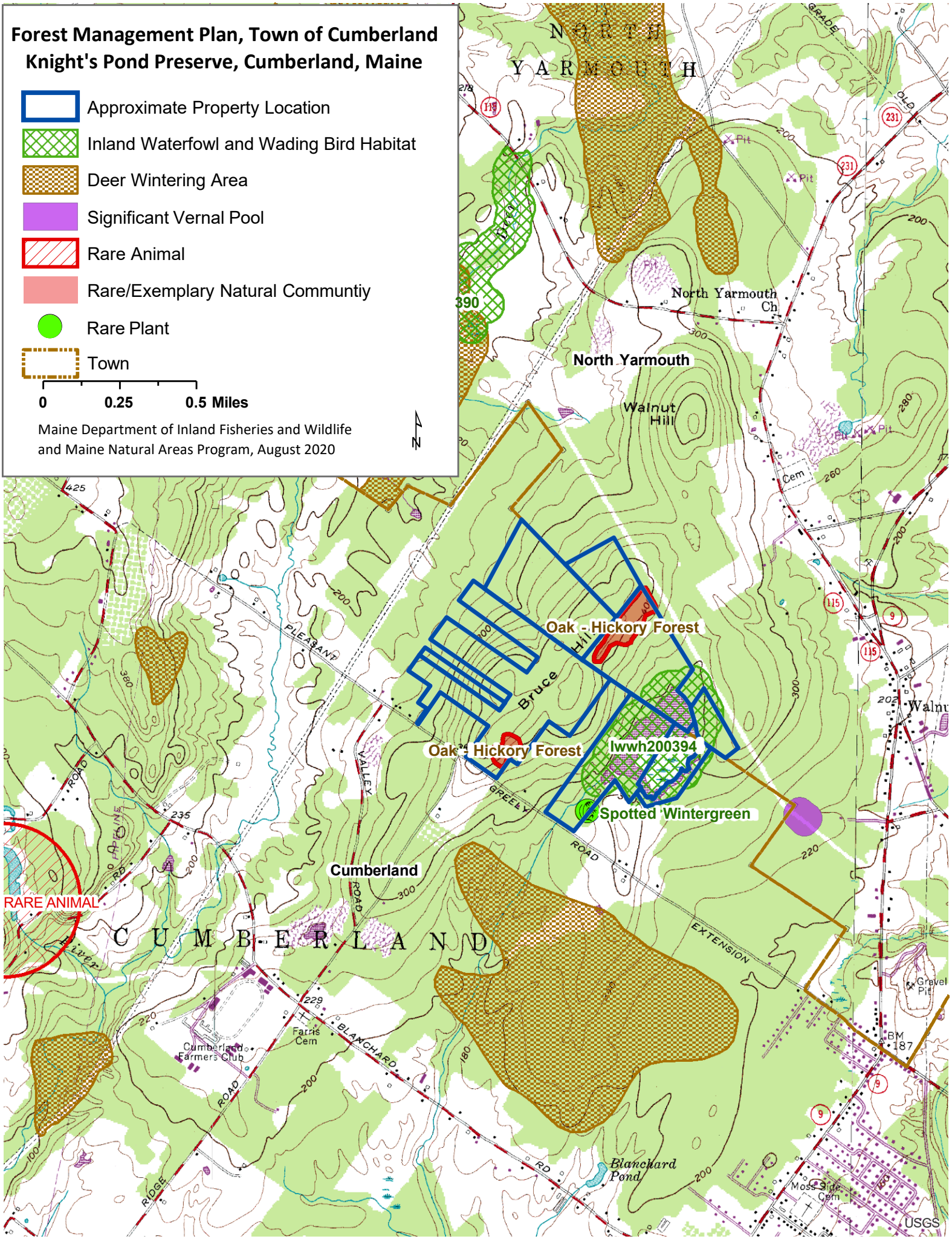
- **G1** Critically imperiled globally because of extreme rarity or because some aspect of its biology makes it especially vulnerable to extinction.
- **G2** Globally imperiled because of rarity or because of other factors making it vulnerable to further decline.
- **G3** Globally rare.
- **G4** Apparently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

