FOREST MANAGEMENT PLAN

for the property of

South Acworth Town Forest
owned by
Town of Acworth

81 acres, located in Acworth, Sullivan County, New Hampshire

Prepared by
Full Circle Forestry, LLC
Jeffrey Snitkin, NH Licensed Forester #452
USDA/NRCS Technical Service Provider #TSP-14-9810
752 Rt. 103A Newbury, NH 03255
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General Landowner Information
May 2024

Landowner(s) Name: Town of Acworth

Address: P.O. 37 Acworth, NH 03601

Contact: Conservation Commission Co-Chair - Gregg Thibodeau, 603-835-6879
acworthconservation@gmail.com

Property Location: Hilliard Road, Acworth, Sullivan County, NH

Access: Hilliard Road

Parcel I.D.: Map 240/Lot 009

Acreage: +/-81 Acres

Date Acquired: January 31, 1944

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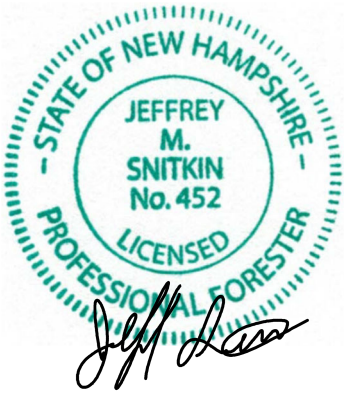
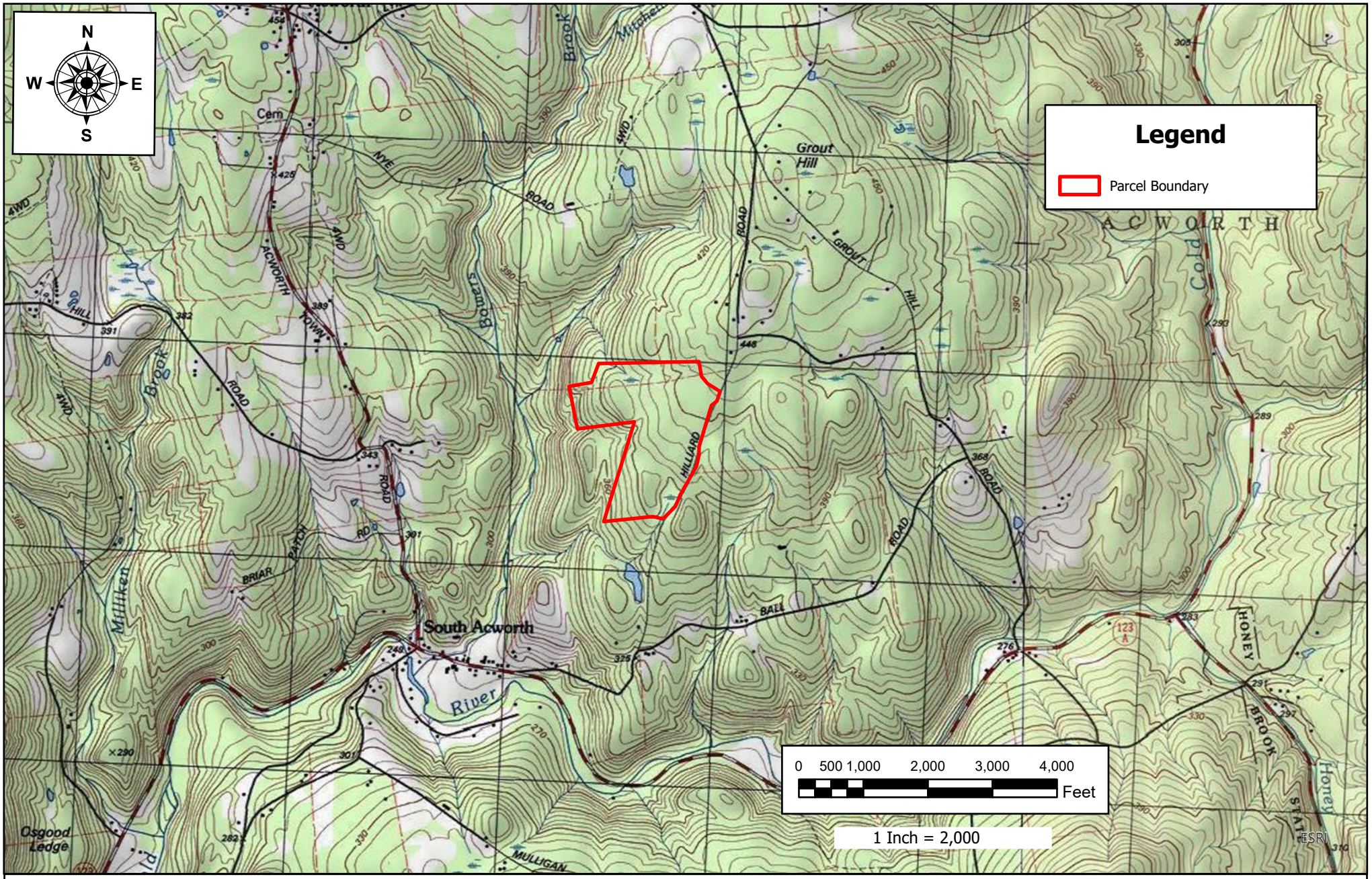


TABLE OF CONTENTS



LOCUS MAP

SOUTH ACWORTH TOWN FOREST

Hilliard Road
Acworth, Sullivan County, NH
Owned by: Town of Acworth
GIS Mapping by: Jeffrey Snitkin, NHLPF #452
Full Circle Forestry, LLC. May 21, 2024

Notes:
This is not a survey. All features are approximate and relative. Base map derived from field evidence and interpretation of GIS layers. Forest types and features based on field notes and mapping; GPS waypoint and track data and interpretation of lidar

STATE OF NEW HAMPSHIRE – JEFFREY M. SNITKIN No. 452 LICENSED PROFESSIONAL FORESTER

FULL CIRCLE FORESTRY, LLC

I. INTRODUCTION

The South Acworth Town Forest is owned by the Town of Acworth and managed by the Acworth Conservation Commission (ACC). It is accessible from Hilliard Road in the town of Acworth, Sullivan County, New Hampshire. According to town records, and supported by a 1970 survey map, and GPS field data, the property encompasses 81 acres. Of the 81 acres, approximately all of the acres are considered productive forestland covered by the forest management plan.

This plan is intended to document the current condition of the forest, to identify resource concerns, and to incorporate the landowner's objectives into a schedule of management recommendations and prescriptions. It is written to comply with the requirements of the American Tree Farm Program.

Landowner Goals & Objectives

The ACC provided a completed Forest Stewardship Objectives Form to begin the forest management planning process. The form allows the ACC to select and rank multiple goals and objectives and state additional desired goals beyond the provided options. Goals and objectives are then incorporated into the data collection and field observations process in order to provide tailored management recommendations. The ACC has identified goals and objectives specific to the South Acworth Town Forest, including:

- Promote diversity of both tree species and age classes, along with the creation of even-aged and uneven-aged stands.
- Create a multigenerational resilient forest.
- Assisted tree migration.
- Maintain soil productivity.
- Conserve native plant and animal species and wildlife habitat.
- Control non-native and/or invasive plant species.
- Maintain or improve the overall quality of forest products.
- Create/Improve recreational opportunities if desirable features are found.

ACC's goals and objectives echo those of the American Tree Farm System, balancing multiple-use management including wood, water, wildlife, and recreation.

Forest Management Planning

Little is known about previous cutting on the property. Decayed tree stumps visible today are evidence of past cutting from approximately 45 years ago in the northern part of the property. A long management planning history exists for the property going back to 1975 by forester Brian Simm. In 2006, forester Peter Rhoades, prepared a forest management plan this parcel.

The first steps in preparing this forest management plan involved a review of the current property deeds and Natural Resource Conservation Service (NRCS) Web Soil Survey. Subsuquently, stand data from a January 2024 forest inventory conducted by Full Circle Forestry, LLC was analyzed and is summarized on the following pages. This includes information about current stand conditions, management recommendations, and prescriptions. This plan is intended as a guide to management and maintenance of the forest for the next ten years with the objective of improving stand vigor, health, resilience, and quality.

Boundary and Survey Information

Deed descriptions (located at the Sullivan Conty Registry of Deeds), tax maps, surveys, and field evidence were referenced to locate boundary lines. Preliminary review of the boundary lines was conducted during the field work portion of the forest management plan.

Corner monuments, deed descriptions, surveys, and the field evidence described in the deeds and/or depicted on a survey (fences, walls, land features, blazed lines, e.g.) collectively define property boundaries. Clearly marked boundaries protect property owners from adverse possession claims and timber trespass, demonstrate use and occupancy, and define the limits of ownership and management. Blazing, followed by painting is the traditional method for marking boundaries; this method also provides the best and longest lasting evidence of a property line. The blaze creates a durable scar that can be detected for decades. Blazes are a method for visually defining property boundaries and for navigating between monuments.

Boundary lines for this property are variable in representation and visibility. Most corner monumentation is visible in the form of iron pipes, iron pins, stone piles, or stone wall intersections. Stone walls sometimes represent a boundary line but are considered incomplete or intermittent. Where stone walls are absent, barbed wire is sometimes found. However, barbed wire does not always follow the exact boundary line closely, and is often absent or undiscernible due to age, decay, and disturbance. Evidence of traditional blazing and painting is found in varying degrees and representations in a few locations. Additionally, flagging of varied ages, colors and condition was observed along some boundary lines. Further time and effort will be required to continue to locate boundary lines before forest management work is executed.

Continued blazing and painting of boundaries is highly recommended for this property to clearly mark the boundary lines. Blazing and painting can only occur when boundary evidence is visible or if corner monumentation is present along with known bearings and distances. Where boundary line evidence and/or corner monumentation is lacking, only a licensed surveyor can define the boundary line location.

Recommendations

- Seek the services of a licensed NH surveyor to confirm boundary lines where evidence is limited.
- Research abutters and provide a letter to each explaining the importance of marking boundaries, describing the process and options and seeking to obtain written permission to blaze and paint common boundaries.
- Maintain boundary lines by painting blazes at 5- to 7-year intervals and re-blazing and painting at 15- to 20-year intervals.

Access

The property can be accessed and supports future forest management opportunities, though will require substantial upgrades. Many portions of Hilliard Road are washed out and eroded. Some sections are eroded down to bedrock and are incised, creating a funnel effect. This condition does not allow for the water to run off the side of the road, but down it for long distances, exacerbating the erosion issue. Upgrading Hilliard Road to allow for logging truck access is possible, though likely expensive. Entering from Grout Hill Road yields the shortest distance to access the property from a town maintained road. Approximately 1,250 feet of Hilliard Road will need to be upgraded, along with constructing a log landing.

Since Hilliard Road is a Class VI Road, tows do not maintain them. One option for upgrading this road

is to have it be part of the timber sale by having the logging contractor do the work. Another option to explore, would be when the Highway Department does maintenance on town roads and is looking for a place to dump sand, gravel, ground up asphalt, or other non-organic material. This material would make for good fill/base on Hilliard Road. Some coordination by others will likely be needed. Using this option should save the town some money.

Access within the property is considered fair to good. No discernable existing skid trails were noted from previous harvesting. Today's equipment is able to operate on most of the terrain.

Future hiking trails may be constructed. Placement of these trails should be thought out carefully. Many of the forest management or skid trails are often placed in the best location for equipment to operate with the least amount of ground disturbance. Future hiking trails should not be placed on existing skid trails as this can become a point of contention between recreationalists and forest management activities.

Wetlands, streams and intermittent drainages break up the property at various locations, limiting access or requiring temporary measures such as skidder bridges or poled fords to cross. Areas with poorly drained, sensitive soils will be excluded from future forest management due to their fragile condition. Forest management adjacent to these areas within the property will be limited to periods of dry or frozen ground conditions to limit adverse impacts. On occasion, steep ground conditions and excessive rockiness will limit forest management.

A detailed description of **Soils Information** appears in the appendix of this forest management plan.

Terrain/Topography

The terrain within the property is typical of the surrounding landscape; rolling terrain broken up by wetland areas and drainages. The property sits on a mostly Southwesterly facing slope, which drains into Bowers Brook. Bowers Brook drains into the nearby Cold River in South Acworth Village, which is part of the Connecticut River Watershed.

Most of the property is considered well-drained despite having a shallow hardpan layer. Pockets of poorly drained soils and drainages are located within the depressions of the rolling terrain. Drainages are considered seasonal and intermittent in nature, limiting opportunities for access due to surrounding saturated soil conditions. Seeps were often observed either within these drainages or adjacent to drainages.

II. STAND DEVELOPMENT

Forest development is influenced by bedrock, soil, water, sunlight, climate, and disturbance. On this property, past cutting (disturbance) and natural disturbances have increased the amount of sunlight reaching the forest floor. Shade tolerant species such as hemlock, red spruce, beech, and sugar maple can reproduce and survive under low light levels. Intolerant species, such as paper birch and aspen require full sunlight to reproduce and thrive. Numerous other species fall in between both ends of the spectrum and are classified as intermediate in tolerance. The complex dynamic of forest succession occurs at different rates within stands on the property. These differences reflect past management practices, environmental factors and natural disturbances, such as wind events and ice storms.

Disturbances

Natural and human disturbances play an integral role in stand development. These disturbances manifest themselves in many forms: timber harvesting, pre-commercial silvicultural treatments, ice and snow damage, wind and rain events (tropical storms, tornadoes and hurricanes), herbivory, invasive plants and insects, and biotic and abiotic pathogens. Single tree fall is the most common disturbance both in the region's forests and on the subject property. Combined, these disturbances further influence what may otherwise appear to be an orderly stand progression from early-successional to “old forest” stands.

Some stand transitions or progressions are readily apparent, while others are more nuanced and challenging to both detect and to predict. These successional tendencies and developmental phases are important to identify; they impact future forest composition and structure and heavily influence stand prescriptions. Stands within the property often display even-aged structure or two-aged structure due to prior harvesting or lack of forest management, resulting in mature forests.

On the South Acworth Town Forest, limited wind damage was noted during the inventory. Signs of snow and ice damage were periodically observed in bent hardwood saplings and poles along with partial crown damage within the hardwoods. Wind-throw and other disturbances allow greater light levels to reach the forest floor, modify micro-climate and frequently expose mineral soil, thereby providing a seedbed for plants. Disturbances encourage stand complexity and diversity. Human disturbances, in the form of silvicultural treatments, both pre-commercial and commercial (timber harvesting) can mimic natural disturbances. Wind has resulted in the largest widespread form of disturbance to this property.

