WOLCOTT COMMUNITY FOREST

A Forest Management Plan for the
Wolcott Community Forest

FOREST MANAGEMENT PLAN
PREPARED FOR THE TOWN OF WOLCOTT
COMMUNITY FOREST STEWARDSHIP
COMMITTEE

Emily Potter | Lamoille County Forester
VT Licensed Forester
148.0125340

Forest Management Plan Approval

This forest management plan was prepared by Emily Potter, Lamoille County Forester, at the request of the Wolcott Community Forest Stewardship Committee.

_____	_____	_____
Printed Name	Signature	Date

We certify that we have read and approve of the 2024 Wolcott Community Forest Management Plan and agree to implement this plan to the best of our abilities. This Forest Management Plan includes the application of silvicultural practices and best available applied ecological research, as well as the full implementation of the "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont" to control stream siltation and soil erosion.

Table of Contents

Purpose of Forest Management Plan 3
General Property Description 3
Location 3
Rivers, Streams, & Wetlands 6
Water Quality 7
Geologic Information 7
Native Biodiversity 7
Wildlife 8
Rare, Threatened & Endangered Species 8
Forest Health 9
Recreation 9
Management Goals and Objectives 11
Forest Resources 11
Forest Stand 1 15
Forest Stand 2 17
Forest Stand 3 21
Forest Stand 4 24
Forest Stand 5 26
Forest Stand 6 29
Forest Stand 7 32
Forest Stand 8 34
Forest Stand 9 37
Forest Stand 10 39
Forest Stand 11 42
Appendix 1: Stocking Guides 45

Purpose of Forest Management Plan

The following forest management plan is intended to provide information and guidance to the Town of Wolcott's Community Forest Stewardship Committee for the management of the approximately 733-acre forest owned by the Town of Wolcott. This forest was comprised of two separate ownerships (Bourne (approximately 399-acres), and Bedell (approximately 335-acres)). This plan will provide management guidance for a ten-year period beginning in 2024. The plan should be updated on a ten-year cycle starting in 2034, and a new forest inventory should be completed at that time. This forest management plan contains information collected from a forest inventory completed in fall and winter of 2023-2024. The information contained in this plan includes ecological, economic, and social considerations to help the Wolcott Community Forest Stewardship Committee make informed decisions based on long-term management objectives for this land.

This forest management plan is a compilation of information from soil and water quality considerations to forest cover types and wildlife habitat features. The intent of this plan is to guide forest management on the property to be consistent with the State of Vermont's Stewardship Ethic which states:

> "*Stewardship is an ethic recognizing that the land and its natural inhabitants have an inherent worth and that we have a responsibility to manage our actions as part of that. It guides us to manage our activities to the utmost of our abilities, to ensure the future health, productivity, and wellbeing of the land, its natural communities, and species, and to allow our successors opportunities at least equal to ours to use the land and its resources."*

General Property Description

Location

One way to understand the complexity of landscapes in Vermont is to think about biophysical regions (Figure 1). There are eight distinct regions in Vermont based on differences in elevation, vegetation, climate, geology, topography, land-use history, and hydrology. Lamoille County (and therefore the Wolcott Community Forest) is in the Northern Green Mountains biophysical region. The Green Mountains are part of the Appalachian Mountain chain extending from Alabama to Quebec. The Northern Green Mountains include Vermont's highest mountain (Mount Mansfield), its coldest climate, and the greatest annual precipitation compared to anywhere else in the state. Bedrock in the Northern Green Mountains is primarily acidic, non-calcareous metamorphic rock. Northern hardwoods such as birch, beech and maple dominate the region on the mountain slopes up to about 2,500 feet, above which yellow birch and red spruce are dominant. Spruce-fir forests occupy the higher slopes and summits, with alpine meadows above 3,500 feet. Higher amounts of precipitation and deep snows in the mountains feed some of the state's largest rivers, including the Lamoille, Missisquoi, Winooski, and White. For more detailed descriptions of each biophysical region in Vermont, refer to the book *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (by Elizabeth Thompson, Eric Sorenson, and Robert Zaino).

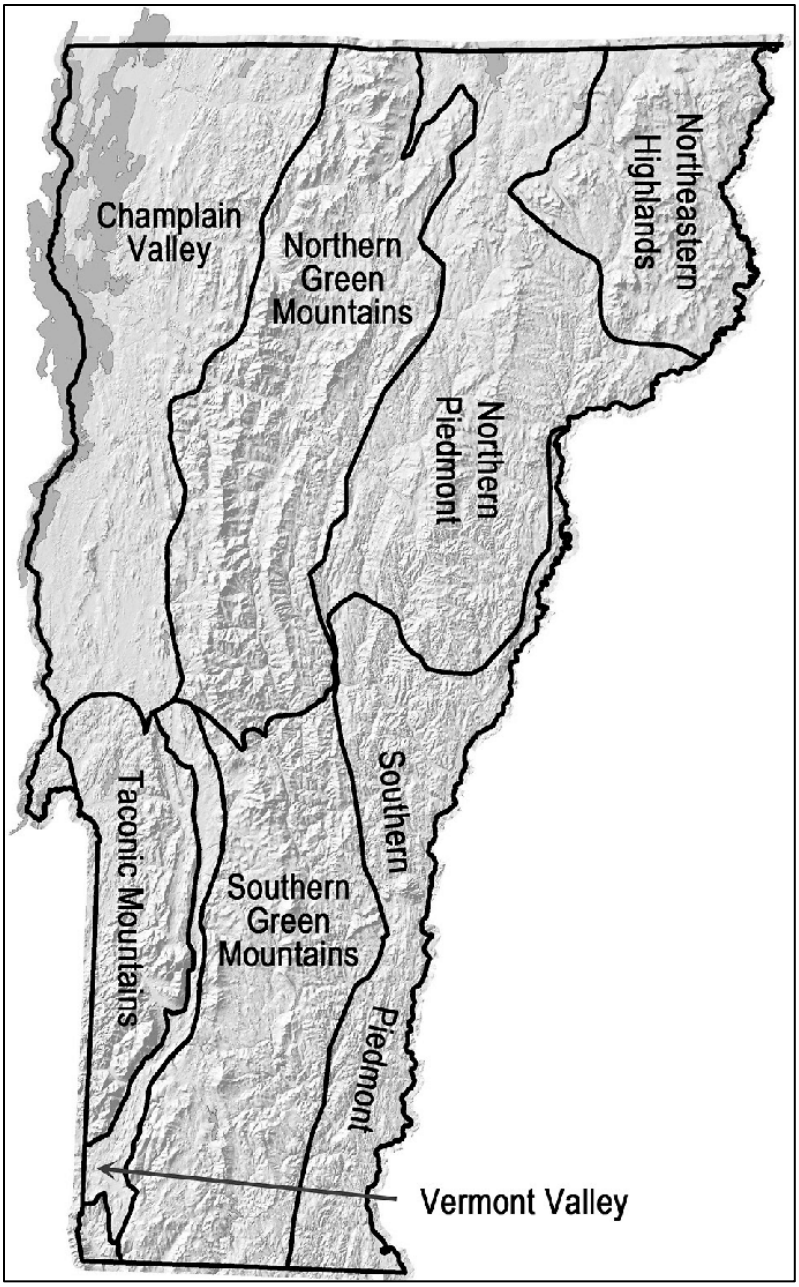


Figure 1: A map of the Biophysical Regions of Vermont. The Wolcott Community Forest is in the Northern Green Mountains.