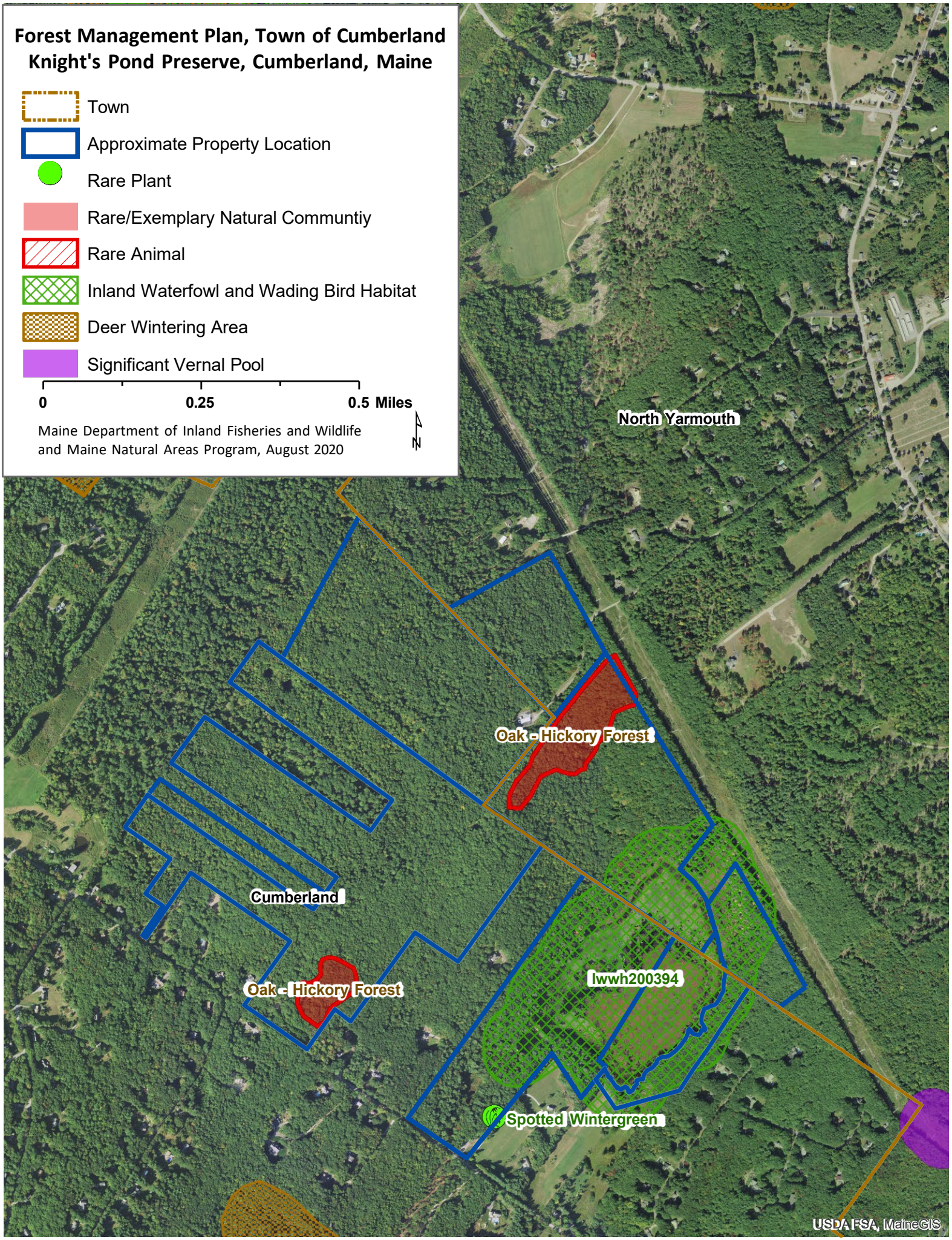
[d] SGCN Priority

Describes the prioritization of Species of Greatest Conservation Need based primarily on risk of extirpation, population trend, endemicity, 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
Knight's Pond Preserve, Cumberland, Maine
Approximate Property Location
Inland Waterfowl and Wading Bird Habitat
Deer Wintering Area
Significant Vernal Pool
Rare Animal
Rare/Exemplary Natural Communtiy
Rare Plant
Town
0
0.25
0.5 Miles
Maine Department of Inland Fisheries and Wildlife
and Maine Natural Areas Program, August 2020
N
NORTH YARMOUTH
CUMBERLAND
North Yarmouth
Walnut Hill
Cumberland
Oak - Hickory Forest
Oak - Hickory Forest
Iwwh200394
Spotted Wintergreen
RARE ANIMAL
Bruce Hill
Greely Road
Pleasant Hill Road
Valley Road
Blanchard Road
Extension
Ridge Rd
Pipeline Rd
North Yarmouth Ch
Cumberland Farmers Club
Farris Cem
Moss Side Cem
Gravel Pit
Blanchard Pond
BM 187
USGS


Forest Management Plan, Town of Cumberland
Knight's Pond Preserve, Cumberland, Maine
Town
Approximate Property Location
Rare Plant
Rare/Exemplary Natural Communtiy
Rare Animal
Inland Waterfowl and Wading Bird Habitat
Deer Wintering Area
Significant Vernal Pool
0
0.25
0.5 Miles
Maine Department of Inland Fisheries and Wildlife
and Maine Natural Areas Program, August 2020
N
North Yarmouth
Oak - Hickory Forest
Cumberland
Oak - Hickory Forest
Iwwh200394
Spotted Wintergreen
USDA FSA, MaineGIS

U.S. Fish & Wildlife Service

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

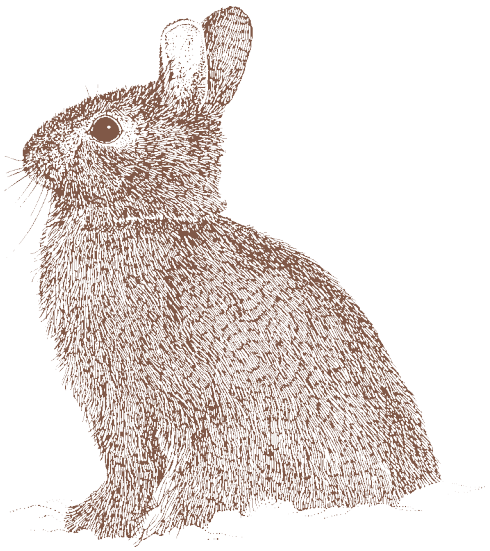
In the early 1900s until the 1960s, hunting clubs and some eastern states introduced another species of rabbit, the eastern cottontail, into New England. Eastern cottontails appear able to thrive in a greater variety of habitats than New England cottontails through its ability to detect predators sooner. 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.

Oak – Hickory Forest

State Rank S1

Community Description

This dry forest type, characteristic of the Central Appalachian Mountains, occurs in small patches or as inclusions within broader expanses of oak-pine forest. It is dominated by a mixture of shagbark hickory and oaks (white, black, red, or chestnut) over park-like sedge lawn. Sugar maple, white pine, or white ash may be canopy associates, and hop-hornbeam is a characteristic sub-canopy species. Additional species in the subcanopy or tall-shrub layer may include witch hazel, shadbushes, striped maple, and maple-leaved viburnum. Low shrubs can include blueberries, and the herb layer is primarily a lawn of woodland sedge with some other grass and sedge species. Moderately enriched sites may support tick-trefoils, hepatica, and the rare bottlebrush grass.

Soil and Site Characteristics

Sites occur on low-elevation, south- or west-facing sideslopes with well-drained loams or sandy loams. Known sites are within 10 miles of the coast.

Shagbark Hickory Bud

Diagnostics

Moderately open to closed canopy forests are dominated by a mixture of shagbark hickory (at least 30% cover) and oak species.

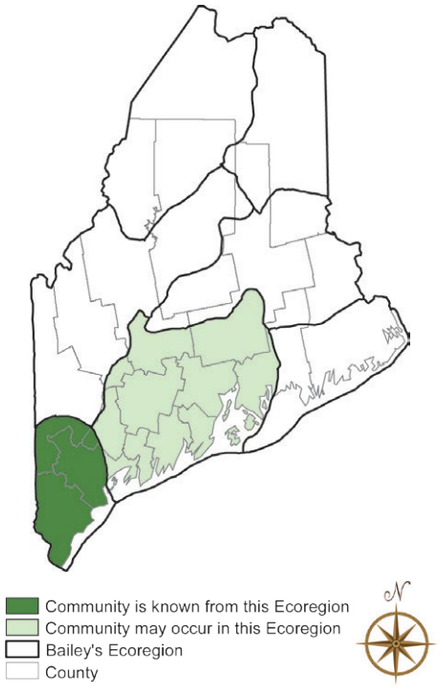
Similar Types

White Oak – Red Oak Forests and Oak - Pine Forests lack shagbark hickory.

Conservation, Wildlife, and Management Considerations

The few mature sites known in Maine were probably cleared in the past. Sites are small and subject to further fragmentation from development. Community dynamics are not well known, but there are some indications that shagbark hickory and white oak are adapted to disturbance – likely fire – though there is no research on this topic in Maine. Most occurrences of this type are on private lands.

Location Map



Bitternut Hickory Bark

This type offers habitat for a variety of birds, including scarlet tanager and ovenbird. Mature occurrences of this community type offer excellent potential sites for cavity dwellers such as the southern flying squirrel. The rare red-winged sallow moth uses red oak as one of its host plants and may be found in this community.

Distribution

Restricted to southern and coastal Maine, characteristic of the Eastern Broadleaf Forest Province. Extends south and west from Maine.

Landscape Pattern: Small patch (in Maine), generally 20 acres or less.

