

# FOREST MANAGEMENT PLAN

## Distant Hill Gardens and Michael and Katherine Nerrie Valley Road Parcel

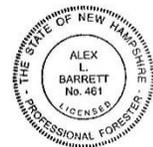


Thoughtful management has favored a quality oak component on this land.

*Alstead and Walpole, NH  
2022 –2032 Planning Period*



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# I. SIGNATURE PAGE

We have all discussed and reviewed this Forest Management Plan. It meets with our management goals for the property and represents our best professional effort to plan for the management of these woods and to protect and enhance the quality of the soil therein.

Michael Nerrie  
Michael Nerrie

11-26-2022  
Date

Katherine Nerrie  
Katherine Nerrie

11/26/2022  
Date

Andrew Sheere  
Andrew Sheere  
NH Licensed Forester #449  
NRCS TSP #12-8326

December 14, 2022  
Date

Alex Barrett  
Alex Barrett  
NH Licensed Forester #461

December 14, 2022  
Date



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## II. EXECUTIVE SUMMARY



A carpet of red oak seedlings thrive along a skid road in Stand 3.

Distant Hill Gardens is an amazing assemblage of forests, fields, wetland features, gardens, and novel ecologically-focused vegetation management demonstration areas spread over 155 acres in Walpole and Alstead, NH. It is a valuable community and regional resource for forest ecology education, management, and demonstration.

This forest management plan focuses on the ~30 acre Valley Road Parcel that Distant Hill recently acquired. This Plan complements Forest Management Plans that already exist for the rest of the property and also seeks to build on other ecological assessments, plant surveys, and management work that Distant Hill Gardens already does.

The parcel features 2 hay mowings, a small stream and wetland that feeds Great Brook, Great Brook itself, and an exemplary northern red oak-dominated upland forest that will be managed to maintain and enhance soil productivity while producing high quality sawlogs and demonstrating small-scale, sustainable New England woodlot management.

In 2022, Long View Forest worked with Distant Hill Gardens and NRCS to do an initial invasive plant control treatment on the Valley Road Parcel. This effort focused on intense glossy buckthorn populations on the northern, lower reaches of the property. This work will in turn make forest management possible here by lessening the risk of invasive plants taking advantage of newly available growing space created by forest operations and enhancing soil quality by establishing native plant regeneration. We will seek to regenerate primarily red oak, white pine, and black birch as we manage this parcel.

Management for the coming 10 years will focus on an irregular shelterwood treatment in Stand 3 where decades of thoughtful management have started a regeneration process with some oak success already. Invasives monitoring and follow-up treatments will complement this work. In Stand 2, a small early successional forest will be created via an ~0.5 acre clearcut.

Overall, the next 10 years will be exciting ones for this parcel. With the invasives controlled and a semblance of native plant diversity restored, timber harvesting and larger scale vegetation management here will focus on maintaining and enhancing soil quality while demonstrating ecological forest management to complement the other educational strengths of the Distant Hill Gardens endeavor.

### III. PROPERTY OVERVIEW

#### A. Property Summary

<b>Landowner Name</b>	Michael and Katherine Nerrie
<b>Mailing Address</b>	507 March Hill Road Walpole, NH 03608
<b>Street Address</b>	Same. Nature Trail at 66 March Hill Road, Alstead, NH 03602
<b>Coordinates</b>	72.3639328°W 43.0883351°N
<b>Primary Contact:</b>	Michael Nerrie
<b>Preferred Method of Contact:</b>	<input type="checkbox"/> - Regular mail; <input checked="" type="checkbox"/> - Email; <input type="checkbox"/> - Phone
<b>Phone</b>	Tel. (603)756-4179 Cell (603)209-3591
<b>Email</b>	<a href="mailto:mnerrie@gmail.com">mnerrie@gmail.com</a>
<b>Town Where Land Is Located</b>	Alstead & Walpole
<b>County Where Land Is Located</b>	Cheshire
<b>Surveyed Acreage</b>	22.25 +/- Acres in Alstead 7.01 +/- Acres in Walpole Total Acres: 29.26
<b>Total Forested Acres</b>	23.32
<b>Parcel ID</b>	Alstead: 053-011-000 Walpole: 000011000042000000
<b>POID</b>	Alstead: 92290 Walpole: 126918
<b>Document Objective and General Property Description</b>	This 10-year forest management plan ("FMP") is valid from 2022-2032. This plan is a guide to the current condition of the forest, and to scheduled forest management activities for the upcoming planning period. This plan also conforms to the standards adopted by the NRCS for Practice E66A- Maintaining and improving forest soil quality.

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**Adaptive Management**

*“Is a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met.” (Excerpted from the Society of American Foresters “Dictionary of Forestry”)*

Using this adaptive approach, it is important to remember that this Plan is a document used to guide, not dictate, forest management. Changeable conditions like insect or disease outbreak, changes in landowner goals, or changing market conditions are examples of events that may necessitate amending the plan. Requests to amend the plan are subject to approval from the County Forester.

Additionally, the plan does not preclude the need for scoping areas in advance of management operations or the need for annual monitoring of the forest.

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**Long View’s Role in Ongoing Stewardship**

As your forester and agent, we strive to represent your best interests.

Please call us for a consultation when:

- When there is a change of ownership
- When you sell or purchase land
- When forest management activities are called for in this management plan
- If you complete a forest management practice that we were not directly involved with
- Anytime you have a question about your forest or what lives in it; we love to hear from you!

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**Record Keeping**

Records of forest management activities should be maintained for a period of at least 5 years. And include such items as

- Forestry invoices
  - Contracts and work orders
  - Timber harvest paperwork & mill slips.
  - A journal of forest practices completed (harvests, timber stand improvement, invasives management, etc.)
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**Landscape****Setting/Biophysical Region**

This property is located in Cheshire County, New Hampshire, in the northeastern United States, and falls within the Connecticut River Valley biophysical region.

The land sits in a transition zone where the richer sites of Connecticut River Valley land give way to the uplands. To the west, large swaths of land are still in fields that are intensively managed. To the east, north, and south, forests cover most of the land. Many of these forests are intensively managed for timber. A massive powerline runs NW-SE across part of Distant Hill Gardens as well.

As such, this parcel forms an important part of the forested connectivity here between the large forest to the east and the corridors of forest land stretching between fields down to the River. These corridors are important for wildlife movement, forest and native plant conservation, and for complex soil development over time.

**Connecticut River Valley Biophysical Region****CONNECTICUT RIVER VALLEY**

The Connecticut River Valley is long and narrow, extending from the Massachusetts border to the southern end of the North Country. Elevations range from 300 feet in the south to more than 1,500 feet in the north. The valley contains extensive lakebed sediments from historic glacial Lake Hitchcock. Glacial till deposits occur on relatively low hills adjacent to the river, and fine, silty sediments are actively deposited along the floodplain. Most of the underlying bedrock is metamorphic, and includes most of the calcium-rich bedrock in the state. The region's lower elevations are characterized by a relatively mild climate, and as a result, numerous plants and natural communities otherwise restricted to southern parts of the state extend far up the valley. Laurentian mixed forests and Appalachian oak and pine forests dominate, and rich woods are relatively common compared to other parts of the state. Wetlands, ponds, and lakes are relatively uncommon. Rocky ridges and cliffs are occasional. Floodplain forests are common but small, as most of the high floodplains and adjacent terraces have been converted to farmland. River channel communities are nearly continuous along the river, although much of the river is regulated by dams.

*\*Sperduto, D., Kimball, B. 2011. The Nature of New Hampshire; Natural Communities of the Granite State. University Press of New Hampshire, Lebanon, NH.*

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**Land Use History**

Prior to European contact, the Abenaki sustained themselves from this land, living in settlements as well as moving seasonally throughout the region. To this day, the Abenaki are present on the land now called New Hampshire. European settlers introduced a dramatic change in the land's use and the human patterns of cultivation, habitation, and resource extraction. Forest management today continues to work with the effects of these changes on the forest's composition.

Currently, the Valley Road parcel is mostly forested with 2 hay fields in the northern third of the property. The southern field is slated to likely become a pollinator meadow while the northern field will remain in hay production.

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**Forests of Recognized Importance (FORI)**

This forest:  - IS;  - IS NOT a FORI

Forests of Recognized Importance (FORI) (A.K.A. high value conservation forest, HVCF) represent 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. FORIs may include but are not limited to landscapes with exceptionally high concentrations of one or more of the following:

- protected, rare, sensitive, or representative forest ecosystems such as riparian areas and wetland biotopes.
- areas containing endemic species and critical habitats of multiple threatened or endangered plant and animal species, as identified under the Endangered Species Act (ESA) or other recognized listings.
- recognized large - scale cultural or archeological sites including sites of human habitation, cities, burial grounds and in situ artifacts.
- areas containing identified and protected water resources upon which large metropolitan populations are dependent.
- areas containing identified unique or geologic features including geysers, waterfalls, lava beds, caves, or craters.

(Definition from American Tree Farm System: <https://www.treefarmssystem.org/fori> )

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**Management Goals**

“Distant Hill is an environmental and horticultural learning center dedicated to inspiring and empowering children and adults to cultivate an intimate connection to the natural world through education and observation. We hope to inspire visitors to develop an ecological approach to working their land and to give them the tools to improve their landscape one plant at a time.

Our goal is to have visitors to Distant Hill leave with a better understanding of the vital connections between plants, animals, and humans, and how we can use Earth’s resources in a way that strengthens and sustains those connections.”

Source: <https://www.distanthill.org/>

The Valley Road Parcel fills a special niche in the overall management of this larger property: it is the demonstration woodlot where sustainable forest management and soil conservation practices can be showcased over time to inspire landowners and to show what is possible in a carefully managed, small-scale New England woodlot.

To demonstrate this, management here will strive:

- To grow quality sawlogs using varied forest management techniques.
- To protect and enhance soil quality and showcase quality logging operations that protect soil quality.
- To protect aesthetic and environmental values.
- To provide diverse habitat for wildlife.
- To provide recreational and educational opportunities for the landowner and for visitors to Distant Hill.

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**Access**

Management access to the property is via a set of established woods roads emanating from the north field with access onto Walpole Valley Road. Between these two fields, the headwaters of Great Brook form a small stream that is crossed via a bridge.

Recreational and educational access is via a well-designed and maintained woods road that borders the western side of the parcel and connects with Distant Hill’s greater trail network. These roads all serve to concentrate and limit soil compaction and thereby improve soil quality elsewhere here.

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**Property Boundaries**

Like road access, boundary line maintenance is an essential part of excellent forest management and land stewardship. This parcel has clear boundaries all fully delineated by stone walls with no boundary maintenance needed.

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**Cultural & Historic Features and Other Special Sites**

This land has a settler agricultural history overlaid upon it. Stone walls bound it and stone piles interior speak to past haying activities. Other than the easily evident stones, no other special sites or features are present.



A stone pile in Stand 2 site where farmers tossed rocks to avoid hitting them with a scythe the following year.

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**Fish & Wildlife Habitat and Rare, Threatened, or Endangered Species**

A 2020 review by New Hampshire’s Natural Heritage Bureau did not find any Rare, Threatened, or Endangered species on this property or within a radius where management here might affect them. The landowner is frequently monitoring plant and wildlife communities across the ownership with the goal of identifying any populations and carefully managing around them.

**Things You Can do to Promote Diverse Wildlife Habitat:**

*(Source: “LANDOWNER GUIDES to a Successful Timber Harvest- Wildlife”. Vermont Department of Forests, Parks, & Recreation- VT Cut with Confidence)*

**Create Brush Piles**

Tree tops left after harvest and brush piles provide cover for animals like ermine, fisher, and rabbits.

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### Keep Standing Dead Trees

Standing dead trees, particularly those with sloughing bark, are important for bats, and trees with cavities are important for woodpeckers, owls and mammals like squirrels or fisher.

### Retain Inclusions

A group of trees that is dissimilar from the surrounding forest can provide important food or cover.

### Control Invasive Plants

Invasives disrupt natural communities by crowding out native plants and preventing the establishment of young trees.

### Use Buffers for Streams and Wetlands

Habitat along water is critical for wildlife, but these areas are particularly sensitive to disturbances.

### Keep Old Trees

Retaining some old trees during a harvest maintains important food sources for wildlife and seed sources for forest regeneration.

### Create Young Forest

When located appropriately, small openings (1-5 acres) that will be allowed to return to forest provide valuable habitat.

### Retain Fruit & Nut Producing Trees

Beech, cherry, and apple trees, as well as shrubs like hobble bush or hazelnut, are excellent sources of food for wildlife.

### Delay Mowing-

Source: Vermont Department of Fish & Wildlife news release May 25, 2017: "Consider Delayed Mowing to Conserve Grassland Birds". (<http://www.vermont.gov/portal/government/article.php?news=6355> )

Summer in Vermont is greatly enriched by the state's many grassland birds, from bobolinks flushing up from a grassy field to the beautiful song of an eastern meadowlark. But many of these species are in decline due to the loss of appropriate grassland habitat.

The Vermont Fish & Wildlife Department and Audubon Vermont are encouraging landowners to help promote these beloved species and give these birds a chance to complete their nesting season simply by altering the times of year that they mow large fields.

Bobolinks build nests from May through July among the grasses and wildflowers of fields and meadows. When bobolinks are present, other grassland bird species such as savannah sparrows and vesper sparrows may also be nesting among the grasses. Deer fawns, wild turkey chicks,

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and other animals take refuge in the grass, and are also at risk by mowing too early.

"People maintain large fields and meadows in Vermont for a variety of reasons, from commercial hayfields and grazing pastures to simple aesthetic beauty," said John Buck, biologist for the Vermont Fish & Wildlife Department. "Mowing is the most common means of maintaining the grasses but if mowed too soon in the summer, many grassland bird species will lose their nest and any hatchlings."

According to Buck, landowners who mow their fields for aesthetic reasons can maintain these fields and accommodate the nesting birds simply by cutting later in the summer. He recommends an August 1 start date.