Herbivory

A noteworthy disturbance observed on this property is herbivory, evidenced by white-tailed deer and occasionally moose browse. This is a significant disturbance factor in this area of New Hampshire. White-tail deer and moose browse was evident on the property. Seedlings and saplings below the browse line (+/-6’) display varying degrees of browse. Limited hardwood regeneration of commercial and desirable species was observed progressing and developing above the browse line. Hardwood regeneration is generally sparse in distribution and inadequate in quality. Notable regeneration includes red spruce, hemlock, white pine, and beech.

Recommendations

- Periodically monitor the property to note (changes in) the browse intensity.
- Consider using treetops and branches from timber harvesting to protect seedlings from browse.
- Explore intensive silvicultural treatments designed to promote desirable regeneration and slow browse.

Invasive Plants

Invasive plants are a disturbance factor with significant negative impacts for the region's forests. Many invasive alien plants were intentionally introduced from Europe or Asia for ornamental plantings, erosion control, and wildlife food throughout the past.

These alien plants have influenced forest composition, particularly the understory, in the region. Invasive plants are frequently found in or near agricultural areas, particularly along field edges, in younger forests, especially abandoned farmland reverting to forest and in other forest areas that experience disturbance. The fruits of these plants are consumed by various wildlife species, most notably birds, who transport and spread seeds throughout the landscape. Invasive plants displace native species, suppress forest succession and create localized monocultures if left unchecked. These plants and

their continued spread are a threat to the composition and functioning of the forest ecosystem throughout the region.

Disturbances, in any form, including silvicultural treatments (logging, creating early-successional habitat, pre-commercial treatments, e.g.) improve conditions for invasive plants and promote their spread. The preference of deer for browsing native species provides an additional advantage to these alien plants.

Invasive plant species were not found on the property during the fieldwork portion of the plan. This does not mean there are not any on the property, but likely if there are any, populations are likely low.

Control of invasive plant species is recommended if they are spotted on the property to prevent further spread and to aid in maintaining natural habitat types. If left untreated, the further spread of invasive plant species is inevitable. Future forest management activities will create opportunities for spreading invasives into the forestland of the property. Herbicide use must always be applied by a licensed pesticide applicator following all label instructions. The label is the law. (In New Hampshire, a landowner may apply pesticides, only on their land without a license, following all label instructions and regulations.) ACC members can become licensed in a "not for hire" capacity to treat invasive plants on lands owned by the town.

Scattered light populations of invasive plants can be hand pulled as encountered.

Recommendations

- Continually monitor the property for the presence of invasive plants; specifically, openings in the canopy.
- Treat while populations are small to ensure successful and economical control (early detection, rapid response).
- Implement control measures to reduce populations.
- Utilize cost-share opportunities, as applicable, to aid in the control of invasive plants.

Pathogens and diseases

Pathogens and diseases are real threats to the trees of New Hampshire's forests. During the fieldwork portion of this management plan, pathogens and diseases were observed. The following addresses the most common pathogen and disease and how they relate to the property:

Beech bark disease affects American beech. Prior to the introduction of this insect/fungus complex, beech was the longest-lived hardwood in the forests of our region. A scale insect inoculates the tree with the fungal spores of *Nectria coccinea* when its sucking mouth penetrates the bark. *Nectria* upsets normal bark formation, which renders the tree susceptible to decay-producing fungi that subsequently attracts carpenter ants. The weakened trees are susceptible to beech snap, caused by the inability of the trunk to support the weight of the crown, causing it to break. Beech responds to this disease, and the resulting stress, by vigorously sprouting from the roots and stump. Eventually a dense beech thicket emerges on some sites, making it difficult to establish a diverse mix of regeneration. The majority of the beech in our region are infected; unfortunately, remedies are unavailable. Approximately 5% of the beech are believed to be genetically resistant to this pathogen. Individual trees exhibiting smooth bark and manifesting no beech bark disease symptoms, and those exhibiting minor symptoms, but maintaining vigor should be retained.

Beech is a minor component of the property, representing less than 3% of the basal area per acre

(BA/acre) stocking.

Eutypella canker of maple is caused by a fungus, and primarily affects sugar maple in forested situations. The fungus normally affects less than 10% of the sugar maple stems in a stand, but higher incidence rates can occur. It acts by attacking host trees during dormancy, with the host tree responding with callus development during the growing season, creating concentric ridges of callus tissue, dead bark, and a flattened area on the bole, but tends to be arranged in a more circular pattern. Concerns include bole degradation, girdling of smaller stems, and weakening of wood in the canker region, leading to susceptibility to breakage. Control measures are achieved via removal of infected stems to reduce the chance of infecting neighboring stems. Sugar maple is a minor component (6% of total basal area) of this property. Varying degrees of canker were noted, typical for the region and site.

Perennial Nectria Canker is caused by a Nectria fungus and is very common in the Northeast. It has the most noticeable effect on black birch, basswood, and yellow birch, although it infects dozens of other hosts. Fungus- host interaction is similar to that described above for Eutypella canker, with the fungus attacking the host tree in the dormant season, and the tree responding with callus growth in the growing season. The resulting canker region has concentric callus ridges and dead bark areas, located on branches and the main stem. The cankers appear circular on basswood and appear more elongated on the birches. The cankers can coalesce and girdle the stem, killing the tree. Bole degradation and decay are the primary concerns, reducing the value of lumber produced from afflicted trees. Control measures are generally ineffective, given the wide range of host trees. Removal of visibly affected stems will allow capitalization of some timber value, prior to total loss to decay or mortality. Sweet birch and yellow birch are both lesser components (7% of total basal area) on the property. Stems display signs of canker typical of the region on dry sites.

Insects

Two non-native insects with the capacity to radically alter forest composition loom on the horizon or on this property: Asian longhorn beetle and emerald ash borer. During the field work portion of this management plan, observations were taken. The following addresses the most common non-native insects and how they relate to the property:

Asian longhorn beetle (ALB) is responsible for killing thousands of maples, native and alien (Norway), in the Worcester, MA area. The State of NH, Division of Forest and Lands, Forest Health Program is emphasizing both prevention and early detection of this insect. ALB is not currently known to occur in NH. This insect attacks hardwoods, with a particular preference for maples. Red maple (18% of total basal area) and sugar maple (6% of total basal area) combined are modest components of the South Acworth Town Forest.

The **emerald ash borer** (EAB) infects all species of ash: white, black and green. This insect causes what is believed to be nearly 100% mortality; it will attack trees 2” and greater diameter at breast height (DBH). EAB was first discovered in the city of Concord, NH, in 2013. Subsequently, EAB has spread to all counties in NH. Vermont, Massachusetts, and New Hampshire are under state- wide quarantine. This allows logs to move within and between each state; firewood however, may not move across state lines without a compliance agreement from USDA. The State of New Hampshire developed Best Management Practices (BMPs) for limiting the spread of EAB within the infested and high-risk areas. The New Hampshire Division of Forests and Lands currently recommends harvesting ash greater than 10” or 12” DBH. Though these small diameter trees are not particularly valuable for logs, the Division believes that eliminating larger trees will reduce the habitat for emerald ash borer and thereby reduce

the ability of this insect to expand its population as rapidly. Emerald ash borer has been confirmed in Acworth, NH (2022) and the surrounding towns. Signs of emerald ash borer were observed during the field work portion of this forest management plan. White ash is observed mostly outside of inventory points and only comprises a small portion of this property (6% of the total basal area).

Climate

The impacts of climate change will result in temperature shifts, variations in disturbance regimes, and altered precipitation levels, all of which will influence our forests. All of these factors and more are already being observed within the past decade. Current predictions indicate that this region will likely become both warmer and wetter; the typical frost-free growing season has already increased by a total of ten days. Winters are likely to be shorter and more precipitation is likely to fall as rain in the future. As a result, species composition and ranges are predicted to shift over time. White pine, red maple, northern red oak, white oak, sweet birch, hickories and black cherry are all predicted to remain stable in the various climate change scenarios. Several other species, however, are predicted to decline over time: red spruce, balsam fir, and potentially sugar maple, and paper and yellow birch. Red oak will likely expand its range northward; it will become more prevalent in future stands. Species composition within this property suggests a low to moderate level of resiliency moving forward as many of the species present are projected to be mixed. See Appendix for climate change projects of individual tree species.

Stand development patterns may not conform to those historically experienced. Disturbance regimes and patterns are expected to shift. Large scale weather events, particularly rainstorms and the resulting flooding, accompanied by high winds, are expected to occur more frequently and cause more damage. Many of the impacts and implications of a shifting climate are unknown; however, such changes will create added challenges for both foresters and landowners. Additionally, climate change may create conditions conducive to both alien exotic insects and plants and potentially aid their spread. Forest management will continue focusing on retaining a diversity of species and size classes on the landscape to further promote resiliency.

Recommendations

- Enhance health, vigor and diversity of forest stands to reduce impacts of drought, storms and pests.
- Increase structural diversity by regenerating new cohorts to promote native desirable vegetation.
- Reduce abundance of high-risk trees to reduce loss and hazard.
- Protect water quality, habitats and their buffers to create cover to increase shade and cooling along with opportunity for long lived species to reside in the buffers.
- Retain dominant and well-formed trees to allow for wind firm stand structure.
- Increase legacy trees, snags and underrepresented species to increase structural diversity.
- Develop forest management trail structure considering extreme rain events and extended periods of wet weather.
- Monitor the forest for upcoming forest health issues including but not limited to beech leaf disease and hemlock wooly adelgid.

III. MULTIPLE USE VALUES

Cultural Features

Review of ground penetrating light detection and ranging (LiDAR) imagery reveals a variety of stone walls and an old road within the property, some of which are barely discernable during the forest inventory. These traces of past agrarian use provide a reminder of just how extensively the original forests were cleared or utilized to raise livestock and crops and how aggressively the forests have regrown after such intensive and extensive disturbance. Care should be taken to minimize disturbance to stone walls, both observed and not observed during the forest inventory.

Recommendations

- Protect cultural features. Maintain the current condition of these features wherever possible and enhance them if and when desirable. Make every attempt to minimize disturbance of historical features on the property when harvesting timber or constructing trails and roads.
- Preserve representation of trees that existed when the land was open, regardless of their species, size, form or condition. These are also historical landscape features.

Wildlife Features

The South Acworth Town Forest, in of itself, a modest, unfragmented block of forestland supporting significant wildlife habitat. Substantial undisturbed landscapes occur less frequently as development pressure encroaches on them, even in remote locations. This property abuts other modest sized, undeveloped parcels, which together, form a significant unbroken forested landscape.

Undeveloped lands provide interior forest habitat for birds and travel corridors for large mammals. The South Acworth Town Forest, along with other surrounding undeveloped tracts in the block, provide crucial habitat to neotropical birds utilizing wildlife travel corridors to access the Cold River. This parcel, and adjacent undeveloped forest lands, are an important and essential component of the larger landscape for the region's fauna.

A diverse array of small, distinct habitats, many of them wetlands and streams, punctuate the larger upland forest matrix. Large open-grown trees, which provide high perches for songbirds and raptors are lightly scattered throughout the property. Cavity and hollow trees are also found on the property. All together, these elements and others add complexity to the landscape and provide habitat for a variety of animals.

Wildlife management for certain species is not a priority for the ACC. Wildlife is dependent on a variety of vegetation and trees. Forest management manipulates the composition and structure of the forest, thereby creating opportunities for wildlife and providing diverse habitats. Management efforts within the working forest portion of the property will focus on creating a diversity of species and size classes, and that possess high timber values. Early-successional habitat should be created in scattered patches throughout the property. This habitat functions as such for a period of about five to eight years.

Recommendations

- Establish regeneration via large group selection harvests, patch cuts, and low residual density shelterwood harvests.
- Manage for multiple age classes and diversity of tree species.
- Retain legacy trees in perpetuity to provide habitat and structure.

Threatened/Endangered Species, Special Sites, Forests of Recognize Importance, and Unique Natural Communities

In addition to identifying forest characteristics, rare plants and exemplary natural communities were surveyed and mapped if found. The New Hampshire Natural Heritage Bureau's DataCheck Tool (DCT) was used to determine if any rare plants, animals, or natural communities were present within or around the property. The results of the DCT determined that there are no threatened or endangered species on the property. This may be due to a lack of surveys or data collected within the property. See Appendix for the DCT results.

Recreational Features and Uses

The ACC values this property greatly for its scenic beauty and recreational opportunities. The ACC expressed possible interest in developing a small trail network of multi-use trails on the property in the future.

Future forest management activities will create new trails and woods roads. As skid trails will continue to be used periodically for future forest management, hiking trails should avoid these established pathways. Landing areas can be converted to small parking areas and utilized as such between forest management operations.

Recommendations

- Improve water control measures on trails to eliminate the movement of sediment.
- Limit recreational disturbance to environmentally sensitive areas on the property and during wet times of year.
- Construct foot bridges over streams or stone fords instead of installing culverts.
- Construct additional hiking trails on the property to less traveled areas.
- Incorporate special sites, unique features, and vistas into hiking trail layout.
- Limit ATV access to trails by gating or placing boulders at entry points should the landing be used as a parking area.

Timber

The most recent cutting at the South Acworth Town Forest was approximately 45 years ago. Evidence of this cutting is visible by the decaying stumps. Most of these stumps are found in the Northern section of the property. The cutting was done so long ago, it is hard to tell what their objectives were. Evidence of past cutting on the rest of the property is absent. A list of management strategies on a stand-by-stand basis is discussed later in this plan. When conducting any forestry work, Best Management Practices (BMPs) shall be followed.

IV. EXAMINATION METHOD & FOREST TYPE CLASSIFICATION

Forest Inventory and Stand Classification

As noted earlier, this property was inventoried in January 2024 by Jeffrey Snitkin of Full Circle Forestry, LLC, assisted by Ryan Fleury. The inventory grid was established at 300' intervals running in cardinal directions parallel and perpendicular, referenced to true north. The inventory grid was transferred into GIS and onto a handheld GPS unit which was used to navigate and locate samples. Samples that fell into inoperable areas of the property were dropped. A total of 35 samples were measured on 81 acres of

"working" commercial forest (productive forestland) for an average sampling intensity of 1/2.31 acres. Based on the inventory data, two commercial, productive forest stands were identified. Areas within this working forest may be excluded from timber harvesting to protect water, soil and fragile sites, or because they are inaccessible or inoperable. These inoperable/inaccessible areas within forested wetlands were noted through visual observation.