Bitternut Hickory Leaves

Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Canopy
Black oak
Red oak*
Shagbark hickory*
Sugar maple
White oak

Sapling/Shrub
Low-bush blueberry
Maple-leaved viburnum*
Shadbushes
Witch hazel*

Herb
Asters
Canada mayflower
Carex (Laxiflorae group)
Panic grasses
Sarsaparilla
Silverrod
Whorled loosestrife*
Wild oats
Woodland sedge*

Associated Rare Plants

Bitternut hickory
Bottlebrush grass
Chestnut oak
Scarlet oak

Associated Rare Animals

Red-winged sallow
Whip-poor-will

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

JANETT. MILLS
GOVERNOR

KIRK F. MOHNEY
DIRECTOR

ARCHAEOLOGY AND HISTORIC RESOURCES REVIEW
FORESTRY PLAN

MHPC# F071-20 Date Received 8/13/2020

Forester T O WNO F C UMB E R L A N D Township CUMBERLAND

Parcel KNIGIITS POND AND RINES FOREST

****0This worksheet was completed for informational purposes only******

Prehistoric (Native American) Archaeology (for further information: anhur.spiess(a.maine.gov)

D No prehistoric archaeological sites known. Based on location, soils and topography, none are expected.

),c No prehistoric archaeological si.le own because no survey has been con ucted. ever, e fo wing area is archaeologically sensitive. ...:4> E....¼..£..A _ _tt_ 1!P _.!(/___!. JV4

☐ Thperoperty includes known sites of archaeological importance. (See attached info)

Historic Archaeology (e.g. 1800s farms, etc.) (for further information: lei1h.smi1h(a_mainc.gov)

JJl.- No sites are known, and none are expected (based on historic maps and documents).

D 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.rideoul(a_maine.go,)

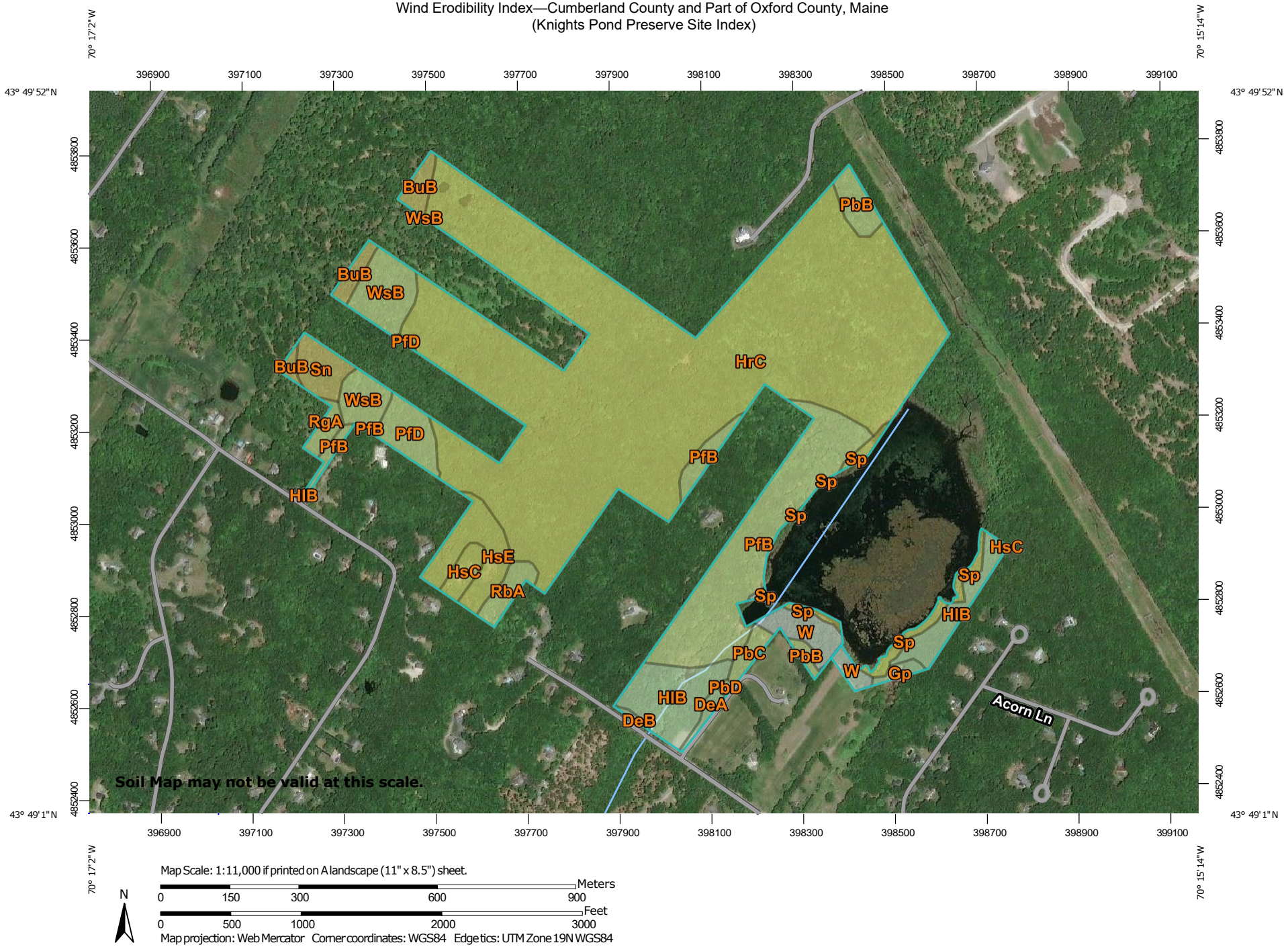
☐ No historic buildings or structures are known or expected on the property (based on 7.5' USGS topographic maps and MHPC records).
Buildings or structures may exist on the property that have not been evaluated for National Register eligibility. Our office will provide an assessment if a request letter, 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 I06 review with the Maine Historic Preservation Commission is required pursuant to the National Historic Preservation Act of 1966.

PHONE: (207) 287-2132 f AX: (207) 287-2335

Wind Erodibility Index—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Site Index)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

Soil Rating Lines

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

Soil Rating Points

0
38
48
56
86
134
160
180
220
250
310
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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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.

