

FOREST MANAGEMENT PLAN



Property of:

Twin Brook Recreation Area
Town of Cumberland
290 Tuttle Road
Cumberland, Maine 04021
(207) 829-5559

Woodland Location

Town: Cumberland, Maine
County: Cumberland
Tax Map R04 Lot 13
Forested Acreage: 123+/- acres
Non-Forested Acreage: 99.3+/- acres
Total Acreage: 222.3

Plan Prepared By:

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Plan Date: June 5, 2023

Planning Period: June 2023 to June 2033

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 2033 unless the landowner's management objectives change or some natural disturbance occurs such as insect or disease

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Town of Cumberland
Twin Brook Parcel
Cumberland, Maine
Cumberland County
Map R04 Lot 13

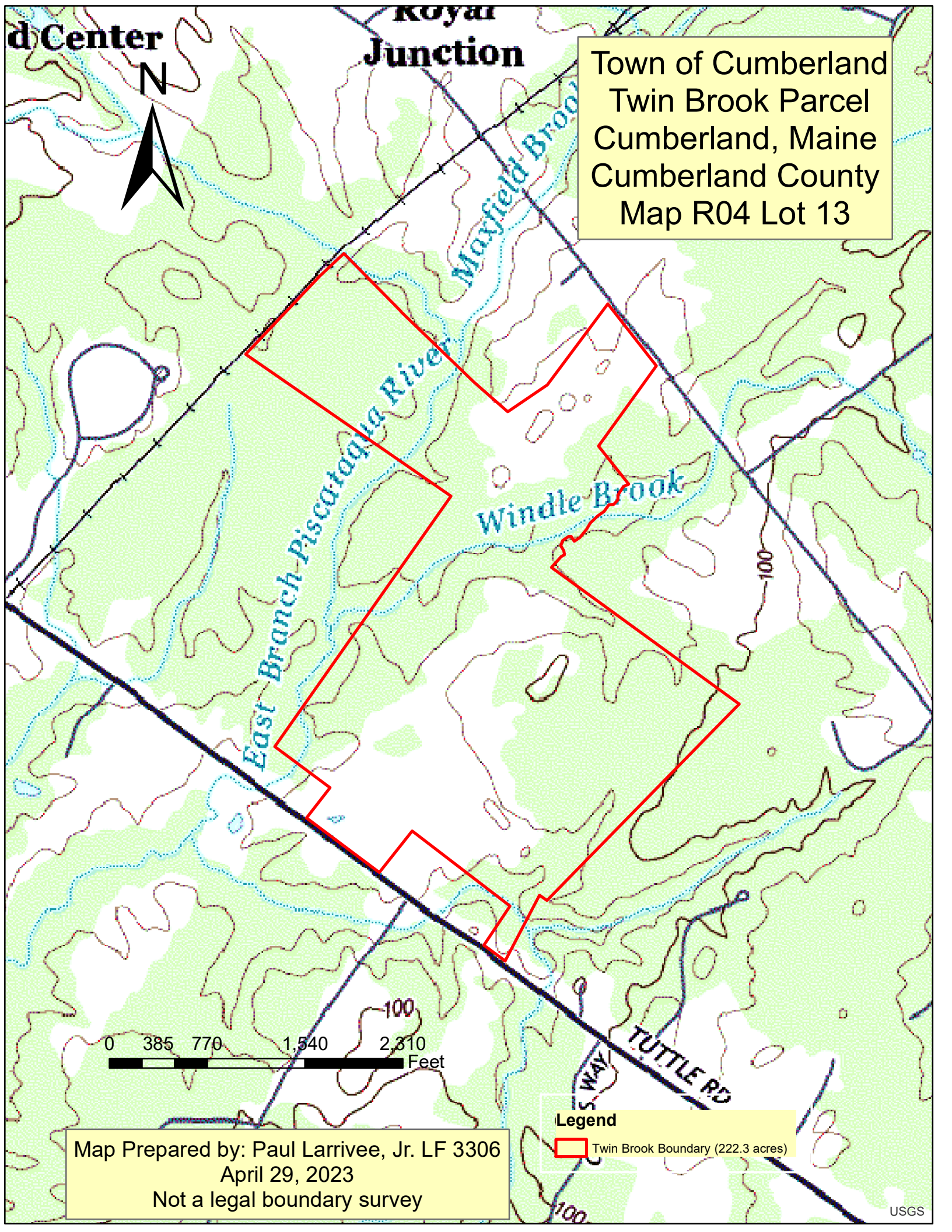


0 385 770 1,540 2,310 Feet

Legend

- Twin Brook Boundary (222.3 acres)
- Twin Brook Open Areas (99.3 acres)
- Twin Brook Compartment 1 (36 acres)
- Twin Brook Compartment 2 (17 acres)
- Twin Brook Compartment 3 (44 acres)
- Twin Brook Compartment 4 (26 acres)
- Twin Brook Wetland Preservation Area 4+/- acres

Map Prepared by: Paul Larrivee, Jr. LF 3306
April 29, 2023
Not a legal boundary survey



Schedule of Recommended Activities:

Activity Name	Extent	Recommended Time Frame	Stand Location	Cost/Income	Priority
IPM Plan for Invasives		Ongoing	All	?	Very High
Boundary Line Maintenance	2-3 miles	2023-2033	All	\$700/mile	High
Trail Repairs Wilderness Trail	500 feet	2021-2025		?	Moderate
Potential Selection Harvest if access is secured and invasive plant plan is prepared and implemented	Compartment 3	2027-2033	30 acres	\$5,000 - \$7,500	Low

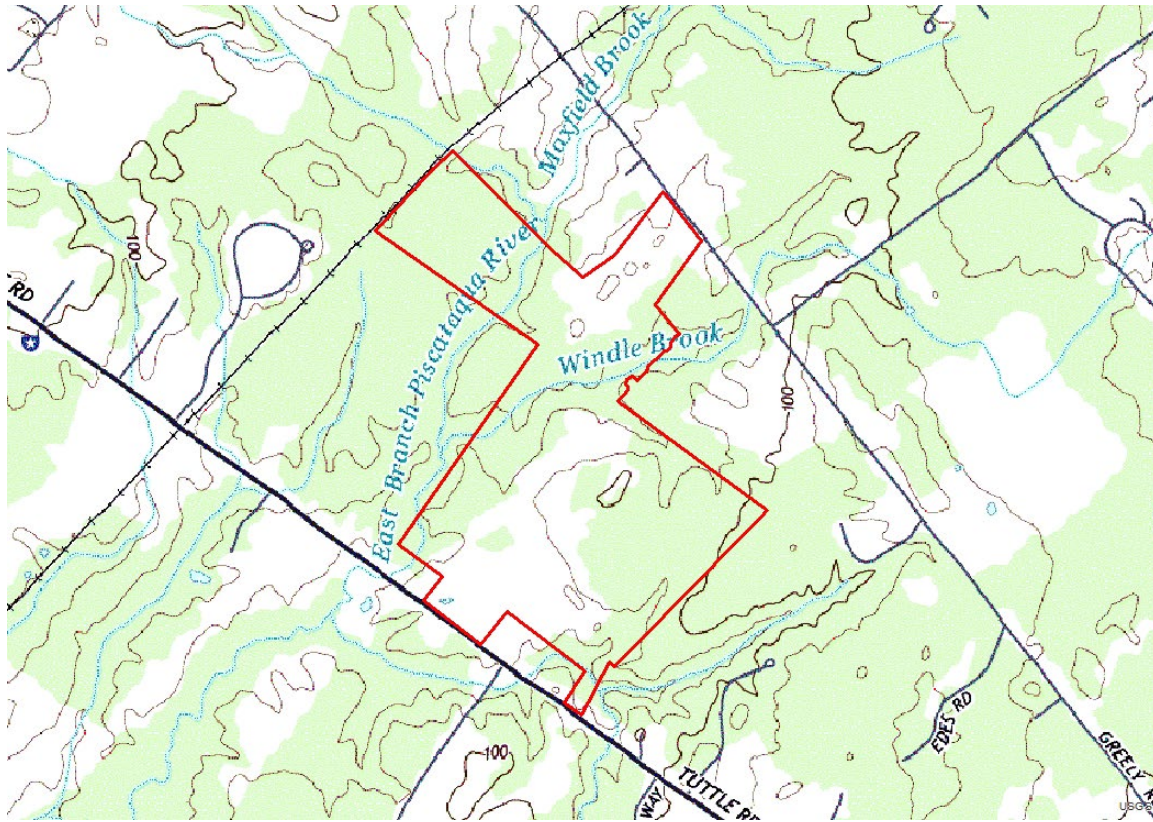
Introduction

This management plan was prepared to meet the requirements of the Maine Forest Service's Woods Wise Program, Maine Tree Growth Tax Law Program and the American Tree Farm Program. There should be no need to update this plan until 2033 unless the landowner's management objectives change or some natural disturbance occurs such as an insect or disease outbreak. This management plan is intended to cover forest management decisions on the forested portion of the Twin Brook Recreation Area for the next ten-years. Before forest management activities occur in the future, this plan and its recommendations should be updated.

This plan is intended to be a "living" document to guide forest management decisions in order to meet Management Guiding Principles for Town Forests. 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 a great written forest management plan is no replacement for having a good working relationship with a forester.

Parcel Location

The Twin Brook Property is a partially developed recreation facility with a forest component. The property is approximately 222 acres in size, of which approximately 123+/- acres are forested. The property is located between Tuttle and Greely Roads completely in the Town of Cumberland, Cumberland County, Maine. The property also abuts the railroad corridor.



Parcel History

The largest portion of acreage was owned by the Dillenbacks and the Fowlers. In March of 1994 the town purchased a parcel owned by the Dillenback Family (Reference is made to Book 11360 Page 267 in the Cumberland County Registry of Deeds). In October of 1996 the town acquired approximately 100 acres owned by the Fowler Family (Reference is made to Cumberland County Registry of Deeds Book 12796 Page 65). The Fowlers reserved the right for five years following the deed to cut up to 20 cords of wood a year under the supervision of the Town's Forest board and to maintain the woods roads. They also reserved to themselves for three years the right to maintain their farming operation.

The parcel is widely used as a recreation destination. The forested areas have a series of well-marked hiking, running and cross-country ski trails that are used continuously. The athletic fields and open fields are utilized by various recreation groups in the community. A neighboring farm has been harvesting firewood and sawlogs from a portion of the forest over the last several years.