Trees were sampled using a twenty basal area factor (20 BAF) prism during the inventory. At each sample point all trees over 6" at diameter breast height (DBH) were tallied by species, 2" diameter classes, crown class, and timber growing stocking category, Acceptable Growing Stock (AGS) or Unacceptable Growing Stock (UGS). AGS is defined as a tree 12" DBH or greater, a commercial tree species containing one sawlog grade 16-foot log or two non-contiguous sawlog grade 8- foot logs, or these that have the potential to produce these products in the future. UGS is defined as a tree not capable of producing a desired product or service, typically quantified by ability to produce sawlogs. UGS are typically pallet grade logs, firewood, pulpwood, or whole-tree chips.

Additional notes pertaining to individual trees were made regarding form, damage and cavities. The inventory data from the property was processed using Forest Metrix software to generate stand and stocking tables. Data was referenced with stocking guides and stocking levels, allowing for comparison of existing number of trees and square feet of basal area in a stand to the amount desired for optimum growth of diameter and volume.

Soil Classification and Forest Typing

Soils information was obtained from the Web Soil Survey (WSS), an online tool that provides soil data and information produced by the National Cooperative Soil Survey. WSS is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. The site is updated and maintained online as the single authoritative source of soil survey information.

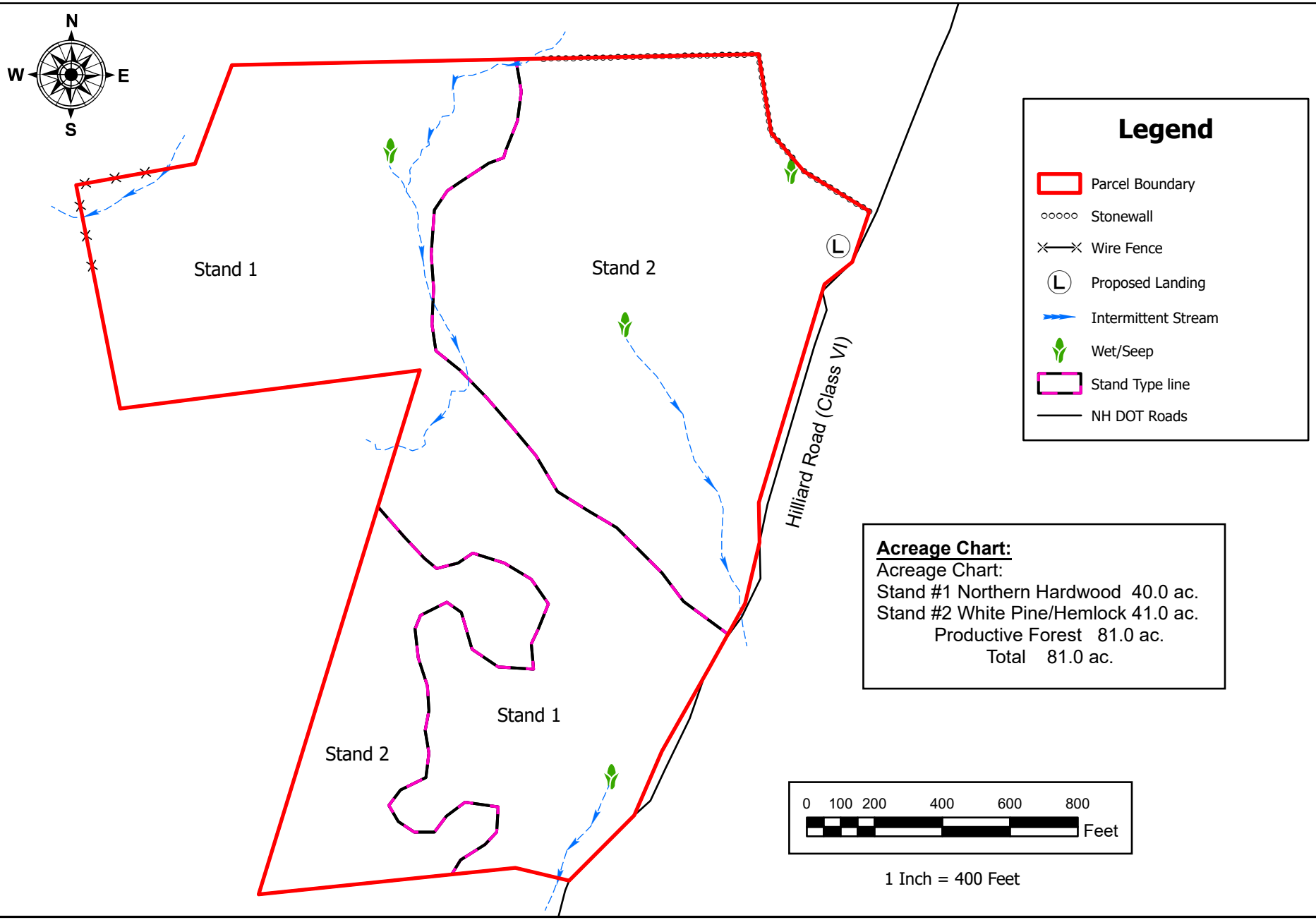
Forest types were classified using the publication by the Society of American Foresters (SAF): *Forest Cover Types of North America*, copyright 1954, reprinted 1975 and *Forest Cover Types of the United States and Canada*, F. H. Erye, Editor, revised and published in 1980 were used to define what a stand type is. The publication defines a forest type as "A descriptive term used to group stands of similar character as regards composition and development due to given ecological factors by which they may be differentiated from other groups of stands" (SAF 2).

It further explains, "A cover type is a forest type now occupying the ground, no implication being conveyed as to whether it is temporary or permanent" (SAF 2). The bulletins emphasize composition instead of development as the basis for identifying forest types and utilize the following principles to recognize them:

"The cover type occupies large areas in aggregate. The type does not necessarily cover a large area in a single stand, but composition is characteristic and typical throughout a considerable range" (SAF 2).

"The cover type is distinctive and easily separated from other types that it closely resembles. Transition areas are always found in the field and result from natural occurrences, including those of man" (SAF 2).

See the following page for a forest type and land features map as it pertains to this property.



FOREST TYPE AND LAND FEATURES MAP

SOUTH ACWORTH TOWN FOREST

Hilliard Road
Acworth, Sullivan County, NH
Owned by: Town of Acworth
GIS Mapping by: Jeffrey Snitkin, NHLPF #452
Full Circle Forestry, LLC. May 21, 2024

Notes:
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STATE OF NEW HAMPSHIRE – JEFFREY M. SNITKIN No. 452 LICENSED PROFESSIONAL FORESTER

FULL CIRCLE FORESTRY, LLC

V. FOREST PLAN STAND SUMMARIES

Stand # 1 Northern Hardwood (SAF #25)

Acreage: 40.0 Acres

Soil type (% slope): Marlow fine sandy loam, 0 to 8% slopes, very stony (MbB), Monadnock-Lyman-Rock outcrop complex, 0 to 8% slopes (MwB), Monadnock-Lyman-Rock outcrop complex, 8 to 15% slopes (MwC), Marlow fine sandy loam, 8 to 15 % slopes, very stony (MbC), and Marlow fine sandy loam, 15 to 25% slopes, very stony (MbD) (in descending order by area of stand)

Forest Soil Group: IA/IIA

Sampling: Date: January 4, 2024; Protocol: 6"+ DBH & by crown class;

Method: Point, 20 BAF; #: 18 (1/2.22 ac)

Stand History: Unknown

Health Issues: Emerald ash borer, Beech bark disease, and Sugar maple borer

Invasive Plants: None

Tree Composition

Species Composition **(% Main Crown BA):** Red Maple 31%, Hemlock 12%, White Pine 11%, White Ash 10%, Paper Birch 10%, Sugar Maple 8%, Black Cherry 5%, Yellow Birch 5%, Hophornbeam 3%, Red Spruce 3%, and Sweet Birch 2%

Structure: 2-aged ***Stocking:*** Fully ***AGS:*** 79 sq. ft. ***UGS:*** 44 sq. ft. ***Total:*** 123 sq. ft. ***MSD:*** 13.0" ***TPA:*** 133

Ecosystem Structural Components

Vertical Diversity: Low+ **Horizontal Diversity:** Low **Cavity Trees:** Moderate
Mast Trees: Low **Unique Trees:** Black Cherry, Basswood
Snags: Low+ **ROM:** Low

Stand Description: This northern hardwood stand occupies two non-contiguous areas comprising about half of the property. White pine, hemlock, and red spruce are found scattered throughout in varying densities. The terrain is rolling to nearly steep; the aspect is primarily southwesterly. Scattered seeps and wet depressions are found in low-lying areas. The soils are primarily a fine sandy loam with a shallow hardpan. Scattered areas of rock outcrop exist. The impervious hardpan layer restricts permeability, impeding drainage during periods of high rainfall. At these times, the upper soil layer becomes saturated and is susceptible to rutting and operability issues.

Timber quality varies but is generally good. All overstory commercial species with the exception of red maple, sugar maple, and yellow birch represent a 75% or greater acceptable growing stock ratio. The three previously mentioned species represent just over 50% of the overstory basal area.

The stand is stocked on the "A" and "B" lines for hardwoods. AGS stocking is approximately half way between the "A" and "B" lines; suggesting enough suitable growing stock to continue managing the current stand. The majority of the sites are suitable for red maple, yellow, sweet, and paper birch, and black cherry, all non-nutrient demanding hardwoods. Some small areas show signs of enrichment with the presence of white ash and sugar maple. These areas are well-suited to growing quality sugar maple. Regeneration is sparse and consisted of suppressed red spruce and hemlock seedlings and beech saplings.

Access to and within this stand is fair to good once a landing is constructed in the northeast corner of the stand. Operate this stand only in dry or winter conditions.

Silvicultural Objectives & Prescriptions for Timber Production (Scheduled for 2024-27)

Silvicultural objective: Two-aged-management favoring site-suited hardwood species (sugar maple, yellow birch, red maple, sweet birch, and paper birch), along with a minor white pine, red spruce, and hemlock component. Establish regeneration where it is absent.

Diam. Objectives: SM 20-24", RM 16-18" ***Estimated Current Age:*** 50-60 and 100-110 years
Cut Cycle: 15+ yrs.

Rotation Ages *(years):* SM 110-125, RM 80-100

Silvicultural Prescription: AGS is adequately between the "A" and "B" lines, resulting in enough suitable growing stock to continue managing the current stand. Portions of this stand can be regenerated and thinned (2024-27) through the use of various methods. Use the shelterwood method (preparatory) for future regeneration; this method closely resembles low thinnings, but with expanded objectives. Preparatory cuttings are conducted to prepare the stand for regeneration by removing undesirable species and trees (weaker, low-vigor individuals) from the lower crown classes to strengthen and improve the vigor of trees retained for the subsequent establishment and removal cuttings. This treatment can be combined with establishment and seed tree treatments depending on site conditions and desired future conditions, removing the least desirable and vigorous trees (UGS) while retaining the largest, most vigorous and best-formed trees of desirable species. Combine the shelterwood cutting with patch cuts of varying size where a high percentage of UGS are found. Thin portions of the stand where it is overstocked. Use a combination of high and low thinnings; remove numerous weak competitors and trees in the upper crown classes to open up the canopy to favor the development of the most promising trees in these same crown classes. Salvage white ash at risk from emerald ash borer damage.

Desirable hardwood regeneration may be difficult to get above the deer browse line. Consider putting a small amount of metal cages around desirable seedlings. To assist in migration of desirable species, consider supplemental planting of hardwood trees such as red and white oak, tulip poplar, and hickory.

Control the beech so it does not take over the stand with a combination of foliar and cut surface treatments. Beech management should aim to reduce, not eradicate it from the stand. Future beech leaf disease may alter the species composition eliminating the need for active beech control.

Retain legacy trees of mixed species as applicable for additional stand structure. Avoid areas containing saturated soils and shallow rock outcrop sites.

Desired Future Conditions: The stand will contain well-formed and spaced hardwoods with areas of advanced regeneration that is free to grow. Aim towards multiple-age management to create a resilient forest.

STAND 1 **Northern Hardwood** **BA 155.6** **TPA 237.6** **Sampling Method: Variable Radius Plots**

ACRES 40.0 **MBF 11.76** **TONS 33.67** **Basal Area Factor: 20.00** **18 PTS**

SPECIES COMPOSITION	BA		TPA		AVG DBH	VOLUME PER ACRE MBF	VOLUME PER ACRE TONS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME TONS
	155.6		237.6		11.0	11.76	33.67	470.39	1,346.70
red maple	40.0	25.7%	58.9	24.8%	11.2	2.02	12.07	80.66	482.84
hemlock	31.1	20.0%	62.2	26.2%	9.6	1.68	6.74	67.08	269.69
sugar maple	14.4	9.3%	23.8	10.0%	10.5	1.04	1.35	41.70	54.09
white ash	14.4	9.3%	19.4	8.2%	11.7	1.79	2.49	71.58	99.58
white pine	13.3	8.6%	5.0	2.1%	22.0	2.72	0.64	108.75	25.45
paper birch	12.2	7.9%	19.0	8.0%	10.9	0.71	3.59	28.26	143.78
yellow birch	5.6	3.6%	5.9	2.5%	13.1	0.33	1.37	13.14	54.85
black cherry	5.6	3.6%	3.8	1.6%	16.4	0.58	0.72	23.36	28.74
hophornbeam	5.6	3.6%	12.2	5.1%	9.1	0.17	1.51	6.81	60.23
beech	4.4	2.9%	8.7	3.7%	9.7	0.10	1.28	4.15	51.38
sweet birch	4.4	2.9%	8.8	3.7%	9.6	0.23	1.90	9.15	76.07
red spruce	4.4	2.9%	9.8	4.1%	9.1	0.39		15.74	

Stand # 2 White Pine/Hemlock (SAF #22)

Acreage: 41.0 Acres

Soil type (% slope): Marlow fine sandy loam, 15 to 25% slopes, very stony (MdD), Monadnock-Hermon association, 15 to 60% slopes, very stony (MrE), Monadnock-Lyman-Rock outcrop complex, 0 to 8% slopes (MwB), Pillsbury fine sandy loam (hydric soil), 0 to 8% slopes, very stony (PiB), Marlow fine sandy loam, 0 to 8% slopes, very stony (MbB), Monadnock-Lyman-Rock outcrop complex, 8 to 15% slopes (MwC), Marlow fine sandy loam, 8 to 15% slopes, very stony (MbC), and Marlow fine sandy loam, 8 to 15% slopes (MaC) (in descending order by area of stand).