Wind Erodibility Index

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
BuB	Lamoine silt loam, 3 to 8 percent slopes	48	3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	134	0.7	0.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	134	0.2	0.1%
Gp	Gravel pits	134	0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	134	10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	56	116.0	62.3%
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	56	1.6	0.8%
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	56	5.4	2.9%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	86	2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	86	1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	86	0.2	0.1%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	86	20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	86	3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	86	1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	86	1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes	48	2.8	1.5%
Sp	Sebago mucky peat	56	3.0	1.6%
W	Water		3.9	2.1%

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	86	7.1	3.8%
Totals for Area of Interest			**186.0**	**100.0%**

Description

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Rating Options

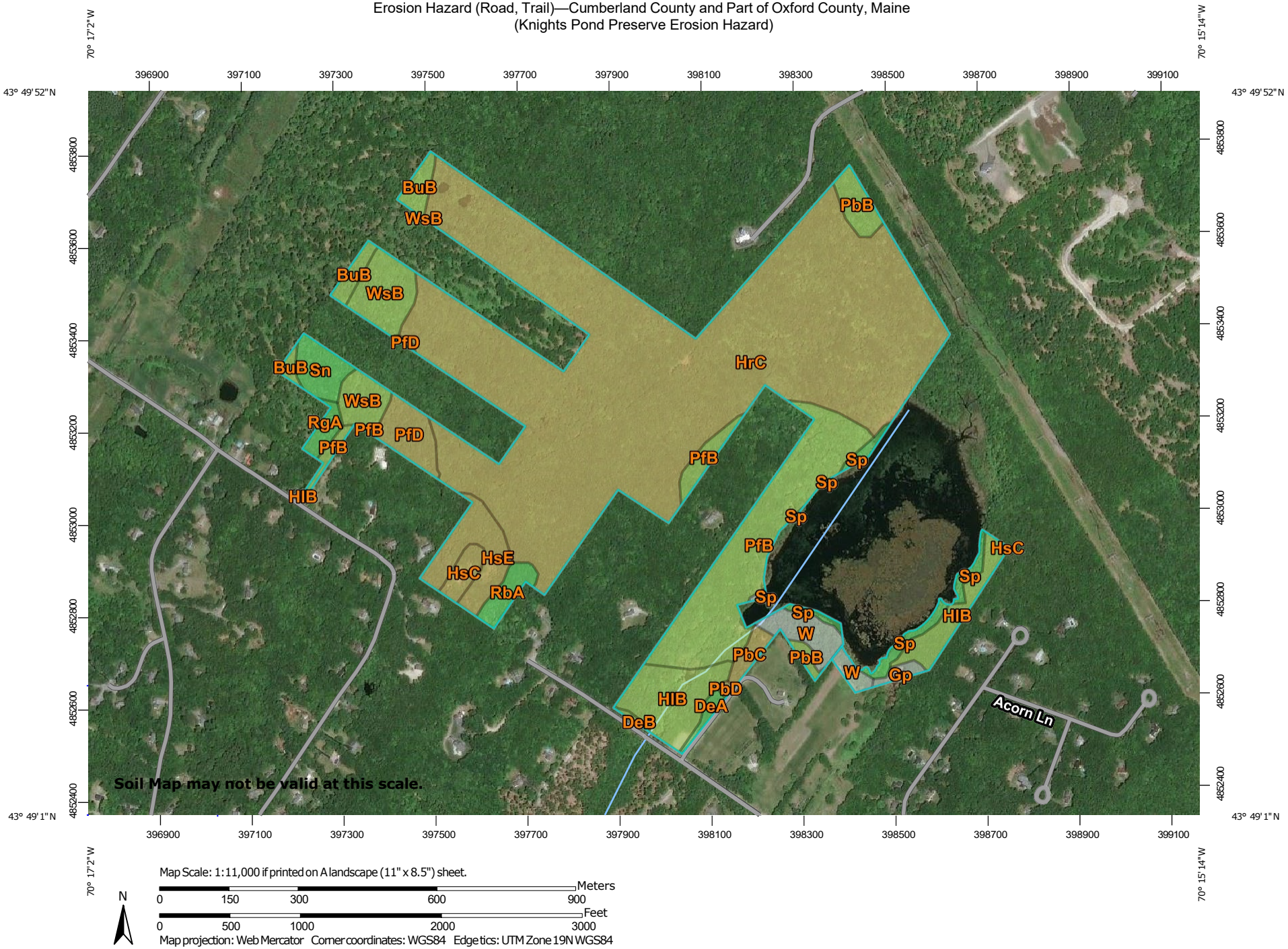
Units of Measure: tons per acre per year

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Erosion Hazard (Road, Trail)—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Erosion Hazard)



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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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
BuB	Lamoine silt loam, 3 to 8 percent slopes	Moderate	Lamoine (85%)	Slope/erodibility (0.50)	3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	Slight	Deerfield (85%)		0.7	0.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Moderate	Deerfield (85%)	Slope/erodibility (0.50)	0.2	0.1%
Gp	Gravel pits	Not rated	Gravel pits (92%)		0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	Moderate	Hinckley (85%)	Slope/erodibility (0.50)	10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Severe	Lyman (45%)	Slope/erodibility (0.95)	116.0	62.3%
			Tunbridge (40%)	Slope/erodibility (0.95)		
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	Severe	Lyman (45%)	Slope/erodibility (0.95)	1.6	0.8%
			Abram (35%)	Slope/erodibility (0.95)		
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	Severe	Lyman (45%)	Slope/erodibility (0.95)	5.4	2.9%
			Abram (40%)	Slope/erodibility (0.95)		
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (87%)	Slope/erodibility (0.50)	2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	Severe	Paxton (86%)	Slope/erodibility (0.95)	1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	Severe	Paxton (85%)	Slope/erodibility (0.95)	0.2	0.1%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (85%)	Slope/erodibility (0.50)	20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	Severe	Paxton (85%)	Slope/erodibility (0.95)	3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	Slight	Ridgebury (85%)		1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	Slight	Ridgebury (85%)		1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes	Slight	Scantic (85%)		2.8	1.5%
Sp	Sebago mucky peat	Slight	Sebago (85%)		3.0	1.6%
W	Water	Not rated	Water (100%)		3.9	2.1%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	Moderate	Woodbridge (85%)	Slope/erodibility (0.50)	7.1	3.8%
Totals for Area of Interest					**186.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Severe	127.9	68.8%
Moderate	43.9	23.6%
Slight	9.6	5.2%
Null or Not Rated	4.5	2.4%
Totals for Area of Interest	**186.0**	**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.