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**Water Quality, Wetlands & Riparian Corridors and Measures to Enhance and/or Protect Functions & Values**

Best Management Practices are essential to ensuring that the benefits for air, soil and water quality are maintained or enhanced for all. Special management zones, including river and stream corridors, steep slopes, fragile soils, wetlands, vernal pools, seeps, and lake and pond shorelines shall follow guidelines set forth in "Best Management Practices for Forestry: Protecting New Hampshire's Water Quality", University of New Hampshire Cooperative Extension.

Forest management operations will be planned to first minimize and avoid disturbance to soil and hydrologic function. Then, any logging operations will carefully operate to minimize any unavoidable disruptions.

Outside of the Great Brook buffer zone, this parcel has no water features. One crossing over the Brook will be utilized either with the existing bridge or with a newer bridge or set of bridge panels on top of the current bridge.

During harvest operations, wooden panel and carefully positioned slash and poles will minimize soil disturbance. Operations will further be timed to occur in dry or frozen conditions.

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**Soil Quality- Protection and Enhancement**

Done right, forest management can help maintain and even enhance forest soil quality. This Forest Management Plan is focused on maintaining soil quality. Each Stand description includes a section on soils with a set of management approaches and practices geared toward maintaining and enhancing soil quality. Overall, these recommendations focus on:

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- Forestry operations- siting haul roads and landings to minimize soil disturbance and compaction
  - Machinery- prescribing machinery mixes and seasonality of operations as well as techniques that cut-to-length logging can use to minimize soil disturbance
  - Forest growth- doing good silviculture to ensure regeneration and thriving forest cover that contributes to building soil and soil health over time
  - Forest carbon- retaining an above-average amount of coarse woody material in-situ, growing large, high-quality trees, and extending rotations to maximize carbon sequestration and storage- both above and belowground.

Current forest roads are generally well-sited and do not show signs of rutting or soil erosion. Past logging has retained slash in the roads and was also likely done in frozen conditions as evidence of soil disturbance is minimal.

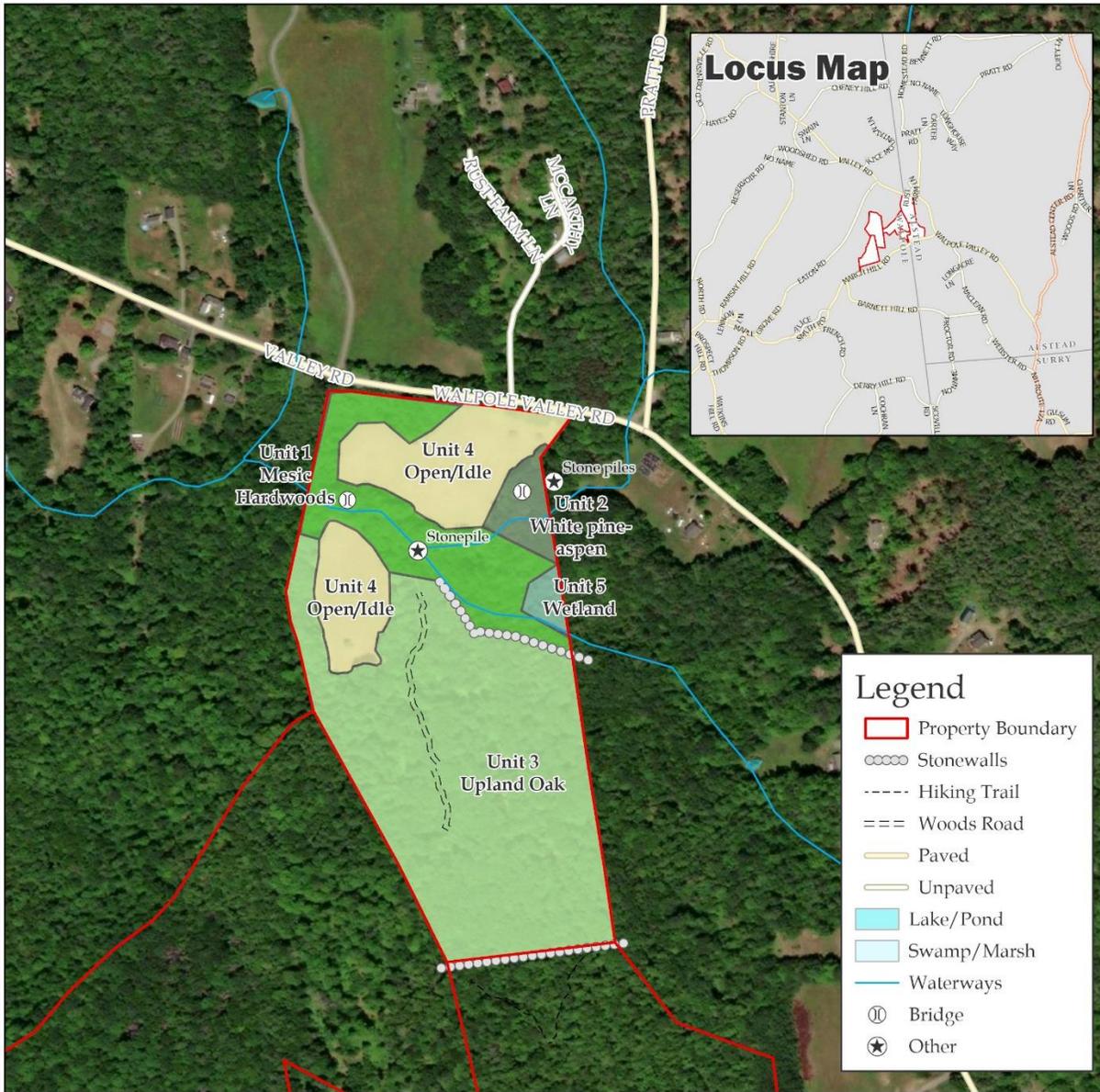
A series of soil tests performed in November, 2022 showed low pH and generally poor nutrient conditions across all Stands and mowings. See Appendix.

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**Management Plan  
Implementation  
Constraints**

There is one main constraint to management here- exotic invasive plants.

- Exotic Invasive Plants: These populations are largely constrained to the fields and field edges and will be managed ahead of any canopy - perforating activities in the forest. With NRCS funding, control began in August of 2022.
- The initial treatment was Certified in September, 2022 as achieving 90% control. Follow-up treatments will mop any stragglers and ongoing monitoring will track invasive plant population dynamics.



0 250 500 1,000 US Feet

- 1) Scale is 1:5,000 if printed from original image file at full dimensions (8.5" x 11")
- 2) Valley Road Parcel: 29.26 acres
- 3) Revised by Hale Morrell of Long View Forest on 9/19/2022
- 4) Map created from layers provided by NH Granit and data collected in the field
- 5) Projection - NAD83 New Hampshire State Plane
- 6) North American Datum 1983
- 7) North arrow indicates true north
- 8) This map is not valid for legal description or conveyance

**Forest Management Map**  
**for lands belonging to**  
**Distant Hill Gardens-**  
**Valley Road Parcel**  
**Alstead & Walpole. NH**



## IV. FOREST UNIT DESCRIPTIONS & PRESCRIBED TREATMENTS

### A. Stand 1

<b>Forest Type:</b>	<b>Mesic Hardwoods</b>
<b>Mapped Acres:</b>	<b>4.98</b>
<b>Location:</b>	<b>Northern portion of the parcel around Great Brook</b>



Maples and ash make up much of the forest along the brook.

## NARRATIVE

Stand 1 is a richer site bisected by the headwaters of Great Brook which also includes a wetland feature in the eastern reaches of the Stand. Occasional trees have been harvested here over time, but it is primarily a buffer for the stream and a wetland on the eastern side of the property.

Management for the next 10 years here will be focused on continued invasive plant control along the edges of the stand where it meets the fields and on occasional interior infestations.

### Soils and Forest Management Considerations

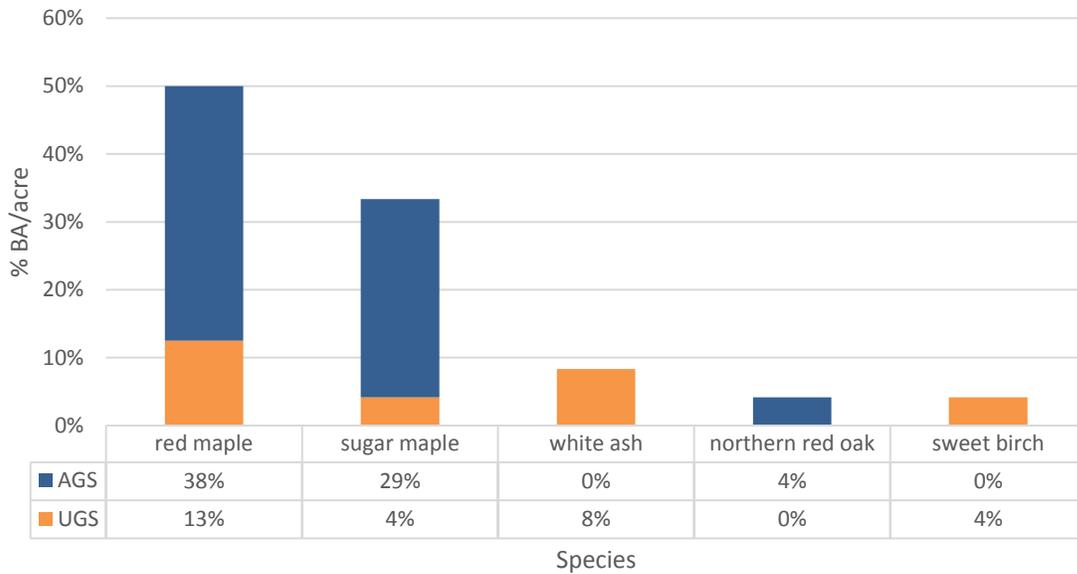
This Stand is underlain by Limerick silt loam. These are sensitive soils found in forested floodplains and this stand is just that. These are poorly drained soils, but they are moderately suited to harvest equipment operability.

Timber Management here will be constrained to occasional single tree selection and further down the road, potentially small amounts of crop tree release work focused on mast trees or exceptional timber trees.

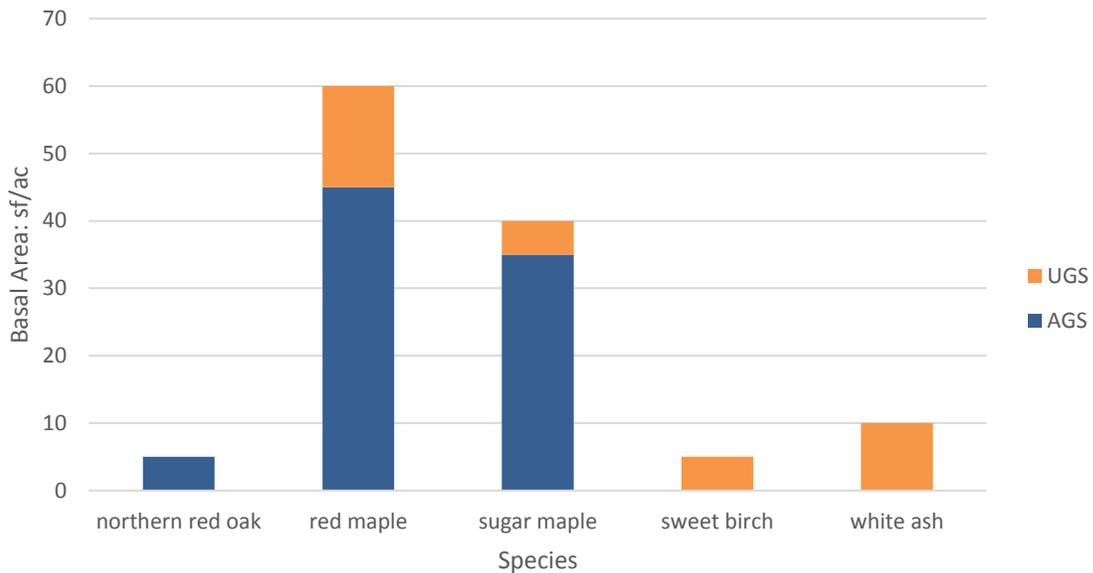
Invasive plant control will help establish and nurture native plant communities. These communities will in turn maintain ecological soil processes and development over time with a focus on enhancing the absorptive and flood buffering capacity of this riparian area.