Forest Soil Group: IA/IIA/IIB

Sampling: Date: January 4, 2024; ***Protocol:*** 6"+ DBH & by crown class

Method: Point, 20 BAF; ***#:*** 17 (1/2.41 ac)

Stand History: Light cutting estimated around 1980

Health Issues: Beech bark disease

Invasive Plants: None

Tree Composition

Species Composition **(% Main Crown BA):** Hemlock 52%, White Pine 12%, Red Maple 11%, Red Spruce 6%, Yellow Birch 6%, Paper Birch 6%, White Ash 3%, Sweet Birch 2%, and Sugar Maple 2%

Structure: two-aged ***Stocking:*** Over ***AGS:*** 108 sq. ft. ***UGS:*** 36 ft. ***Total:*** 144 sq. ft. ***MSD:*** 11.6"

TPA: 198

Ecosystem Structural Components

Vertical Diversity: Low
Horizontal Diversity: Low+
Cavity Trees: Moderate
Mast Trees: Moderate-
Unique Trees: Black Cherry
Snags: Moderate
ROM: Low

Stand Description: This stand is located in a diagonal line from the northwest corner to the southeast corner of the property. Hemlock, white pine, and red maple dominate the composition along with occasional yellow birch, red spruce, and paper birch. The stand is stocked approximately on the "B" line, though the AGS is stocked just below the "B^1" line on the Lancaster stocking guide. Tree quality is fair to good, with red spruce, hemlock, white pine, and white ash being the highest quality.

The soils are a sandy loam with a shallow hardpan with scattered rock outcrops. The impervious hardpan layer restricts permeability, impeding drainage during periods of high rainfall. At these times, the upper soil layer becomes saturated and is susceptible to rutting. Windthrow has been, and will continue to be, a disturbance factor in this stand. Operate this stand only in dry or frozen conditions. This site is suited to hemlock, white pine, red spruce, yellow birch and red oak, though not currently found growing on the property. The aspect is southwesterly with rolling to nearly flat terrain. Access to

this stand is poor due to no current landing and upgrades to Hilliard Road. Once Hilliard Road is upgraded and a landing is in place, access is good.

Silvicultural Objectives & Prescriptions for Timber Production (Scheduled for 2024-27)

Silvicultural objective: Two-aged management favoring site-suited white pine, yellow birch, and red spruce, along with a minor red maple, hemlock, and sweet birch component. Establish regeneration via patch cuts and low thinnings.

Diam. Objectives: HM, RM, YB 16-18" WP 20-24"
Cut Cycle: 15-20 yrs. ***Estimated Current Age:*** 50-60 and 100-110 years

Rotation Ages *(years):* HM 110-125, RM 80-100, YB 110-125

Silvicultural Prescription: Regenerate this stand within the next 3 years (2024-27). Utilize the following methods based on stand conditions: 1) patch cuts where UGS is abundant; create irregular canopy openings (patches) ranging from ¼ to 1 acre, depending on the extent of high proportions of UGS. 2) Thin from below between the patches with the occasional overstory trees removed. This treatment is aimed at removing numerous weak competitors. Care should be taken to not overthin the stand due to windthrow potential.

Areas (up to 5 acres) of early-successional habitat can be created to initially aid in wildlife for up to 10 years. After 5 to 8 years, the wildlife benefits fade. In the future at 20+ year intervals, additional early-successional areas can be created adjacent to the existing areas. These areas will succeed into a new age class helping to create a multi-aged resilient forest.

Desirable hardwood regeneration may be difficult to obtain above the deer browse line. Consider putting a small amount of metal cages around desirable seedlings. To assist in migration of desirable species, consider planting hardwood trees such as red and white oak and hickory.

Desired Future Conditions: The stand will contain multiple small openings filled with shade tolerant softwood (red spruce and hemlock) and mid-tolerant white pine, yellow and sweet birch saplings. Between the patch cuts, red spruce regeneration is desired under the overstory trees.

STAND 2 **White Pine/Hemlock** **BA 191.8** **TPA 332.9** **Sampling Method: Variable Radius Plots**

ACRES 41.0 **MBF 13.52** **TONS 52.97** **Basal Area Factor: 20.00** **17 PTS**

SPECIES COMPOSITION	BA		TPA		AVG DBH	VOLUME PER ACRE MBF	VOLUME PER ACRE TONS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME TONS
	191.8		332.9		10.3	13.52	52.97	554.40	2,171.64
hemlock	104.7	54.6%	167.2	50.2%	10.7	7.45	31.70	305.41	1,299.74
red maple	22.4	11.7%	40.4	12.1%	10.1	0.92	8.19	37.65	335.99
white pine	17.6	9.2%	7.6	2.3%	20.6	3.39	1.07	139.16	43.99
yellow birch	10.6	5.5%	13.2	4.0%	12.1	0.58	1.66	23.65	68.06
paper birch	9.4	4.9%	29.1	8.7%	7.7		4.25		174.29
red spruce	9.4	4.9%	31.2	9.4%	7.4	0.61	0.45	24.96	18.25
white ash	4.7	2.5%	5.9	1.8%	12.1	0.34	2.03	14.10	83.39
sugar maple	4.7	2.5%	9.6	2.9%	9.5	0.23	0.97	9.46	39.69
sweet birch	4.7	2.5%	16.1	4.8%	7.3		1.73		71.12
beech	3.5	1.8%	12.7	3.8%	7.1		0.91		37.14

VI. SUMMARY

Forests are diverse and continually changing. They are influenced by underlying bedrock, soils, drainage, slope, position on the slope, climate, weather, and human use. This property is typical of the region. The current conditions are directly attributable to the land use practices of yesterday. Undoubtedly, human influence, natural succession and disturbance, along with the unknown influences of climate change and invasive plants and insects, will continue to shape the character of this forest.

Properties such as this pose a variety of management challenges. One of the biggest challenges to this property is the lack of access. This, along with hardpan soils, create harvesting challenges. In addition, a lot of the wood to be harvested will be of low value. Harvesting the low value trees now allows for healthier higher value trees to grow into the future. This sets the stage for higher value sales in the future.

Another challenge to managing properties such as this relate to community perception. Currently, this property has low visibility and use by the public. A future trail network planned for this property further magnifies this visibility. Consider extensive outreach efforts during the planning process of forest management, allowing those in the surrounding area to become familiarized with the process of managing properties such as this. When carrying out forest management, consider increased aesthetics.

Despite the challenges mentioned, this property lends itself to multiple forest management strategies. Forest management is recommended for each commercial forested stand within the next 10 years. A variety of even-aged and multi-aged silvicultural systems are recommended for the majority of the property. Shelterwood systems can be employed to start or build upon regeneration while retaining AGS. When applicable, implementing patch cuts can build new desirable cohorts. Forest management needs to move the dial to create conditions favorable for both shade intolerant species and shade tolerant species. A variety of thinnings can be implemented to tend stands and promote growth of desirable dominant and codominant tree species where AGS stocking is higher. Future forest management will focus on maintaining and adding a variety of tree species, size classes, and multiple age classes on the property. Retain legacy trees for additional structure and carbon benefits. Forest management will refrain from disrupting sensitive sites; this includes areas of poorly drained soils and shallow areas with rock outcrops. Portions of the property will remain in their natural state in perpetuity, allowing for the forest to age naturally and increase biodiversity on the landscape.

Finally, consider promoting good forest management to the public. Make the public aware of the benefits forests bring to humans and wildlife. Historically, foresters and landowners have tried to hide the management work that's been done. Over time this has made the public less aware and knowledgeable about the benefits and has created misconceptions about forestry. Educational awareness can be accomplished through numerous public outreach events targeting non-traditional audiences. Develop, advertise and promote a self-guided tour with numbered stops of specific areas of interest along the way. Use today's latest technology such as QR codes, Avenza maps, and ArcGIS StoryMaps to put all of this information right in the property user's hands.

This plan documents the current condition of the forest, identifies resource concerns, and incorporates the landowner's objectives into a schedule of management recommendations and prescriptions. The prescriptions found in this plan are silviculturally and operationally sound and provide management guidance over the next 10 +/- years. The actual timing of treatments is dependent on numerous factors including: 1) access; 2) market conditions; 3) environmental conditions, such as pest outbreaks and weather; and also importantly, 4) The AAC's priorities. The silvicultural prescriptions contained in this

document provide a creative, ecological approach to forest management that is designed to achieve the Conservation Commission's stated management objectives for the South Acworth Town Forest, to provide economic and intangible benefits over the long-term, and to demonstrate exemplary forest management techniques to other forest owners and to the public.

Treatment Schedule

For

The South Acworth Town Forest

Owned by

Town of Acworth

located in

Acworth, Sullivan County, New Hampshire

Stand #	Treatment Year	Forest Type	Acres to be treated, treatment, & priority
N/A	2024-25	N/A	Locate, Blaze and Paint boundary lines. High priority.
2	2024-25	Northern Hwds.	Construct landing and improve access to it on Hilliard Road. Very high priority.
1	2024-27	Northern Hwds.	40 acres, Shelterwood cutting, patches, thinning, salvage, and planting native trees. High priority.
2	20245-27	White Pine/Hemlock	41 acres, shelterwood cutting, patches, thinning, early-successional habitat. High priority.

Ongoing

Monitor hemlock wooly adelgid situation and hemlock health and vigor.

Monitor development of regeneration & browse impacts.

Monitor & control invasive plants as needed

2034-39 Re-inventory for 10-15 year management plan update.

Prepared by:

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Jeffrey M. Snitkin*, NH Licensed Professional Forester #452*

TRACT SUMMARY

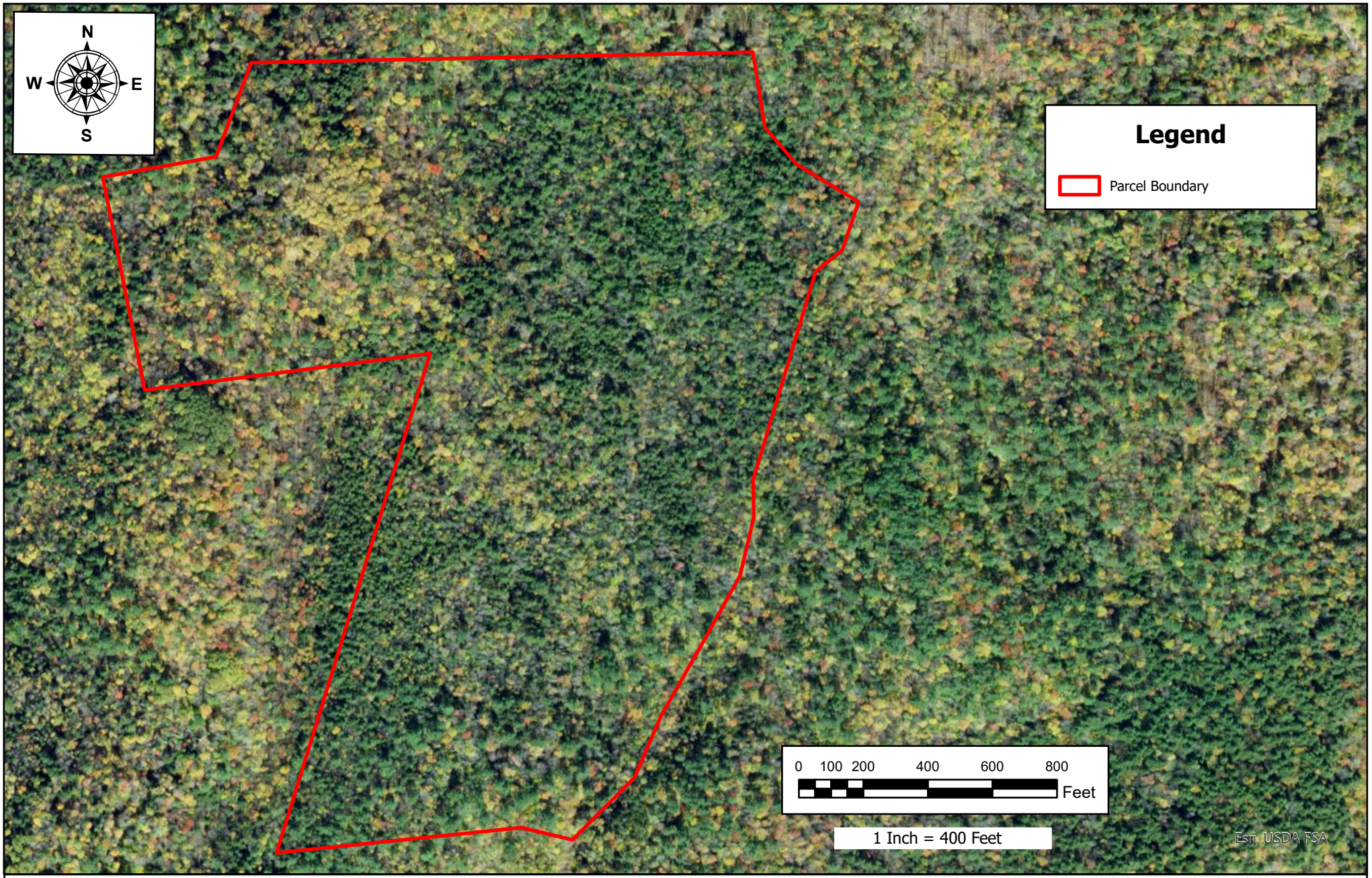
1/4/24

TRACT INFO 2 STANDS

ACRES 81.0 35 PTS

SPECIES COMPOSITION	BA		TPA		AVG DBH	VOLUME PER ACRE MBF	VOLUME PER ACRE TONS	TOTAL TRACT VOLUME MBF	TOTAL TRACT VOLUME TONS
	173.1		283.9		10.6	12.65	43.44	1,024.79	3,518.35
hemlock	66.9	38.6%	113.2	39.9%	10.4	4.60	19.38	372.50	1,569.43
red maple	31.4	18.2%	49.9	17.6%	10.7	1.46	10.11	118.31	818.82
white pine	15.4	8.9%	6.3	2.2%	21.2	3.06	0.86	247.92	69.44
paper birch	10.9	6.3%	23.9	8.4%	9.1	0.35	3.93	28.26	318.07
sugar maple	9.7	5.6%	16.9	6.0%	10.3	0.63	1.16	51.17	93.78
white ash	9.7	5.6%	12.8	4.5%	11.8	1.06	2.26	85.68	182.97
yellow birch	8.0	4.6%	9.5	3.3%	12.4	0.45	1.52	36.79	122.90
red spruce	6.9	4.0%	20.2	7.1%	7.9	0.50	0.23	40.70	18.25
sweet birch	4.6	2.6%	12.4	4.4%	8.2	0.11	1.82	9.15	147.19
beech	4.0	2.3%	10.7	3.8%	8.3	0.05	1.09	4.15	88.52
black cherry	2.9	1.7%	2.0	0.7%	16.4	0.29	0.35	23.36	28.74
hophornbeam	2.9	1.7%	6.3	2.2%	9.1	0.08	0.74	6.81	60.23