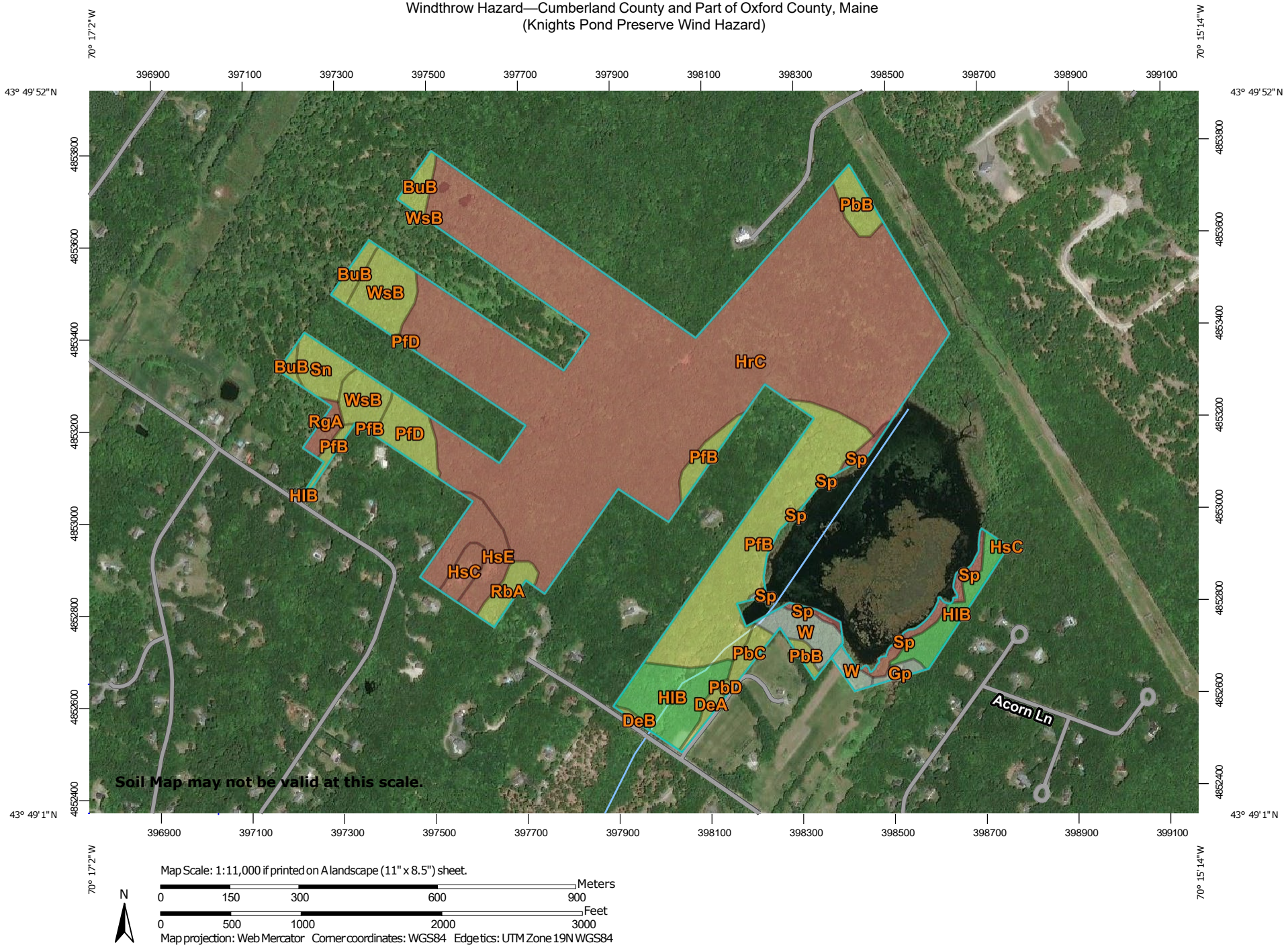
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Windthrow Hazard—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Wind Hazard)



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

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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
BuB	Lamoine silt loam, 3 to 8 percent slopes	Moderate	Lamoine (85%)	Water table depth (1.00)	3.0	1.6%
				Hillslope position (0.30)		
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	Moderate	Deerfield (85%)	Hillslope position (0.30)	0.7	0.4%
				Water table depth (0.12)		
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Moderate	Deerfield (85%)	Hillslope position (0.30)	0.2	0.1%
				Water table depth (0.12)		
Gp	Gravel pits	Not rated	Gravel pits (92%)		0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	Slight	Hinckley (85%)	Low cohesion (1.00)	10.2	5.5%
				Hillslope position (0.50)		
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Severe	Lyman (45%)	Depth to root restriction (1.00)	116.0	62.3%
				Low cohesion (1.00)		
				Hillslope position (0.75)		
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	Severe	Lyman (45%)	Depth to root restriction (1.00)	1.6	0.8%
				Low cohesion (1.00)		
				Hillslope position (0.75)		
			Abram (35%)	Depth to root restriction (1.00)		
				Hillslope position (1.00)		
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	Severe	Lyman (45%)	Depth to root restriction (1.00)	5.4	2.9%
				Low cohesion (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Hillslope position (0.75)		
			Abram (40%)	Depth to root restriction (1.00)		
				Hillslope position (1.00)		
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (87%)	Depth to root restriction (1.00)	2.7	1.5%
				Hillslope position (0.50)		
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	Moderate	Paxton (86%)	Depth to root restriction (1.00)	1.2	0.7%
				Hillslope position (0.75)		
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	Moderate	Paxton (85%)	Depth to root restriction (1.00)	0.2	0.1%
				Hillslope position (0.75)		
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (85%)	Depth to root restriction (1.00)	20.7	11.1%
				Hillslope position (0.50)		
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	Moderate	Paxton (85%)	Depth to root restriction (1.00)	3.5	1.9%
				Hillslope position (0.75)		
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	Moderate	Ridgebury (85%)	Water table depth (1.00)	1.9	1.0%
				Depth to root restriction (1.00)		
				Hillslope position (0.30)		
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	Severe	Ridgebury (85%)	Water table depth (1.00)	1.2	0.7%
				Depth to root restriction (1.00)		
				Low cohesion (1.00)		
				Hillslope position (0.30)		

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)	2.8	1.5%
				Hillslope position (0.30)		
Sp	Sebago mucky peat	Severe	Sebago (85%)	Water table depth (1.00)	3.0	1.6%
				Low cohesion (1.00)		
				Hillslope position (0.30)		
W	Water	Not rated	Water (100%)		3.9	2.1%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	Moderate	Woodbridge (85%)	Hillslope position (1.00)	7.1	3.8%
				Depth to root restriction (1.00)		
				Water table depth (0.35)		
Totals for Area of Interest					**186.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Severe	127.2	68.4%
Moderate	44.1	23.7%
Slight	10.2	5.5%
Null or Not Rated	4.5	2.4%
Totals for Area of Interest	**186.0**	**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.