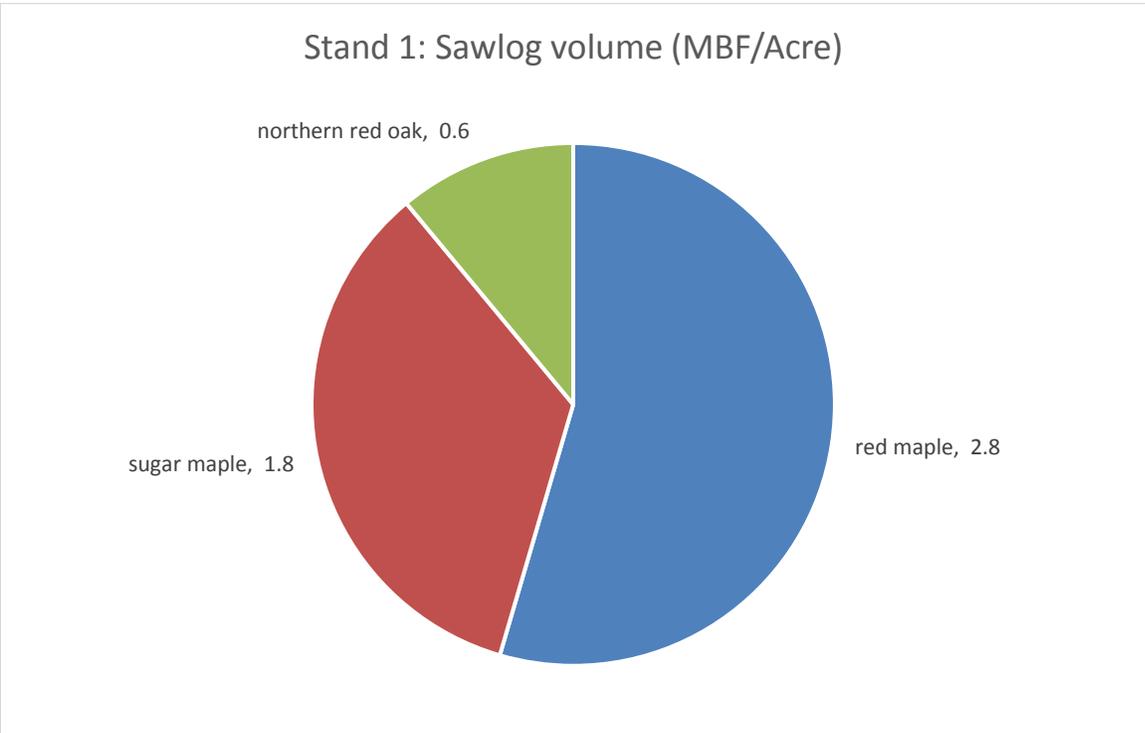
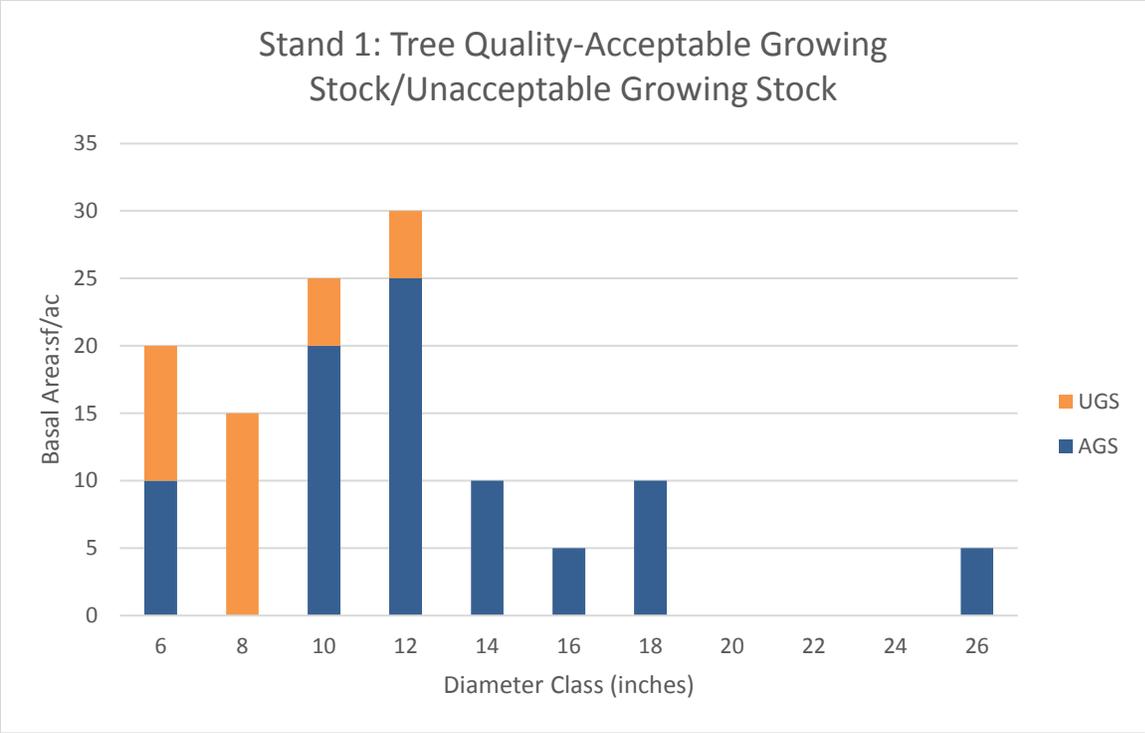
Interestingly, soil sampling showed that of all the forested stands, this is the most enriched. This makes sense since it is at the bottom of the slope. While this does not immediately impact any management recommendations, it is good information to have as a baseline moving forward.

Stand 1: Species Composition(Acceptable Growing Stock/Unacceptable Growing Stock)



Stand 1: Tree Quality-Acceptable Growing Stock/Unacceptable Growing Stock

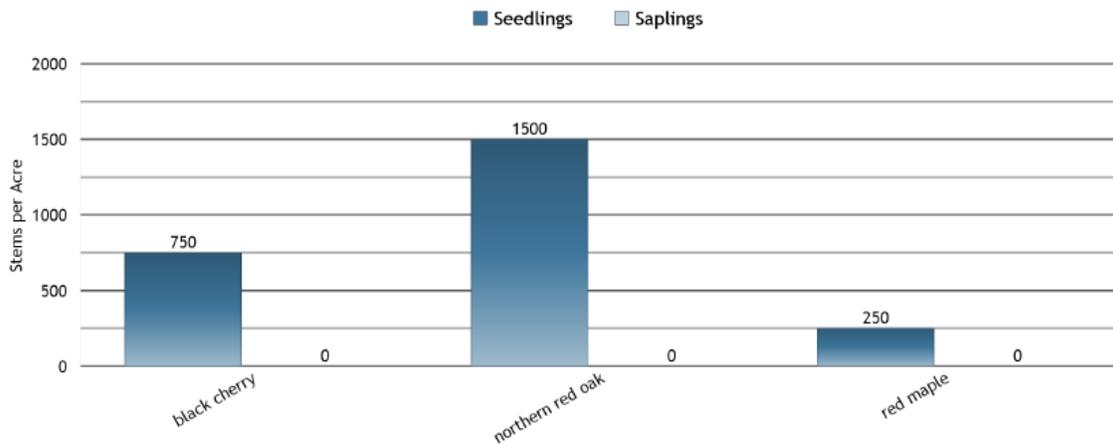




<b>EXISTING UNIT DESCRIPTION</b>			
<b>Age Class Distribution</b>	<input checked="" type="checkbox"/> - Even-aged <input type="checkbox"/> - Uneven-aged	<b>Unit History</b>	<ul style="list-style-type: none"> <li>This Stand has served as a buffer to the Brook with occasional single tree selection harvesting.</li> </ul>
<b>Forest Productivity cu.ft./ac./yr</b>	Red maple- 29 White pine- 114	<b>Soil Map Unit(s)</b>	Limerick Silt Loam- Please see Soils Map.
<b>Forest Health Concerns</b> <i>(Insects, disease, physical damage, or invasive plants)</i>	Invasive Plants in adjacent fields and occasionally in Stand. Emerald Ash Borer.		
<b>Invasive Species</b>	Primarily glossy buckthorn and Japanese barberry.		
<b>Observed level of Impact</b>	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High		
<b>Stand Quality &amp; Health</b> <i>(Subjective)</i>	<input type="checkbox"/> Poor <input checked="" type="checkbox"/> Average <input type="checkbox"/> Excellent There is an agricultural legacy here that has modified the soils post-glaciation. However, the Stand's soils are now recovering nicely.		
<b>Logging Chance</b> <i>(Subjective)</i>	<input type="checkbox"/> Poor <input checked="" type="checkbox"/> Average <input type="checkbox"/> Excellent This is a mesic site with sensitive soils. It is small, so single tree selection and extraction largely from outside the unit is acceptable.		
<b>Sampling Method</b>	Variable Radius Point Sampling	<b>Regeneration</b>	
<b>Sampling Date</b>	9.2.22	There is some red oak regeneration here mixed in with glassy buckthorn along field edges. Understory is otherwise mostly fern with scattered invasives. -see regeneration table below.	
<b>Number of Sample Points</b>	4		
<b>Basal Area Factor</b>	20		
<b>Quadratic Mean Dia. (inches)</b>	9.4		
<b>Total Basal Area (ft<sup>2</sup>/acre)</b>	120		
<b>Basal Area in Acceptable Growing Stock (ft<sup>2</sup>/acre)</b>	85		

<b>EXISTING UNIT DESCRIPTION</b>		
<b>Basal Area in Unacceptable Growing Stock</b> (ft <sup>2</sup> /acre)	35	
<b>Basal Area Range</b>	40-180	<b>Species to Favor</b>
<b>Trees per Acre</b>	249	Timber: Sugar maple, red maple, and ash.
<b>Estimate of Unit Age (years)</b>	100+	
<b>Elevation (feet)</b>	1050-1080	Wildlife: This is an important field edge habitat adjacent to water.
<b>Slope (%)</b>	3-8%	
<b>Aspect</b>	North	
<b>Terrain</b>	Flat-riparian	
<b>Distance from Geographic Center of Unit to Class 1, 2, or 3 Road (feet, straight-line distance)</b>	300-500	

### Stand 1 Regeneration



	TOTAL	Seedlings	Saplings				
			<1	1	2	3	4
black cherry	750	750					
northern red oak	1,500	1,500					
red maple	250	250					
<b>STEMS PER ACRE</b>	<b>2,500</b>	<b>2,500</b>					

**PLANT OBSERVATIONS AND CONSIDERATIONS**

*List below represents qualitative observations. The time of year that the forest cruise was completed (winter, spring, summer, and fall) will have an effect on the types of plants noted.*

Data collected: during growing season: ; during dormant season: ; during snow cover:

• Royal fern	• New York Fern	• Cinnamon Fern
• Sensitive Fern	• Virginia creeper	

**DESIRED FUTURE UNIT CONDITION**

<b>Forest Type</b>	Mesic Hardwoods
<b>Long Range Silvicultural Management Regime</b>	<input type="checkbox"/> Even-aged <input checked="" type="checkbox"/> Uneven-aged
<b>Present Unit Age</b> <i>(Estimate; even-age management only)</i>	100+
<b>Cutting Cycle</b> <i>(Uneven-age management only)</i>	30-40 years
<b>Diameter Objective for Principal Species</b> <i>(Uneven-age management only)</i>	Sugar Maple: 24" White Ash 20" Red Maple: 20"

**PLANNED TREATMENTS**

<b>Year</b>	2023
<b>Treatment</b>	<p>Invasive Plant Control: Follow- Up</p> <ul style="list-style-type: none"> <li>• Treat field edges and grid interior or unit to protect against further incursion.</li> <li>• Technicians on foot or with appropriate tired vehicles on field edges will maintain soil stability and function during treatments.</li> </ul>

B. Stand 2

<b>Forest Type:</b>	<b>White pine-Aspen</b>
<b>Mapped Acres:</b>	<b>1.01</b>
<b>Location:</b>	<b>Northeastern portion of the parcel</b>



Poor quality white pine and good quality aspen occupy this Stand.

NARRATIVE

In terms of soils, hydrology, and terrain, this Stand is quite similar to Stand 1. However, it has a different land use history which dramatically impacts the current forest structure and composition here. This land was kept cleared more recently and has grown back to old field pine along with large aspen clones supporting good-sized bigtooth aspen stems. A small tributary to Great Brook meanders along the western

edge. The shrubby banks of this stream form the boundary between Stand 1 and the adjacent field. Timber quality is quite low and invasive plant populations are more entrenched.

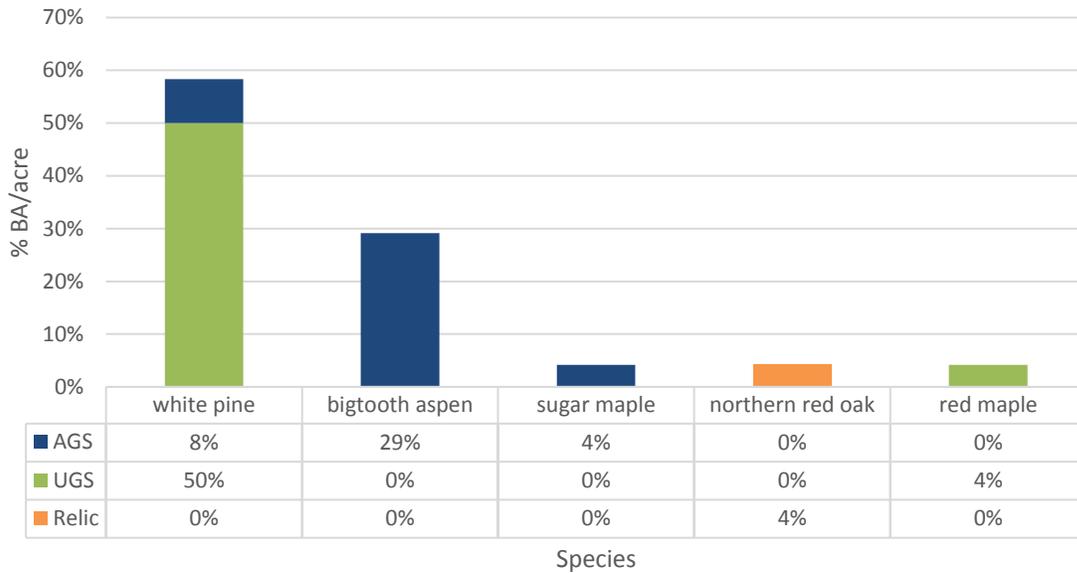
In terms of management, this planning period will focus on continuing invasives control and then installing a ~0.5 acre patch cut to make young forest adjacent to field and regenerate ~50% the Stand- basically the operable part outside the roadside buffer and stream buffer. The big tooth aspen would sprout back amazingly and quickly, which would make excellent habitat for birds.