APPENDIX



2021 AERIAL PHOTO MAP

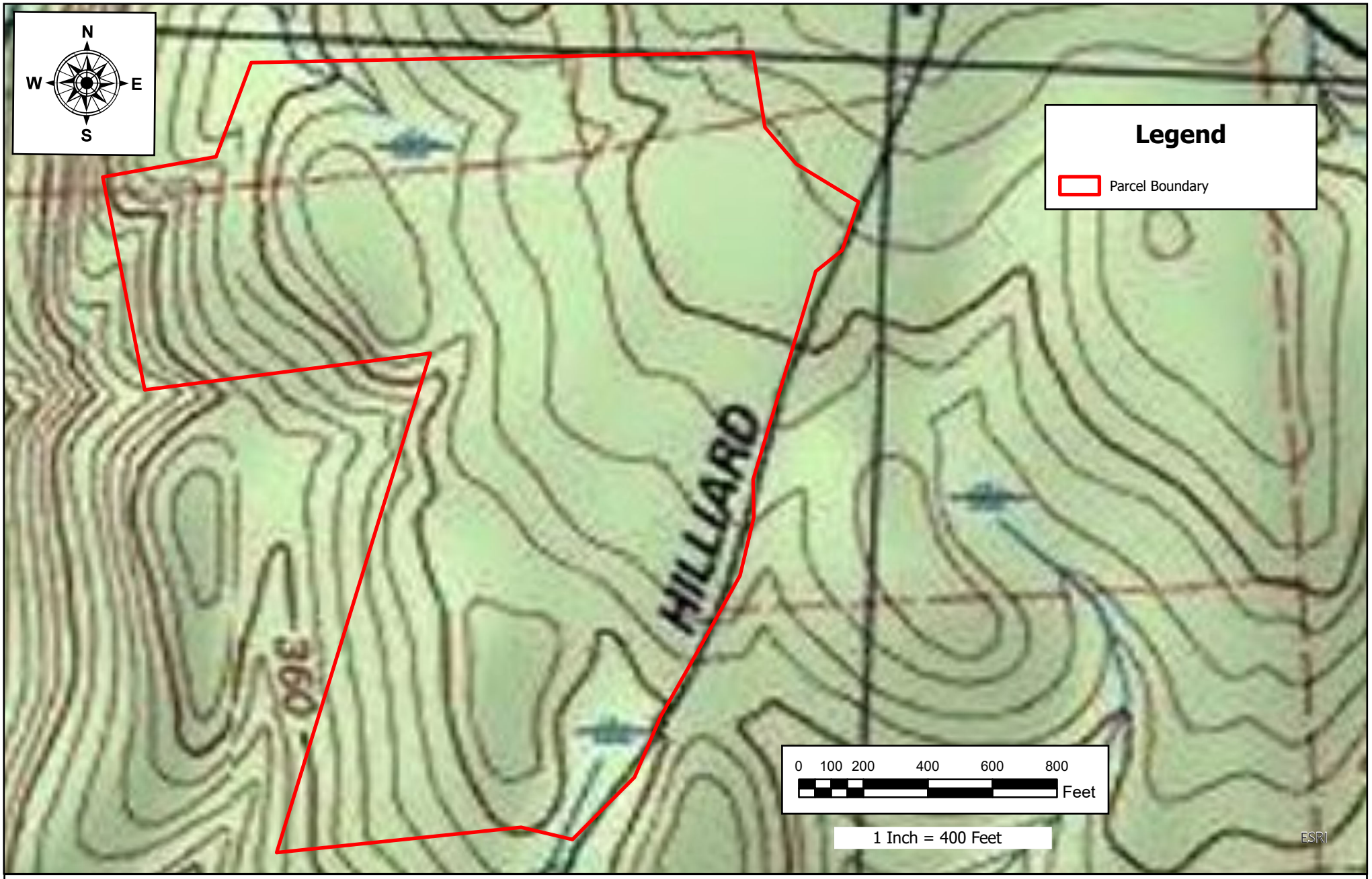
SOUTH ACWORTH TOWN FOREST

Hilliard Road
Acworth, Sullivan County, NH
Owned by: Town of Acworth
GIS Mapping by: Jeffrey Snitkin, NHLPF #452
Full Circle Forestry, LLC. May 21, 2024

Notes:
This is not a survey. All features are approximate and relative. Base map derived from field evidence and interpretation of GIS layers. Forest types and features based on field notes and mapping; GPS waypoint and track data and interpretation of lidar

STATE OF NEW HAMPSHIRE – JEFFREY M. SNITKIN No. 452 LICENSED PROFESSIONAL FORESTER

FULL CIRCLE FORESTRY, LLC



TOPOGRAPHIC MAP

SOUTH ACWORTH TOWN FOREST

Hilliard Road
Acworth, Sullivan County, NH
Owned by: Town of Acworth
GIS Mapping by: Jeffrey Snitkin, NHLPF #452
Full Circle Forestry, LLC. May 21, 2024

Notes:
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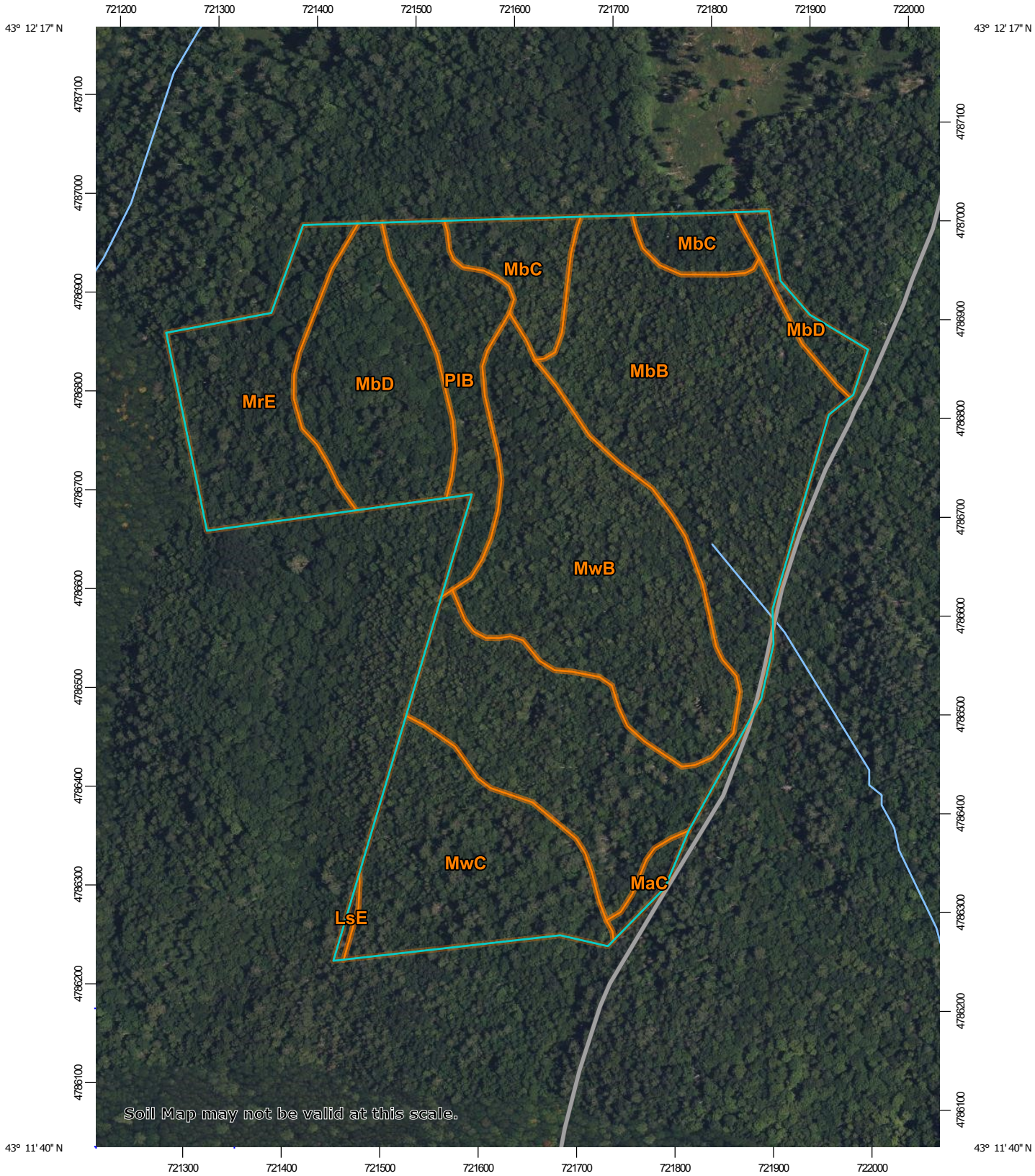
STATE OF NEW HAMPSHIRE – JEFFREY M. SNITKIN No. 452 LICENSED PROFESSIONAL FORESTER

FULL CIRCLE FORESTRY, LLC

Soil Map—Sullivan County, New Hampshire
(South Acworth Town Forest)



Map Scale: 1:5,520 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Sullivan County, New Hampshire
Survey Area Data: Version 29, Aug 22, 2023

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

Date(s) aerial images were photographed: May 27, 2020—Sep 16, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LsE	Lyman-Monadnock-Rock outcrop complex, 25 to 50 percent slopes, very stony	0.2	0.2%
MaC	Marlow fine sandy loam, 8 to 15 percent slopes	0.6	0.8%
MbB	Marlow fine sandy loam, 0 to 8 percent slopes, very stony	28.8	35.6%
MbC	Marlow fine sandy loam, 8 to 15 percent slopes, very stony	4.3	5.3%
MbD	Marlow fine sandy loam, 15 to 25 percent slopes, very stony	9.2	11.4%
MrE	Monadnock-Hermon association, 15 to 60 percent slopes, very stony	7.7	9.5%
MwB	Monadnock-Lyman-Rock outcrop complex, 0 to 8 percent slopes	15.5	19.2%
MwC	Monadnock-Lyman-Rock outcrop complex, 8 to 15 percent slopes	9.8	12.0%
PlB	Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony	4.8	6.0%
Totals for Area of Interest		**81.0**	**100.0%**

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Sullivan County, New Hampshire

Map Unit: LsE—Lyman-Monadnock-Rock outcrop complex, 25 to 50 percent slopes, very stony

Component: Lyman, very stony (35%)

The Lyman, very stony component makes up 35 percent of the map unit. Slopes are 25 to 50 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial till derived from granite and gneiss and/or phyllite and/or mica schist. Depth to a root restrictive layer, bedrock, lithic, is 11 to 24 inches (depth from the mineral surface is 10 to 20 inches). The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 8 percent. This component is in the F144BY702ME Shallow and Moderately-deep Till ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Monadnock, very stony (30%)

The Monadnock, very stony component makes up 30 percent of the map unit. Slopes are 25 to 50 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist. Depth to a root restrictive layer, strongly contrasting textural stratification, is 18 to 36 inches (depth from the mineral surface is 17 to 31 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 2 percent. This component is in the F144BY505ME Loamy over Sandy ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Rock outcrop (20%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Tunbridge, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Hermon, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Hermon, very stony soil is a minor component.

Component: Marlow, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Marlow, very stony soil is a minor component.

Component: Rubble land (3%)

Generated brief soil descriptions are created for major soil components. The Rubble land soil is a minor component.

Map Unit: MaC—Marlow fine sandy loam, 8 to 15 percent slopes

Component: Marlow (84%)

The Marlow component makes up 84 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite. Depth to a root restrictive layer, densic material, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 7 percent. This component is in the F144BY501ME Loamy Slope (Northern Hardwoods) ecological site. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Peru (7%)

Generated brief soil descriptions are created for major soil components. The Peru soil is a minor component.

Component: Berkshire (4%)

Generated brief soil descriptions are created for major soil components. The Berkshire soil is a minor component.

Component: Tunbridge (3%)

Generated brief soil descriptions are created for major soil components. The Tunbridge soil is a minor component.

Component: Pillsbury (2%)

Generated brief soil descriptions are created for major soil components. The Pillsbury soil is a minor component.

Map Unit: MbB—Marlow fine sandy loam, 0 to 8 percent slopes, very stony

Component: Marlow, very stony (83%)

The Marlow, very stony component makes up 83 percent of the map unit. Slopes are 0 to 8 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite. Depth to a root restrictive layer, densic material, is 20 to 41 inches (depth from the mineral surface is 20 to 39 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 13 percent. This component is in the F144BY501ME Loamy Slope (Northern Hardwoods) ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Peru, very stony (7%)

Generated brief soil descriptions are created for major soil components. The Peru, very stony soil is a minor component.

Component: Pillsbury, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Pillsbury, very stony soil is a minor component.

Component: Tunbridge, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Berkshire, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Berkshire, very stony soil is a minor component.

Map Unit: MbC—Marlow fine sandy loam, 8 to 15 percent slopes, very stony

Component: Marlow, very stony (85%)

The Marlow, very stony component makes up 85 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite. Depth to a root restrictive layer, densic material, is 20 to 41 inches (depth from the mineral surface is 20 to 39 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 13 percent. This component is in the F144BY501ME Loamy Slope (Northern Hardwoods) ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Peru, very stony (6%)

Generated brief soil descriptions are created for major soil components. The Peru, very stony soil is a minor component.

Component: Berkshire, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Berkshire, very stony soil is a minor component.

Component: Tunbridge, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Pillsbury, very stony (2%)

Generated brief soil descriptions are created for major soil components. The Pillsbury, very stony soil is a minor component.

Map Unit: MbD—Marlow fine sandy loam, 15 to 25 percent slopes, very stony

Component: Marlow, very stony (86%)

The Marlow, very stony component makes up 86 percent of the map unit. Slopes are 15 to 25 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite. Depth to a root restrictive layer, densic material, is 20 to 41 inches (depth from the mineral surface is 20 to 39 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 13 percent. This component is in the F144BY501ME Loamy Slope (Northern Hardwoods) ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Tunbridge, very stony (5%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Peru, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Peru, very stony soil is a minor component.

Component: Berkshire, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Berkshire, very stony soil is a minor component.

Component: Pillsbury, very stony (2%)

Generated brief soil descriptions are created for major soil components. The Pillsbury, very stony soil is a minor component.