Zooming in, the Wolcott Community Forest is in the southeastern quadrant of the town of Wolcott; on the east and west sides of East Elmore Road, with frontage on the Elmore Branch, extending east to Route 15; south of and abutting the Lamoille Valley Rail Trail. The easternmost portion of the land connects to the Wolcott Elementary School property. Pedestrian access to the property is via frontage on VT Route 15, East Elmore Road, Gates Farm Road (Class IV), and the Lamoille Valley Rail Trail. Two access areas/parking areas are planned (discussed in the Proposed Action Schedule section of the Wolcott Community Forest Stewardship Plan and shown on Map D: Access and Recreation Map for potential parking and access areas).

The Wolcott Community Forest is central in an approximately 4,000-acre forest block in Wolcott and Elmore (Figure 2).

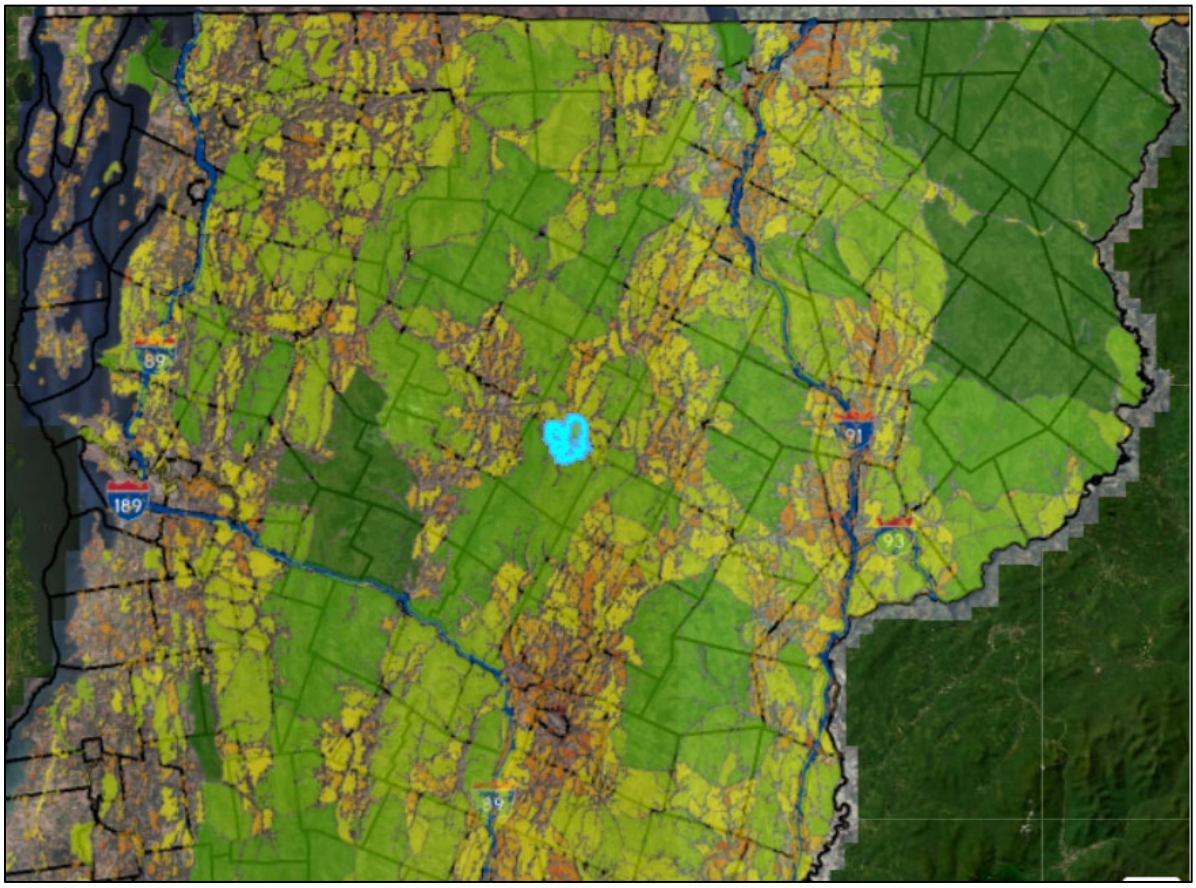


Figure 2: Map of forest blocks in northern Vermont. Darker greens represent large habitat blocks that are less fragmented by development and roads and therefore higher priority areas for protection than lighter-shaded areas. The Wolcott Community Forest is located within the blue highlighted area, an approximately 4,000-acre forest block.

It is important to note that our forests in Vermont, including the Wolcott Community Forest, are part of the largest, most intact, temperate broadleaf deciduous forest in the world (Figure 3). This forest provides habitat for a wide range of species that depend on large blocks of forest and is considered globally significant.