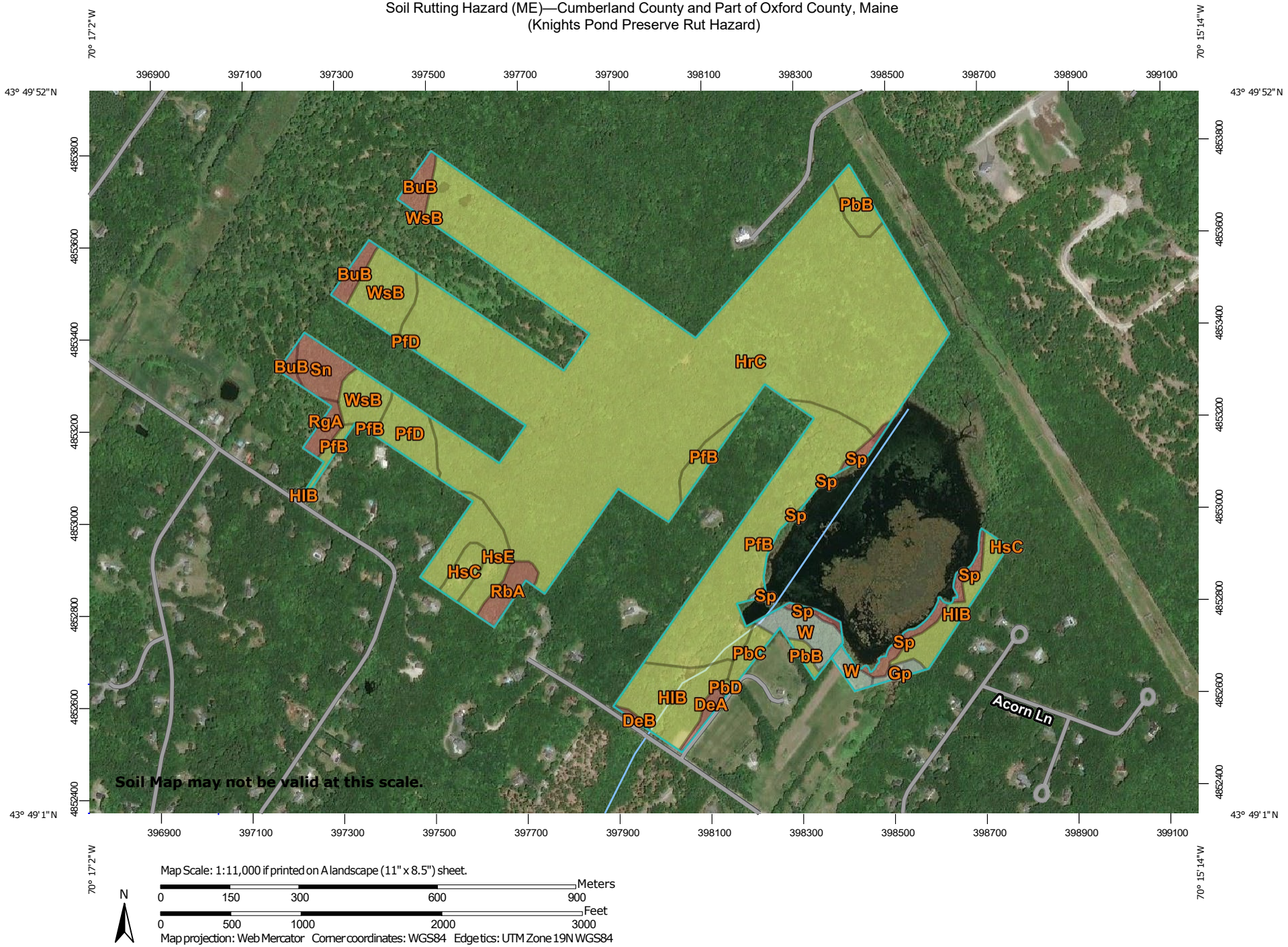
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Rutting Hazard (ME)—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Rut Hazard)



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

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 (ME)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BuB	Lamoine silt loam, 3 to 8 percent slopes	Severe	Lamoine (85%)	Wetness (0.83)	3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	Severe	Deerfield (85%)	Wetness (0.67)	0.7	0.4%
				Low Strength (0.38)		
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	Severe	Deerfield (85%)	Wetness (0.67)	0.2	0.1%
				Low Strength (0.38)		
Gp	Gravel pits	Not rated	Gravel pits (92%)		0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	Moderate	Hinckley (85%)	Low Strength (0.38)	10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	Moderate	Lyman (45%)	Low Strength (0.38)	116.0	62.3%
			Tunbridge (40%)	Low Strength (0.38)		
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	Moderate	Lyman (45%)	Low Strength (0.38)	1.6	0.8%
			Abram (35%)	Low Strength (0.38)		
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	Moderate	Lyman (45%)	Low Strength (0.38)	5.4	2.9%
			Abram (40%)	Low Strength (0.38)		
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (87%)	Wetness (0.17)	2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	Moderate	Paxton (86%)	Wetness (0.17)	1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	Moderate	Paxton (85%)	Wetness (0.17)	0.2	0.1%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Moderate	Paxton (85%)	Wetness (0.17)	20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	Moderate	Paxton (85%)	Wetness (0.17)	3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	Severe	Ridgebury (85%)	Wetness (0.75) Low Strength (0.38)	1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	Severe	Ridgebury (85%)	Wetness (0.75) Low Strength (0.38)	1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes	Severe	Scantic (85%)	Wetness (0.83)	2.8	1.5%
Sp	Sebago mucky peat	Severe	Sebago (85%)	Wetness (0.92)	3.0	1.6%
W	Water	Not rated	Water (100%)		3.9	2.1%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	Moderate	Woodbridge (85%)	Wetness (0.58)	7.1	3.8%
Totals for Area of Interest					**186.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Moderate	168.6	90.7%
Severe	12.8	6.9%
Null or Not Rated	4.5	2.4%
Totals for Area of Interest	**186.0**	**100.0%**

Description

Ratings for 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.

Ratings are both verbal and numerical. 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.