#### Soils and Forest Management Considerations

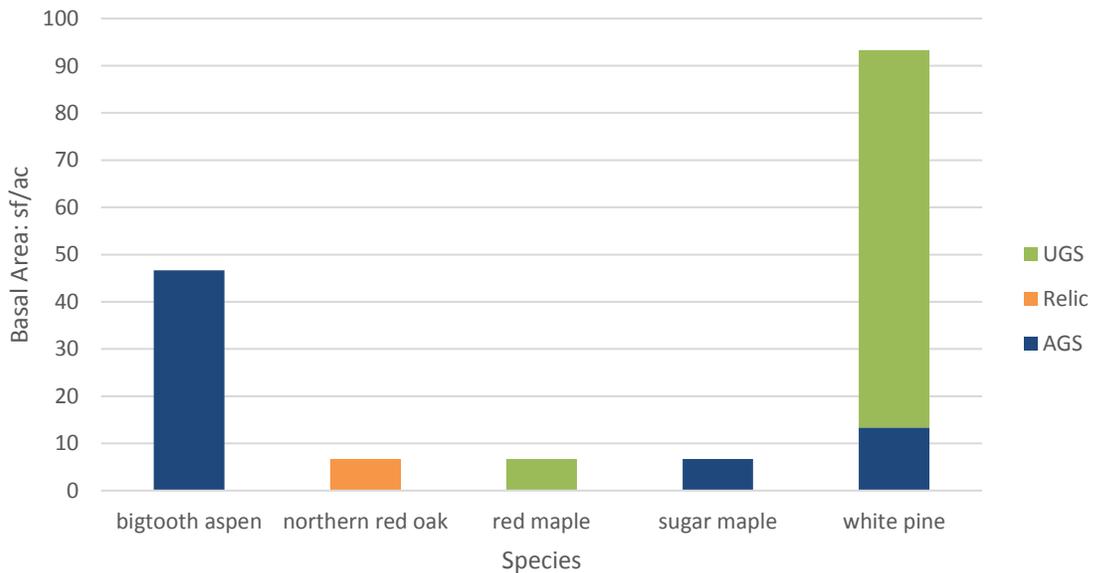
This Stand is largely underlain by Limerick and Dutchess silt loams. However, since the ground feels drier here, I expect that the transition between these silt loams and the Caridgan-Kearsarge complex mapped to the north may be different than shown on the soil survey. Either way, this is a relatively sensitive site. Since one management option will be to install a small clearcut and manage this area more intensively, woody debris should be processed and retained on site to decrease soil compaction during operations and minimize erosion.

Invasive plant control will help establish and nurture native plant communities. These communities will in turn maintain ecological soil processes and development over time with a focus on enhancing the absorptive and flood buffering capacity of this riparian area.

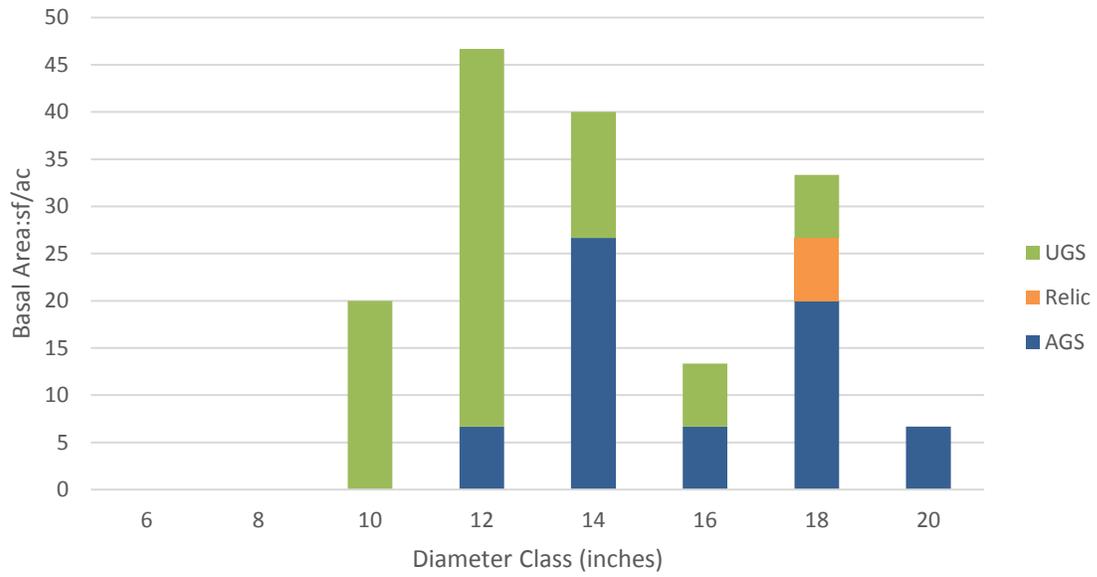
### Stand 2 : Species Composition(Acceptable Growing Stock/Unacceptable Growing Stock/Relic)



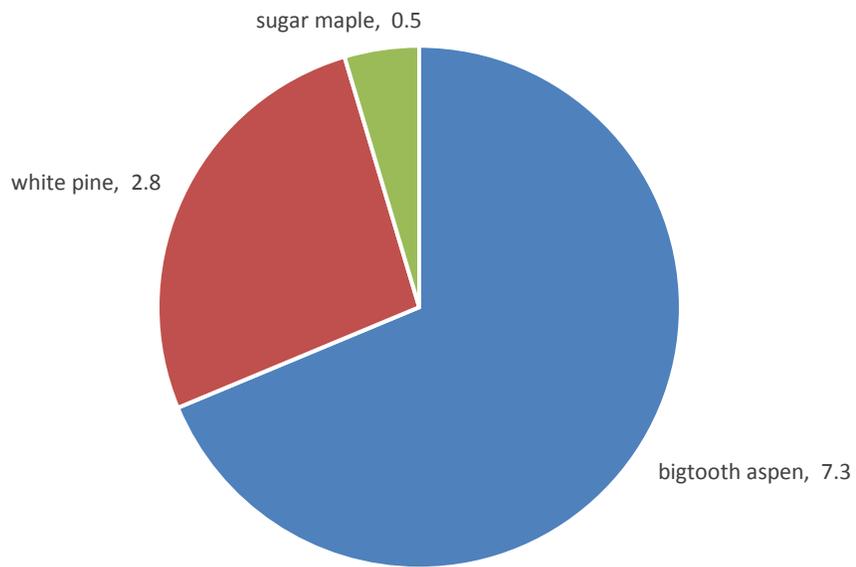
### Stand 2: Tree Quality-Acceptable Growing Stock/Unacceptable Growing Stock/Relic



### Stand 2: Tree Quality-Acceptable Growing Stock/Unacceptable Growing Stock/Relic



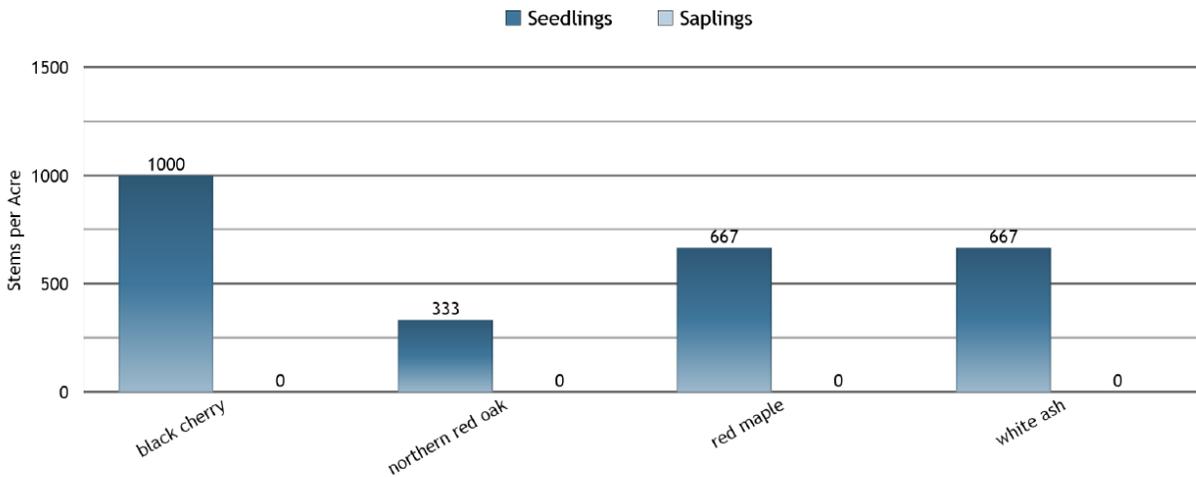
### Stand 2: Sawlog volume (MBF/Acre)



<b>EXISTING UNIT DESCRIPTION</b>			
<b>Age Class Distribution</b>	<input checked="" type="checkbox"/> - Even-aged <input type="checkbox"/> - Uneven-aged	<b>Unit History</b>	This is a field recently turned to forest that is entering late stem exclusion phase stand development.
<b>Forest Productivity</b> <i>cu.ft./ac./yr</i>	Red maple- 29 White pine- 114	<b>Soil Map Unit(s)</b>	Limerick and Dutchess Silt Loams - Please see Soils Map Northern edge likely transitions into Cardigan-Kearsarge Complex.
<b>Forest Health Concerns</b> <i>(Insects, disease, physical damage, or invasive plants)</i>		Invasive plants along field edge.	
<b>Invasive Species</b>		Mostly Glossy Buckthorn.	
<b>Observed level of Impact</b>		<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	
<b>Stand Quality &amp; Health</b> <i>(Subjective)</i>		<input checked="" type="checkbox"/> Poor <input type="checkbox"/> Average <input type="checkbox"/> Excellent The white pine is poor, but the aspen is good. However, there is not much of either in terms of volume.	
<b>Logging Chance</b> <i>(Subjective)</i>		<input type="checkbox"/> Poor <input checked="" type="checkbox"/> Average <input type="checkbox"/> Excellent While it is a little drier than Stand 1, this is still a mesic site with sensitive soils. Machinery can enter this site carefully under dry or frozen conditions.	
<b>Sampling Method</b>		Variable Radius Point Sampling	<b>Regeneration</b>
<b>Sampling Date</b>		9.2.22	There is ash regeneration scattered here but it is being browsed by deer. There are also abundant black cherry seedlings. See regeneration chart below.
<b>Number of Sample Points</b>		3	
<b>Basal Area Factor</b>		20	
<b>Quadratic Mean Dia. (inches)</b>		13.3	
<b>Total Basal Area (ft<sup>2</sup>/acre)</b>		160	
<b>Basal Area in Acceptable Growing Stock (ft<sup>2</sup>/acre)</b>		67	

<b>EXISTING UNIT DESCRIPTION</b>		
<b>Basal Area in Unacceptable and Relic Growing Stock (ft<sup>2</sup>/acre)</b>	93	
<b>Basal Area Range</b>	140-200	<b>Species to Favor</b>
<b>Trees per Acre</b>	165	Timber: Big tooth aspen, white pine, red oak, and cherry.  Wildlife: Same as timber.
<b>Estimate of Unit Age (years)</b>	60-80	
<b>Elevation (feet)</b>	1080-1115	
<b>Slope (%)</b>	0-5	
<b>Aspect</b>	West	
<b>Terrain</b>	Gently sloping	
<b>Distance from Geographic Center of Unit to Class 1, 2, or 3 Road (feet, straight-line distance)</b>	150	

### Stand 2- Regeneration



	TOTAL	Seedlings	Saplings				
			<1	1	2	3	4
black cherry	1,000	1,000					
northern red oak	333	333					
red maple	667	667					
white ash	667	667					
<b>STEMS PER ACRE</b>	<b>2,667</b>	<b>2,667</b>					

**PLANT OBSERVATIONS AND CONSIDERATIONS**

*List below represents qualitative observations. The time of year that the forest cruise was completed (winter, spring, summer, and fall) will have an effect on the types of plants noted.*

Data collected: during growing season: ; during dormant season: ; during snow cover:

- Glossy buckthorn

**DESIRED FUTURE UNIT CONDITION**

<b>Forest Type</b>	Mixedwoods
<b>Long Range Silvicultural Management Regime</b>	<input checked="" type="checkbox"/> Even-aged <input type="checkbox"/> Uneven-aged
<b>Present Unit Age</b> <i>(Estimate; even-age management only)</i>	60-80
<b>Rotation Age</b> <i>(Even-age management only)</i>	30-60 Maintain as a small patch of younger forest with intensive management for timber and wildlife on a shorter rotation.

**PLANNED TREATMENTS**

<b>Year</b>	2026
<b>Treatment</b>	Create a small clearcut in the southern reaches of the Stand. Patch size will be ~0.5 acres.
<b>Trees Favored for Retention</b>	Black cherry, ash, white pine, and red oak. Bigtooth aspen will be regenerated from roots.
<b>Trees Favored for Regeneration</b>	Bigtooth aspen, black cherry, and red oak.
<b>For Even-Aged Management</b>	
<b>Residual Basal Area</b> <i>(ft<sup>2</sup>/acre)</i>	0-10 in clearcut 120-140 outside of clearcut

C. Stand 3

<b>Forest Type:</b>	<b>Upland Oak</b>
<b>Pro-Rated Acres:</b>	<b>17.33</b>
<b>Location:</b>	<b>Southern portion of parcel</b>



Stand 3 features some outstanding red oak that has been well-managed in the past.

NARRATIVE

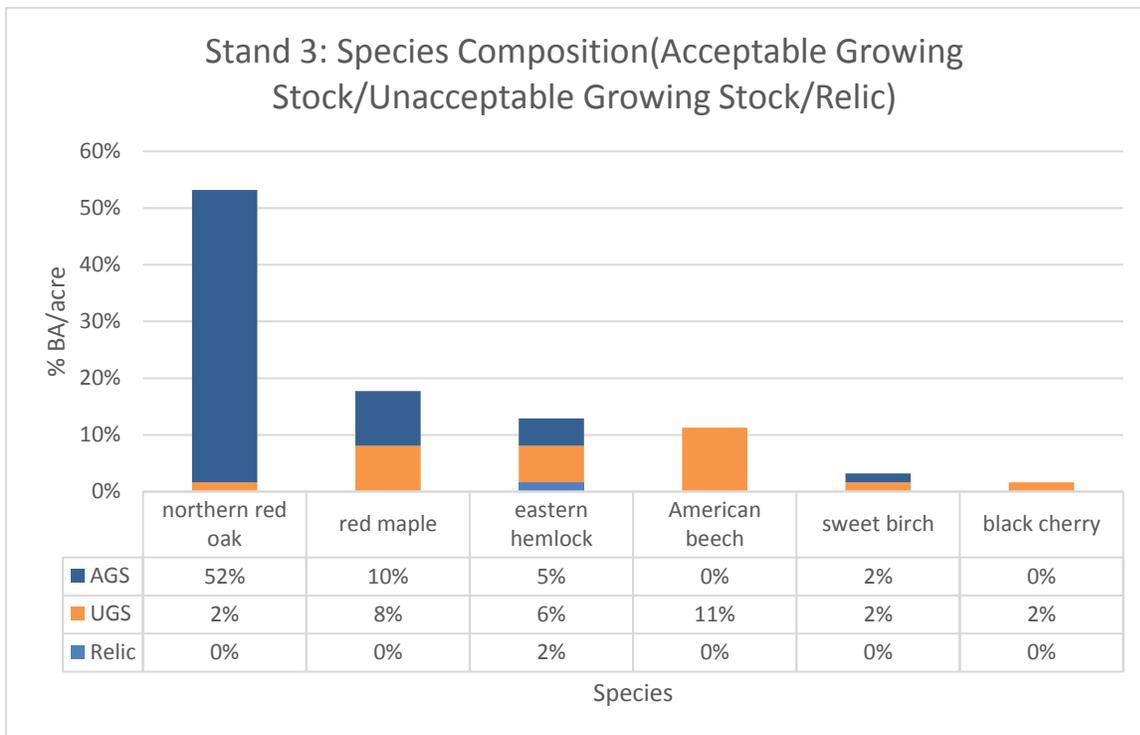
Stand 3 is richly stocked with a significant amount of northern red oak and will be managed as a demonstration woodlot where the focus is on growing and harvesting high quality timber all within the context of ecological forest management. I observed at least 2 small-scale logging projects that thinned amongst the oak, hemlock, and occasional pine here.