Map Unit: MrE—Monadnock-Hermon association, 15 to 60 percent slopes, very stony

Component: Monadnock, very stony (45%)

The Monadnock, very stony component makes up 45 percent of the map unit. Slopes are 15 to 60 percent. This component is on mountains on glaciated uplands, hills on glaciated uplands. The parent material consists of loamy supraglacial meltout till derived from granite and gneiss and/or mica schist and/or phyllite over sandy and gravelly supraglacial meltout till derived from granite and gneiss and/or mica schist and/or phyllite. Depth to a root restrictive layer, strongly contrasting textural stratification, is 18 to 36 inches (depth from the mineral surface is 17 to 31 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 2 percent. This component is in the F144BY505ME Loamy over Sandy ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Hermon, very stony (40%)

The Hermon, very stony component makes up 40 percent of the map unit. Slopes are 15 to 60 percent. This component is on mountains on glaciated uplands, hills on glaciated uplands. The parent material consists of sandy and gravelly supraglacial meltout till derived from granite and gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 2 percent. This component is in the F144BY601ME Dry Sand ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Lyman, very stony (6%)

Generated brief soil descriptions are created for major soil components. The Lyman, very stony soil is a minor component.

Component: Tunbridge, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Skerry, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Skerry, very stony soil is a minor component.

Component: Lyme, very stony (1%)

Generated brief soil descriptions are created for major soil components. The Lyme, very stony soil is a minor component.

Map Unit: MwB—Monadnock-Lyman-Rock outcrop complex, 0 to 8 percent slopes

Component: Monadnock, very stony (45%)

The Monadnock, very stony component makes up 45 percent of the map unit. Slopes are 0 to 8 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist. Depth to a root restrictive layer, strongly contrasting textural stratification, is 18 to 36 inches (depth from the mineral surface is 17 to 31 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 2 percent. This component is in the F144BY505ME Loamy over Sandy ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Lyman, very stony (25%)

The Lyman, very stony component makes up 25 percent of the map unit. Slopes are 0 to 8 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial till derived from granite and gneiss and/or phyllite and/or mica schist. Depth to a root restrictive layer, bedrock, lithic, is 11 to 24 inches (depth from the mineral surface is 10 to 20 inches). The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 8 percent. This component is in the F144BY702ME Shallow and Moderately-deep Till ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Rock outcrop (15%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Marlow, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Marlow, very stony soil is a minor component.

Component: Tunbridge, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Sunapee, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Sunapee, very stony soil is a minor component.

Component: Lyme, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Lyme, very stony soil is a minor component.

Map Unit: MwC—Monadnock-Lyman-Rock outcrop complex, 8 to 15 percent slopes

Component: Monadnock, very stony (45%)

The Monadnock, very stony component makes up 45 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist. Depth to a root restrictive layer, strongly contrasting textural stratification, is 18 to 36 inches (depth from the mineral surface is 17 to 31 inches). The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 2 percent. This component is in the F144BY505ME Loamy over Sandy ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Lyman, very stony (25%)

The Lyman, very stony component makes up 25 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy supraglacial till derived from granite and gneiss and/or phyllite and/or mica schist. Depth to a root restrictive layer, bedrock, lithic, is 11 to 24 inches (depth from the mineral surface is 10 to 20 inches). The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. Below this thin organic horizon the organic matter content is about 8 percent. This component is in the F144BY702ME Shallow and Moderately-deep Till ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Rock outcrop (15%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Sunapee, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Sunapee, very stony soil is a minor component.

Component: Tunbridge, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Tunbridge, very stony soil is a minor component.

Component: Marlow, very stony (4%)

Generated brief soil descriptions are created for major soil components. The Marlow, very stony soil is a minor component.

Component: Lyme, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Lyme, very stony soil is a minor component.

Map Unit: PlB—Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony

Component: Pillsbury, very stony (79%)

The Pillsbury, very stony component makes up 79 percent of the map unit. Slopes are 0 to 8 percent. This component is on hills on glaciated uplands, mountains on glaciated uplands. The parent material consists of loamy lodgment till derived from gneiss and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from granite. Depth to a root restrictive layer, densic material, is 21 to 43 inches (depth from the mineral surface is 20 to 39 inches). The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches (depth from the mineral surface is 5 inches) during January, February, March, April, May, September, October, November, December. Organic matter content in the surface horizon is about 85 percent. This component is in the F144BY305ME Wet Loamy Flat ecological site. Nonirrigated land capability classification is 6s. This soil meets hydric criteria.

Component: Peru, very stony (9%)

Generated brief soil descriptions are created for major soil components. The Peru, very stony soil is a minor component.

Component: Peacham, very stony (5%)

Generated brief soil descriptions are created for major soil components. The Peacham, very stony soil is a minor component.

Component: Wonsqueak (4%)

Generated brief soil descriptions are created for major soil components. The Wonsqueak soil is a minor component.

Component: Lyman, very stony (3%)

Generated brief soil descriptions are created for major soil components. The Lyman, very stony soil is a minor component.

Data Source Information

Soil Survey Area: Sullivan County, New Hampshire
Survey Area Data: Version 29, Aug 22, 2023

IMPORTANT FOREST SOIL GROUPS

New Hampshire soils are complex and highly variable due primarily to their glacial origins. The Natural Resource Conservation Service (NRCS) soil mapping recognizes and inventories these complex patterns and organized them into a useful and understandable planning tool, Important Forest Soil Groups. The objective—a simplified yet accurate tool that will be helpful to natural resource professionals and landowners. These groupings allow managers to evaluate the relative productivity of soils and to better understand patterns of plant succession and how soil and site interactions influence management decisions. All soils have been grouped into one of six categories, as described below. For a complete list, contact your local NRCS field office or
http://extension.unh.ecluiresources/filesiResource001580_Rep2136.xls

Group IA consists of the deeper, loamy, moderately well-drained and well-drained soils. Generally, these soils are more fertile and have the most favorable soil-moisture conditions. Successional trends are toward climax stands of shade-tolerant hardwoods such as sugar maple and beech. Early-successional stands frequently contain a variety of hardwoods such as sugar maple, beech, red maple, yellow, gray, and paper birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and white pine.
The soils in this group are well-suited for growing high-quality hardwood veneer and sawtimber, especially, sugar maple, white ash, yellow birch, and northern red oak. Softwoods are usually less abundant and are best managed as a minor component of predominantly hardwood stands. Hardwood competition is severe on these soils. Successful natural regeneration of softwoods and the establishment of softwood plantations require intensive management.

Group IB generally consists of soils that are moderately well-drained and well-drained, sandy or loamy over-sandy, and slightly less fertile than those in group 1A. Soil moisture is adequate for good tree growth but may not be quite as abundant as in group 1A. Successional trends and the trees common in early-successional stands are similar to those in group IA. However, beech is usually more abundant on group IB and is the dominant species in climax stands.
Group IB soils are well-suited for growing less-nutrient and- moisture-demanding hardwoods such as paper birch and northern red oak. Softwoods generally are scarce to moderately abundant and managed in groups or as part of a mixed stand.
Hardwood competition is moderate to severe on these soils. Successful regeneration of softwoods and the establishment of softwood plantations are dependent upon intensive management. The deeper, coarser-textured, and better-drained soils in this group are generally suitable for conversion to intensive softwood production.

Group IC soils are derived from glacial outwash sand and gravel. The soils are coarse textured and are somewhat excessively drained to excessively drained and moderately well-drained. Soil moisture and fertility are adequate for good softwood growth but are limiting for hardwoods.
Successional trends on these soils are toward stands of shade- tolerant softwoods, such as red spruce and hemlock. White pine, northern red oak, red maple, aspen, gray birch, and paper birch are common in early-successional stands. These soils are well-suited for high quality softwood sawtimber, especially white pine, in nearly pure stands. Less site-demanding hardwoods such as northern red oak and paper birch have fair to good growth on sites where soil moisture is more abundant. Hardwood competition is moderate to slight.
With modest levels of management, white pine can be maintained and reproduced. Although

chemical control of woody and herbaceous vegetation may be desirable in some situations, softwood production is possible without it.

Group IIA consists of diverse soils and includes many of the soils that are in groups IA and IB. The soils in IIA, however, have limitations such as steep slopes, bedrock outcrops, erodibility, surface boulders, and extreme stoniness. Productivity of these soils isn't greatly affected by those limitations, but management activities such as tree planting, thinning, and harvesting are more difficult and more costly.

Group IIB soils are poorly drained. The seasonal high water table is generally at a depth of 12 inches or less. Productivity is lower than in IA, IB, or IC. Fertility is adequate for softwoods but is a limitation for hardwoods. Successional trends are toward climax stands of shade-tolerant softwoods, such as red spruce and hemlock. Balsam fir is a persistent component in nearly all stands. Early-successional stands frequently contain a variety of hardwoods such as red maple, yellow, gray, and paper birch, aspen, and white and black ash in varying mixtures with red spruce, hemlock, balsam fir, and white pine. These soils are well-suited for spruce and balsam fir pulpwood and sawtimber. Advanced regeneration is usually adequate to fully stock a stand. Hardwood competition isn't usually a major limitation, but intensive management by chemical control of competing woody and herbaceous vegetation may be desirable.

Not Rated- Several mapping units in New Hampshire are either so variable or have such a limited potential for commercial production of forest products that they haven't been placed in a group. Examples are very poorly drained soils and soils at high elevations.

Forest Stewardship Objectives

General Information	
Landowner Name(s):	Town of Acworth Municipality
Property Location:	Map 240 Lot 9 - South of intersection of Groat Hill and Hillard Roads X: -8045181.943348 Y: 5342648.358044
Mailing Address:	13 Town Hall Road, PO Box 37, Acworth NH 03601
Phone Number:	603 835 6879
Total Property Acreage:	81
Date Property Acquired:	January 31, 1944
Deed Book/Page:	TBD

Do you have a survey map of the property? ☐ Yes ☒ No

Is the property enrolled in Current Use? ☒ Yes ☐ No

Are you interested in certifying your property as a Tree Farm? ☐ Yes ☒ No

Landowner Goals
Please check the column on the right that best reflects the importance of each of the following goals.

Goal	Importance to Me			
	High	Medium	Low	Don't Know
Enhance Quality/Quantity of Timber Products	☐	☒	☐	☐
Generate Income from Timber Products	☐	☐	☒	☐
Produce Firewood for Personal Use	☐	☐	☐	☐
Produce Maple Syrup	☐	☐	☐	☐
Define Boundary Lines	☐	☐	☐	☐
Control Invasive Plant Species	☐	☐	☐	☐
Promote Biological Diversity	☒	☐	☐	☐
Enhance Habitat for Birds	☐	☒	☐	☐
Enhance Habitat for Animals	☐	☒	☐	☐
Develop or Maintain Access Roads and Trails	☐	☐	☒	☐
Improve Recreational Opportunities	☐	☒	☐	☐
Maintain or Enhance Privacy	☐	☐	☐	☐
Enroll/Maintain Current Use Property Tax Assessment	☐	☐	☐	☐
Protect from Development	☐	☐	☐	☐
Preserve or Improve Scenic Beauty	☐	☐	☐	☐
Protect Water Quality	☐	☐	☐	☐
Protect Unique/Special/Cultural Areas	☐	☐	☐	☐

In your own words, describe your goal(s) for the property.

Priority is to create a diverse multigenerational resilient forest, that takes into account some of the risks from the relevant invasive species (emerald ash bore, beech, other plants, etc.) and the likely impacts to soil, tree and plant species due to climate change (warming temperatures, increased rain events, shorter/warmer winters, and drought periods).

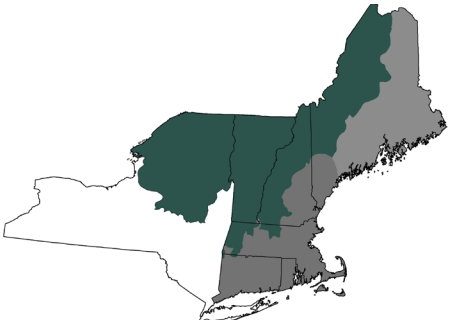
Also consider areas that could become early successional habitats for animals and birds. The property doesn't lend itself to many eco-forestry options so we might consider a early successional habitat plan over 20-30 years with smaller 3 acre rotating areas. Maybe we could experiment with some seeding in one of these areas with resilient trees that are better equipped to handle more rain and warmer temps. Would defer to your guidance with these suggestions.

We marked recreation at a medium, however this is only important if there are natural resources that could be considered attractions. Without any natural attractions (view, significant rock formations, water features, significant wildlife habitats, etc.) recreation would not be a priority.

Pr

Landowner Signature:_____ Date: _____

CLIMATE CHANGE PROJECTIONS FOR INDIVIDUAL TREE SPECIES
THE NORTHERN FOREST



This region's forests will be affected by a changing climate and other stressors during this century. A team of managers and researchers created an assessment that describes the vulnerability of forests in the region (*Janowiak et al. 2018*). This report includes information on observed and future climate trends, and also summarizes key vulnerabilities for forested natural communities. The Landscape Change Research Group recently updated the Climate Change Tree Atlas, and this handout summarizes that information. Full Tree Atlas results are available online at *www.fs.fed.us/nrs/atlas/*. Two climate scenarios are presented to "bracket" a range of possible futures. These future climate projections (2070 to 2099) provide information about how individual tree species may respond to a changing climate. Results for "low" and "high" emissions scenarios can be compared on the reverse side of this handout.

The updated Tree Atlas presents additional information helpful to interpret tree species changes:

- Suitable habitat - calculated based on 39 variables that explain where optimum conditions exist for a species, including soils, landforms, and climate variables.
- Adaptability - based on life-history traits that might increase or decrease tolerance of expected changes, such as the ability to withstand different forms of disturbance.
- Capability - a rating of the species' ability to cope or persist with climate change in this region based on suitable habitat change (statistical modeling), adaptability (literature review and expert opinion), and abundance (FIA data). The capability rating is modified by abundance information; ratings are downgraded for rare species and upgraded for abundant species.
- Migration Potential Model - when combined with habitat suitability, an estimate of a species' colonization likelihood for new habitats. This rating can be helpful for assisted migration or focused management (see the table section: "New Habitat with Migration Potential").

Remember that models are just tools, and they're not perfect. Model projections can't account for all factors that influence future species success. If a species is rare or confined to a small area, model results may be less reliable. These factors, and others, could cause a particular species to perform better or worse than a model projects. Human choices will also continue to influence forest distribution, especially for tree species that are projected to increase. Planting programs may assist the movement of future-adapted species, but this will depend on management decisions. Despite these limits, models provide useful information about future expectations. It's perhaps best to think of these projections as indicators of possibility and potential change.