The Twin Brook Forest is a typical forest for southern Maine; its composition shaped by past agricultural use, weather events and logging activity. Stonewalls and old wire fence witnessed indicate that the majority of the property was used as agricultural land. Much of this agricultural land abandonment began in the early 1900s as farming activity transitioned west. The forest appears to have been actively harvested for firewood and pine log harvests. The limited recent forest management activities have resulted in well stocked stands of average quality timber.

Landowner's Goals and Objectives

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

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

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

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

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

1. Focus on the invasive species issue. Do not promote timber harvesting with the existing invasive species component.
2. Locate, blaze and paint boundary lines.
3. Potentially expand the amount of the forestland in Reserve, especially on steep slopes and riparian corridors.
4. Future timber harvesting should utilize low impact equipment only after invasive plant issues have been resolved.

Acreage Breakdown

The following table summarizes total acreage by land use classification:

<u>Stand</u>	<u>Type</u>	<u>Acres</u>
Compartment 1	SH4A	36
Compartment 2	SH4A	17
Compartment 3	HS4A	44
Compartment 4	HS4A	26
Open Areas		99.3
Total		222.3

	<u>Acres</u>
<u>Hrdwd</u>	0
<u>Mxwd</u>	123
<u>Forested</u>	123

General Conditions of the Woodlot

General Woodland Description

The Twin Brook Forest is an average woodland in southern Maine. Past management activities have focused on removing firewood and larger white pine to be used at the farm. It appears multiple entries have been made since the 1960s. Regeneration exists in openings created during past harvests, though some areas would be considered closed canopy conditions. The forest is a two or possibly three age forest. The Twin Brook Forest encompasses the following broad major wooded upland types:

- Oak - Northern Hardwood: This broad upland forest type dominates portions of the property. Oak-Northern Hardwood is described as a mixed upland forest type with red oak and northern hardwoods in the canopy. Some stands are almost entirely deciduous (typically oak-maple-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.
- 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.
- 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 areas of Twin Brook, the hemlock is mixed with white ash, yellow birch and various scattered hardwood species.

Boundary Lines & Monitoring

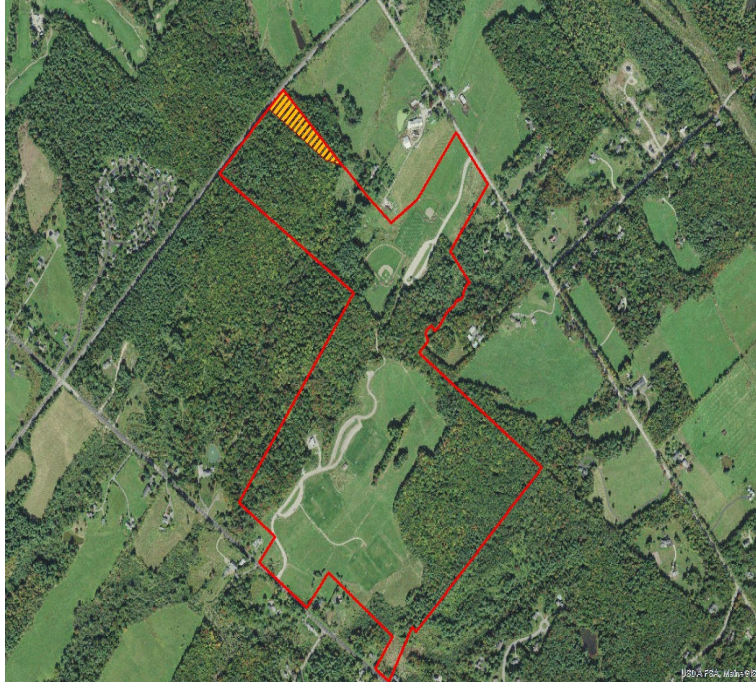
Twin Brook property lines are in good condition. Boundary evidence including old pipes and blazes were found in most areas. Based on limited research in the registry of deeds, it appears the Dillenback Parcel was surveyed in 1994 prior to the town's acquisition of the parcel. In 2007 Sevee and Mahar Engineers produced an Overall Site Plan for the parcel (attached), though it does not provide a lot of specific information regarding the boundary lines.

The external boundary lines exist in most areas and just need maintenance. The town has positioned signs in the vicinity of the boundary lines letting abutters know that they are entering town property. Boundary lines were flagged in the most recent harvest areas. All lines should be blazed and painted. Blazing and painting greatly reduces the likelihood of future expensive survey costs. Existing corner pins should be noted and highlighted with paint.

Terrain/Hydrology

Two brooks and a stream run through Twin Brook, the largest being the East Branch of the Piscataqua River. Windle Brook flows through the center of the parcel and Maxfield Brook can be found in the northern component of the forest. All of these flowages are zoned waterbodies under Maine Forest Service Statewide Standards.

The forested areas of Twin Brook are relatively flat with an elevation of approximately 100'. The only slopes associated with the forest are associated with the brook and stream channels. The low flat areas are also the wettest soils and potentially have been assessed for forest reserve area expansion. A 4+/- acre DEP required wetland preservation area exists and no vegetation can be removed in this area that surrounds the East Branch of the Piscataqua River (see map).



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. It is recommended that a licensed forester mark timber for removal in these areas.

Watershed – Name/Positions

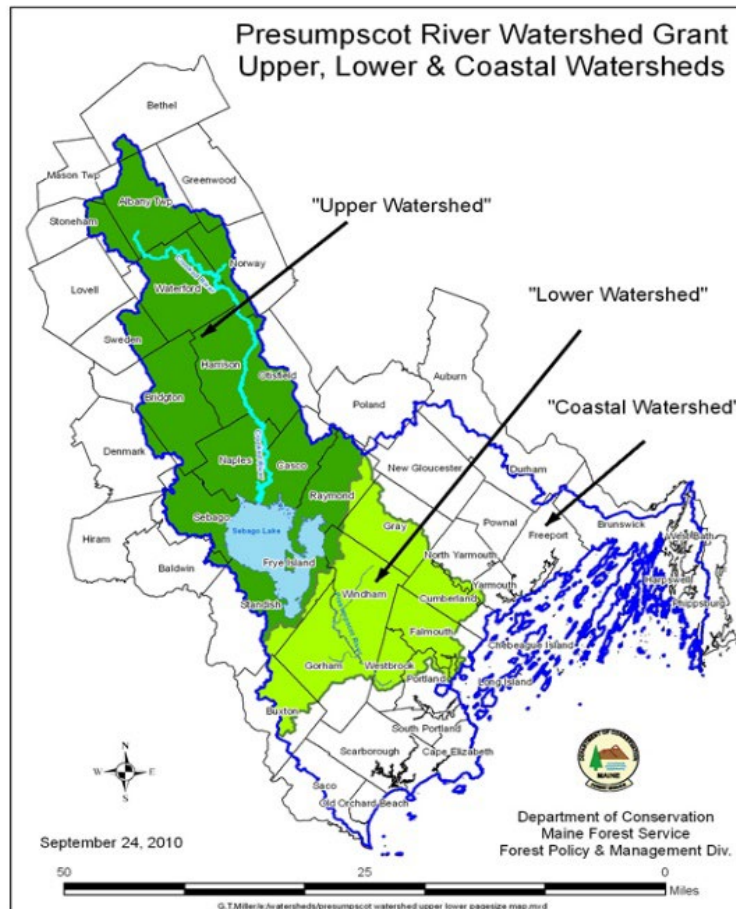
In taking a state wide watershed view, this parcel is located within the Presumpscot River Watershed. More specifically the Twin Brook is located within the “Lower Watershed”.

The Presumpscot River Watershed is located in the Southern region of Maine and drains a 648 square mile watershed.

The Presumpscot River Watershed is split into two sub-watersheds. The Sebago Lake/Upper Presumpscot Watershed and the Lower Presumpscot River Watershed. The Sebago Lake watershed (upper Presumpscot watershed) begins in Bethel and ends at the lake outlet in Standish at Sebago Lake. The watershed covers approximately 440 square miles. The Lower Presumpscot River watershed begins at Sebago Lake and ends at Casco Bay and the Gulf of Maine draining a 208 square mile watershed. It is the largest freshwater input in Casco Bay.

The lower Presumpscot watershed is also comprised of primarily forested and agricultural land.

The Presumpscot River Watershed is one of the most developed and fastest growing watersheds in Maine. The Upper Presumpscot Watershed covers a large section of Oxford County and Cumberland County. The Lower Presumpscot River Watershed covers a large portion of the greater Portland metropolitan area and encompasses large parts of Cumberland County and York County.



Soils Information

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

Site Index

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

<u>Soil Series</u>	<u>White Pine</u>	<u>Red Pine</u>	<u>Red Oak</u>
BgB	-	-	-
BuB	-	-	-
BuC2	-	-	-
Sz	-	-	-
HIB	61	54	49
HIC	61	54	49
HrB	56	-	53
HrC	56	-	53
Sn	-	-	-
SuC2, SuD2, SuE2	62	-	60
WmB	-	-	-

Factors Affecting Forest Management

<u>Soil Series</u>	<u>Erosion Hazard</u>	<u>Soil Rutting Hazard</u>	<u>Windthrow Hazard</u>
BgB	Moderate	Severe	Moderate
BuB	Moderate	Severe	Moderate
BuC2	Severe	Severe	Moderate
Sz	Slight	Severe	Moderate
HIB	Moderate	Moderate	Slight
HIC	Moderate	Moderate	Slight
HrB	Moderate	Severe	Severe
HrC	Severe	Severe	Severe
Sn	Slight	Severe	Moderate
SuC2, SuD2, SuE2	Severe	Severe	Moderate
WmB	Slight	Moderate	Slight

Nicholville very fine sandy loam, 0 to 8 percent slopes, (BgB): The Nicholville series consists of very deep, moderately well drained soils formed in wind or water deposited material having a high content of silt and very fine sand. They are on lake plains and low benches on uplands. Estimated saturated hydraulic conductivity is moderately high or high. Most areas have been cleared and are used for growing hay, corn, small grain, and vegetable crops. Wooded areas support sugar maple, beech, Northern red oak, and some white pine.

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

Buxton Silt Loam, 3 to 8 percent slopes (BuC2): The Buxton series consists of very deep, moderately well drained soils that formed in glaciolacustrine or glaciomarine deposits on coastal lowlands and river valleys. Slope ranges from 3 to 50 percent. Permeability is moderate or moderately slow in the surface horizon, moderately slow or slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil and in the substratum. Cleared areas are used mainly for hay, forage crops, or pasture. Some areas are used for silage corn or

vegetables. The remaining areas are forested. Common tree species include eastern white pine, balsam fir, paper birch, white spruce, eastern hemlock, and northern red oak.