Soils and Forest Management Considerations

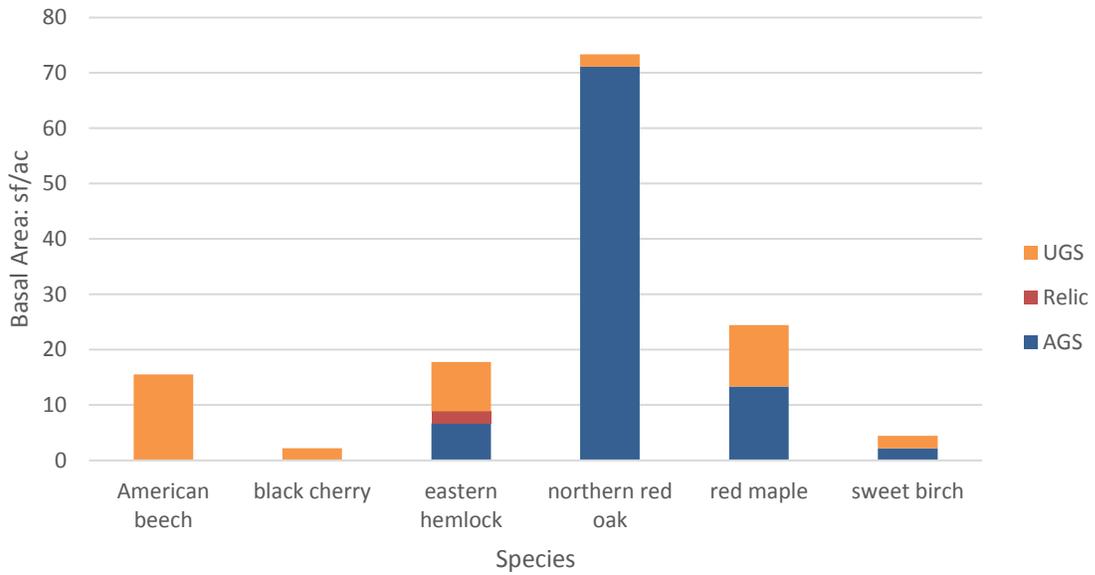
The Cardigan-Kearsarge complex here is a well-drained, rocky, upland soil well-suited to forest management operations and to tree growth. Here, it is growing exceptional northern red oak.

The management here will focus on growing, harvesting, and regenerating a diverse mix of hardwoods and softwoods with a focus on red oak and white pine. Securing regeneration via an irregular shelterwood system will help maintain forest cover and protect soil stability. Retention of coarse wood material and larger pieces of downed woody material will protect soils and aid in building soil quality over time.

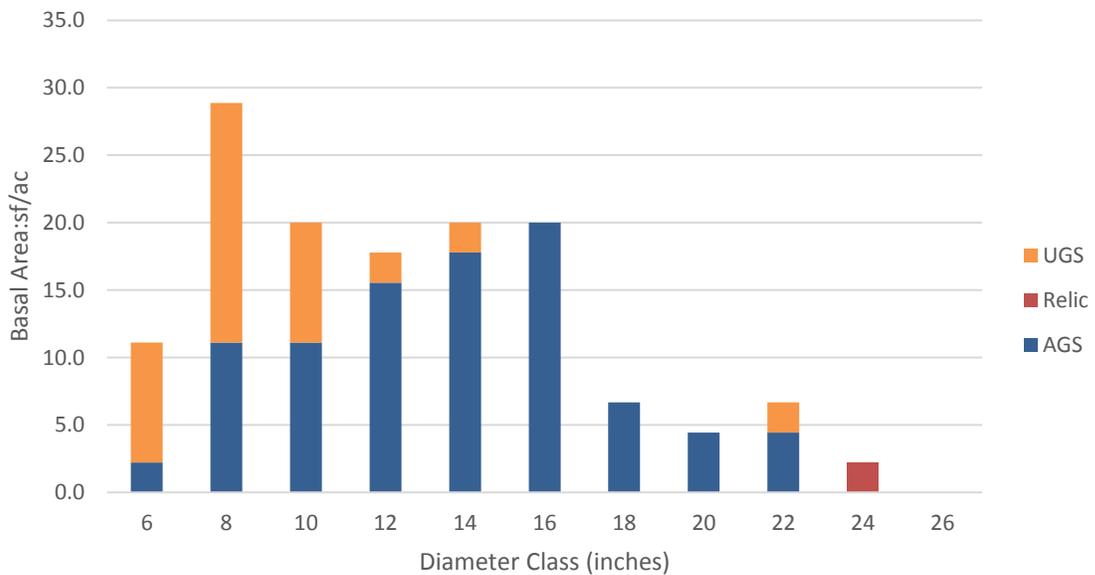
Operations should occur under dry or frozen conditions and should be done using Cut-to-length harvesting techniques that utilize a forwarder to drive merchantable wood to a landing while leaving slash, non-merchantable wood, and strategic coarse woody additions in the forest to meet our soil quality enhancement targets.



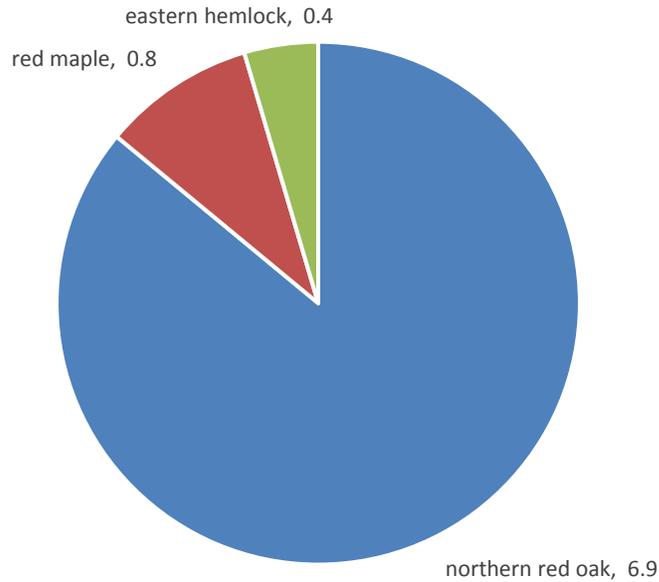
Stand 3: Tree Quality-Acceptable Growing Stock/Unacceptable Growing Stock/Relic



Stand 3: Tree Quality-Acceptable Growing Stock/Unacceptable Growing Stock/Relic



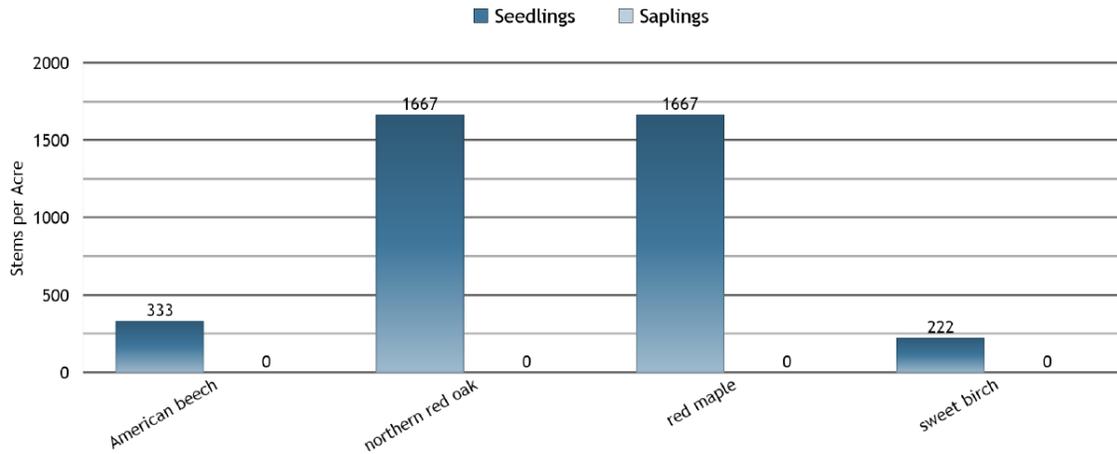
Stand 1: Sawlog volume (MBF/Acre)



EXISTING UNIT DESCRIPTION			
<b>Age Class Distribution</b>	<input checked="" type="checkbox"/> - Even-aged <input type="checkbox"/> - Uneven-aged	<b>Unit History</b>	Past harvests- likely around 2010 and perhaps in the 1990s- have selected nicely for high quality oak here.
<b>Forest Productivity</b> <i>cu.ft./ac./yr</i>	Red oak- 43 White pine- 129	<b>Soil Map Unit(s)</b>	Dutchess Silt Loam giving way to Cardigan-Kearsarge Complex. Please see Soils Map.
<b>Forest Health Concerns</b> <i>(Insects, disease, physical damage, or invasive plants)</i>		Beech bark disease Hemlock Wooly Adelgid Elongate Hemlock Scale	
<b>Invasive Species</b>		Occasional glossy buckthorn seedlings exist, but mostly the stand is invasives-free.	
<b>Observed level of Impact</b>		<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	

EXISTING UNIT DESCRIPTION		
<b>Stand Quality &amp; Health</b> <i>(Subjective)</i>	<input type="checkbox"/> Poor	<input type="checkbox"/> Average <input checked="" type="checkbox"/> Excellent
<b>Logging Chance</b> <i>(Subjective)</i>	<input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Excellent
<b>Sampling Method</b>	Variable Radius Point Sampling	<b>Regeneration</b>
<b>Sampling Date</b>	9.2.22	There is a healthy array of seedlings here but most are <2' tall due to lack of light. They are biding their time, waiting for release, but also being browsed by deer. Red oak and red maple are the dominant regeneration here. See Regeneration table below.
<b>Number of Sample Points</b>	9	
<b>Basal Area Factor</b>	20	
<b>Quadratic Mean Dia. (inches)</b>	10.2	
<b>Total Basal Area (ft<sup>2</sup>/acre)</b>	138	
<b>Basal Area in Acceptable Growing Stock (ft<sup>2</sup>/acre)</b>	93	
<b>Basal Area in Unacceptable Growing Stock (ft<sup>2</sup>/acre)</b>	45	
<b>Basal Area Range</b>	80-200	<b>Species to Favor</b>
<b>Trees per Acre</b>	241	Timber: Northern red oak and white pine.  Wildlife: Northern red oak
<b>Estimate of Unit Age (years)</b>	100-140	
<b>Elevation (feet)</b>	1181-1083	
<b>Slope (%)</b>	8-50	
<b>Aspect</b>	North	
<b>Terrain</b>	Gently Sloping except for a few steep areas	
<b>Distance from Geographic Center of Unit to Class 1, 2, or 3 Road (feet, straight-line distance)</b>	1200'	

### Stand 3 Regeneration



	TOTAL	Seedlings	Saplings				
			<1	1	2	3	4
American beech	333	333					
northern red oak	1,667	1,667					
red maple	1,667	1,667					
sweet birch	222	222					
<b>STEMS PER ACRE</b>	<b>3,889</b>	<b>3,889</b>					

#### **PLANT OBSERVATIONS AND CONSIDERATIONS**

*List below represents qualitative observations. The time of year that the forest cruise was completed (winter, spring, summer, and fall) will have an effect on the types of plants noted.*

Data collected: during growing season: ; during dormant season: ; during snow cover:

• New York fern

• Starflower

#### **DESIRED FUTURE UNIT CONDITION**

<b>Forest Type</b>	Red oak- hemlock- white-pine
<b>Long Range Silvicultural Management Regime</b>	<input checked="" type="checkbox"/> Even-aged <input type="checkbox"/> Uneven-aged
<b>Present Unit Age</b> <i>(Estimate; even-age management only)</i>	100-140
<b>Rotation Age</b> <i>(Even-age management only)</i>	120-160

<b>PLANNED TREATMENTS</b>	
<b>Year</b>	2024
<b>Treatment</b>	Irregular shelterwood harvest <ul style="list-style-type: none"> <li>• Build upon past work by continuing to grow some of the best oak while opening mid- and understory to feed light to regeneration.</li> <li>• Consider beech control treatment where beech is diseased.</li> <li>• Protect smooth-barked beech (there is at least one).</li> <li>• Recruit new pine, birch, and oak regeneration</li> <li>• Retain hemlock inclusions.</li> <li>• Retain and recruit snags and living cavity trees.</li> </ul>
<b>Trees Favored for Retention</b>	Red oak, white pine, and black birch.
<b>Trees Favored for Regeneration</b>	Red oak and white pine.
<b>For Even-Aged Management</b>	
<b>Residual Basal Area (ft<sup>2</sup>/acre)</b>	60-80

D. Other Management Units

Unit #	Acres	Type	Comments
4	5.56	Open/Idle	Continue invasive plant control.  Consider converting southern hayfield into pollinator meadow demonstration area.
5	0.41	Wetland	Protect hydrologic function here by monitoring for invasive plants and removing them if they establish.  Otherwise, leave alone.