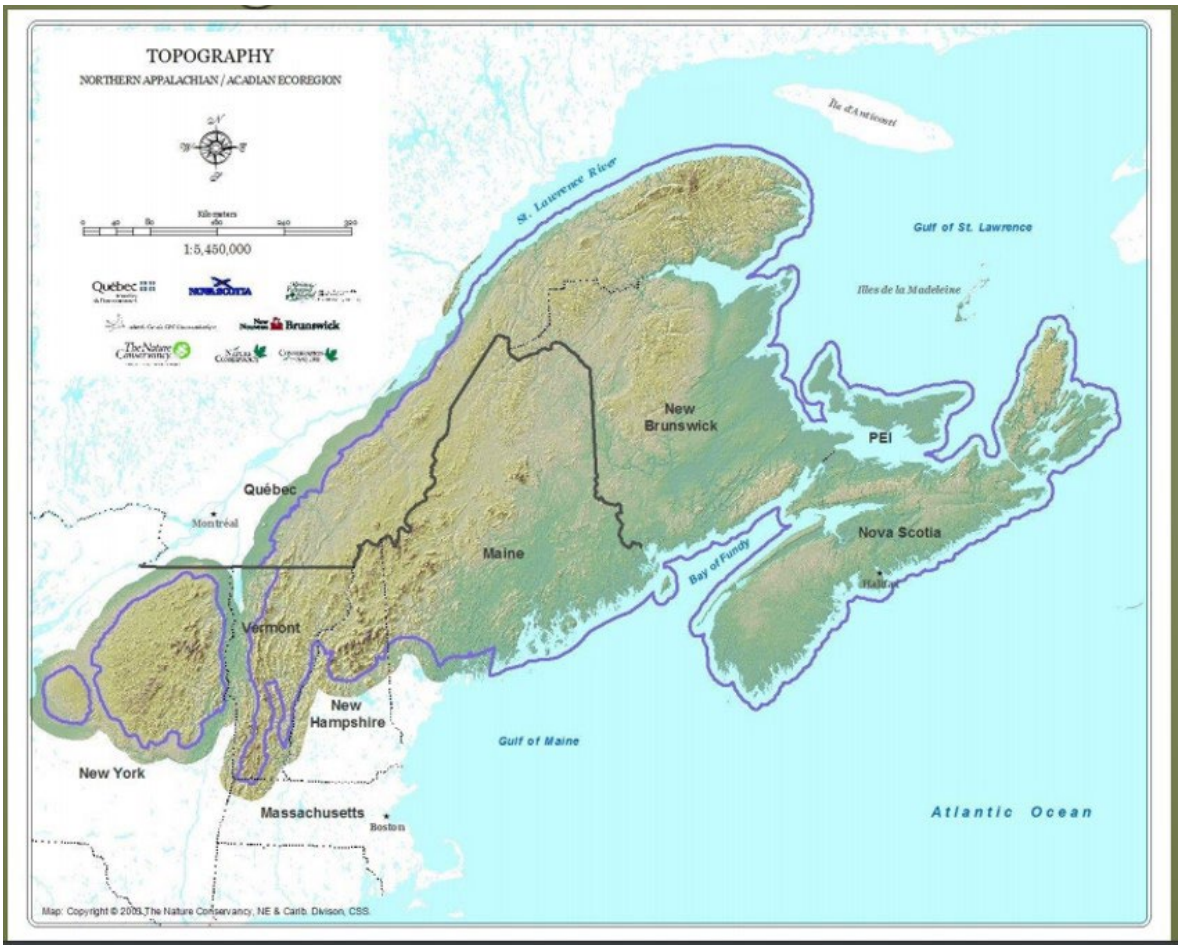


Figure 3: Map of the Northern Appalachian / Acadian Ecoregion, the largest, most intact, temperate broadleaf deciduous forest in the world. Viewed in this context, our forests in Vermont, including the Wolcott Community Forest, are globally significant.

Rivers, Streams, & Wetlands

The Wolcott Community Forest lies entirely within the Lamoille River Watershed, with 1/3 of a mile of frontage on the Lamoille River. The Elmore Branch and 5.5 miles of headwater streams, including Whitcomb Brook, flow from the property into the Lamoille River and onward into Lake Champlain.

Wetlands on the property are numerous and widespread, totaling 30.5-acres. The most notable wetland habitat on the property is the stream and surrounding wetland of the Elmore Branch. Any forest management activities planned in the future on the property will protect riparian and wetland areas within 100 foot buffers as required by the Conservation Easement co-held by Northern Rivers Land Trust and the Vermont Housing and Conservation Board. Wetlands and riparian areas are essential for floodwater mitigation, wildlife habitat and maintenance of water quality. Wetlands and riparian areas support a diverse array of wildlife species from birds and mammals to amphibians and reptiles. Many species of wildlife rely on wetland and river corridors for travel, breeding, and dispersal.

Water Quality

Management activities on this property should be carried out in a way that protects water quality for all surface waters including streams, ponds, wetlands, and vernal pools. Erosion and sediment control measures should be utilized to avoid and reduce any disturbance due to logging, trail construction, or maintenance. All streams and wetlands should be afforded operational buffers (at least 100-feet as is required by the Conservation Easement) during harvesting activities. Particularly, the riparian corridors along the streams within the parcel and sensitive areas in and surrounding the wetlands should be protected to minimize erosion, sedimentation, and degradation. One of the simplest ways to reduce or avoid negative impacts is to restrict management activities to times of very dry soil conditions or frozen winter ground. The Vermont Department of Forests, Parks & Recreation's publication *Acceptable Management Practices* (AMPs) is an excellent guide for skid trail and landing design, maintenance, and close-out, and should be followed to reduce negative impacts due to logging. The *Acceptable Management Practices (AMP)* manual is available here: *(*https://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Forest_Management/Library/FullDocument-7.29.pdf)

An extensive evaluation of forest road/skid trail conditions on the property was not within the scope of the forest inventory that is the basis of this report. However, there are forest roads/skid trails on the property that are currently eroding and have potential to deposit sediment into nearby streams if left in their present condition. It would be pertinent to carry out a thorough assessment of forest roads/skid trails on the property to determine which portions need to be repaired through smoothing, grading, installation of water bars, placing stone armor in high traffic areas, seeding and mulching exposed soil, and abandoning any sections of forest road/trail that will not ever be used again in the future. The AMP manual (link above) is an excellent resource for guidance on forest road/skid trail installation, repair, maintenance and closeout.

Geologic Information

The Wolcott Community Forest is entirely underlain by the Moretown Formation, a bedrock comprised of relatively acidic metamorphic granofels and quartzite, formed 480-500 million years ago in the Ordovician to Cambrian period. Dominant soil types within the Wolcott Community Forest include Lyman-Tunbridge fine sandy loam; Berkshire-Tunbridge fine sandy loam; and the Colton-Duxbury complex. As would be expected from soils derived from acidic bedrock, these soil types are slightly acidic and relatively shallow as evidenced by frequent rock outcrops and exposed ledges within the forest. Regardless of soil types, forest management activities in the forest will strive to minimize erosion through winter harvesting and implementation of the Acceptable Management Practices to protect water quality. A soil type map with descriptions of soil types underlying the Wolcott Community Forest can be found in Appendix 2 of this document.

Native Biodiversity

Protecting native biodiversity is an essential part of maintaining a healthy forest ecosystem. Careful monitoring of the property for invasive species is critical to reducing their spread and limiting their negative impacts to the forest ecosystem. Invasive species, if allowed to persist, can out-compete native species, degrade habitat quality and impair ecosystem functions. When infestations of invasive species are noted and dealt with early on, their negative impacts will be reduced, and the chance of further spread can be eliminated.

Wildlife

Wildlife habitat diversity and quality should be encouraged. Deer wintering grounds, vernal pools, wildlife corridors, snags and den trees should be maintained and enhanced. The retention of hard mast (nuts and seeds) and soft mast (fruit) trees should be applied to provide sources of food for various wildlife species.

As mentioned above, the Wolcott Community Forest lies within an approximately 4,000-acre forest block that provides habitat and travel corridors for a wide range of wildlife species. During the forest inventory, white-tailed deer and snowshoe hare were observed, a recently shed deer antler was found, and signs of porcupine, ruffed grouse, woodcock, fox, fisher, deer and black bear were noted in the form of tracks, scat, dens, and beech trees with bear claw marks and bear "nests." (Bears will climb mature beech, leaving claw marks as they climb and pulling branches inward towards themselves to feed on beechnuts, creating "nests" which can sometimes be mistaken as ice damage).

The forest has an abundance of habitat characteristics that are used by several species of wildlife, including hardwood and softwood forest, riparian areas, wetlands, rock outcrops, and open land. Multiple species of trees which produce soft mast and hard mast, including beech, black cherry, yellow birch, red spruce, white pine, apple, and hawthorn are also present on the property.