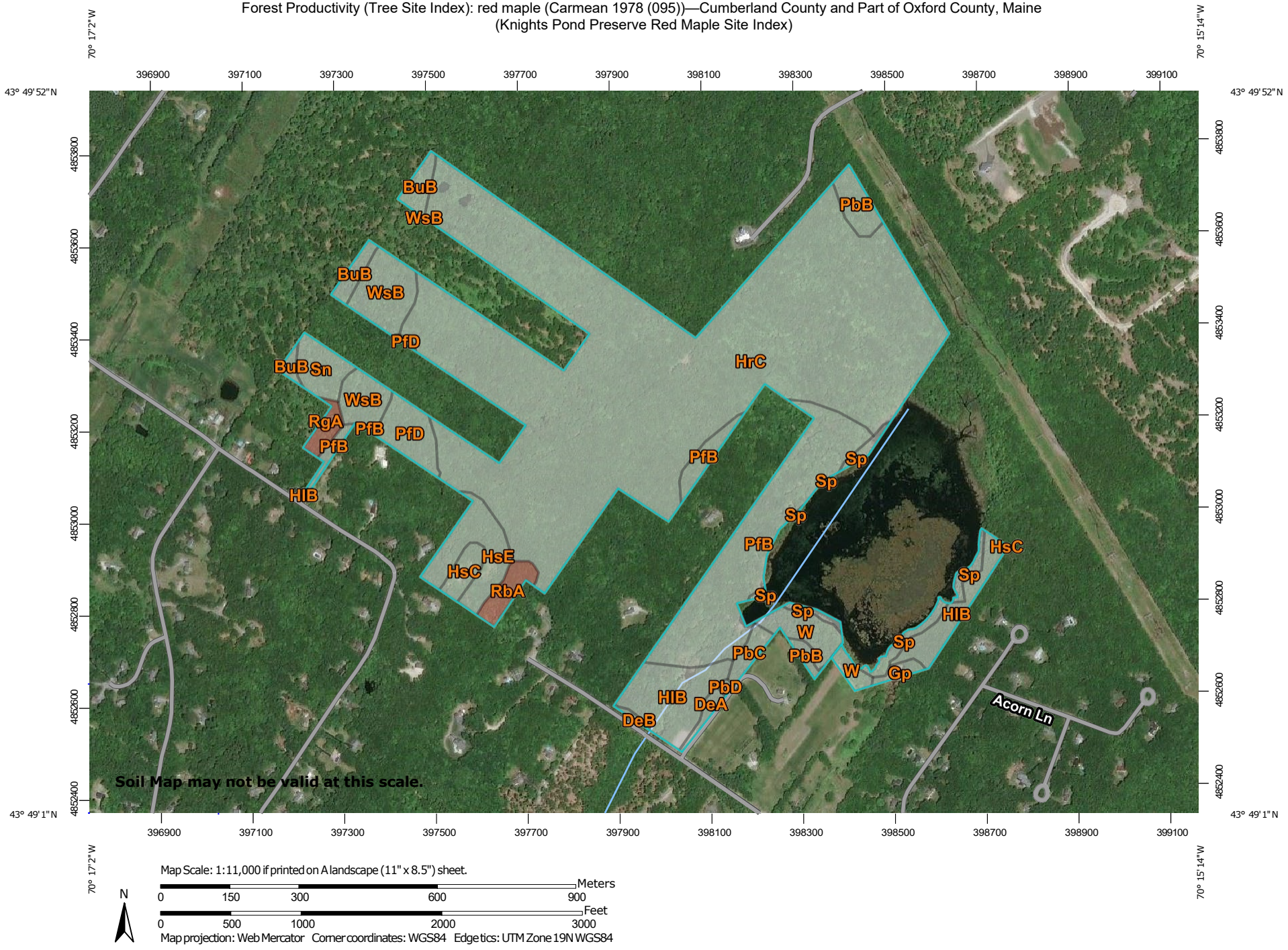
Rating Options

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Forest Productivity (Tree Site Index): red maple (Carmean 1978 (095))—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Red Maple Site Index)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

= 65

Not rated or not available

Soil Rating Lines

= 65

Not rated or not available

Soil Rating Points

= 65

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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): red maple (Carmean 1978 (095))

Map unit symbol	Map unit name	Rating (feet)	Acres in AOI	Percent of AOI
BuB	Lamoine silt loam, 3 to 8 percent slopes		3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes		0.7	0.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes		0.2	0.1%
Gp	Gravel pits		0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes		10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky		116.0	62.3%
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky		1.6	0.8%
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky		5.4	2.9%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes		2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes		1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes		0.2	0.1%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes		20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes		3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	65	1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	65	1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes		2.8	1.5%
Sp	Sebago mucky peat		3.0	1.6%
W	Water		3.9	2.1%

Map unit symbol	Map unit name	Rating (feet)	Acres in AOI	Percent of AOI
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes		7.1	3.8%
Totals for Area of Interest			**186.0**	**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: red maple

Site Index Base: Carmean 1978 (095)

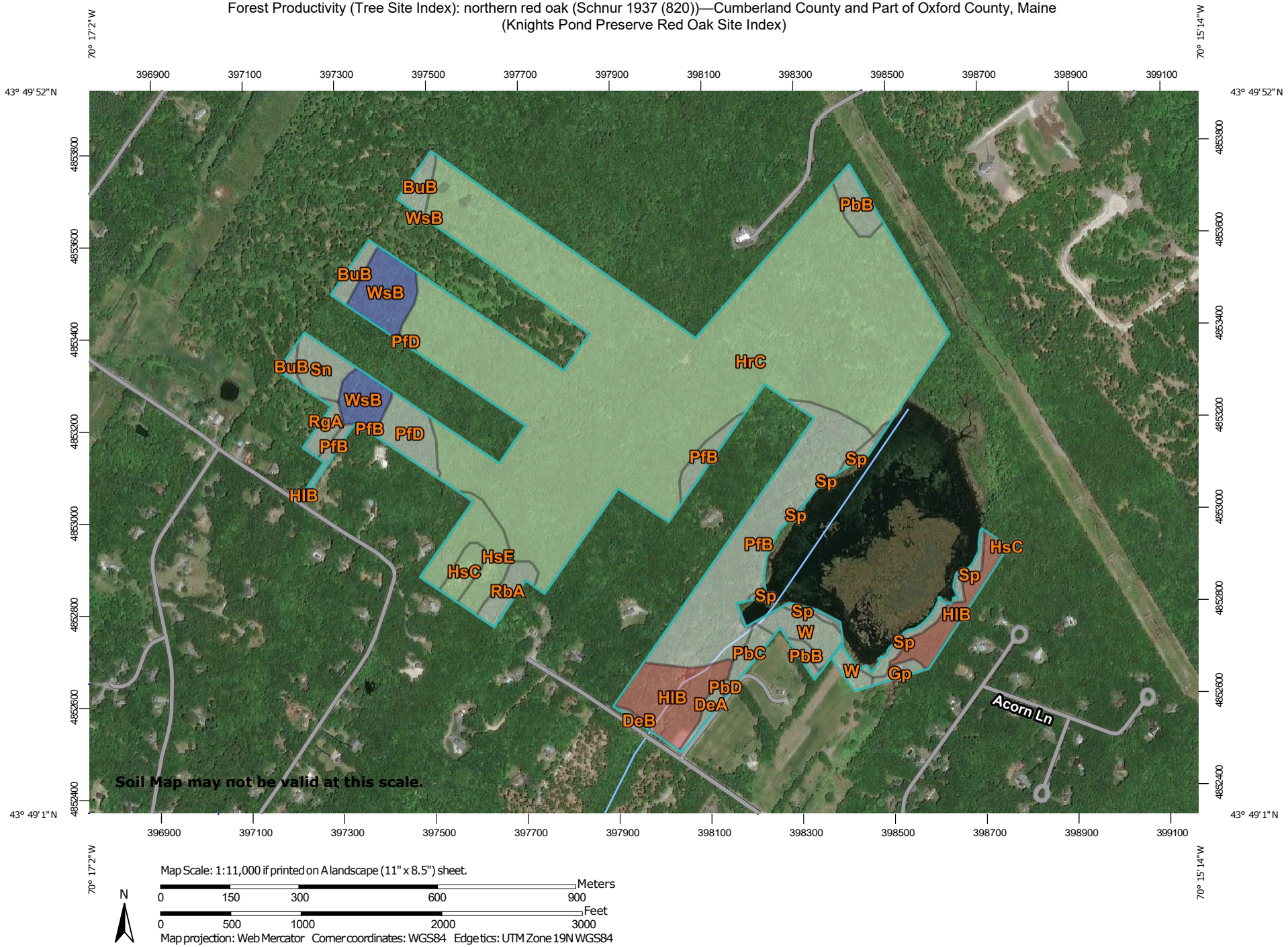
Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Forest Productivity (Tree Site Index): northern red oak (Schnur 1937 (820))—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve Red Oak Site Index)