Swanton fine sandy loam (Sz): The Swanton series consists of very deep, somewhat poorly drained and poorly drained soils that formed in a thin mantle of loamy outwash materials over clayey marine or lacustrine deposits on lake and marine plains, and outwash plains and deltas. Slope ranges from 0 to 8 percent. Cleared areas are used mainly for hay and pasture and some row crops. The remaining areas are mostly forested and the common tree species are eastern white pine, white spruce, and red spruce. Hemlock, gray birch, red maple, sugar maple, balsam fir, and tamarack also are present to a lesser extent.

Hinkley loamy sand, 3 to 15 percent slopes, (H1B, H1C): The Hinkley series consists of very deep, excessively drained soils formed in glaciofluvial materials. They are nearly level through very steep soils on outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Saturated hydraulic conductivity is high or very high. Most areas are forested, brush land or used as urban land. Northern red, black, white, scarlet and scrub oak, eastern white and pitch pine, eastern hemlock, and gray birch are the common trees. Unimproved pasture and idle land support hardhack, little bluestem, bracken fern, sweet fern, and low bush blueberry.

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

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

Suffield silt loam, 8 to 45 percent slopes (SuC2, SuD2, SuE2): The Suffield series consists of very deep, well drained soils formed in lacustrine or marine sediments. They are mainly on gently sloping to very steep dissected plains. The soils formed in marine or lacustrine sediments consisting of a silt loam mantle over silty clay loam or silty clay materials. Mostly areas are cleared and are used for growing grass and legume hay, pasture, and corn silage. Common forest trees are sugar maple, oak, elm, white pine, and hemlock.

Windsor loamy sand, 0 to 8 percent slopes (WmB): The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. They are nearly level through very steep soils on glaciofluvial landforms. Most areas are forested or in low growing brushy vegetation. Some areas are used for silage corn, hay, and pasture. Small areas, mostly irrigated, are used for shade tobacco, vegetables and nursery stock. Some areas are in community development. Common trees are white, black, and northern red oak, eastern white pine, pitch pine, gray birch, poplar, red maple, and sugar maple.

Insects, Disease and Forest Health

As is typical with white pine in the area, some blister rust was witnessed as well as white pine weevil damage. Also, with the amount of oak present on this parcel, Gypsy moth activity should be monitored. Some gypsy moth egg masses were witnessed during the timber inventory. 4% of the basal area is red oak.

Another situation to monitor is the presence of white pine needle cast which was fairly moderate last year. The needles should be dropped and the trees green again by the beginning of July. The situation will be monitored by the forestry committee and forester. White pine needle cast has been occurring regularly now for roughly the past ten to 15 years. The problem appears to be much worse when the pine trees are in close proximity to waterbodies. 23% of the basal area is white pine.



(Picture Maine Forest Service)

As is typical with American Beech in Maine, Beech bark disease exists throughout the beech on the lot. Beech bark disease has been detected in Maine since the 1930's. The disease is caused by the combination of a scale insect and two necrotic fungi. The complex causes degradation of wood quality and mortality in Beech. It also allows other fungi and insects to enter the trees through the damaged areas it has created. There is no cost-effective approach to controlling beech bark disease in the forest setting. Forest management decisions should factor in the extent of the disease and options for diversifying species composition in heavily infested beech areas. While only 1% 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 (6% 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 27% of the lots basal area.

Portions of the Twin Brook Forest have a major invasive plant issue. The area surrounding the dog trail is overrun with Buckthorn and Honeysuckle. The most recent harvest areas have scattered invasive plants that should be addressed immediately. Other areas of dense plants and scattered individuals exist across the entire parcel, especially along the field edges. Timber harvesting should be paused until a plan is implemented to eliminate the invasive plant issues. I believe that any plan will involve mechanical and chemical treatment in order to begin to control this issue. A new MFS Invasive Plant Plan is being developed along with this forest management plan. Much more detail related to the invasive plants will be covered in that plan along with a strategy to control the spread and eradicate in areas.

Access

Access to Twin Brook is sufficient from Greely Rd. or Tuttle Rd. on existing access roads that provide public use and maintenance services currently. The most recent harvests accessed from the abutters parcel on Mustang Ln. though no log trucks were used during the harvest. For future harvests temporary log landings could be utilized along field edges in order to access other areas of the forestland.

I did not witness any major erosion problems on the current access points. Some small sections of the recreation trails have erosion issues because of high use. Some more permanent trail work needs to be completed at the intersection of the fields and woods in areas of the more recent harvesting. Also, the old wooden bridges should be removed when this is completed.

Interaction with Surrounding Properties

Twin Brook Recreation Area is a major gathering point for various recreational activities. The athletic fields, open fields and woodland provide numerous opportunities for the public to enjoy the land. The land is not connected to any other public use properties. It has one corner in common with Crossing Brook, though it is across the Maine Central Railroad Corridor and there is no approved trail crossing of the railroad corridor. However, I did witness people crossing when conducting fieldwork.

Legal Obligations

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

-Deed restrictions: According to the best available knowledge of the landowner and the forester's review of the deeds, the property is not subject to deed restrictions which affect forest management activities. However, a 4-acre Wetlands Preservation Area exists and was required by the Maine DEP. No vegetation can be removed in this area (see map).

-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. Any commercial timber harvesting requires notification of the Maine Forest Service. This notification must take place online using the new Maine Forest Service Forest Online Resource Tool. 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. A 75' streamside protection zone exists on the East Branch of the Piscataqua River, Windle Brook and Maxfield Brook.

-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.

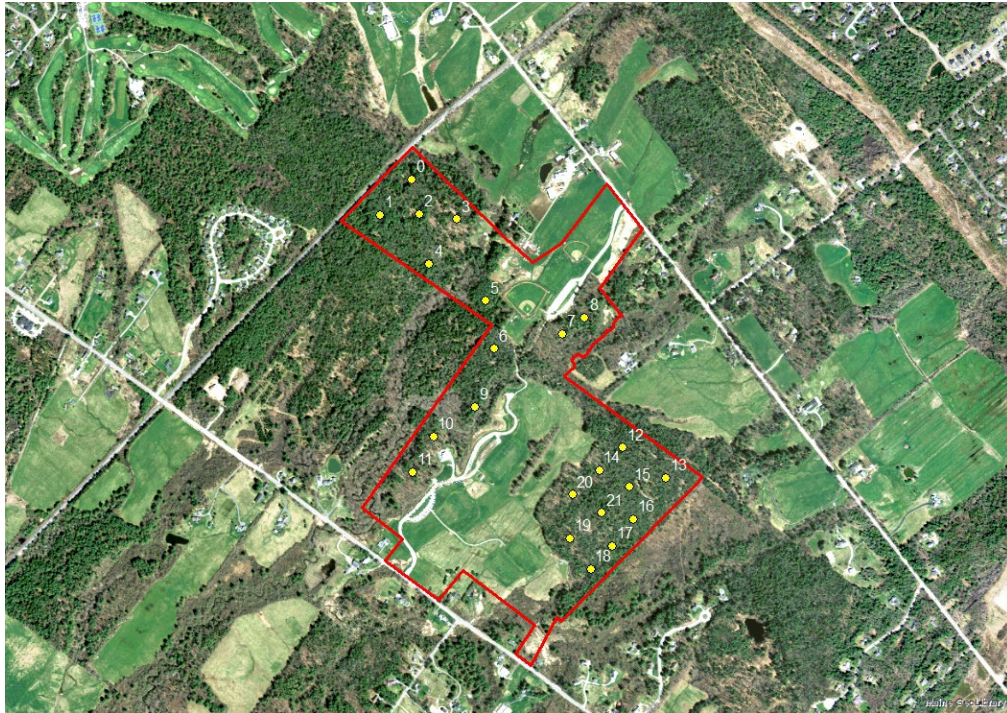
Property Tax Status

None of the parcel is enrolled in Maine Tree Growth Tax program, as the landowner is a municipality.

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. 22 BAF 20 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 Twin Brook Forest. The full report is attached in the index of this plan. Below is a summary of the findings:

- “The property is within a New England cottontail (NEC) Focal Area, in which MDIFW and our conservation partners are attempting to restore the species. Cottontails can be differentiated from the more common snowshoe hare by their 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.” In 2014 the forester had a discussion with then cottontail biologist Kelly Boland regarding Twin Brook. At that time, she had conducted a review of the property and scat was collected and tested. No populations were discovered.

- “Vernal pools are shallow wetlands that contain water for much of the year, often drying out by mid to late summer, and can be found as either isolated depressions in forested uplands or as basins in larger swamps. Vernal pools provide valuable habitat for frogs, salamanders, and a diversity of invertebrates that play a significant role in the local ecology of Maine forests. While vernal pools are distributed statewide, most have not yet been mapped or surveyed. Forest management is usually compatible with the conservation of vernal pool habitat if practiced in an ecologically sensitive manner.” I did not witness any at Twin Brook but if there are, Forestry Habitat Management Guidelines for Vernal Pool Wildlife should be followed.

- “Other than those described above or listed in the Forest Management Plan Review section, no other natural resources of statewide significance have been documented in the reviewed area. The “Unconfirmed presence” for Endangered, Threatened, or Special Concern Animals; Rare, Threatened, or Endangered Plants; or Rare/Exemplary Natural Communities may be a lack of comprehensive data rather than the absence of those resources in the reviewed area.”

Wildlife Habitat Elements

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

Snag trees (standing dead trees) should be retained where feasible (not adjacent to hiking trails) to provide valuable cavities for species such as woodpecker. Currently 6% of the standing basal area would be considered snags, which equates to 18.5+/- trees per acre. The average diameter of the snags is 13” dbh. During future management activities managers should identify and reserve larger diameter (20” + dbh) legacy trees as future snag trees. Increasing the average diameter of snags would be beneficial in creating larger cavity trees and future down woody debris.

Harvesters should also be encouraged to return some large woody material from yard areas to the woods, which in turn will provide valuable habitat to a variety of invertebrates and vertebrates. Maintaining a diversity of tree species and age classes is the best way to provide the greatest good to the greatest variety of wildlife species.