Another habitat feature boasted by this property is the presence of large trees in varying stages of decay which have the potential to develop into cavity trees (also known as den trees) which provide den and nest sites for many species. These decaying trees also provide an important food source for woodpeckers that feed on the insects inside of them. When large cavity trees fall to the ground, they provide habitat for amphibians and small mammals, and contribute to soil moisture and nutrients.

Retention of five cavity trees per acre will provide habitat for forest mammals and birds. (One suggestion is to retain one cavity tree greater than 18 inches in diameter per acre and three cavity trees greater than 16 inches in diameter per acre). Retaining three snags per acre and two large, downed trees per acre will provide habitat for salamanders, small mammals, and invertebrates in the forest. This may not be the present condition throughout the property; however, establishing this structure property wide can be achieved over the long term.

Based on information collected during the forest inventory of the property, there are currently approximately 39 snags per acre, the majority of which are 12" in diameter and smaller. There are approximately 2 snags per acre that are greater than 16" in diameter. The forest inventory did not include an assessment of downed trees.

Rare, Threatened & Endangered Species

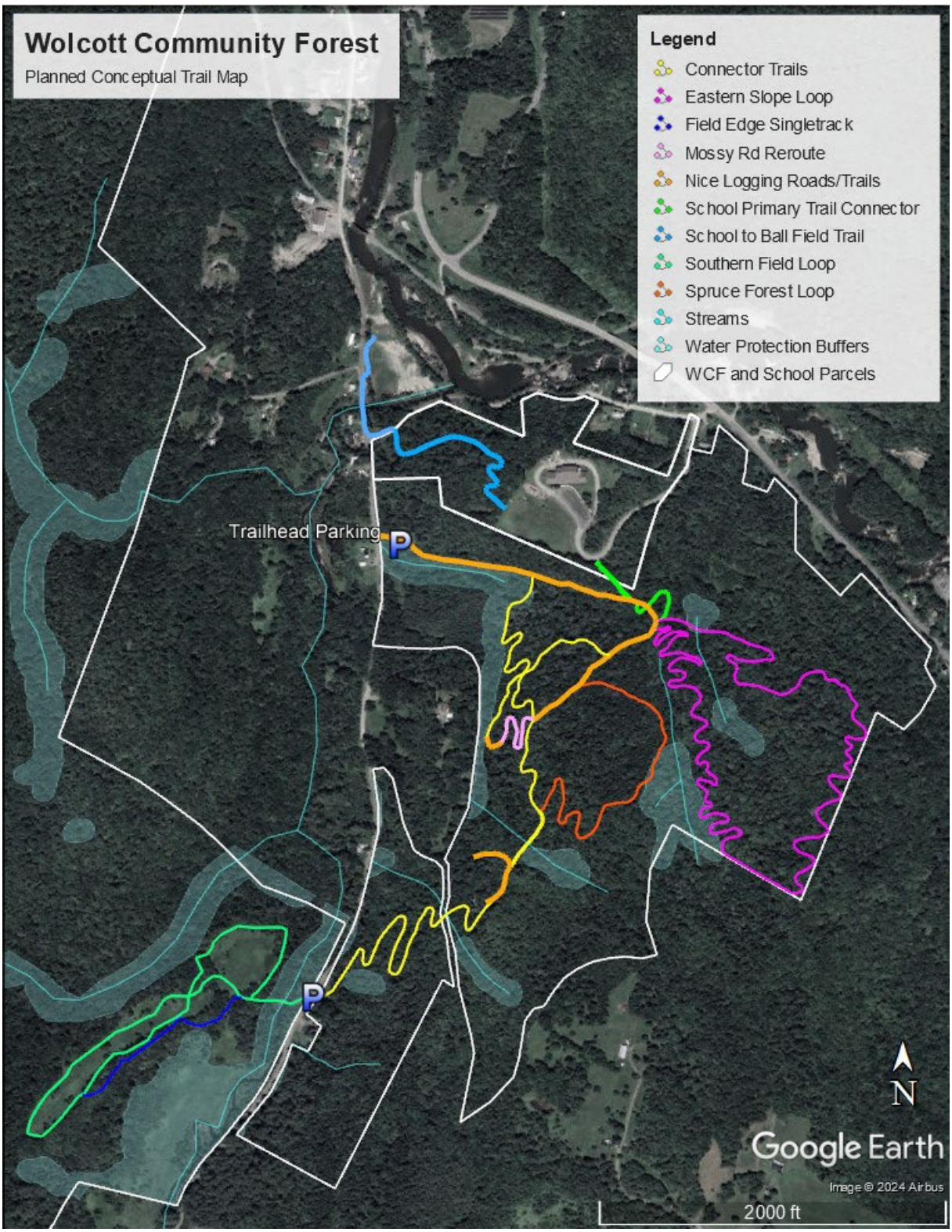
A review of the Vermont Department of Fish and Wildlife's database shows an incident occurrence report of a Rare, Threatened or Endangered plant or animal near the property but, to ensure protection of this occurrence, does not provide details as to the species or exact location. No other rare, threatened, or endangered (RTE) species incident occurrence reports are listed. No RTE species were observed or encountered during the forest inventory though the Rapid Ecological Assessment of the parcel documented several occurrences of rare and uncommon plants (refer to Appendix E and F of the Forest Stewardship Plan for more information).

Forest Health

No significant forest health issues were observed or identified during the 2023-2024 forest inventory. Common forest pests and diseases were observed on the property including excessive browse by white-tailed deer, beech bark disease (BBD) on a majority of the beech trees, *Eutypella* canker and maple borer damage on maple trees, balsam woolly adelgid (BWA) on balsam fir, *Inonotus obliquus,* also known as chaga, on birch trees, and a few non-native, invasive honeysuckle shrubs located both in the forest and on edges of the open land. **It is recommended that these non-native, invasive plants be removed as soon as possible to minimize additional spread through the forest and fields.** In general, it is very good practice to carry out annual monitoring of the forest and fields for the presence of non-native, invasive plants, including but not limited to honeysuckle. Non-native, invasive plants are relatively common in Lamoille County, making it even more important to monitor the forest for their presence before they become established and spread. Early detection and rapid response to invasions of these vigorous competitors is critical to maintaining forest health and biodiversity. More information on non-native, invasive plants and tips for identification can be found at www.vtinvasives.org. The Lamoille County Forester is available to assist with identification and to provide suggestions and methods for control and eradication.