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

N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Background
- Aerial Photography

Soils

Soil Rating Polygons
- <= 49
- > 49 and <= 53
- > 53 and <= 70
- Not rated or not available

Soil Rating Lines
- <= 49
- > 49 and <= 53
- > 53 and <= 70
- Not rated or not available

Soil Rating Points
- <= 49
- > 49 and <= 53
- > 53 and <= 70
- 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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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): northern red oak (Schnur 1937 (820))

Map unit symbol	Map unit name	Rating (feet)	Acres in AOI	Percent of AOI
BuB	Lamoine silt loam, 3 to 8 percent slopes		3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes		0.7	0.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes		0.2	0.1%
Gp	Gravel pits		0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	49	10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	53	116.0	62.3%
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	53	1.6	0.8%
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	53	5.4	2.9%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes		2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes		1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes		0.2	0.1%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes		20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes		3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes		1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes		1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes		2.8	1.5%
Sp	Sebago mucky peat		3.0	1.6%
W	Water		3.9	2.1%

Map unit symbol	Map unit name	Rating (feet)	Acres in AOI	Percent of AOI
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	70	7.1	3.8%
Totals for Area of Interest			**186.0**	**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: northern red oak

Site Index Base: Schnur 1937 (820)

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

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.

kJJ-

Vice Chair - Forestry Committee
Town of Cumberland Main e

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.

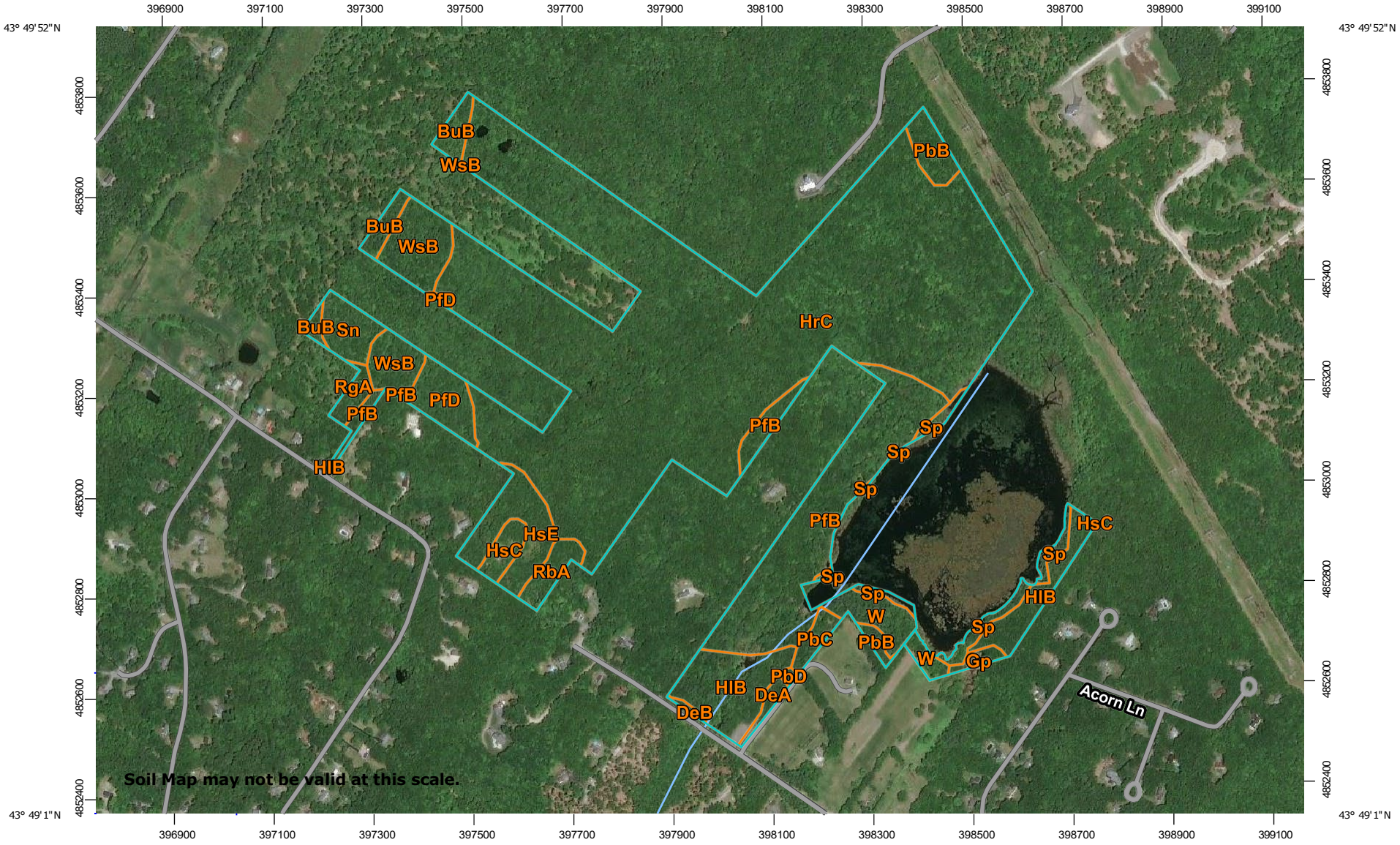
Rines Forest is a magnificent 268 acre woodland in the heart of Town. It protects a healthy forest with diverse wildlife, vernal pools, waterfalls and streams that flow to the East Branch of the Piscataqua River, a major tributary of the Presumpscot River. Rines Forest is a keystone property in an important 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 1941they 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.

Soil Map—Cumberland County and Part of Oxford County, Maine
(Knights Pond Preserve)



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

N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

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

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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
BuB	Lamoine silt loam, 3 to 8 percent slopes	3.0	1.6%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	0.7	0.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	0.2	0.1%
Gp	Gravel pits	0.7	0.4%
HlB	Hinckley loamy sand, 3 to 8 percent slopes	10.2	5.5%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	116.0	62.3%
HsC	Lyman-Abram complex, 8 to 15 percent slopes, very rocky	1.6	0.8%
HsE	Lyman-Abram complex, 15 to 35 percent slopes, very rocky	5.4	2.9%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	2.7	1.5%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	1.2	0.7%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	0.2	0.1%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	20.7	11.1%
PfD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	3.5	1.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	1.9	1.0%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	1.2	0.7%
Sn	Scantic silt loam, 0 to 3 percent slopes	2.8	1.5%
Sp	Sebago mucky peat	3.0	1.6%
W	Water	3.9	2.1%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	7.1	3.8%
Totals for Area of Interest		**186.0**	**100.0%**