## V. SUMMARY OF MANAGEMENT ACTIVITIES

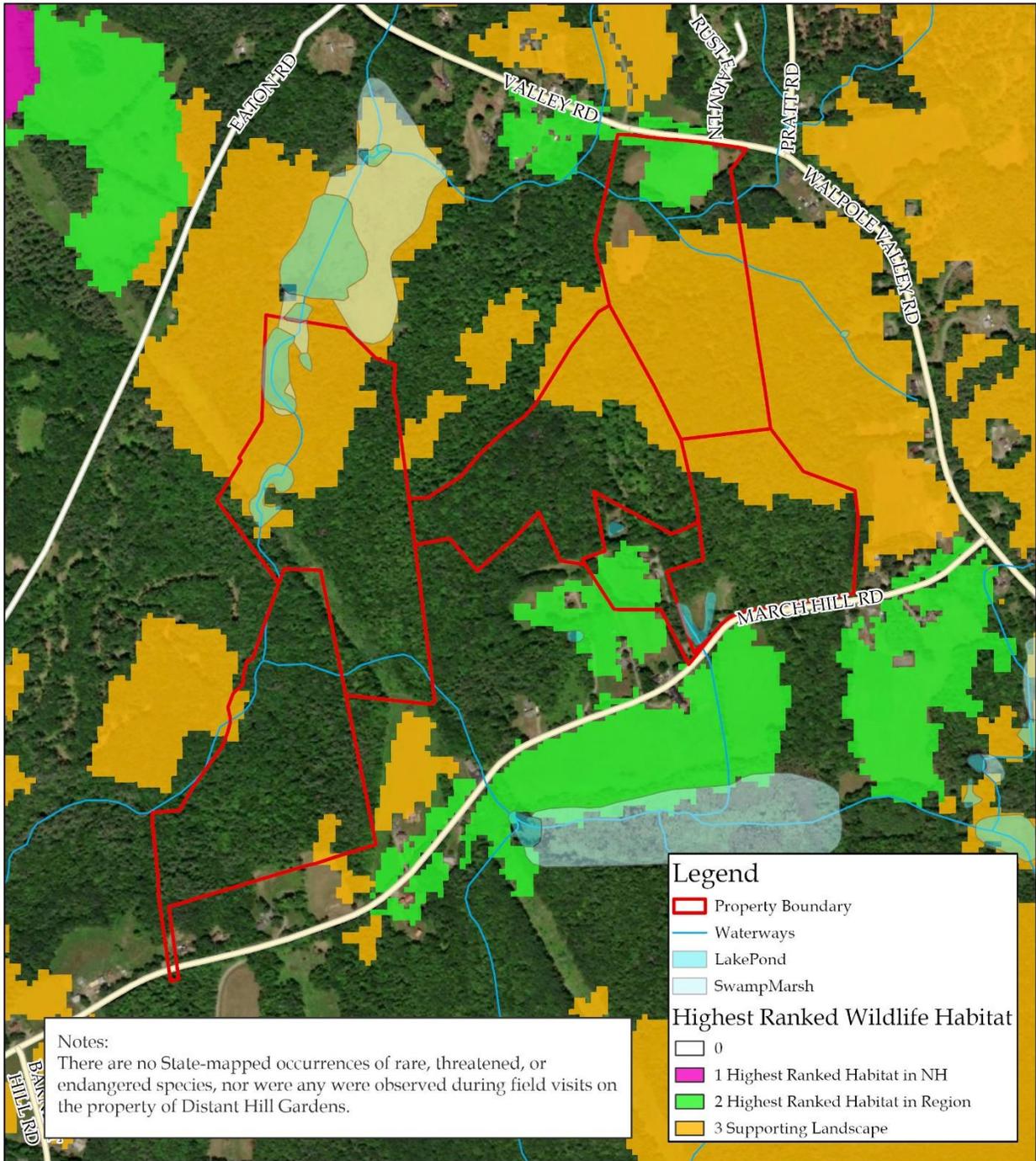
Upon the signing of this management plan, the *required* management activities in this table become **binding** and the landowner will be expected to complete the activities which are supervised by the county forester as part of the use value appraisal program (current use). We here at Long View Forest will make every effort to notify you when practices are due. However, the responsibility for ensuring that practices get completed in the timeframe stated ultimate falls upon the landowner.

<b>Year</b> <i>(Plus, or minus three years)</i>	<b>Stand</b>	<b>Activity</b>	<b>Reason</b>
2023	1,2 and 3	Follow-up invasive plant control	Build on 2022 control treatments and restore native plant diversity.
2023	2	Small Clearcut	Establish a patch of young forest adjacent to wetland, stream, and field edge.
2023	3	Irregular shelterwood	Continue to nurture oak component here while demonstrating excellent woodlot management.
2032	All	Update forest management plan	Prepare for next set of management activities.

**Notes:**

1. This list is a summary designed for quick reference. Details are included in the main body of the management plan.
2. Implementation of management activities may require a year or more of advanced planning. The planning phases for commercial timber sales or applications for cost-share funding can be especially lengthy. For this reason, the planning phase of any forest management activity should be initiated well in advance of the recommended date of completion.

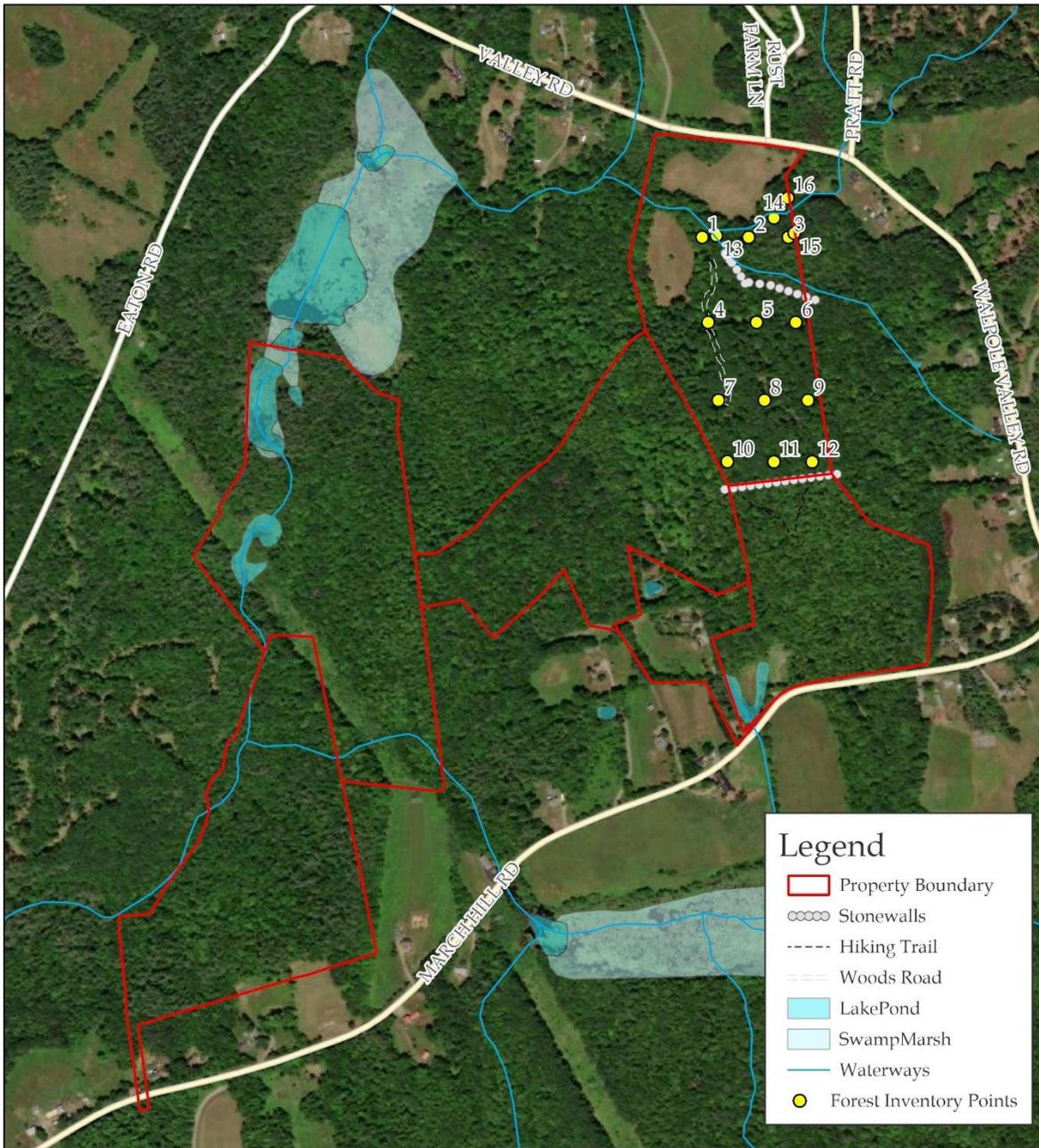




0 500 1,000 2,000 US Feet

**Wildlife Habitat**  
for lands belonging to  
**Distant Hill Gardens**  
Alstead & Walpole, NH





**Forest Inventory Map**  
 for lands belonging to  
**Distant Hill Gardens-Valley Road Parcel**  
 Alstead & Walpole, NH



## VII. APPENDIX

### A. Reader's Guide to Forest Management Planning

The following is a description of the forest management planning process. To assist the reader with unfamiliar terminology, a glossary has been provided at the end of the document. Long View Forest Management continually updates the format of management plans to improve communication with landowners. Suggestions for improvement are therefore greatly appreciated.

#### **Mapping**

The first step in preparing a forest management plan is mapping. A previous forest management map or survey allows the forester to locate the property and get oriented on it. Relevant physical features are also mapped, landform, water bodies, soil types and man-made features. A regular grid of forest inventory points is superimposed on the property map. These points are loaded onto a GPS device to guide the forester and ensure complete inventory coverage when he or she later visits the property.

#### **The Forest Inventory**

After mapping, a forester visits the property to conduct the forest inventory. Data on the following biological and physical features is gathered to help guide forest management decisions:

- Cultural features (*e.g., old cellar holes, sugarhouse foundations, old quarries*)
- Forest health (*insect pests, pathogens, invasive species, or natural disturbances*)
- Herbaceous plants (*seasonally dependent*)
- Management history (*past logging, farming, or other land management activity*)
- Recreational features (*existing or potential*)
- Site conditions (*aspect, elevation & terrain features*)
- Tree species present (*size, quantity & quality*)
- Wildlife features (*wildlife sign, sightings & habitat features*)

#### **Delineating Forest Management Units**

Returning to the office, forest management units are delineated using forest inventory data and other information. Forest management units are contiguous or closely spaced areas where the trees are of sufficiently uniform age distribution, composition, and structure, and where the site is of sufficiently uniform quality that they can be distinguished from other areas. Foresters rely on the following landscape attributes when delineating forest management units:

- Uniformity of tree growth (*forest stand and/or natural community type*)
- Defining terrain features (*e.g., ledges, ridges, aspect, slope, physical connectivity*)
- Soil type
- Land use history
- Man-made features (*roads, driveways, woods roads*)
- Access points and available landing areas

### **Writing the Forest Management Plan**

Next, planned forest management activities are written for each forest management unit. Common activities include pre-commercial thinning to favor the growth of desirable trees, harvesting of wood products, improvements to property access points and skid trails, and property boundary maintenance. With a plan for forest management activities over the planning period in hand, the forest management plan itself is written. The plan contains detailed descriptions of the existing forest management units at the time the inventory data was collected, as well as specifications for planned forest management activities over the ten-year planning period.

B. Resources for the Landowner

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**COST SHARE PROGRAMS**

Environmental Quality Incentives Program (EQUIP)	<a href="http://www.nrcs.usda.gov/PROGRAMS/EQUIP/">http://www.nrcs.usda.gov/PROGRAMS/EQUIP/</a>
Forest Stewardship Program	<a href="http://www.fs.fed.us/spf/coop/programs/loa/fsp.shtml">http://www.fs.fed.us/spf/coop/programs/loa/fsp.shtml</a>
NRCS Conservation Practice Standards (Provides information on all the different Conservation Practices and their codes)	<a href="http://www.nrcs.usda.gov/technical/standards/nhcp.html">http://www.nrcs.usda.gov/technical/standards/nhcp.html</a>
New Hampshire NRCS	<a href="http://www.nh.nrcs.usda.gov/">http://www.nh.nrcs.usda.gov/</a>

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**FOREST CERTIFICATION SCHEMES**

American Tree Farm System	<a href="http://www.treefarmssystem.org/">http://www.treefarmssystem.org/</a>
Forest Stewardship Council (FSC)	<a href="http://fscus.org/">http://fscus.org/</a>
Programme for the Endorsement of Forest Certification schemes (PEFC)	<a href="http://www.pefc.org/internet/html/index.htm">http://www.pefc.org/internet/html/index.htm</a>
Sustainable Forestry Initiative (SFI)	<a href="http://www.sfiprogram.org/">http://www.sfiprogram.org/</a>

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**INSECTS & DISEASES**

Cornell Christmas Tree Integrated Pest Management	<a href="http://www.nysipm.cornell.edu/publications/field_guide_xmas_trees/field_guide_xmas_trees.asp">http://www.nysipm.cornell.edu/publications/field_guide_xmas_trees/field_guide_xmas_trees.asp</a>
Forest Insect & Disease leaflets- United States Forest Service	<a href="http://www.fs.fed.us/r6/nr/fid/wo-fidls/">http://www.fs.fed.us/r6/nr/fid/wo-fidls/</a>
USFS- forest health page <i>Invasive/ Exotic Management</i>	<a href="http://na.fs.fed.us/pubs/misc.shtm">http://na.fs.fed.us/pubs/misc.shtm</a>
Invasive Plant Atlas of New England's (IPANE)	<a href="http://nbii-nin.ciesin.columbia.edu/ipane/">http://nbii-nin.ciesin.columbia.edu/ipane/</a>
Vermont invasive exotic plant committee	<a href="http://vtinvasives.org/">http://vtinvasives.org/</a>