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

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

Historical, Cultural & Archaeological Sites

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

Recreation and Aesthetics

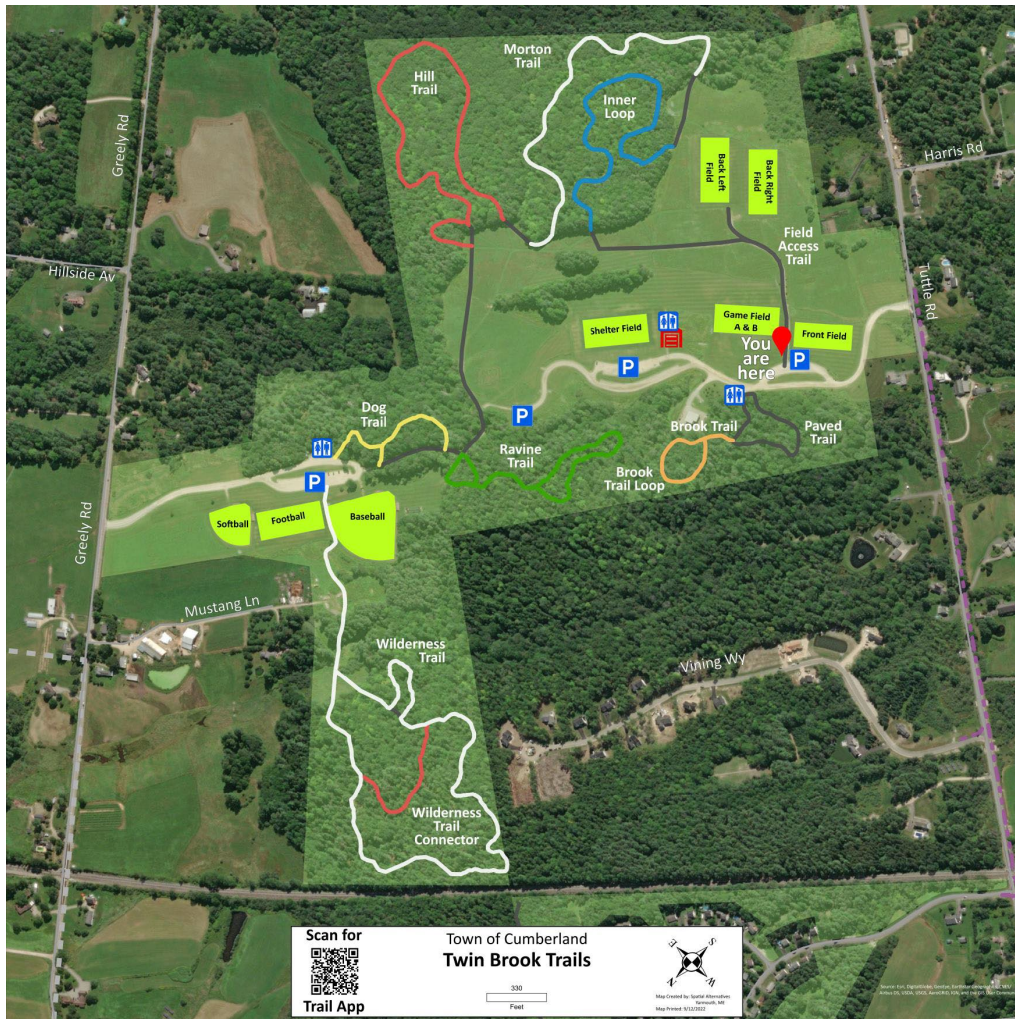
The lot is well used as a recreational destination. The trails are used by walkers, bikers, skiers, snowshoers, hunters and nature watchers regularly. This is very important for managers to recognize as recreation trails should be avoided by harvesting equipment. However, often the recreation trails 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.

Another thought is that it appears the invasive plants are traveling along the trail corridors. It is highly likely that animals and humans may be inadvertently spreading seed along the trails from infested areas to non-infested areas. This may be an important future educational topic for the public as well. The Dog Trail has the worst infestation of invasive plants in proximity to the trail. This should be discussed as part of the Invasive Plant Plan being developed for the forest.

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 Twin Brook 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 piles should be kept well away from property lines and the hiking trails.

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

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

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

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

Prism BAF or Plot Size = 20
Acres = 128.0
of Plots = 22
Acres Per Plot = 5.8

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

Species	Roots C Tonnes	Stump C Tonnes	Bole C Tonnes	Top C* Tonnes	AG C Tonnes	AG CO ₂ eq Tonnes	Total Mer. Cords
Balsam fir	12	0	41	10	51	188	90
Hemlock	192	0	686	153	840	3,080	1,349
Red spruce	20	0	72	16	88	321	147
White pine	224	0	833	165	998	3,661	1,843
Softwood	448	1	1,632	345	1,977	7,251	3,430
Aspen	11	0	43	15	58	212	58
Beech	19	0	80	21	101	370	111
Snags	0	0	0	0	0	0	0
Black cherry	6	0	23	7	30	110	35
Paper birch	6	0	22	7	29	106	31
Red maple	216	1	850	265	1,116	4,093	1,425
Red oak	55	0	230	57	288	1,054	300
Sugar maple	84	0	328	105	434	1,590	413
White ash	84	0	342	94	436	1,599	493
Yellow birch	7	0	23	12	36	131	36
Hardwood	487	1	1,943	583	2,527	9,265	2,901
Totals	935	2	3,574	927	4,504	16,516	6,331

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

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

Long Range Silvicultural Objectives

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

Management will guide the forest towards late successional conditions. The Maine DEP requires that the 4-acre wetland preservation area be maintained and no vegetation removed. This area will be placed as a “reserve” area and expanded. The steep slopes associated with the stream and brook corridors along with the forested wetland areas will be added as “reserve” areas. I estimate that an additional 30 acres will be added to the reserve area based on field work.

Growth Estimates

Growth estimates were calculated using local information related to red pine stands and mixed forests. Current estimates are net growth rates of 0.75 cords per acre per year would provide a target estimate of approximately 96 cords of growth annually on the parcel. Over the next ten-year planning period the recommendations in this plan call for the potential removal of 250 – 300 cords of low-quality wood. The growth over that same period is estimated at 960 cords. Growth will far out-pace harvested volume recommendations prepared in this plan.

Individual Stand Descriptions and Prescriptions

For stand description purposes, data was grouped into four different forest segments (compartments) In this situation descriptions were not prepared for non-wooded areas. In the event of a natural disaster such as another ice storm, an insect or disease infestation, modified landowner objectives, poor weather or timber market conditions, recommendations made below can be altered with little effect on the long-term sustainable management of this parcel. It is important to let your forester know about changes so that the plan can be amended as necessary. None of the recommendations below should be implemented if poor timber markets or weather conditions exist, as this would have a negative effect on long term sustainable goals for the woodlot. These stand prescriptions are good for ten-years. Prior to forest management activities beyond ten-years, this plan and the recommendations should be updated by the Town of Cumberland and a licensed forester.

Results are presented for the following forest types and segments:

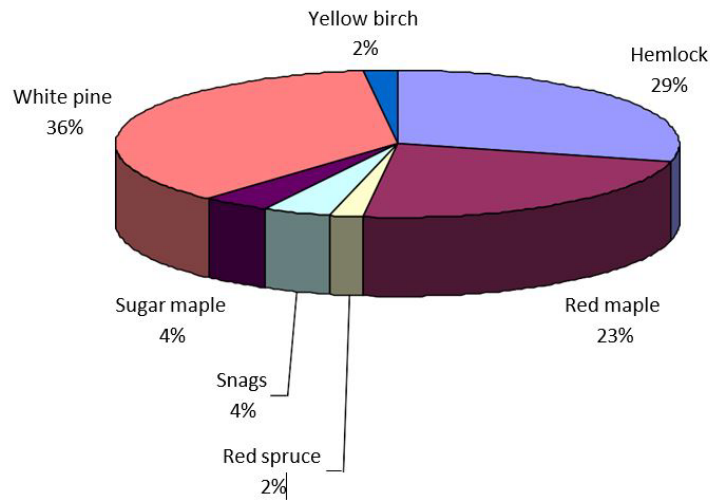
Forest Typing Key					
H- Hardwood Type					Treesize
S- Softwood Type					1 0 - 6' height
SH - Mixed - Softwood Dominate	>50%				2 1" - 3" diameter
HS- Mixed - Hardwood Dominate	> 50%				3 3" - 8" diameter
CS- Cedar Type					4 8"- 12" diameter
					5 12"+ diameter
A- Very Dense (overstocked)					
B-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

Stand	Forest Type	Acres
Compartment 1	SH4A	36
Compartment 2	SH4A	17
Compartment 3	HS4A	44
Compartment 4	HS4A	26
	Total	123

Compartment 1
36 acres
Overstory: SH4A



Dominant Species

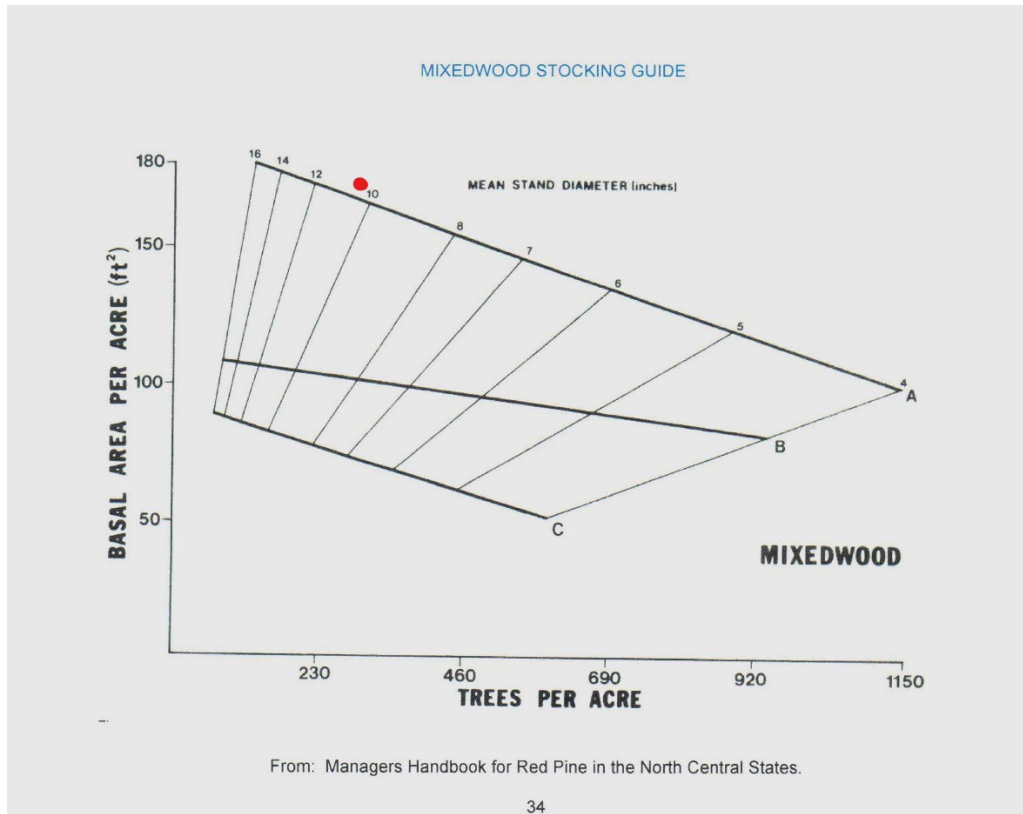


Compartment 1 has been the focus of on and off firewood harvesting by neighbor Jeff Storey over the past 6+ years, weather dependent. Timber has been marked by a licensed forester starting with Chip Love and more recently Paul Larrivee. The focus of the removal has been low quality, declining and suppressed stems in favor of higher quality growing stock. Some larger pine, hemlock and hardwood were removed for use on the Storey Farm. However, snags were retained away from the recreation trails. A 4-acre permanent wetland preservation area exists and no timber was harvested within it. A red blazed and painted line delineates this area on the ground. A Maine Forest Service Statewide Standards 75' streamside protection zone exists around the perimeter of the compartment. During past harvesting activities no timber harvesting occurred within approximately 150' of the stream channels.