Recreation

The Wolcott Community Forest will provide a diversity of recreational opportunities to community members and visitors alike including hiking, bird watching, hunting, fishing, mountain biking, running, cross-country skiing and general enjoyment of the nature of the forest. The existing network of forest roads as well as the planned creation of a trail network on the eastern portion of the property are currently and will continue to be invaluable to community members and other visitors to the forest. Maintaining access to forestland is essential for management activities and enjoyment of the resource. Existing forest roads on the property encompass the great majority of the land area and continued maintenance of these forest roads is essential for continued access into the future and to prevent and reduce erosion caused by these man-made travel corridors in the forest. An exciting addition to the forest road network is planned to provide opportunities for mountain biking and hiking or running. A map of the planned trail network is shown below. Trail building and maintenance at times requires cutting vegetation to clear the path or to open sight lines to ensure safe navigation. The creation of the new trail network will involve cutting down some trees, though the majority of these will be of 4-5” in diameter and will have little impact on the overall stocking of the forest. Forest stands on the property that will be home to the new trail network (shown in the map below) include information regarding their creation and maintenance in the stand descriptions contained within this report.


Wolcott Community Forest
Planned Conceptual Trail Map
Legend
Connector Trails
Eastern Slope Loop
Field Edge Singletrack
Mossy Rd Reroute
Nice Logging Roads/Trails
School Primary Trail Connector
School to Ball Field Trail
Southern Field Loop
Spruce Forest Loop
Streams
Water Protection Buffers
WCF and School Parcels
Trailhead Parking
P
P
N
Google Earth
Image © 2024 Airbus
2000 ft

Management Goals and Objectives

Below are the goals and objectives identified by the Wolcott Community Forest Stewardship Committee through a survey of the Wolcott community in the fall of 2022 and input into the creation of the forest stewardship plan for this property.

- Manage the land with an emphasis on forest health, wildlife habitat and connectivity, and maintenance and enhancement of existing important wetlands, riparian areas, and rare natural communities.
- Provide opportunities for dispersed recreation including hiking, mountain biking, cross country skiing, and snowshoeing.
- Provide forest-based educational opportunities and nature study for Wolcott Elementary School students and the Wolcott community.
- Identify areas for permanent protection where forest management activities will be limited to those that maintain and enhance old-forest characteristics.
- Explore opportunities to enhance carbon sequestration and storage.

Forest Resources

To measure, map and evaluate the forest resources of the Wolcott Community Forest, a forest inventory was carried out by the Lamoille County Forester on the property in the fall and winter of 2023 and 2024. Ninety-six variable radius (using a 10-factor prism) plots were systematically located throughout the forest (approximately 1 plot per 7 acres). Using ArcGIS Pro (a geographic information system (GIS) computer mapping program), sample points were located along a random grid which was overlaid on the property boundaries to create the field map for the inventory. The ArcGIS Pro map with the inventory grid and sample points was then loaded onto Avenza Maps (a mapping application which can be used on tablets and smartphones) and used to navigate to each point. Within each variable radius plot, trees are considered "in" the plot, and therefore measured, based on their cross-sectional area, measured at breast height (4.5' above the ground), and the factor of the prism (in this case, a 10-basal-area-factor prism) used. Data was collected using a tablet and was then processed and stored using the State of Vermont's FOREX Inventory Database System. Eleven forest stands were identified, and over 1,100 trees measured for their diameter, species, merchantable volume, and quality.

Each tree that fell within a plot and was therefore measured, was determined to be either Acceptable Growing Stock (AGS) or Unacceptable Growing Stock (UGS). Basal area (BA), which is the cross-sectional area of trees measured at 4.5' above the ground, of Acceptable Growing Stock (AGS BA) trees consists of that portion of trees tallied as total basal area at each plot that are of commercial species and have the potential to produce sawlog-quality or better material now or in the future. Commercial species are those tree species that are commonly accepted as being commercially valuable. Unacceptable Growing Stock Basal Area (UGS BA) consists of that portion of trees tallied as total basal area at each plot that are not of commercial species, or do not have the potential to produce sawlog-quality or better material now or in the future. Examples of non-commercial species include species such as striped maple, hophornbeam, pin cherry and apple. AGS and UGS Basal Areas are used in the following pages to describe the stocking (or overall density) of overstory trees in each stand.

Recommendations for management of the forest stands described in this report are based on silviculture. **According to the U.S. Forest Service**, ***Silviculture*** *is the art and science of controlling the*

establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis. This is accomplished by applying different types of silvicultural treatments such as thinning, harvesting, planting, pruning, prescribed burning, and site preparation. Intermediate treatments (thinning) are designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. Regeneration treatments (harvesting) are applied to mature stands in order to establish a new age class of trees.

The Wolcott Community did not identify timber production as one of the goals for this forest and thus prescriptions for managing each forest stand focus on improving forest health, enhancing wildlife habitat, maximizing carbon sequestration and storage, enhancing the forest's resilience in a changing climate and ensuring the compatibility between any forest management activities and recreational opportunities on the property. The Wolcott Community did identify managing at least a portion of the forest to enhance old forest characteristics as one of their goals for the property, and accordingly, recommendations are made for growing large trees, retaining and recruiting snags (standing dead trees) and coarse woody material (large logs and limbs) on the forest floor, and encouraging retention of both old "legacy trees" (big, old trees that will never be cut) and young trees of a diversity of species and size classes to accelerate the accumulation of old forest characteristics in this relatively young (in forest time) forest.

Silvicultural treatments are generally separated into two categories: even-aged management and uneven-aged (or multi-aged) management. Even-aged treatments typically have a goal of creating large disturbances that will create favorable light conditions for shade-intolerant species such as pine, aspen, birch, or oak. Even-aged treatments aim to replicate stand-replacing disturbances such as wind or insect defoliation, and in all even-aged treatment methods, the overstory is eventually removed.

Uneven-aged or multi-aged silviculture aims to mimic natural forest processes where trees live out their biological lifespans and die as individuals or in small groups due to natural disturbances such as windthrow. Uneven-aged management involves small, frequent disturbances that create small canopy gaps and eventually result in a diversity of age classes of trees and dominance of late successional (generally shade-tolerant) species such as sugar maple, hemlock and red spruce.

Uneven-aged and even-aged silvicultural management objectives are included in the following report and are generally in line with the goals and objectives for the forest identified by the Wolcott community. By utilizing ecological forestry techniques, forest managers can work to enhance old forest characteristics, to encourage and accelerate the growth of big trees, to create and improve wildlife habitat features, to ensure a diversity of tree species and size classes is present, to focus on maintaining and improving forest health, and to sequester and store carbon. Present conditions of the Wolcott Community Forest don't necessarily require immediate action and further exploration of management options is welcomed.

Figure 4, below, shows the species composition of trees in the Wolcott Community Forest based on the percentage of total basal area that they occupy.