SOURCE: *This handout summarizes the full model results for the Northern Forest region, available at www.fs.fed.us/nrs/atlas/combined/resources/summaries. More information on vulnerability and adaptation in the New England region can be found at www.forestadaptation.org/new-england. A full description of the models and variables are provided in Iverson et al. 2019 (www.nrs.fs.fed.us/pubs/57857 and www.nrs.fs.fed.us/pubs/59105) and Peters et al. 2019 (www.nrs.fs.fed.us/pubs/58353).*

CLIMATE CHANGE CAPABILITY

POOR CAPABILITY	
Balsam fir	Gray birch
Balsam poplar	Mountain maple
Black ash	Pin cherry
Black willow	Red pine
Bur oak	Striped maple
Eastern cottonwood	Tamarack (native)
FAIR CAPABILITY	
American elm	Red spruce
Bitternut hickory	Silver maple
Black spruce	White ash
Boxelder	White spruce
Jack pine	Yellow birch
GOOD CAPABILITY	
American basswood	Mockernut hickory
Bigtooth aspen	Northern red oak
Black cherry	Pignut hickory
Black locust	Pitch pine
Black oak	Quaking aspen
Blackgum	Red maple
Chestnut oak	Scarlet oak
Eastern redcedar	Sugar maple
Eastern white pine	Sweet birch
Hackberry	White oak
Ironwood	
MIXED RESULTS	
American beech	Northern white cedar
Eastern hemlock	Paper birch
Flowering dogwood	Serviceberry
Green ash	Shagbark hickory
NEW HABITAT WITH MIGRATION POTENTIAL	
Chinkapin oak	Pin oak
Common persimmon	Southern red oak
Cucumbertree	Sweetgum
Eastern redbud	Virginia pine
Osage-orange	

NIACS
Northern Institute of Applied Climate Science

www.forestadaptation.org

ADAPTABILITY: Life-history factors, such as the ability to respond favorably to disturbance, that are not included in the Tree Atlas model and may make a species more or less able to adapt to future stressors.

- \+ **HIGH** *Species may perform better than modeled*
- • **MEDIUM**
- – **LOW** *Species may perform worse than modeled*

HABITAT CHANGE: Projected change in suitable habitat between current and potential future conditions.

- ▲ **INCREASE** *Projected increase of >20% by 2100*
- ● **NO CHANGE** *Projected change of <20% by 2100*
- ▼ **DECREASE** *Projected decrease of >20% by 2100*
- ★ **NEW HABITAT** *Tree Atlas projects new habitat for species not currently present*

ABUNDANCE: Based on Forest Inventory Analysis (FIA) summed Importance Value data, calibrated to a standard geographic area.

- \+ **ABUNDANT**
- • **COMMON**
- – **RARE**

CAPABILITY: An overall rating that describes a species' ability to cope or persist with climate change based on suitable habitat change class (statistical modeling), adaptability (literature review and expert opinion), and abundance within this region.

- △ **GOOD** *Increasing suitable habitat, medium or high adaptability, and common or abundant*
- ○ **FAIR** *Mixed combinations, such as a rare species with increasing suitable habitat and medium adaptability*
- ▽ **POOR** *Decreasing suitable habitat, medium or low adaptability, and uncommon or rare*

SPECIES	ADAPT	ABUN	LOW CLIMATE CHANGE (RCP 4.5) HABITAT CHANGE	LOW CLIMATE CHANGE (RCP 4.5) CAPABILITY	HIGH CLIMATE CHANGE (RCP 8.5) HABITAT CHANGE	HIGH CLIMATE CHANGE (RCP 8.5) CAPABILITY
American basswood	•	•	▲	△	▲	△
American beech	•	+	●	△	▼	○
American elm	•	•	●	○	●	○
American hornbeam*	•	–	●	▽	●	▽
American mountain-ash*	–	–	▼	▽	▼	▽
Bald cypress	•	–	★		★	
Balsam fir	–	+	▼	▽	▼	▽
Balsam poplar	•	–	▼	▽	▼	▽
Bigtooth aspen	•	•	▲	△	▲	△
Bitternut hickory*	+	–	●	○	●	○
Black ash	–	–	▲	▽	▲	▽
Black cherry	–	•	▲	△	▲	△
Black locust*	•	–	▲	△	▲	△
Black oak	•	–	▲	△	▲	△
Black spruce	•	•	●	○	●	○
Black walnut*	•	–	▲	△	▲	△
Black willow*	–	–	▼	▽	●	▽
Blackgum	+	–	▲	△	▲	△
Boxelder*	+	–	●	○	●	○
Bur oak	+	–	▼	▽	▼	▽
Chestnut oak	+	–	▲	△	▲	△
Chinkapin oak	•	–	★		★	
Common persimmon*	+	–	★		★	
Cucumbertree*	•	–	★		★	
Eastern cottonwood*	•	–	●	▽	●	▽
Eastern hemlock	–	+	▲	△	●	○
Eastern redbud*	•	–	★		★	
Eastern redcedar	•	–	▲	△	▲	△
Eastern white pine	–	+	▲	△	▲	△
Flowering dogwood	•	–	▲	○	▲	△
Gray birch*	•	–	▼	▽	▼	▽
Green ash*	•	–	●	▽	▲	○
Hackberry	+	–	▲	△	▲	△
Ironwood*	+	•	▲	△	▲	△
Jack pine	+	–	●	○	●	○
Loblolly pine	•	–			★	

SPECIES	ADAPT	ABUN	LOW CLIMATE CHANGE (RCP 4.5) HABITAT CHANGE	LOW CLIMATE CHANGE (RCP 4.5) CAPABILITY	HIGH CLIMATE CHANGE (RCP 8.5) HABITAT CHANGE	HIGH CLIMATE CHANGE (RCP 8.5) CAPABILITY
Mockernut hickory	+	–	▲	△	▲	△
Mountain maple*	+	–	▼	▽	▼	▽
Northern red oak	+	•	▲	△	▲	△
Northern white-cedar	•	•	▼	▽	●	○
Osage-orange	+	–	★		★	
Paper birch	•	•	●	○	▼	▽
Pawpaw*	•	–	★		★	
Pecan*	–	–	★		★	
Pignut hickory	•	–	▲	△	▲	△
Pin cherry*	•	–	▼	▽	▼	▽
Pin oak*	–	–	★		★	
Pitch pine	•	–	▲	△	▲	△
Quaking aspen	•	•	▲	△	▲	△
Red maple	+	+	▲	△	●	△
Red pine	–	•	●	▽	●	▽
Red spruce	–	+	▼	○	▼	○
Sassafras*	•	–	▲	△	▲	△
Scarlet oak	•	–	▲	△	▲	△
Serviceberry*	•	–	●	▽	▲	○
Shagbark hickory	•	–	▲	○	▲	△
Shortleaf pine	•	–	★		★	
Silver maple*	+	–	●	○	●	○
Southern red oak	+	–	★		★	
Striped maple	•	•	▼	▽	▼	▽
Sugar maple	+	+	●	△	●	△
Swamp white oak*	•	–	●	▽	▲	○
Sweet birch	–	•	▲	△	▲	△
Sweetgum	•	–	★		★	
Sycamore*	•	–	▲	△	▲	△
Tamarack (native)	–	–	●	▽	●	▽
Virginia pine	•	–	★		★	
White ash	–	•	▲	○	▲	○
White oak	+	–	▲	△	▲	△
White spruce	•	•	●	○	●	○
Yellow birch	•	+	▼	○	▼	○
Yellow-poplar	+	–	★		★	

**Species with low model reliability based on five statistical metrics of the habitat models that affect change class. See maps and tables for more information (www.fs.fed.us/nrs/atlas/combined/resources/summaries).*

A TABLE OF MATURITIES AND/OR NORMAL EXPECTED AND MAXIMUM AGES
for
SELECTED TREES OF NORTHERN NEW ENGLAND

Species Common Name	Scientific Name	Expected Normal Age	or	Maximum Age in years
Eastern white pine	*Pinus strobus*	150-200		450+
Red pine	*Pinus resinosa*	150-200		300-400
Eastern larch	*Larix laricina*	100-200		335
Red spruce	*Picea rubens*	200		350-400
Black spruce	*Picea mariana*	100-150		250
Eastern hemlock	*Tsuga canadensis*	---		500-900
Balsam Fir	*Abies balsamea*	90-100		200+
Quaking Aspen	*Populus tremuloides*	60-70		150
Bitternut hickory	*Carya cordiformis*	---		175+
Yellow birch	*Betula alleghaniensis*	150		300
Sweet birch	*Betula lenta*	100		200-265
Paper birch	*Betula papyrifera*	60-75		140-200
American beech	*Fagus grandifolia*	---		300-400
White oak	*Quercus alba*	---		500-600
Northern red oak	*Quercus rubra*	---		200-300
American elm	*Ulmus americana*	150-200		300
Black cherry	*Prunus serotina*	150-200		
Sugar maple	*Acer saccharum*	---		200-400
Red maple	*Acer rubrum*	70-80		150
American basswood	*Tilia americana*	90-140		100-140
Black ash	*Fraxinus nigra*			135-150
White ash	*Fraxinus americana*			300

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Jeffrey Snitkin
752 RT. 103A
Newbury, NH 03255

From: NH Natural Heritage Bureau

Date: 5/28/2024 (This letter is valid through 5/28/2025)

Re: Review by NH Natural Heritage Bureau of request dated 5/28/2024

Permit Type: Forestry Statutory Permit by Notification (SPN)

NHB ID: NHB24-1661

Applicant: Jeffrey Snitkin

Location: Acworth
Tax Map: 240, Tax Lot: 009
Address: Hilliard Rd

Proj. Description: Forest management plan

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

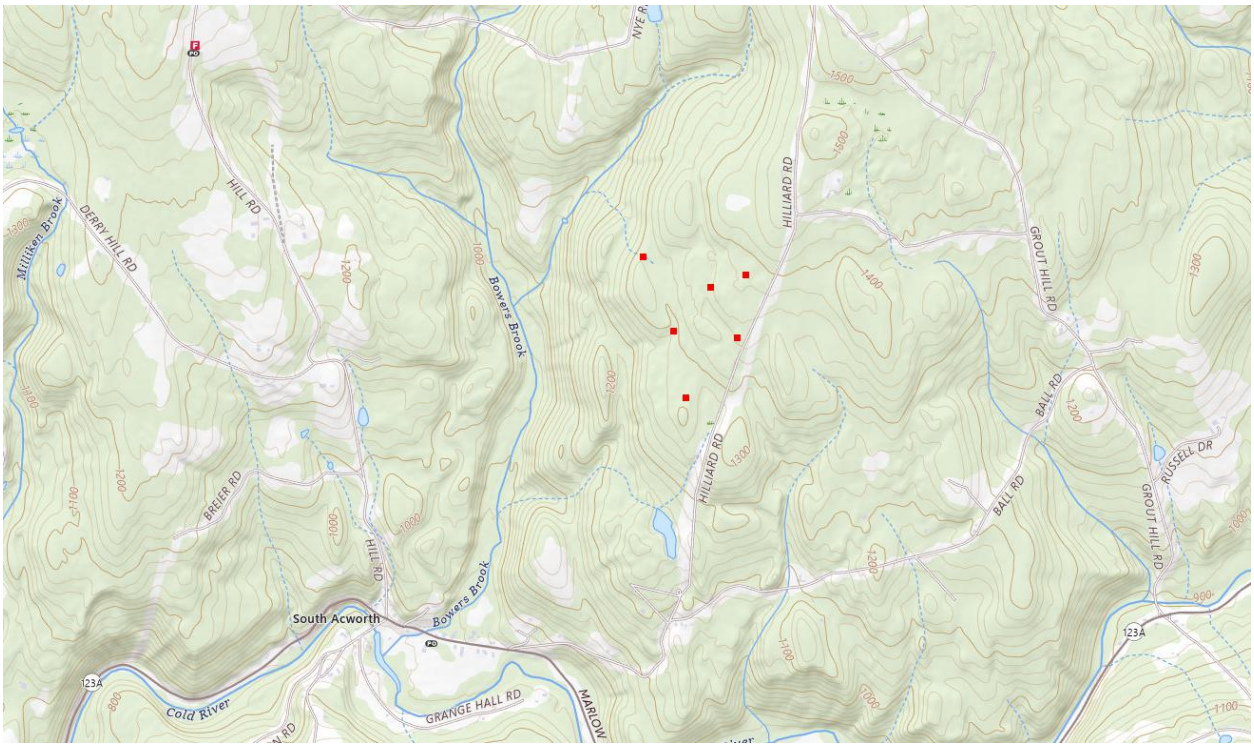
Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

MAP OF NOTIFICATION POINTS FOR: NHB24-1661



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GLOSSARY

ACCEPTABLE GROWING STOCK (AGS): A crop tree managed to meet any given landowners' objective. Use Value Appraisal guidelines define AGS as commercial tree species containing one 12-foot log or two non-contiguous 8- foot logs, or that have the potential to produce these products in the future.

ACCEPTABLE MANAGEMENT PRACTICES (AMPs): Standards for protecting water quality on logging jobs developed by the Department of Forests, Parks and Recreation and outlined in the booklet titled *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont.*

ACRE: A standard unit of area measure. One acre equals: 43,560 square feet, 10 square chains or an area that is 209' X 209'.

ADVANCED REGENERATION: Natural regeneration that was established and has advanced beyond the seedling stage to saplings and/or small poles.

ALL-AGED (UNEVEN-AGED): Age class category; applied to a stand of trees in which, theoretically, trees of all ages are found; a stand occupied by three or more age classes.

ANCIENT FOREST (OLD GROWTH FOREST): Forest in late successional stages; the older seral stages of natural forests.

ANNUAL RING: The growth layer of one year, as viewed on the cross-section of a stem, branch or root.

ASPECT: The direction of a slope.

BASAL AREA: The cross-sectional area of a tree computed from DBH measurements, expressed in square feet; the sum of the basal areas of all trees on an acre, expressed as basal area/acre, is an objective measure of density and is useful for making forest management decisions.

BIODIVERSITY: The variety of life and its processes including living organisms, genetic differences among them, the ecosystems in which they occur and the ecological and evolutionary processes that maintain their functions.

BIOMASS: The total above ground volume of a tree, stand or forest, usually expressed in tons/acre. This term is also used to describe a whole tree or chip harvest.

BOARD FOOT: A unit of measurement to determine volume of lumber; one board foot equals a board 12" x 12" x 1". Also, a measure of standing or logs.

BROWSE: Buds, leaves, and twigs of tree seedlings and saplings, shrubs and herbaceous plants that are utilized for food by wildlife.

CANOPY: The combined forest cover formed by individual overstory tree crowns.

CHAIN: A unit of measure 66 feet or 4 rods in length; ten square chains equal one acre; 80 chains equal one mile.

CLEANING: A pre-commercial cutting made in a stand that is not past the sapling stage to release desirable trees from undesirable trees of the same age that overtop them or are expected to do so.