The compartment is considered uneven-aged. Current stocking levels would be considered “over stocked” from a timber management standpoint. The quadratic mean stand diameter is 10.2” DBH, basal area is 173.3 sq. ft./acre and contains 55.2 cords/acre of volume (32 of the 55.2 cords is considered pulpwood sized). The timber quality in this stand ranges from good to excellent.

The compartment has a low component of invasive plants scattered mostly around the hiking trails. These should be the highest priority for the stand during this management period. Also, fixing several “soft” spots on the trails with permanent solutions should be addressed with the town staff and trails committee.



Recommendations:

Based on the town of Cumberland's Guiding Principles, the current recommendation is to allow the compartment to grow for another ten-year planning period. The stocking guides place the compartment above the A line, however the repeated entries of the last several years should be over. The woodlot should be allowed to grow for another ten years and re-examined for updated recommendations in 2033. No thinning should occur in 2033 unless the invasive species issues have been tackled and this management plan has been updated. Future harvesting should continue transitioning the compartment toward a late successional structure in order to enhance plant and animal diversity and higher levels of carbon storage. Focus should be on continuing the transition of the compartment towards a red oak-white pine- hemlock forest. This can be accomplished with continuing the individual tree and group selection management regime that has been occurring in the compartment over the last decade.

Per Acre Volume Estimates by Type or Stand

Type or Stand	Compartiment 1			
Prism BAF or Plot Size =	20			
Acres =	41.0			
# of Plots =	6	Acres Per Plot =	6.8	
Quadratic Mean Diameter =	10.2 in.			

International 1/4" log rule.

Smalian's equation.

85 Net Cubic Feet Per Merch. Cord.

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Hemlock	50.0	156.5	0	1,938	0	0	0.0	9.0	12.6
Red spruce	3.3	4.2	0	407	0	0	0.0	0.3	1.2
White pine	63.3	26.1	0	9,119	0	0	0.0	9.3	25.9
Softwood	116.7	186.9	0	11,464	0	0	0.0	18.6	39.6
Snags	6.7	7.6	0	0	0	0	0.0	0.0	0.0
Red maple	40.0	58.9	0	1,125	0	0	0.0	11.1	13.3
Sugar maple	6.7	15.7	0	0	0	0	0.0	2.0	2.0
Yellow birch	3.3	38.2	0	0	0	0	0.0	0.3	0.3
Hardwood	56.7	120.4	0	1,125	0	0	0.0	13.4	15.6
Totals	173.3	307.2	0	12,589	0	0	0.0	32.0	55.2

Per Acre Stumpage Estimates from MBF & Ton Values by Type or Stand

Type or Stand	Compartiment 1				
Prism BAF or Plot Size =	20				
Acres =	41.0				
# of Plots =	6				
Acres Per Plot =	6.8				
Quadratic Mean Diameter =	10.2 in.				

International 1/4" log rule.
 Smalian's equation.

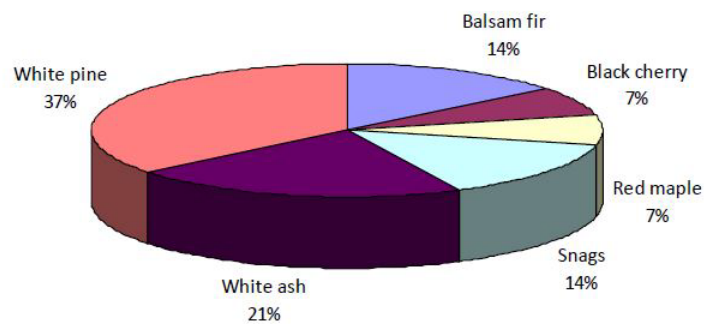
Species	BA /Acre	Trees /Acre	Veneer \$/Ac	Saw \$/Ac	Pallet \$/Ac	Boltwood \$/Ac	Pot. Log \$/Ac	Pulp \$/Ac	Total \$/Ac
Hemlock	50.0	156.5	\$0	\$136	\$0	\$0	\$0	\$86	\$222
Red spruce	3.3	4.2	\$0	\$81	\$0	\$0	\$0	\$3	\$84
White pine	63.3	26.1	\$0	\$2,280	\$0	\$0	\$0	\$80	\$2,360
Softwood	116.7	186.9	\$0	\$2,497	\$0	\$0	\$0	\$169	\$2,666
Snags	6.7	7.6	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Red maple	40.0	58.9	\$0	\$225	\$0	\$0	\$0	\$199	\$424
Sugar maple	6.7	15.7	\$0	\$0	\$0	\$0	\$0	\$43	\$43
Yellow birch	3.3	38.2	\$0	\$0	\$0	\$0	\$0	\$6	\$6
Hardwood	56.7	120.4	\$0	\$225	\$0	\$0	\$0	\$249	\$474
Totals	173.3	307.2	\$0	\$2,722	\$0	\$0	\$0	\$418	\$3,140

			MBF Products				Ton Products		All Tons
Associated MBF & Tons/Ac			0.000	12.589	0.000	0.000	0.0	73.4	124.3
\$/MBF & \$/Ton			#Num!	\$216	#Num!	#Num!	#Num!	\$6	\$25

Compartment 2
17 acres
Overstory: SH4A



Dominant Species

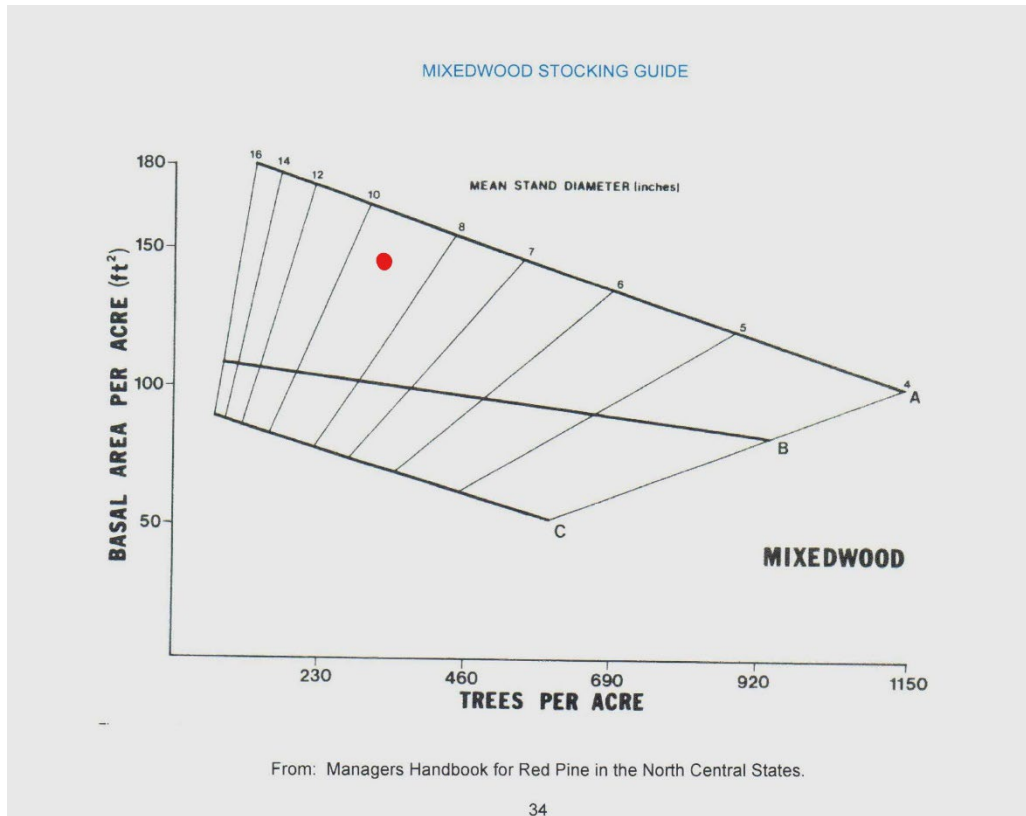


Compartment 2 is the area all around the “Dog Loop Trail”. The timber and the soils are poor in the majority of this compartment. No recent forest management has occurred in this compartment. The majority of the stand is overrun with invasive buckthorn and honey suckle. A Maine Forest Service Statewide Standards 75’ streamside protection zone exists around the perimeter of the compartment.



The majority of the compartment is considered even-aged. Current stocking levels place the stand between the “A” and “B” Line and would be considered “adequately stocked” from a timber management standpoint. The quadratic mean stand diameter is 9.2” DBH, basal area is 140 sq. ft./acre and contains 34.3 cords/acre of volume (31.7 of the 34.3 cords is considered pulpwood sized). The timber quality in this stand is mostly poor-quality white pine, declining balsam fir and red maple and ash.

The compartment has a very high component of invasive plants throughout the woods and along the field edges. At this point this stand should be left alone and should be a lower priority for invasive species control than all the other compartments on the property.