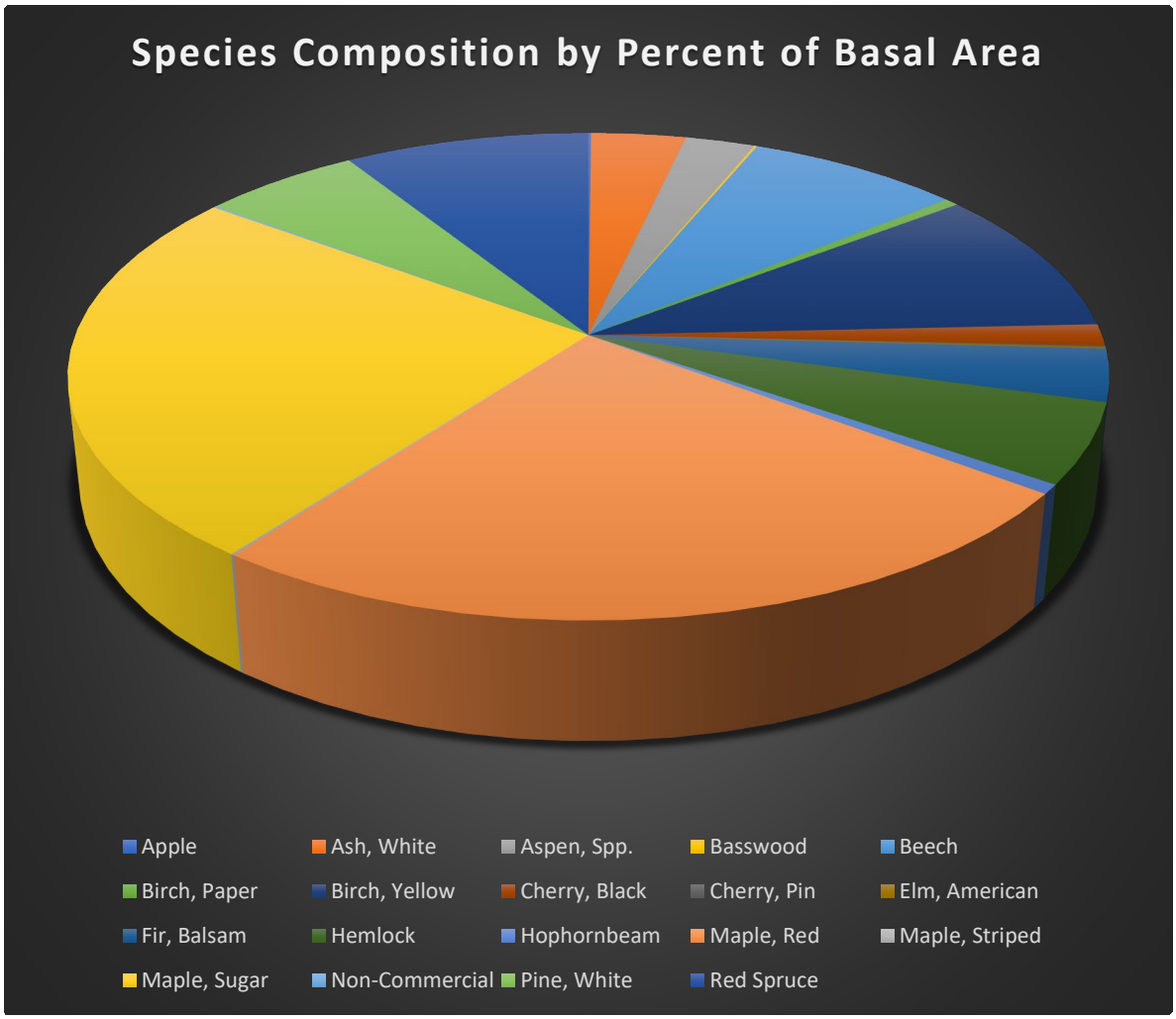


Figure 4: Species composition of the Wolcott Community Forest by percent of basal area.

Hardwoods account for approximately 81% of the trees measured, with 19% softwood. Sugar maple and red maple are the most common species, both accounting for approximately 25% of the basal area, respectively. Yellow birch (10%) and red spruce (9%) were the next two most common species measured. The graph below shows trees per acre by DBH class and species.

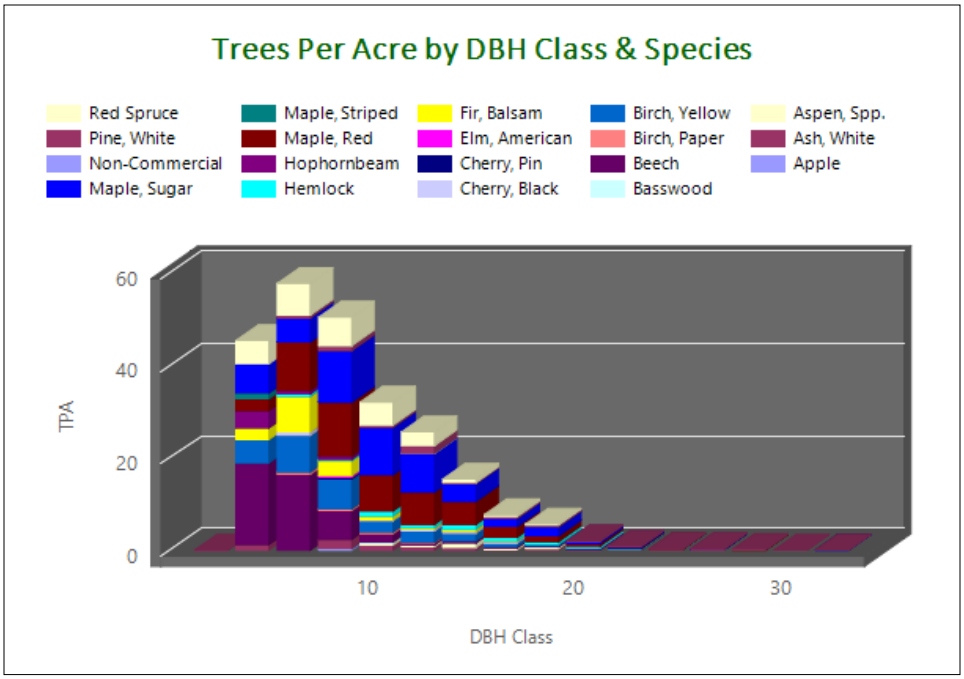


Figure 5: Trees per acre by DBH class and species in the Wolcott Community Forest.