CLEAR-CUT: A method of harvesting that removes all the trees in an area for the purpose of regenerating a new stand; results in even-aged stands. Variations include patch cuts and strip cuts.

CLIMAX: The theoretical culminating stage in plant succession for a given site; vegetation is self-reproducing; the resulting community has reached stability under a particular set of environmental conditions through time.

CODOMINANT TREE: A crown classification; trees with crowns forming the general level of the forest canopy and receiving full sunlight from above but little from the sides. (See crown class.)

COHORT: An aggregation of trees that starts as a result of a single disturbance; a generation of trees.

CORD: A unit of roundwood volume equal to 128 cubic feet of wood, air and bark; a pile of four' long round or split wood piled four' high and eight' long; traditional measure of pulpwood and fuelwood, now commonly replaced by weight measurement. A cord generally contains 80 to 90 cubic feet of solid wood. One cord equals 500 board feet.

CROP TREE: A tree selected in a stand or plantation based on growth rate, crown position or stem quality which will be grown to maturity; growth of crop trees is the object of frequent thinnings or other improvement cuttings.

CROWN: The upper part of a tree including the branches and foliage.
CROWN CLASS: Classification of trees based on the relative position of their crowns.

CULL TREE: A tree of little or no economic value due to poor form, excessive limbs, rot or other defects. Culls frequently have wildlife, aesthetic or other values.
CUITING CYCLE: Frequency of logging operations on the same area, expressed as years.

CURRENT USE TAXATION: Assessed values for property tax purposes that are based on the current use of the land, not on fair market value. Such programs are found in many states: New Hampshire Current Land Use and Vermont Use Value Appraisal are examples.
DAYLIGHTING: Clearing vegetation along roads and trails to provide light and air drainage, to maintain herbaceous plants and to exclude woody plants from occupying the site; a maintenance and wildlife habitat enhancement practice.

DEN TREE: A tree possessing a cavity large enough to serve as a shelter for birds and mammals, or as a site to give birth and raise young. Den trees generally must be 15" DBH or" larger and have a cavity opening of 4" diameter or more.

DBH (Diameter Breast Height): Diameter measured outside the bark of a tree at 41/ 2 feet above the ground, expressed in inches.

DOMINANT TREE: A crown classification; trees with large crowns extending above the general level of the forest canopy and receiving full light from above and partial light from the sides.

ECOSYSTEM: A dynamic complex of plant, animal, fungal and microorganism communities and their associated non- living environment interacting as an ecological unit.

ECOSYSTEM APPROACH: A strategy or plan to manage ecosystems to provide for all associated native organisms in an ecosystem, as opposed to managing for individual species.

ECOTONE: The border between two habitat types that is composed of a mixture of species from neighboring habitats, creating a unique and often very rich habitat.

EDGE: The ecological changes that occur at the boundaries of ecosystems or habitats; the interface between different vegetation types. These changes may include species composition, size class, gradients of moisture, sunlight, soil and air temperature, soil type, wind speed...; edge effects can have both positive and negative impacts for wildlife.

ELDER TREE(S): An old and often (but not always) large diameter tree(s); occurring singly or in small groups; these are older and/or larger than the majority of the surrounding trees and often possess unique characteristics; often remnants from past harvests; when occupying larger areas or stands these may constitute old growth or ancient forests.
EROSION: Usually destructive movement of soil particles, often associated with logging operations and access roads.
EVEN-AGED: Age class category; a stand in which a small age differences exist between individual trees; the maximum difference in age permitted in an even-aged stand is usually 10 to 20 years, or 10% of rotation age.

EVEN-AGED MANAGEMENT: Any treatment system that establishes or maintains one age class, more than one even- aged stand can occupy a site. Even-age silvicultural systems include clearcut, seed-tree and shelterwood harvests.

FOREST STAND or FOREST TYPE or VEGETATIVE COVER TYPE: a group of trees occupying a specific area and similar characteristics of composition, species, age, arrangement, condition and ecological development which is distinguishable from other groups of stands. Forest types are typically defined by one or more of the dominant tree species in the type.
FOREST STAND IMPROVEMENT (FSI): Pre-commercial treatments designed to improve stand conditions without producing revenue, including cleaning, weeding, thinning, pruning, or cull removal. Also known as Timber Stand Improvement (TSI).

GIRDLING: A method used in FSI to eliminate unwanted trees; also used to create snags and future ROM. Blocking the flow of carbohydrates (food) from the leaves to the roots by cutting, usually with a chainsaw, a ring around the tree that penetrates past the inner bark, ultimately killing the tree; herbicides and hatchet frill can also be used to cut or kill the ring.

GROUP SELECTION: A method harvest method where groups of trees are removed to create openings that are designed to promote regeneration; results in an uneven-aged stand.

GROWING STOCK: A tree or trees that currently provides a desired product or service, usually quantified as sawlog production, or trees that are currently too small to contain a log, but that possess the necessary characteristics to produce a future sawlog; potential sawlog trees.
GROWTH RATE: Measurement of annual rings in the outer radial inch of a tree; indicates the rate of growth of a tree; expressed as rings/radial inch.

HABITAT: The environment in which an organism lives; also, the organisms and physical environment in a particular place.

HARVEST: The removal of a crop or stand of financially or physically mature trees as a with the objective of establishing or releasing regeneration.

HARVESTING TRAIL: Small trails laid out in the woods over which logs are pulled (skidded) or carried (forwarded) from the stump to the landing.

HIGH-GRADING: A cut that extracts only the best quality trees or high value timber; made without regard to the future composition or quality of a stand or forest; degrades the forest ecosystem.

IMPROVEMENT CUT: An intermediate cutting made to regulate species composition and quality; called releasing in young stands.

INTERMEDIATE CUT: Various cuttings made during development of the stand from the reproduction stage to maturity; generally, for the purposes of improving stand quality and composition for timber production.

INTERMEDIATE TREE: A crown classification; trees with small crowns crowded into the general level of the forest canopy, receiving some light from above but none from the sides.

INTOLERANT SPECIES: Trees unable to regenerate, grow and develop in the shade of other species; for example, paper birch and quaking and big-tooth aspen.
LANDING: A place where logs are from the forest and accumulated for loading and transportation to market.

LEGACIES: Ancestors; residual organisms and structures handed down from a pre-disturbance ecosystem, including live trees, dead trees and wood, seeds, surviving roots, basal buds, mycorrhizal fungi, other soil microbes, invertebrates, mammals, and soil chemistry and structure. Legacies influence recovery, composition, structure and function of post- disturbance (including harvesting) ecosystems.
LIQUIDATION HARVEST: The removal of all, or the majority, of the merchantable products from the forest strictly for short term economic gain; creates a non-performing asset; frequently precedes the sale (liquidation) of the land.

MAST: Fruits or nuts produced by woody plants (including trees) which are utilized by wildlife for food; usually divided into hard mast (e.g.: acorns, beech nuts) or soft mast (e.g.: black cherry, apple).

MATURITY: 1. Financial maturity; occurs when a tree has reached financial value; frequently based on carrying costs and assumed or expected interest rates of return; reached long before biological maturity; 2. Biological maturity; the point where energy costs exceed the energy input from photosynthesis.

MBF: Abbreviation for thousand board feet; the standard unit of measure for logs.
MEAN STAND DIAMETER (MSD): The arithmetic mean diameter of the stand measured at DBH.

MERCHANTABLE TIMBER: Trees that are currently salable.

MULTIPLE USE: Managing the same area of forestland for several uses simultaneously, i.e., recreation, wildlife, water, timber production....

MYCORRHIZAL FUNGI: A fungus living in a mutualistic association with plants; facilitates nutrient and water uptake.

NATIVE SPECIES: Plants, animals, fungi and microorganisms which naturally occur in an area or region.

NATURAL COMMUNITY: An interacting assemblage of plants and animals, their physical environment, and the natural processes that affect them; typically describing an expected or potential condition in the late successional stage of forests.
OPTIMUM GROWTH: The greatest growth achievable on a given site, usually in reference to timber volume.

OVERMATURE: That period in the life cycle of trees and stands when growth or value declines rapidly; frequently defined from a forest products or timber harvesting perspective; frequently a myth perpetuated to encourage timber harvesting.

OVERSTOCKED: A stand where the growing space is occupied leaving no or little room for future stand development or continued growth.

OVERSTORY: The upper crown canopy of the forest; the larger diameter and/or taller trees in the stand.
PIONEER SPECIES: Shade intolerant species that are the first trees to develop in an area after or the abandonment of a field or after a disturbance that covers a fairly large area. Pioneer species include aspen and paper birch.

PIT and MOUND: The micro-topography created on the forest floor when trees fall, resulting in the mound of the root mass and the pit, or depression, in the soil where the tree formally stood.

POLES: A size class; trees that are 4" DBH to 10" DBH.

PRE-COMMERCIAL TREATMENTS: treatments in young or unmerchantable stands that do not, or cannot, economically extract merchantable forest products; e.g.: FSI; cleaning, weeding, thinning and release.
PRODUCTION POTENTIAL: Mean Annual Increment (MAl); average growth of the stand over the rotation under optimum stocking conditions; expressed as volume/acre/year.

PRUNING: The practice of removing tree limbs so that a bole free of knots will develop over time; after pruning, the resulting wound heals and clear wood (knot free) is produced. Pruning is a component of FSI.

PULP TREES: Trees that can yield at least two 8-foot bolts with a minimum 4" top diameter inside the bark and which are unsuitable for sawtimber because of size, crook, rot or other defect; used for manufacturing paper products; these trees frequently represent a negative value on private non-industrial forests in this area.
REGENERATION: New growth obtained by natural seeding or sprouts.

RELEASE OPERATIONS: Free young stands of desirable trees, not past the sapling stage, from competition of undesirable trees that are or will suppress them; cleanings and liberation cutting.

REPRODUCTION: New growth artificially obtained by planting or direct seeding.

RETAINED ORGANIC MATERIAL (ROM): Woody material that lies on or near the forest floor; also known as down woody material or down woody debris; provides essential ecosystem functions such as adding organic material to the soil, increasing moisture retention and creating habitat for animals and plants; the larger the diameter and the longer the piece, the greater the ecological value; This material is a stand legacy.

ROTATION: The period of years required to reproduce, grow and harvest a crop of timber; applies only to even-aged management.

SAPLING: A size class; trees less than 4" DBH and 4 1/2 to 10 feet tall.

SAWTIMBER: A product category: usually trees that are greater than 10" DBH for softwoods and 12" DBH for hardwoods and that are reasonably straight, free of defects and otherwise suitable for lumber or veneer production.
SEEDLING: A size class; trees up to 4 1/2 feet tall.
SHADE TOLERANCE: The ability of trees to reproduce and grow in the shade of other trees.

SILVICULTURE: The art and science of tending a forest; the application of the knowledge of silvics in the treatment of a forest; the theory and practice of controlling forest establishment, composition and growth.

SINGLE TREE SELECTION: A method of final harvest in which single trees are removed and the vacancies created promote new growth; results in uneven-aged stands.

SITE: An area considered in terms of its environment (including climate, slope, soil, temperature and moisture); particularly as a determiner of vegetation type and quality supported by an area.
SITE CLASS: A broad category of soil productivity; usually rated site I, TI, Ill, IV, from highest to lowest productivity.

SITE INDEX: A measure of the productivity of the site using the relationship of tree height to tree age; in the East 50 years is the basis: e.g.: a tree 60 feet tall and 50 years old indicates a site index of 60.

SITE POTENTIAL TREE HEIGHT: The average height of trees that have attained the maximum height possible on a given site.
SIZE CLASS: A classification of trees based on predominate tree size (diameter and/or height) within a stand or type.

SLASH: The tops, branches and defective parts of trees that are left on the ground after a logging job; these provide carbon which in the decomposition process produces calcium which is essential for cell formation.
SNAG: A standing dead or partially dead tree at least 6" DBH and 10' in height. Large diameter snags meet the needs of more wildlife species than do small diameter snags, and are more persistent.
STAGNATION: A condition that occurs when too many trees are growing on a site; growth is minimal and vigor declines.

STAND: See "forest stand or forest type" above.

STANDARD: A size class; usually trees over 10" DBH for softwood and 12" DBH for hardwood and up to 24" DBH.

STOCKING LEVEL: A qualitative expression comparing existing number of trees and square feet of basal area in a stand to the amount desired for optimum growth of diameter and volume. Stocking guides are based on the relationship of the number of trees/acre, the square feet of basal area/acre and the mean stand diameter. Stocking levels are expressed as A, B or C lines. Stands

near or above the A line are overstocked. Trees are crowded and growth is slow. Stands between the A and B line are fully stocked. Stands at the B line are at an optimum stocking level. Diameter growth is rapid and volume growth is high. Stands between the B and C lines should be fully stocked within 10 years. Diameter growth remains rapid, but volume growth diminishes. Stands below the C line are understocked. Stocking guides are developed for optimum timber production.

STUMPAGE: The value of standing timber dependent upon market conditions, quality of timber, accessibility and other factors.

STRUCTURAL DIVERSITY: The diversity in a community resulting from the occurrence of many horizontal or vertical physical elements, e.g., layers or tiers of the canopy; an increase in layering increases structural diversity.

SUCCESSION: A process of physical and chemical change which takes place on a site over time, resulting in a progression of forest types; The orderly and predictable replacement of one plant community by another over time in the absence of disturbance.

SUPPRESSED TREES: A crown classification; trees with small crowns that are entirely below the general level of the canopy, receiving no direct light from above or from the sides; also called overtopped.

THINNING: An intermediate silvicultural treatment that regulates stand density, composition and quality.

TOLERANT SPECIES: Trees that are able to reproduce and grow satisfactorily in their own shade or the shade of other trees. Tolerant species include sugar maple, beech, red spruce and hemlock.

UNACCEPTABLE GROWING STOCK (UGS): A tree not capable of producing a desired product or service, typically quantified by ability to produce sawlogs; also see growing stock.

UNDERSTORY: Trees growing below the main crown canopy, usually advanced natural regeneration.

UNEVEN-AGED: A stand that contains trees of many different ages and sizes; all aged.

UNEVEN-AGED MANAGEMENT: Any treatment system that establishes or maintains a stand of all age/size classes, treatments are multi-purpose, designed to establish natural regeneration, thin, and achieve other cultural objectives simultaneously.

VIGOR: The health and vitality of a tree; generally assessed by observing crown characteristics such as foliage density and color, live crown ratio, crown depth and width.

WATERBAR: A diversion created by mechanical means to redirect the flow of water (to prevent erosion) on roads and skid trails.

WINDTHROW: Damage to trees caused by winds, usually of a severe nature; results in tip ups and stem breakage.