Recommendations:

Based on the town of Cumberland's Guiding Principles, the current recommendation is to allow the compartment to grow for another ten-year planning period. The stocking guides place the compartment between the A and B line. The compartment should be allowed to grow for at least another ten years and re-examined for updated recommendations in 2033. No thinning should occur beyond 2033 unless the invasive species issues have been addressed. However, this area is so overrun with invasives, the focus on invasive plant treatment should be in other compartments first. Future harvesting, if undertaken at all, should remove declining balsam fir and very poor-quality white pine. Based on the soils, the majority of the compartment will likely never produce a well-stocked stand of high-quality timber. However, improvements in the vigor of the timber can be accomplished with individual tree and group selection management regime on roughly 20-year rotations.

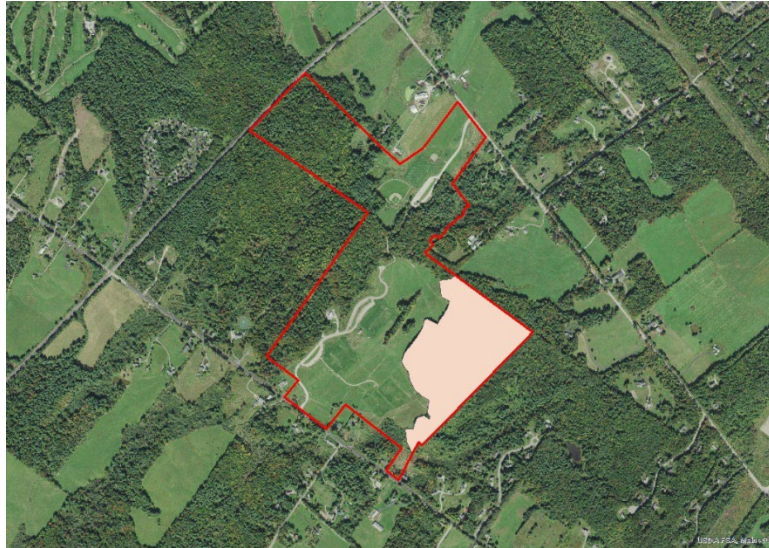
Per Acre Volume Estimates by Type or Stand

Type or Stand Compartment 2 Prism BAF or Plot Size = 20 Acres = 17.0 # of Plots = 2 Acres Per Plot = 8.5 Quadratic Mean Diameter = 9.2 in.									
International 1/4" log rule. Smalian's equation. 85 Net Cubic Feet Per Merch. Cord.									
Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Balsam fir	20.0	57.3	0	0	0	0	0.0	4.0	4.0
White pine	50.0	134.2	0	1,460	0	0	0.0	12.7	15.3
Softwood	70.0	191.5	0	1,460	0	0	0.0	16.7	19.3
Snags	20.0	35.8	0	0	0	0	0.0	0.0	0.0
Black cherry	10.0	12.7	0	0	0	0	0.0	2.1	2.1
Red maple	10.0	18.3	0	0	0	0	0.0	3.2	3.2
White ash	30.0	43.8	0	0	0	0	0.0	9.7	9.7
Hardwood	70.0	110.7	0	0	0	0	0.0	15.0	15.0
Totals	140.0	302.2	0	1,460	0	0	0.0	31.7	34.3

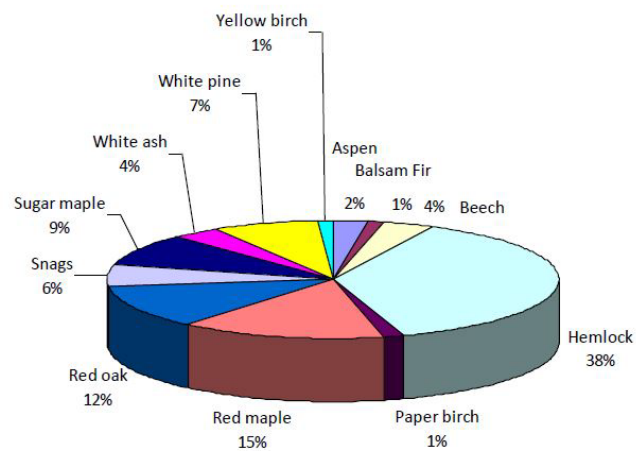
Per Acre Stumpage Estimates from MBF & Ton Values by Type or Stand

Type or Stand Compartment 2 Prism BAF or Plot Size = 20 Acres = 17.0 # of Plots = 2 Acres Per Plot = 8.5 Quadratic Mean Diameter = 9.2 in.									
International 1/4" log rule. Smalian's equation.									
Species	BA /Acre	Trees /Acre	Veneer \$/Ac	Saw \$/Ac	Pallet \$/Ac	Boltwood \$/Ac	Pot. Log \$/Ac	Pulp \$/Ac	Total \$/Ac
Balsam fir	20.0	57.3	\$0	\$0	\$0	\$0	\$0	\$34	\$34
White pine	50.0	134.2	\$0	\$365	\$0	\$0	\$0	\$109	\$474
Softwood	70.0	191.5	\$0	\$365	\$0	\$0	\$0	\$143	\$508
Snags	20.0	35.8	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Black cherry	10.0	12.7	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Red maple	10.0	18.3	\$0	\$0	\$0	\$0	\$0	\$58	\$58
White ash	30.0	43.8	\$0	\$0	\$0	\$0	\$0	\$175	\$175
Hardwood	70.0	110.7	\$0	\$0	\$0	\$0	\$0	\$233	\$233
Totals	140.0	302.2	\$0	\$365	\$0	\$0	\$0	\$376	\$741
			MBF Products				Ton Products		All Tons
Associated MBF & Tons/Ac			0.000	1.460	0.000	0.000	0.0	69.6	75.1
\$/MBF & \$/Ton			#Num!	\$250	#Num!	#Num!	#Num!	\$5	\$10

Compartment 3
44 acres
Overstory: HS4A



Dominant Species



Compartment 3 is the area all around the Morton and Hill Trails as well as the Inner Loop. This is the largest block of forestland on the property with no zoned waterbodies. No recent forest management has occurred in this compartment. Portions of the compartment near the Hill Trail and Inner Trail would be considered older growth later succession forest. Areas along the property line and near the Morton Trail are younger, poor-quality pine areas that are compromised with invasive species. The older growth areas have invasive plants scattered along the hiking trails.



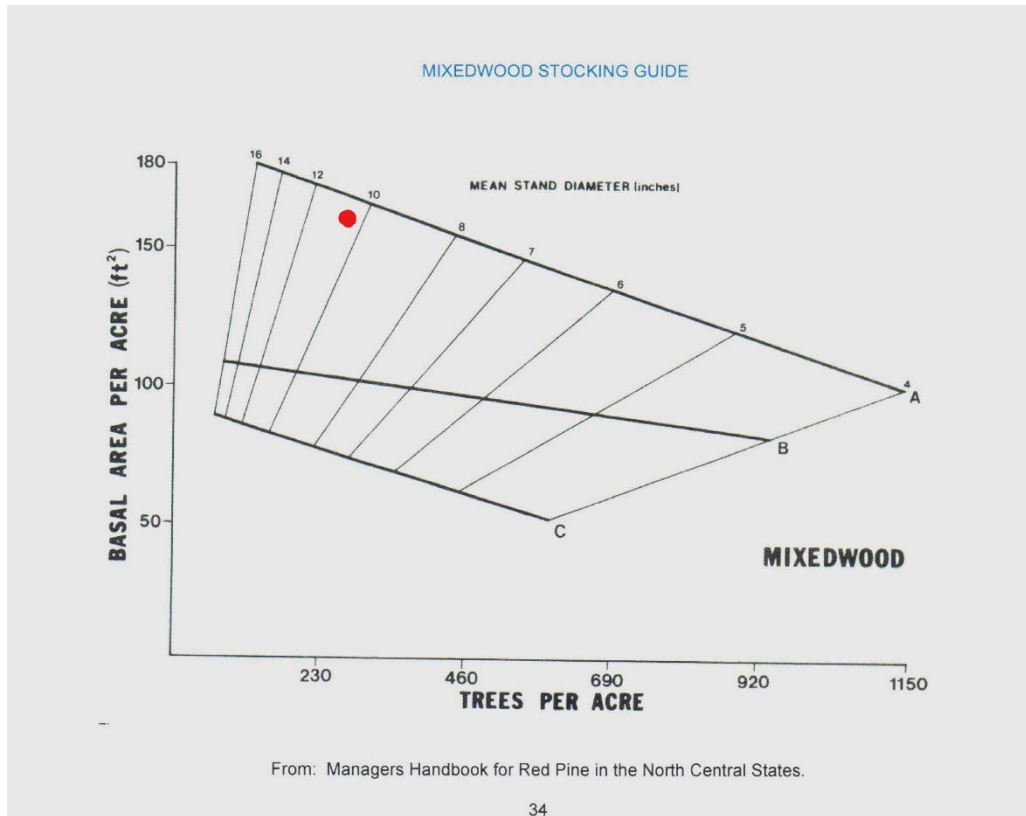
*Older Growth Area of the Compartment



*Rough Pine and invasives near the property line and Morton Trail

The majority of the compartment is considered uneven-aged. Current stocking levels place the stand near the “A” line and would be considered “adequately to overstocked” from a timber management standpoint. The quadratic mean stand diameter is 10.6” DBH, basal area is 164 sq. ft./acre and contains 49.4 cords/acre of volume (35.8 of the 49.4 cords is considered pulpwood sized). The timber quality in this compartment ranges from poor quality white pine to high quality red oak and white pine.

The compartment has a very high component of invasive plants in areas of the poorer quality, younger white pine near the property line. Areas along the trails in the older portions of the forest have scattered invasive plants that should be dealt with immediately.



Recommendations:

This stand presents the best opportunity for some very light low impact forest management in areas but only if invasive plants are dealt with. Any forest management activity would have to utilize smaller low-impact equipment given the number of recreation trails that traverse the compartment. Harvesting should focus on low-quality declining stems in favor of higher quality white pine, red oak and hemlock throughout the compartment. This should only happen after treatment of invasive plants along the trail corridors and after discussions with the abutting landowners about invasive plant issues. Harvesting should be restricted to the winter in order to utilize a log landing in the open areas of the property. After this treatment the compartment should be allowed to grow to 15-20 years and re-examined.

Per Acre Volume Estimates by Type or Stand

Type or Stand		Compartiment 3							
Prism BAF or Plot Size =		20							
Acres =		44.0							
# of Plots =		10		Acres Per Plot =		4.4			
Quadratic Mean Diameter =		10.6 in.							