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**MISCELLANEOUS**

To find out information on your watershed, visit Backyard Conservation: Natural Resources Conservation Service (NRCS)	<a href="http://cfpub.epa.gov/surf/locate/index.cfm">http://cfpub.epa.gov/surf/locate/index.cfm</a> <a href="http://www.nrcs.usda.gov/wps/portal/nrcs/detail/?ss=16&amp;navtype=BROWSEBYSUBJECT&amp;cid=nrcs143_023574&amp;navid=220120000000000&amp;position=Not%20Yet%20Determined.html&amp;ttype=detail">http://www.nrcs.usda.gov/wps/portal/nrcs/detail/?ss=16&amp;navtype=BROWSEBYSUBJECT&amp;cid=nrcs143_023574&amp;navid=220120000000000&amp;position=Not%20Yet%20Determined.html&amp;ttype=detail</a>
Good forestry in the Granite State (13MB)	<a href="http://extension.unh.edu/goodforestry/index.htm">http://extension.unh.edu/goodforestry/index.htm</a>
Online Conversion (convert any unit of measurement to anything else)	<a href="http://www.onlineconversion.com/">http://www.onlineconversion.com/</a>
National Timber Tax website	<a href="http://www.timbertax.org/">http://www.timbertax.org/</a>
UNH cooperative extension	<a href="http://extension.unh.edu/">http://extension.unh.edu/</a>

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***TREE & PLANT IDENTIFICATION***

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New England Wildflower Society Simple Key	<a href="https://gobotany.newenglandwild.org/">https://gobotany.newenglandwild.org/</a>
Silvics of North America	<a href="http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm">http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm</a>

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***SOILS & GEOLOGY***

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USDA Web Soil Survey	<a href="http://websoilsurvey.nrcs.usda.gov/app/">http://websoilsurvey.nrcs.usda.gov/app/</a>
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### C. Forest Management Reference Publications

1. *Silvicultural Guide for Northern Hardwood Types in the Northeast* (revised). USDA-USFS-NA-FES. Leak, Solomon, De Bald. Research Paper NE-603. 1987.
2. *A Silvicultural Guide for Spruce-Fir in the Northeast*. USDA- USFS-NA-FES. Technical Report NE-6. 1973.
3. *Uneven-aged Management of Northern Hardwoods in New England*. USDA-USFS. Research Paper NE-332. 1975.
4. *A Stocking Guide for Eastern White Pine*. USDA-USFS. Research Note NE-168. 1973.
5. *A Silvicultural Guide for White Pine in the Northeast*. USDA-USFS. Lancaster & Leak. General Technical Report NE-41. 1978.
6. Bennett, Karen P. editor. 2010. *Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire* (second edition). University of New Hampshire Cooperative Extension, Durham, N.H. [www.goodforestry.org](http://www.goodforestry.org)
7. *Revised White Pine Stocking Guide for Managed Stands*. USDA-USFS-NASPF. Leak & Lamson. NA-TP-01-99. 1999.
8. *White Pine Management – A Quick Review*. USDA-USFS-NASPF-NA-FR-27. Lancaster. 1984.
9. *A Silvicultural Guide for Northern Hardwoods in the Northeast*. USDA-USFS. Research Paper NRS-132. April 2014.
10. *Forester’s Guide to Marking and Grading Eastern Hemlock Timber*. GFA Project Hemlock Utilization Guide No. 1. 1973.
11. *A Guide to Hardwood Timber Stand Improvement*. USDA-USFS-NA Upper Darby, PA. 1975.
12. *Crop Tree Management in Eastern Hardwoods*. USDA-USFS-NASPF. Perkey. NA-TP-19-93. 1993.
13. *Establishing Even-aged Northern Hardwood Regeneration by Shelterwood Method – A Preliminary Guide*. USDA-USFS-FES North Central. Research Paper NC-99. 1973.
14. *Manager’s Handbook for Northern White Cedar in the North Central States*. USDA-USFS-FES. General Technical Report NC-35. 1977.
15. *Manager’s Handbook for Red Pine in the North Central States*. USDA-USFS-FES. General Technical Report NC-33. 1977. Use
16. *Manager’s Handbook for Oaks in the North Central States*. USDA-USFS-FES North Central. General Technical Report NC-37. 1977.
17. *Manager’s Handbook for Aspen in the North Central States*. USDA-USFS-FES North Central. General Technical Report NC-37. 1977.
18. *Managing Eastern Hemlock: A Preliminary Guide*. USDA-USFS-NA-FR-30. 1985.
19. *Reforestation Handbook / Stocking Standards*. USDA-USFS. Handbook R-9. GMNF Supplement No. 4 pp. 113.2-113.3.
20. *Silvicultural Guide for Paper Birch in the Northeast* (revised). USDA-USFS-NA-FES. Research Paper NE-535. 1983.
21. *Forest Statistics for Vermont, 1933 and 1983*. USDA-USFS-FES Northeastern Station. Research Bulletin NE-87. 1985. pp. 99-100 (Log grade standards).
22. *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont*. VT ANR-FPR. 15 August 1987.
23. *Management Guide for Deer Wintering Areas in Vermont*. Russell S. Reay et al., VT ANR-FPR-FW. 1990.
24. *Elementary Forest Sampling & Elementary Statistical Methods for Foresters*. USDA-USFS-FES Southern. Freese & Frank. 1962.
25. *Forestry Handbook*. Wenger, Karl, ed. Society of American Foresters. New York: John Wiley and Sons, 1984.
26. *Forest Measurements*. Avery, Thomas E. and Burkhardt, Harold, E. Boston: McGraw Hill, 1994.
27. *Forest Wetlands Functions, Benefits, and the Use of Best Management Practices*. USDA-USFS-NA. PR-01-95. 1995.
28. *Technical Guide to Forest Wildlife Habitat Management in New England*. University of Vermont Press, Burlington, VT. DeGraaf et al. 2006.
29. *Wetland, Woodland, Wildland A Guide to the Natural Communities of Vermont*. University Press, Hanover, NH. Thompson & Sorenson. 2005.
30. *The Practice of Silviculture*, 7th edition. D. M. Smith. Wiley and Sons

## D. Glossary

ACCEPTABLE GROWING STOCK (AGS): STEMS of commercial tree species which have the potential to produce one 12-foot or two non-contiguous 8-foot sawlogs, where the management objective is sawlog production.

ADVANCED REGENERATION: See REGENERATION

AVERAGE HAUL DISTANCE: Approximate distance from the geographic center of a harvest area to the nearest class 1, 2, or 3 road or log landing

BASAL AREA (BA): A measurement of stand density, commonly expressed on a per-acre basis. Basal area is the sum of the cross-sectional areas of all trees measured at BREAST HEIGHT.

BEST MANAGEMENT PRACTICE(S) (BMP): A practice or usually a combination of practices that are determined by a state or designated planning agency to be the most effective and practicable means (including technological, economic, and institutional considerations) of controlling point and non-point source pollutants at levels compatible with environmental quality goals.

CO-DOMINANT: Large-crowned at the average height of the forest canopy, receiving sunlight from above and partly from the sides. Co-dominant crowns are somewhat smaller than DOMINANTS but still healthy and vigorous.

COMMERCIAL TREATMENT: A silvicultural treatment that results in the generation of positive revenue for the owner of the timber.

CORD: A unit of measure equal to 128 cubic feet of wood or a stacked pile of wood that measures 4 feet by 4 feet by 8 feet. Cords are used to measure firewood and PULPWOOD.

CORDWOOD: Generally, stems of hardwood species suitable only for sale as firewood

CROP TREES: Growing trees chosen for their potential to produce high quality timber. Crop trees are generally straight, vigorous, and disease-free and consequently respond best to thinning treatments with increased growth rates. Where specified, crop trees may be chosen based on other criteria, including value as a food source or habitat for wildlife or for aesthetic value.

CROWN: The upper part of the tree, including branches with foliage

CULL: A tree of sufficiently poor form or internal defect as to be un-merchantable

CUTTING CYCLE: The planned or recommended interval between harvest operations within a stand

DIAMETER AT BREAST HEIGHT (DBH): The diameter of a tree outside the bark at a point 4.5 feet above ground level

DOMINANT: Trees with wide crowns above the level of the forest canopy, receiving sunlight from above and from the sides

EVEN AGED: Stands with two or fewer size classes.

FOREST INVENTORY: A set of objective sampling methods designed to quantify the spatial distribution, composition, and rates of change of forest parameters within specified levels of precision for the purposes of management.

FUELWOOD: See CORDWOOD

GIRDLE: To encircle the bole of a tree with a cut extending past the cambium layer (inner bark) into the xylem layer (center of the tree) to kill the tree without felling it

GROUP: A group of trees comprising a small harvest unit, generally a few acres in size or less, intended to open up a gap in the forest canopy to permit the establishment and growth of new tree seedlings

HARD MAST: Tree seeds or nuts, typically of oak, beech, and hickory, which serve as food for wildlife.

HIGH GRADING: A harvesting practice involving the removal of the most commercially valuable trees leaving a residual stand composed of trees of poor form and undesirable species composition. High grading may result in dysgenic effects and have long-term negative economic and forest health implications.

INTERMEDIATE: A tree with most of the crown below the average canopy level which receives some sunlight from above and little or none from the sides

LANDING: A generally flat, open area that can be easily accessed by a log truck or truck and trailer where wood is gathered during a harvest and where logs are sorted and stacked to await transport to mill or market

MANAGEMENT UNIT: A subdivision of a management area, often synonymous with STAND

OPPRESSED: Trees fitting the definition of suppressed, but having been so for a sufficient length of time that they will not recover or respond if released

OVERSTORY: The upper crown canopy of a forest.

PRE-COMMERCIAL THINNING (PCT): The removal of un-merchantable or sub-merchantable trees to reduce stocking and concentrate growth rates in the most desirable individuals.

POLE-TIMBER, POLES: Trees 5-9" DBH

PULPWOOD: Wood of generally lower quality for manufacture into wood pulp, paper, fiber, board, or other products

REGENERATION: Young seedlings and saplings. If seedlings and saplings are present prior to any cutting, they may be termed advanced regeneration.

SAPLINGS: Trees 3-10 feet high and up to 5" DBH

SAWTIMBER: Trees 12" DBH and up (10" and up for red spruce and balsam fir)

SEEDLINGS: Young trees up to 3 feet high

SILVICS: The study of the life history and characteristics of forest trees and stands, with particular reference to environmental factors

SILVICULTURE: The scientific theory and practice of controlling forest establishment, composition, and growth to obtain forest crops and other benefits

SITE: The biotic, climatic, and soil conditions of a given area which are relevant to the growth of trees

SITE CLASS: A measure of the capacity of a site to support the growth of desirable trees. Site class may be given for one species or for the range of species growing in a STAND. Site class is most commonly represented with Roman numerals I – IV, with Site I being the best sites and Site IV being the worst.

SLASH: Branches, bark, tops, chunks, cull logs, uprooted stumps and broken or uprooted trees left on the ground after logging

SMALL SAWTIMBER: Trees 10-15" DBH

SOFT MAST: Fruit or berries, typically of dogwood, viburnum, elderberry, blueberry, hawthorn, grape, raspberry, and blackberry, which serve as a food source for wildlife.

STAND: An aggregation of trees occupying a specific area and sufficiently uniform in species composition, age, arrangement, and conditions as to be distinguishable from the trees in adjoining areas

STEM: A synonym for an individual tree; may refer to the main trunk of a tree, not including branches, foliage, stump, or roots

STOCKING: A measure of the density of a stand, usually determined by the number of trees per acre and their average diameter

STUMPAGE: The monetary value of standing timber to the owner of the timber. Stumpage is generally calculated as:

$$= (\text{Price paid by mill for delivered wood}) \text{ less } (\text{Cost of trucking from roadside to mill}) \text{ less } (\text{Cost of logging and skidding to roadside})$$

SUPPRESSED: Trees overtopped by larger trees and receiving only indirect sunlight

TIMBER STAND IMPROVEMENT (TSI): See PRE-COMMERCIAL THINNING

UNACCEPTABLE GROWING STOCK (UGS): Live trees judged to be of relatively poorer form or health, and which should be removed at the time of the next timber harvest to provide trees of relatively better form with more room to grow.

UNDERSTORY: Trees or shrubs growing below the main canopy in a forest STAND

UNEVEN-AGED: A STAND with three or more size classes

WEED: A tree species with little or no commercial value

WOLF TREE: Trees with widespread crowns which hinder the growth of ACCEPTABLE GROWING STOCK and are themselves of little commercial value. They often have significant value for wildlife or aesthetics, however



	Nitrogen (N)	Phosphorus (P <sub>2</sub> O <sub>5</sub> )	Potassium K <sub>2</sub> O
Nutrients Required (lbs per acre)	0 - 25	0 - 40	150 - 180
Credits			
Manure (0 )	0	0	0
Recommendations (lbs per acre)	0 - 25	0 - 40	150 - 180

**Comments:** NOTE: All nutrient recommendations are in lbs per acre

If % clover falls below 40-50% increase the nitrogen application rate to 50 #/A.

### Staff Comments

Soil pH is OK, but applying lime will keep it in the optimal range. If the field is actively cropped (grazed or at least one cutting of hay per season), and the stand is at least 40% clover, apply muriate of potash (0-0-60) at 250# per acre. If the stand is less than 40% clover, apply 15-0-40 blend at 300# per acre, split over two applications (early spring and after first cutting) If the field is not cropped and is maintained for bird/pollinator habitat, you could reduce fertilizer to 200# of potash to increase soil potassium a bit, but you could also get away without applying any fertilizer.