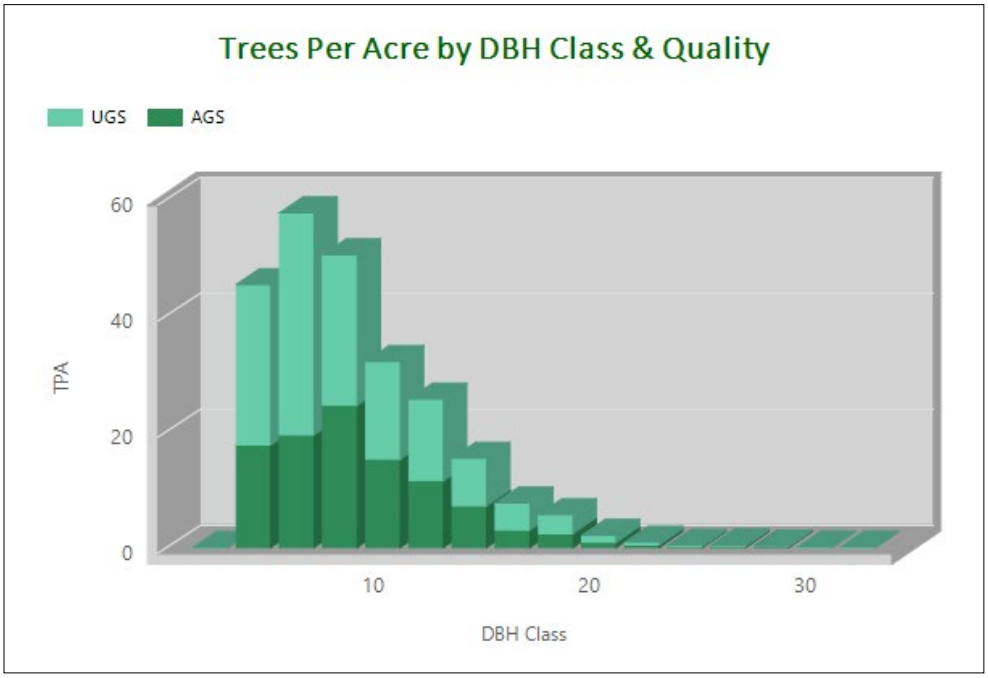


Figure 6: Trees per acre by DBH class and quality (Acceptable Growing Stock (AGS) or Unacceptable Growing Stock (UGS)) in the Wolcott Community Forest.

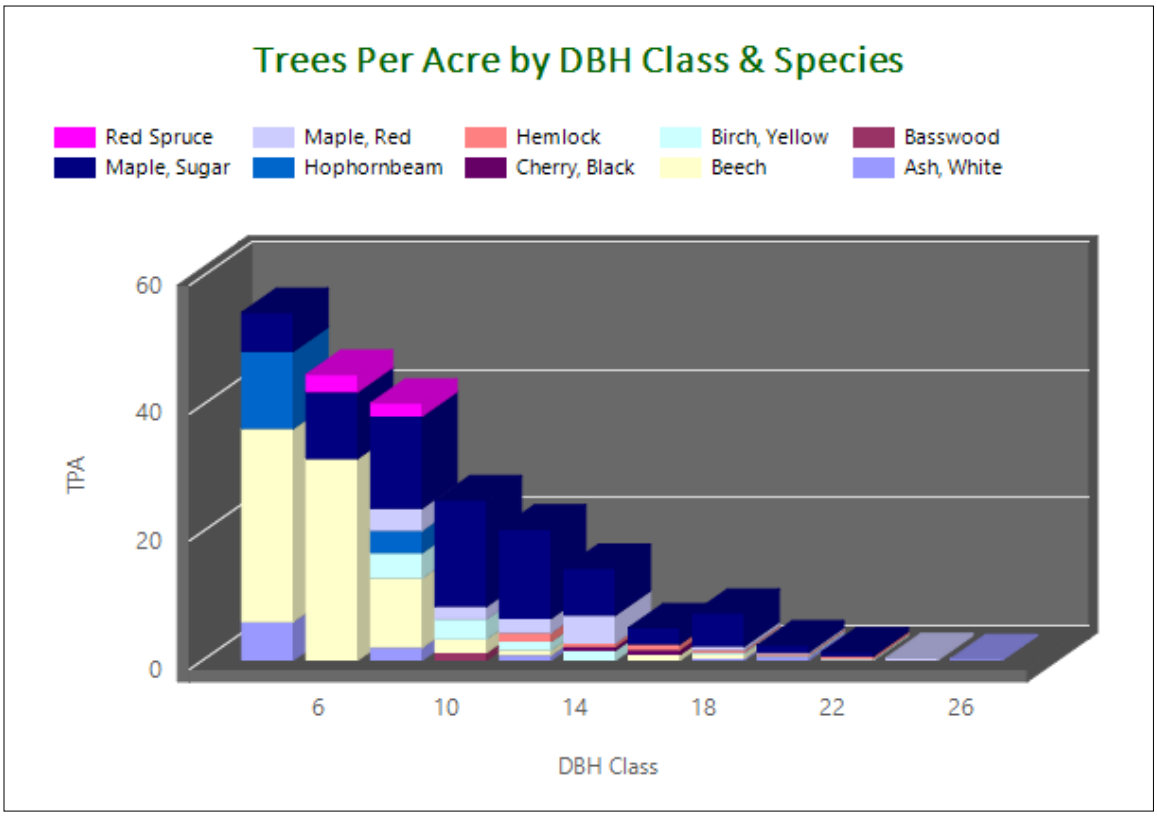
Forest Stand 1

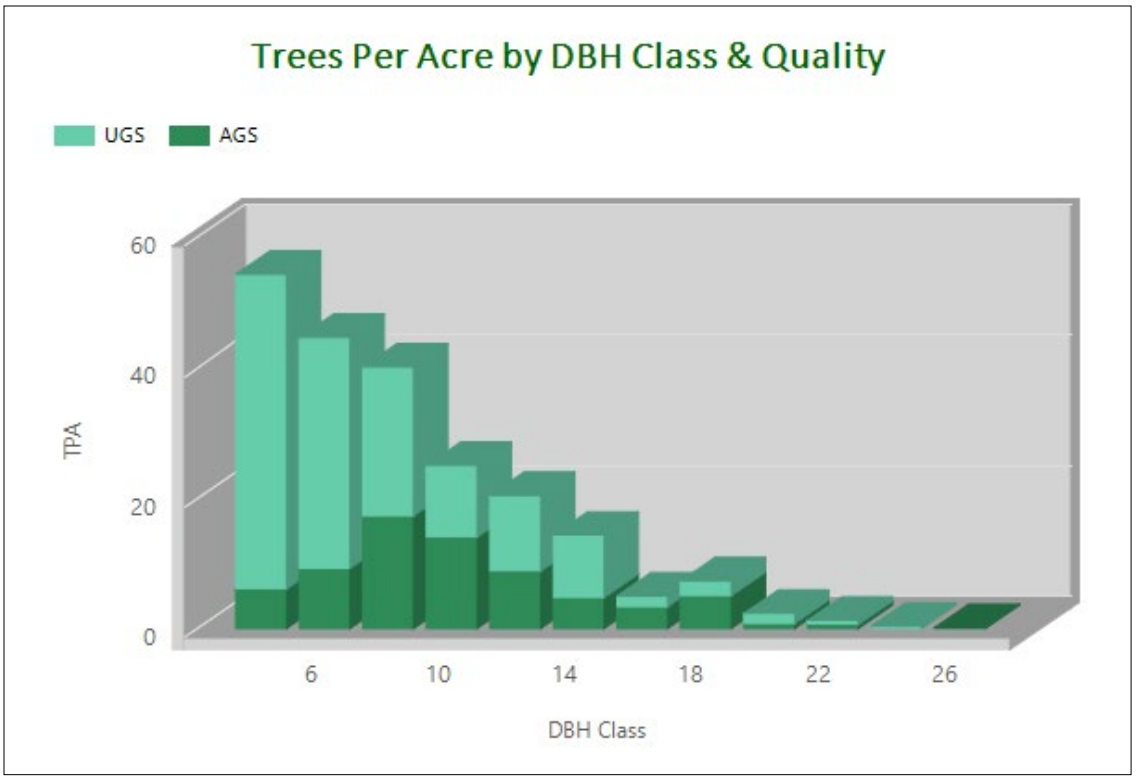
Acreage: 175.8 acres

Forest Type: *Sugar Maple-Northern Hardwood*

Composition: Sugar maple (51%), beech (16%), red maple (11%), yellow birch (7%), hemlock (5%), white ash (4%). Other species (6%) include hophornbeam, black cherry, red spruce, and basswood.