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

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Balsam fir	2.0	5.7	0	0	0	0	0.0	0.5	0.5
Hemlock	62.0	150.6	0	2,290	0	0	0.0	11.9	16.2
White pine	12.0	3.7	0	1,261	0	0	0.0	2.5	4.8
Softwood	76.0	160.1	0	3,551	0	0	0.0	14.9	21.4
Aspen	4.0	6.2	0	0	0	0	0.0	1.3	1.3
Beech	6.0	3.7	0	181	0	0	0.0	2.2	2.5
Snags	10.0	24.7	0	0	0	0	0.0	0.0	0.0
Paper birch	2.0	2.5	0	142	0	0	0.0	0.4	0.7
Red maple	24.0	30.3	0	763	0	0	0.0	6.8	8.4
Red oak	20.0	10.8	0	1,533	0	0	0.0	4.0	6.8
Sugar maple	14.0	17.8	0	755	0	0	0.0	3.9	5.3
White ash	6.0	4.1	0	329	0	0	0.0	1.8	2.4
Yellow birch	2.0	5.7	0	0	0	0	0.0	0.6	0.6
Hardwood	88.0	105.9	0	3,702	0	0	0.0	20.9	28.0
Totals	164.0	266.0	0	7,253	0	0	0.0	35.8	49.4

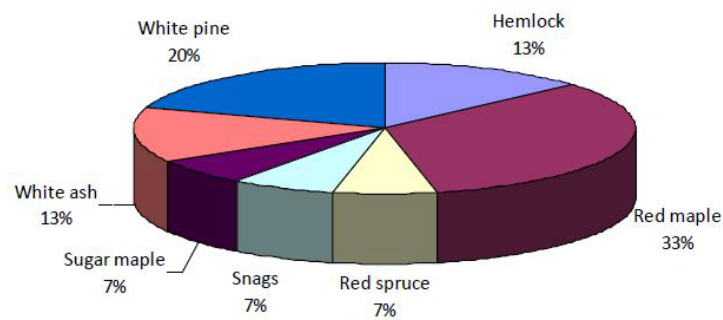
Per Acre Stumpage Estimates from MBF & Ton Values by Type or Stand

Type or Stand			Compartiment 3						
Prism BAF or Plot Size =			20						
Acres =			44.0						
# of Plots =			10						
Acres Per Plot =			4.4						
Quadratic Mean Diameter =			10.6 in.						
International 1/4" log rule. Smalian's equation.									
Species	BA /Acre	Trees /Acre	Veneer \$/Ac	Saw \$/Ac	Pallet \$/Ac	Boltwood \$/Ac	Pot. Log \$/Ac	Pulp \$/Ac	Total \$/Ac
Balsam fir	2.0	5.7	\$0	\$0	\$0	\$0	\$0	\$4	\$4
Hemlock	62.0	150.6	\$0	\$160	\$0	\$0	\$0	\$114	\$274
White pine	12.0	3.7	\$0	\$315	\$0	\$0	\$0	\$22	\$337
Softwood	76.0	160.1	\$0	\$476	\$0	\$0	\$0	\$140	\$615
Aspen	4.0	6.2	\$0	\$0	\$0	\$0	\$0	\$23	\$23
Beech	6.0	3.7	\$0	\$36	\$0	\$0	\$0	\$40	\$76
Snags	10.0	24.7	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Paper birch	2.0	2.5	\$0	\$18	\$0	\$0	\$0	\$7	\$25
Red maple	24.0	30.3	\$0	\$153	\$0	\$0	\$0	\$123	\$276
Red oak	20.0	10.8	\$0	\$537	\$0	\$0	\$0	\$85	\$622
Sugar maple	14.0	17.8	\$0	\$189	\$0	\$0	\$0	\$84	\$273
White ash	6.0	4.1	\$0	\$99	\$0	\$0	\$0	\$32	\$130
Yellow birch	2.0	5.7	\$0	\$0	\$0	\$0	\$0	\$12	\$12
Hardwood	88.0	105.9	\$0	\$1,030	\$0	\$0	\$0	\$406	\$1,436
Totals	164.0	266.0	\$0	\$1,506	\$0	\$0	\$0	\$545	\$2,051
			MBF Products				Ton Products		All Tons
Associated MBF & Tons/Ac			0.000	7.253	0.000	0.000	0.0	85.7	118.6
\$/MBF & \$/Ton			#Num!	\$208	#Num!	#Num!	#Num!	\$6	\$17

Compartment 4
26 acres
Overstory: HS4A



Dominant Species



Compartment 4 is the area all around the Ravine, Paved and Brook Trails. The timber ranges from poor to good quality. Central areas of this stand would be considered forested wetland and the understory is dominated by invasive plants. Invasive plants occupy all areas of this compartment. Invasive plants are all along the paved trail and the ravine trail.



*Invasive Plants in understory



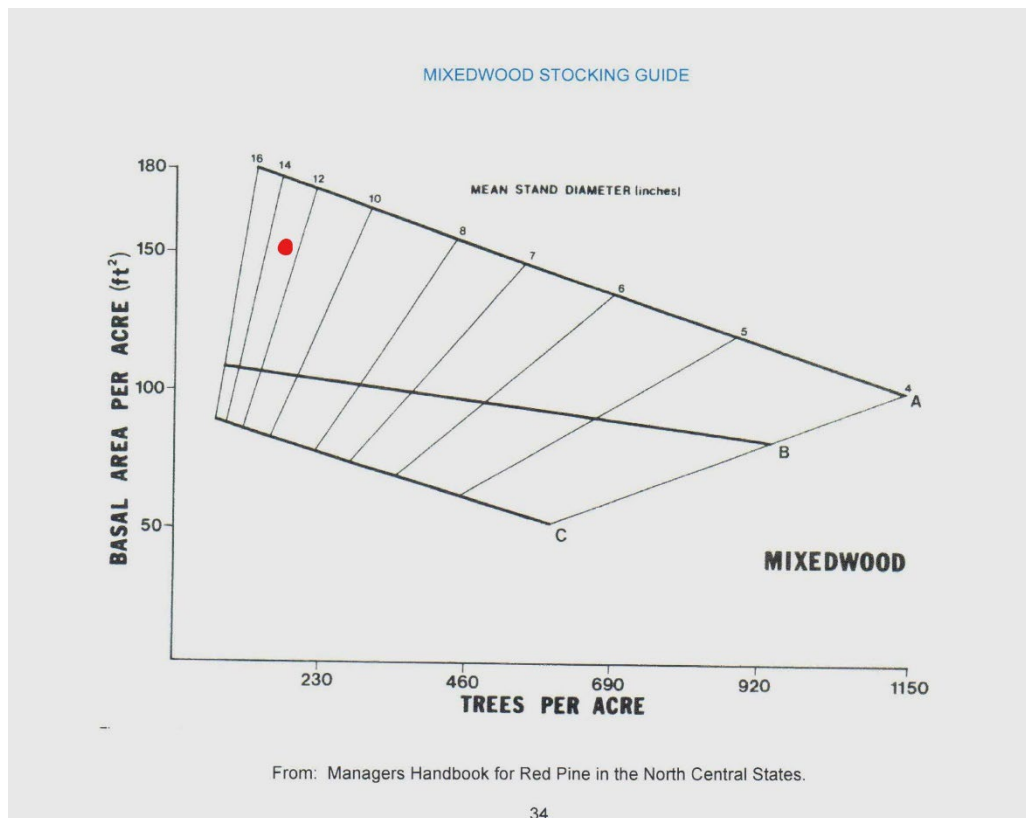
*Forested wetland area with invasive plants in understory



*Invasive plants along paved trail

The majority of the compartment is considered uneven-aged. Current stocking levels place the stand between the “A” and “B” Line and would be considered “adequately stocked” from a timber management standpoint. The quadratic mean stand diameter 12.5” DBH, basal area is 150 sq. ft./acre and contains 50.5 cords/acre of volume (35.6 of the 50.5 cords is considered pulpwood sized).

The compartment has a very high component of invasive plants along the field edges as well as in the woodland.



Recommendations:

Based on the town of Cumberland’s Guiding Principles, the current recommendation is to allow the compartment to grow for another ten-year planning period. The stocking guides place the compartment between the A and B line. The compartment should be allowed to grow for at least another ten years and re-examined for updated recommendations in 2033. No thinning should occur in 2033 unless the invasive species issues have been addressed. However, areas are so overrun with invasives, the focus on invasive plant treatment should only be in portions of this compartment to start. Given the paved trail, the ravine and the two (2) Maine Forest Service Statewide Standards 75’ streamside protection zones, this compartment offers little in the way of future forest management. It is more likely that this area will be managed for safety hazards to trails only.

Per Acre Volume Estimates by Type or Stand

Type or Stand	Compartment 4		
Prism BAF or Plot Size =	20		
Acres =	26.0		
# of Plots =	4	Acres Per Plot =	6.5
Quadratic Mean Diameter =	12.5 in.		

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

Species	BA /Acre	Trees /Acre	Veneer Bd Ft/Ac	Saw Bd Ft/Ac	Pallet Bd Ft/Ac	Boltwood Bd Ft/Ac	Pot. Log Cds/Ac	Pulp Cds/Ac	Total Cds/Ac
Hemlock	20.0	70.1	0	915	0	0	0.0	3.0	4.7
Red spruce	10.0	8.3	0	1,538	0	0	0.0	0.9	3.8
White pine	30.0	7.9	0	843	0	0	0.0	10.5	12.0
Softwood	60.0	86.2	0	3,296	0	0	0.0	14.3	20.6
Snags	10.0	13.8	0	0	0	0	0.0	0.0	0.0
Red maple	50.0	54.8	0	2,266	0	0	0.0	13.4	17.6
Sugar maple	10.0	11.0	0	743	0	0	0.0	2.2	3.7
White ash	20.0	9.8	0	1,580	0	0	0.0	5.7	8.6
Hardwood	90.0	89.5	0	4,589	0	0	0.0	21.3	29.9
Totals	150.0	175.7	0	7,885	0	0	0.0	35.6	50.5

Per Acre Stumpage Estimates from MBF & Ton Values by Type or Stand

Type or Stand	Compartment 4		
Prism BAF or Plot Size =	20		
Acres =	26.0		
# of Plots =	4		
Acres Per Plot =	6.5		
Quadratic Mean Diameter =	12.5 in.		

International 1/4" log rule.
Smalian's equation.