### References

For more information, please refer to the following:

[Improving Pastures and Hayfields](#)

[Interpreting Soil Tests – Micronutrient Levels](#)

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Test Data

Table with 4 columns: Test Name, Value, Unit/Label, Optimum Range. Rows include pH - Soil (pH), Mehlich - Lime Test (Buffer pH), Calcium, Magnesium, Potassium, Phosphorus, Est. CEC, Est. Base Sat., Est. Ca Sat., Est. Mg Sat., Est. K Sat., Org. Matter, LOI-360 (OM), Copper, Zinc, Manganese, Iron.

Optimum Range Key

VL - Very Low L - Low O - Optimal H - High VH - Very High

Recommendations

Deciduous trees and shrubs

Supplement Recommendation

An appropriate pH range for most deciduous trees and shrubs is 5.5 - 6.5. To lime to pH 6.0, apply and incorporate 7 lbs dolomitic lime per 100 sq. ft. Mix thoroughly into the top 6 inches of soil before planting or broadcast on the soil surface and lightly rake in.

Nitrogen

Nitrogen (N) applications are not necessary the first growing season, although a slow-release or organic application of nitrogen-containing fertilizer can be used safely at planting or soon after. If using a soluble fertilizer, wait until fall (for spring planted trees and shrubs) or until the following spring to fertilize. At that time, add 1 lb N/1,000 sq. ft. to the entire planting bed or rooting area.

A preplant application of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) will be adequate for 3-5 years based on the following rates:

use a rate of 4-8 lbs P<sub>2</sub>O<sub>5</sub>/1,000 sq. ft.

For each lb of P<sub>2</sub>O<sub>5</sub> desired, apply 5 lbs/1,000 sq ft of superphosphate (0-20-0) or 2.5 lbs/1000 sq. ft. of triple superphosphate (0-46-0). Apply the P<sub>2</sub>O<sub>5</sub> fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole.

Note: do not till in turf areas or where there many tree roots from nearby trees; in this case, mix the P<sub>2</sub>O<sub>5</sub> fertilizer thoroughly with the backfill soil only. Use 3 oz. superphosphate (0-20-0) or 1 oz. triple superphosphate (0-46-0) per cubic foot of soil.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **Potassium**

Apply 5-10 lbs/1,000 sq. ft. of potash (K<sub>2</sub>O). This can be provided by 8-16 lbs/1,000 sq. ft. of muriate of potash (KCl, 0-0-60) or may be provided by other fertilizers. Use the lower rate for sandy soils and the higher rate for loam or clay soils. Apply the fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole if possible. Water thoroughly during and after planting.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **References**

For more information, please refer to the following:

[\*Fertilizing Trees and Shrubs\*](#)

[\*Slow-Release Fertilizers for Home Gardens and Landscapes\*](#)

[\*Interpreting Soil Tests – Micronutrient Levels\*](#)

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Lab ID: 49912

Lab Run Date: 12/06/22

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Test Data

Table with 4 columns: Test Name, Value, Status, Optimum Range. Rows include pH - Soil (pH), Mehlich - Lime Test (Buffer pH), Calcium, Mehlich 3, Magnesium, Mehlich 3 (Mg), Potassium, Mehlich 3 (K), Phosphorus, Mehlich 3 (P), Est. CEC, Est. Base Sat., Est. Ca Sat., Est. Mg Sat., Est. K Sat., Org. Matter, LOI-360 (OM), Copper, Mehlich 3 (Cu), Zinc, Mehlich 3 (Zn), Manganese, Mehlich 3 (Mn), Iron, Mehlich 3 (Fe).

Optimum Range Key:

VL - Very Low L - Low O - Optimal H - High VH - Very High

Recommendations

Deciduous trees and shrubs

Supplement Recommendation

An appropriate pH range for most deciduous trees and shrubs is 5.5 - 6.5. To lime to pH 6.0, apply and incorporate 11 lbs dolomitic lime per 100 sq. ft. Mix thoroughly into the top 6 inches of soil before planting or broadcast on the soil surface and lightly rake in.

Nitrogen

Nitrogen (N) applications are not necessary the first growing season, although a slow-release or organic application of nitrogen-containing fertilizer can be used safely at planting or soon after. If using a soluble fertilizer, wait until fall (for spring planted trees and shrubs) or until the following spring to fertilize. At that time, add 1 lb N/1,000 sq. ft. to the entire planting bed or rooting area.

A preplant application of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) will be adequate for 3-5 years based on the following rates:

use a rate of 4-8 lbs P<sub>2</sub>O<sub>5</sub>/1,000 sq. ft.

For each lb of P<sub>2</sub>O<sub>5</sub> desired, apply 5 lbs/1,000 sq ft of superphosphate (0-20-0) or 2.5 lbs/1000 sq. ft. of triple superphosphate (0-46-0). Apply the P<sub>2</sub>O<sub>5</sub> fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole.

Note: do not till in turf areas or where there many tree roots from nearby trees; in this case, mix the P<sub>2</sub>O<sub>5</sub> fertilizer thoroughly with the backfill soil only. Use 3 oz. superphosphate (0-20-0) or 1 oz. triple superphosphate (0-46-0) per cubic foot of soil.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **Potassium**

Apply 5-10 lbs/1,000 sq. ft. of potash (K<sub>2</sub>O). This can be provided by 8-16 lbs/1,000 sq. ft. of muriate of potash (KCl, 0-0-60) or may be provided by other fertilizers. Use the lower rate for sandy soils and the higher rate for loam or clay soils. Apply the fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole if possible. Water thoroughly during and after planting.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **References**

For more information, please refer to the following:

[\*Fertilizing Trees and Shrubs\*](#)

[\*Slow-Release Fertilizers for Home Gardens and Landscapes\*](#)

[\*Interpreting Soil Tests – Micronutrient Levels\*](#)

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Lab ID: 49914

Lab Run Date: 12/06/22

### Client Information

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### Sample Information

Field Size (acres): 3  
Soil Series or Type: n/a

# of Cuttings: 1 - 2  
Map Unit: n/a

### Test Data

Parameter	Value	Optimum Range
pH - Soil (pH)	5.6	
Mehlich - Lime Test (Buffer pH)	6.08	
Calcium, Mehlich 3 (Ca)	263 (ppm)	VL 800 - 1200
Magnesium, Mehlich 3 (Mg)	14 (ppm)	VL 60 - 120
Potassium, Mehlich 3 (K)	22 (ppm)	VL 170 - 280
Phosphorus, Mehlich 3 (P)	13 (ppm)	L 30 - 50
Est. CEC	7.3	
Est. Base Sat.	20.4 %	
Est. Ca Sat.	18.0 %	
Est. Mg Sat.	1.6 %	
Est. K Sat.	0.8 %	
Est. P Sat.	0.8 %	
Org. Matter, LOI-360 (OM)	5.9 (%)	
Copper, Mehlich 3 (Cu)	1.2 (ppm)	
Zinc, Mehlich 3 (Zn)	1.7 (ppm)	
Manganese, Mehlich 3 (Mn)	20.1 (ppm)	
Iron, Mehlich 3 (Fe)	141.1 (ppm)	

#### Optimum Range Key:

VL - Very Low      L - Low      O - Optimal      H - High      VH - Very High

### Recommendations

Crop: Grass Topdress - Hay

**Lime:** Apply 1 ton(s) of lime per acre.  
Apply anytime in the growing season.

	Nitrogen (N)	Phosphorus (P <sub>2</sub> O <sub>5</sub> )	Potassium K <sub>2</sub> O
<b>Nutrients Required</b> (lbs per acre)	50 - 60	0 - 40	150 - 180
<b>Credits</b>			
<b>Manure</b> (0 )	0	0	0
<b>Recommendation:</b> (lbs per acre)	50 - 60	0 - 40	150 - 180

*Comments:* NOTE: All nutrient recommendations are in lbs per acre

### Staff Comments

Soil pH is a little low; applying lime will bring it into the optimal range. If the field is actively cropped (grazed or at least one cutting of hay per season), and the stand is at least 40% clover, apply muriate of potash (0-0-60) at 250# per acre. If the stand is less than 40% clover, apply 15-0-40 blend at 300# per acre, split over two applications (early spring and after first cutting) If the field is not cropped and is maintained for bird/pollinator habitat, you could reduce fertilizer to 200# of potash to increase soil potassium a bit, but you could also get away without applying any fertilizer.

### References

For more information, please refer to the following:

[\*Interpreting Soil Tests – Micronutrient Levels\*](#)

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Lab ID: 49911

Lab Run Date: 12/06/22

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**Test Data**

<b>pH - Soil (pH)</b>	5.1		<b>Optimum Range</b>
<b>Mehlich - Lime Test (Buffer pH)</b>	5.75		
<b>Calcium, Mehlich 3</b>	106.6 (ppm)	VL	800 - 1200
<b>Magnesium, Mehlich 3 (Mg)</b>	22.0 (ppm)	L	60 - 120
<b>Potassium, Mehlich 3 (K)</b>	61.0 (ppm)	VL	170 - 280
<b>Phosphorus, Mehlich 3 (P)</b>	8.0 (ppm)	VL	30 - 50
<b>Est. CEC</b>	0.9		
<b>Est. Base Sat.</b>	100.0 %		
<b>Est. Ca Sat.</b>	61.1 %		
<b>Est. Mg Sat.</b>	21.0 %		
<b>Est. K Sat.</b>	17.9 %		
<b>Org. Matter, LOI-360 (OM)</b>	5.8 (%)		
<b>Copper, Mehlich 3 (Cu)</b>	1.1 (ppm)		
<b>Zinc, Mehlich 3 (Zn)</b>	1.2 (ppm)		
<b>Manganese, Mehlich 3 (Mn)</b>	8.6 (ppm)		
<b>Iron, Mehlich 3 (Fe)</b>	130.5 (ppm)		

Optimum Range Key

VL - Very Low      L - Low      O - Optimal      H - High      VH - Very High

**Recommendations**

*Deciduous trees and shrubs*

**Supplement Recommendation**

An appropriate pH range for most deciduous trees and shrubs is 5.5 - 6.5. To lime to pH 6.0, apply and incorporate 14 lbs dolomitic lime per 100 sq. ft. Mix thoroughly into the top 6 inches of soil before planting or broadcast on the soil surface and lightly rake in.

**Nitrogen**

Nitrogen (N) applications are not necessary the first growing season, although a slow-release or organic application of nitrogen-containing fertilizer can be used safely at planting or soon after. If using a soluble fertilizer, wait until fall (for spring planted trees and shrubs) or until the following spring to fertilize. At that time, add 1 lb N/1,000 sq. ft. to the entire planting bed or rooting area.

A preplant application of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) will be adequate for 3-5 years based on the following rates:

use a rate of 4-8 lbs P<sub>2</sub>O<sub>5</sub>/1,000 sq. ft.

For each lb of P<sub>2</sub>O<sub>5</sub> desired, apply 5 lbs/1,000 sq ft of superphosphate (0-20-0) or 2.5 lbs/1000 sq. ft. of triple superphosphate (0-46-0). Apply the P<sub>2</sub>O<sub>5</sub> fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole.

Note: do not till in turf areas or where there many tree roots from nearby trees; in this case, mix the P<sub>2</sub>O<sub>5</sub> fertilizer thoroughly with the backfill soil only. Use 3 oz. superphosphate (0-20-0) or 1 oz. triple superphosphate (0-46-0) per cubic foot of soil.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **Potassium**

Apply 5-10 lbs/1,000 sq. ft. of potash (K<sub>2</sub>O). This can be provided by 8-16 lbs/1,000 sq. ft. of muriate of potash (KCl, 0-0-60) or may be provided by other fertilizers. Use the lower rate for sandy soils and the higher rate for loam or clay soils. Apply the fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole if possible. Water thoroughly during and after planting.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

### *Narrowleaf evergreen trees and shrubs*

#### **Supplement Recommendation**

An appropriate pH range for most narrowleaf evergreen trees and shrubs (conifers) is 5.0 - 6.0. No lime is recommended at this time.

Exceptions are arborvitae, taxus (yew), and Colorado blue spruce which prefer a pH of 6.0 - 7.0. For these plants, lime to pH 6.5 by applying and incorporating 18 lbs dolomitic lime per 100 sq. ft. before planting or broadcast on the soil surface and lightly rake in.

#### **Nitrogen**

Nitrogen (N) applications are not necessary the first growing season, although a slow-release or organic application of nitrogen-containing fertilizer can be used safely at planting or soon after. If using a soluble fertilizer, wait until fall (for spring planted trees and shrubs) or until the following spring to fertilize. At that time, add .5 lb N/1,000 sq. ft. to the entire planting bed or rooting area.

#### **Phosphorus**

A preplant application of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) will be adequate for 3-5 years based on the following rates:

use a rate of 4-8 lbs P<sub>2</sub>O<sub>5</sub>/1,000 sq. ft.

For each lb of P<sub>2</sub>O<sub>5</sub> desired, apply 5 lbs/1,000 sq ft of superphosphate (0-20-0) or 2.5 lbs/1000 sq. ft. of triple superphosphate (0-46-0). Apply the P<sub>2</sub>O<sub>5</sub> fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole.

Note: do not till in turf areas or where there many tree roots from nearby trees; in this case, mix the P<sub>2</sub>O<sub>5</sub> fertilizer thoroughly with the backfill soil only. Use 3 oz. superphosphate (0-20-0) or 1 oz. triple superphosphate (0-46-0) per cubic foot of soil.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

#### **Potassium**

Apply 5-10 lbs/1,000 sq. ft. of potash (K<sub>2</sub>O). This can be provided by 8-16 lbs/1,000 sq. ft. of muriate of potash (KCl, 0-0-60) or may be provided by other fertilizers. Use the lower rate for sandy soils and the higher rate for loam or clay soils. Apply the fertilizer to the soil surface and then till it in to a depth of 6-8" before digging the planting holes(s). Fertilize the entire planting bed, or for individual trees, an area two times the diameter of the planting hole if possible. Water thoroughly during and after planting.

These nutrients are best applied before planting and incorporated into the soil to supply adequate levels for more than one year.

## **References**

For more information, please refer to the following:

[\*Fertilizing Trees and Shrubs\*](#)

[\*Slow-Release Fertilizers for Home Gardens and Landscapes\*](#)

[\*Interpreting Soil Tests – Micronutrient Levels\*](#)

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