Species	BA /Acre	Trees /Acre	Veneer \$/Ac	Saw \$/Ac	Pallet \$/Ac	Boltwood \$/Ac	Pot. Log \$/Ac	Pulp \$/Ac	Total \$/Ac
Hemlock	20.0	70.1	\$0	\$64	\$0	\$0	\$0	\$28	\$92
Red spruce	10.0	8.3	\$0	\$308	\$0	\$0	\$0	\$8	\$315
White pine	30.0	7.9	\$0	\$211	\$0	\$0	\$0	\$90	\$301
Softwood	60.0	86.2	\$0	\$582	\$0	\$0	\$0	\$126	\$709
Snags	10.0	13.8	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Red maple	50.0	54.8	\$0	\$453	\$0	\$0	\$0	\$241	\$694
Sugar maple	10.0	11.0	\$0	\$186	\$0	\$0	\$0	\$47	\$233
White ash	20.0	9.8	\$0	\$474	\$0	\$0	\$0	\$103	\$577
Hardwood	90.0	89.5	\$0	\$1,113	\$0	\$0	\$0	\$391	\$1,504
Totals	150.0	175.7	\$0	\$1,695	\$0	\$0	\$0	\$517	\$2,213
			MBF Products				Ton Products		All Tons
Associated MBF & Tons/Ac			0.000	7.885	0.000	0.000	0.0	80.4	114.2
\$/MBF & \$/Ton			#Num!	\$215	#Num!	#Num!	#Num!	\$6	\$19

Total Stumpage Estimates from MBF & Ton Values for All Types or Stands Combined

Stratified Estimates Combined							
Prism BAF or Plot Size =		20					
Acres =		128.0					
# of Plots =		22					
Acres Per Plot =		5.8					
International 1/4" log rule. Smalian's equation.							
Species	Veneer Total \$	Saw Total \$	Pallet Total \$	Boltwood Total \$	Pot. Log Total \$	Pulp Total \$	Total Stumpage \$
Balsam fir	\$0	\$0	\$0	\$0	\$0	\$756	\$756
Hemlock	\$0	\$14,278	\$0	\$0	\$0	\$9,296	\$23,574
Red spruce	\$0	\$11,335	\$0	\$0	\$0	\$315	\$11,649
White pine	\$0	\$119,024	\$0	\$0	\$0	\$8,438	\$127,462
<i>Softwood</i>	\$0	\$144,637	\$0	\$0	\$0	\$18,805	\$163,442
Aspen	\$0	\$0	\$0	\$0	\$0	\$1,002	\$1,002
Beech	\$0	\$1,593	\$0	\$0	\$0	\$1,739	\$3,332
Snags	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Black cherry	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Paper birch	\$0	\$779	\$0	\$0	\$0	\$311	\$1,090
Red maple	\$0	\$27,723	\$0	\$0	\$0	\$20,819	\$48,542
Red oak	\$0	\$23,607	\$0	\$0	\$0	\$3,756	\$27,363
Sugar maple	\$0	\$13,136	\$0	\$0	\$0	\$6,696	\$19,832
White ash	\$0	\$16,662	\$0	\$0	\$0	\$7,064	\$23,726
Yellow birch	\$0	\$0	\$0	\$0	\$0	\$775	\$775
<i>Hardwood</i>	\$0	\$83,500	\$0	\$0	\$0	\$42,163	\$125,663
Totals	\$0	\$228,137	\$0	\$0	\$0	\$60,967	\$289,104
	MBF Products in International 1/4" log rule.				Ton Products		All Tons
Total MBF & Tons	0.0	1,065.1	0.0	0.0	0	10,051	14,559
\$/MBF & \$/Ton	#Num!	\$214	#Num!	#Num!	#Num!	\$6	\$20

* 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.

*22 variable radius points were randomly placed using ArcGis and a GPS receiver across 128 forested acres.

Total Volume Statistics for All Types or Strata Combined

Stratified Estimates Combined

Prism BAF or Plot Size = 20
Acres = 128.0
Total # of Plots = 22

International 1/4" log rule.

Smalian's equation.

85 Net Cubic Feet Per Merch. Cord.

Statistic	Tot. MBF Products	Veneer MBF	Saw MBF	Pallet MBF	Boltwood MBF	Pot. Log Cords	Pulp Cords	Total Cords
Mean Tot	1,065.1	0.0	1,065.1	0.0	0.0	0	4,353	6,331
CV	56.4%	NA	56.4%	NA	NA	NA	31.5%	29.2%
St. Error	141	0	141	0	0	0	319	433
St. Error %	13.2%	NA	13.2%	NA	NA	NA	7.3%	6.8%
95% Conf.	27.7%	NA	27.7%	NA	NA	NA	15.4%	14.4%
90% Conf.	22.9%	NA	22.9%	NA	NA	NA	12.7%	11.8%
<i>Above Statistics for All Species Combined</i>								

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Raptor: Predatory birds such as hawks and eagles.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Tree Farm: See American Tree Farm System.

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

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

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

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

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

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

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



JANET T. MILLS
GOVERNOR

STATE OF MAINE
BEGINNING WITH HABITAT
DEPARTMENT OF INLAND FISHERIES & WILDLIFE
41 STATE HOUSE STATION
AUGUSTA, MAINE 04333



**BEGINNING
WITH HABITAT**

May 09, 2023

Paul Larrivee
207 Forestry Consulting Services, LLC
plarrivee@newgloucester.com

RE: Forest Management Plan Review - Twin Brooks Recreation Area property in Cumberland

Dear Paul Larrivee:

On behalf of Beginning with Habitat (BwH), the Maine Department of Inland Fisheries and Wildlife (MDIFW), and the Maine Natural Areas Program (MNAP) have reviewed your request received on May 05, 2023. The review includes all of the resources listed in the Forest Management Plan Review Section below. Non-regulatory management recommendations are provided for natural resource features within the parcel, as well as those nearby should the landowner wish to manage the property for important landscape-level features. Good management of natural resources is consistent with good forestry, and BwH has the tools to assist you with your habitat management goals and objectives while allowing for forest management and timber procurement. Please contact Joseph Roy, MDIFW Private Lands Wildlife Biologist, or the staff listed below with any questions or requests for assistance.

The property is associated with the following Conserved Lands:

- "Spring Brook Farm" (Chebeague and Cumberland Land Trust, Inc., Easement)
- "OR04 0013 0000" (Maine Minor Civil Division, Fee)

The property is within a with a New England cottontail (NEC) Focal Area, in which MDIFW and our conservation partners are attempting to restore the species. Cottontails can be differentiated from the more common snowshoe hare by their 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 contact MDIFW Small Mammal Biologist Cory Stearns (287-8775; cory.r.stearns@maine.gov) or New England Cottontail Restoration Coordinator Sarah Dudek (207-646-9226 x32; sarah_dudek@fws.gov), or refer to the Landowners Guide to New England Cottontail Habitat Management, available at <http://www.newenglandcottontail.org/>. 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.

Vernal pools are shallow wetlands that contain water for much of the year, often drying out by mid-late summer, and can be found as either isolated depressions in forested uplands or as basins in larger swamps. Vernal pools provide valuable habitat for frogs, salamanders, and a diversity of invertebrates that play a significant role in the local ecology of Maine's forests. While vernal pools are distributed statewide, most have not yet been mapped or surveyed. Forest management is usually compatible with the conservation of vernal pool habitat if practiced in an ecologically sensitive manner. As such, MDIFW recommends that the following forest management guidelines be applied to any potentially high value vernal pools located on the subject parcel:

https://digitalmaine.com/cgi/viewcontent.cgi?article=1239&context=for_docs.

Other than those described above or listed in the Forest Management Plan Review section, no other natural resources of statewide significance have been documented in the reviewed area. The "unconfirmed presence" for Endangered, Threatened, or Special Concern Animals; Rare, Threatened, or Endangered Plants; or Rare/Exemplary Natural Communities may be a lack of comprehensive data rather than the absence of those resources in the reviewed area.

Thank you for using BWH, MDIFW, and MNAP in the forest management planning process. If you have questions, or if you would like more information about this site, please feel free to contact me. You can also visit our webpage: <https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/index.html>.

Sincerely,

Joseph Roy, AWB (R)

Private Lands Wildlife Biologist | Maine Department of Inland Fisheries and Wildlife
joseph.roy@maine.gov | Phone: (207) 592-3344

FOREST MANAGEMENT PLAN REVIEW

General Information			
Date Received	May 05, 2023	Date Reviewed	05/09/2023
Tracking #	2023-05-08-AD-04	Reviewed By	Joseph M. Roy
Applicant/Landowner	Twin Brooks Recreation Area	Forester	Paul Larrivee

Project Location/Contacts	
County	Cumberland
Town	Cumberland
MDIFW Region A	A
Wildlife Biologist	Scott Lindsay, (207) 287-2345, scott.lindsay@maine.gov
Fisheries Biologist	Brian Lewis, (207) 657-2345, brian.lewis@maine.gov

Natural Resources	In ^a	Near ^b
Animals: endangered, threatened, or special concern ^c	Unconfirmed	Unconfirmed
Atlantic Salmon Critical Habitat^d	No	No
Atlantic Salmon Stream Habitat^e	Unknown	Unknown
Canada Lynx Habitat^d	No	No
Deer Wintering Areas^e	No	No
Inland Waterfowl/Wading bird Habitat^d	No	No
LUPC Protection Fish & Wildlife Zone^e	No	No
Natural Communities: rare and/or exemplary ^c	Unconfirmed	Unconfirmed
Plants: rare, threatened, and/or endangered ^c	Unconfirmed	Unconfirmed
Tidal Waterfowl/Wading Bird Habitat^d	No	No
Shorebird Roosting Areas^d	No	No
Significant Vernal Pools^d	Unknown	Unknown
Wild Brook Trout Habitat^e	Unknown	Unknown

^a. Within the property.

^b. Within 750 ft of the property.

^c. "Yes" = observation data documents the presence of a species/natural community (see itemized table below for more details). "Unconfirmed" = there is insufficient data to document presence.

^d. "Yes" = the habitat occurs there, "No" = it does not.

^e. "Yes" = this potential habitat occurs there, "Unknown" = there is insufficient data to determine whether it occurs there.

Landscape Context Features	In ^a	Near ^b
Beginning with Habitat Focus Area(s)	No	No
Conserved Land(s)	Yes	No
New England Cottontail Focus Area(s)	Yes	Yes
MNAP Potential Inventory Site(s):	No	No

^a. Within the property.

^b. Within 750 ft of the property.

Forest Management Plan, Paul Larrivee
Twin Brooks Recreation Area
Cumberland, Maine

- Approximate Property Location
- ETSC Rare Animals
- Deer Wintering Area
- Significant Vernal Pool
- Tidal Waterfowl and Wading Bird Habitat
- Town

0 0.25 0.5 Miles

Maine Department of Inland Fisheries and Wildlife and
Maine Natural Areas Program, May 2023