Understory composition: beech, sugar maple, yellow birch, red spruce, hophornbeam and hobblebush (*Viburnum alnifolium),* a native, woody shrub.





Stand Description: Stand 1 is characterized by an overstory dominated by sugar maple mixed with beech, red maple, yellow birch, and other hardwoods. Red spruce and hemlock are present as well though not abundant. The understory composition is dominated by beech saplings though sugar maple and red spruce saplings are also present. Additionally, hobblebush, a native shrub, is also common in the understory. This stand is situated in the northern portion of the property and is characterized by gentle to moderately sloped terrain with a generally northern aspect. Fingers of headwater streams drain east and south from this stand toward the Elmore Branch.

Regeneration: Adequate; sugar maple, beech, yellow birch, red maple and red spruce seedlings and saplings are present in the understory. Portions of the stand with sweeter (calcium rich) soils boast higher amounts of sugar maple seedlings and saplings while areas with poorer soils are dominated by beech and hobblebush regeneration.

Age Structure: Even-aged **Size Class:** poles to large sawtimber

Stocking: Well-stocked, between the B-line and the A-line on the hardwood stocking guide.

Total Basal Area/Acre: 93ft^2 **AGS Basal Area/Acre:** 42ft^2

Quadratic Mean Stand Diameter: 8.91 inches **Trees Per Acre:** 215

Approximate Stand Age: variable; overstory stems are approximately 80 to 100+ years.

Stand Health: No significant forest health issues were observed. Common forest pests/diseases are present including beech bark disease and *Eutypella* canker. Browsing by deer is apparent in the understory, though not at alarming levels. Approximately 42 snags per acre are present in this stand,

80% of which are less than 12 inches in diameter. There are approximately 1.5 large snags (greater than 16 inches in diameter) per acre.

Invasive Species: No non-native, invasive plants were noted in this stand during the present inventory.

Site Index: 50 for sugar maple by soils

History/Previous Activity: This stand developed from abandoned farmland around the 1940s to 1950s. A large portion of the area was thinned in the late 1990s, though steeper northern slopes were not included in this harvest. A harvest was carried out in this area in 2020 and 2021; mature or diseased/declining yellow birch, beech, ash, and maple were the focus for removal according to the records of the former landowner.

Silvicultural Management Objectives: Over time, this forest will be managed for the development of multiple age classes. As a result of the land-use history of this forest and past harvesting activities, current stand conditions have limited structural diversity, and the forest is generally even-aged. Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: Stocking levels in this stand are not critically high and the forest is continuing to recover from harvesting in 2020-2021. This stand should be allowed to grow for the next 10 years. At the time of the next forest management plan update, this stand should be evaluated for opportunities to enhance growth on healthy northern hardwood trees and scattered healthy red spruce trees through crop tree release. Crop tree release can help to accelerate growth on those trees selected as crop trees, helping to restore this old forest characteristic to the currently relatively simplified forest structure. Trees in competition with crop trees' crowns can be cut and left on the ground to serve as coarse woody material, another important feature of old forests. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to live their biological lifespans.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing of brush and debris, and managing the impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

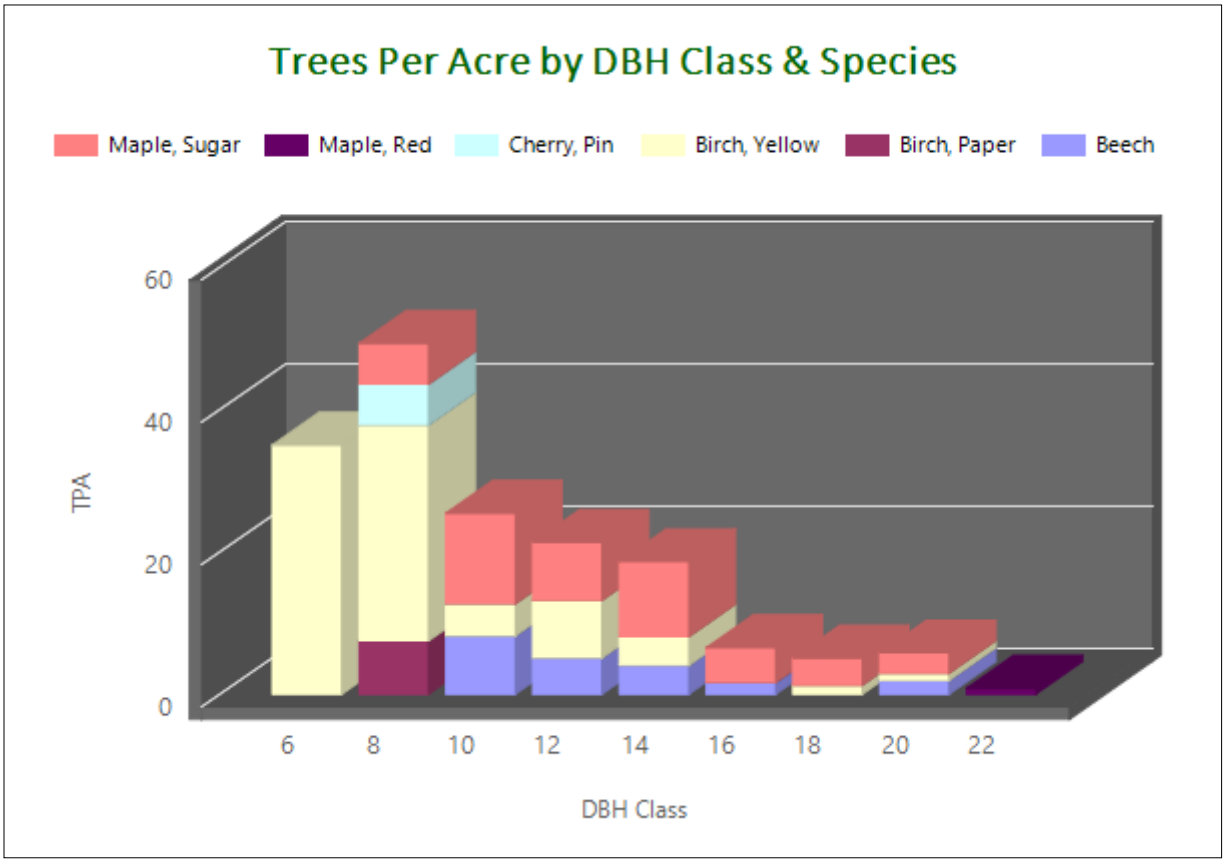
Forest Stand 2

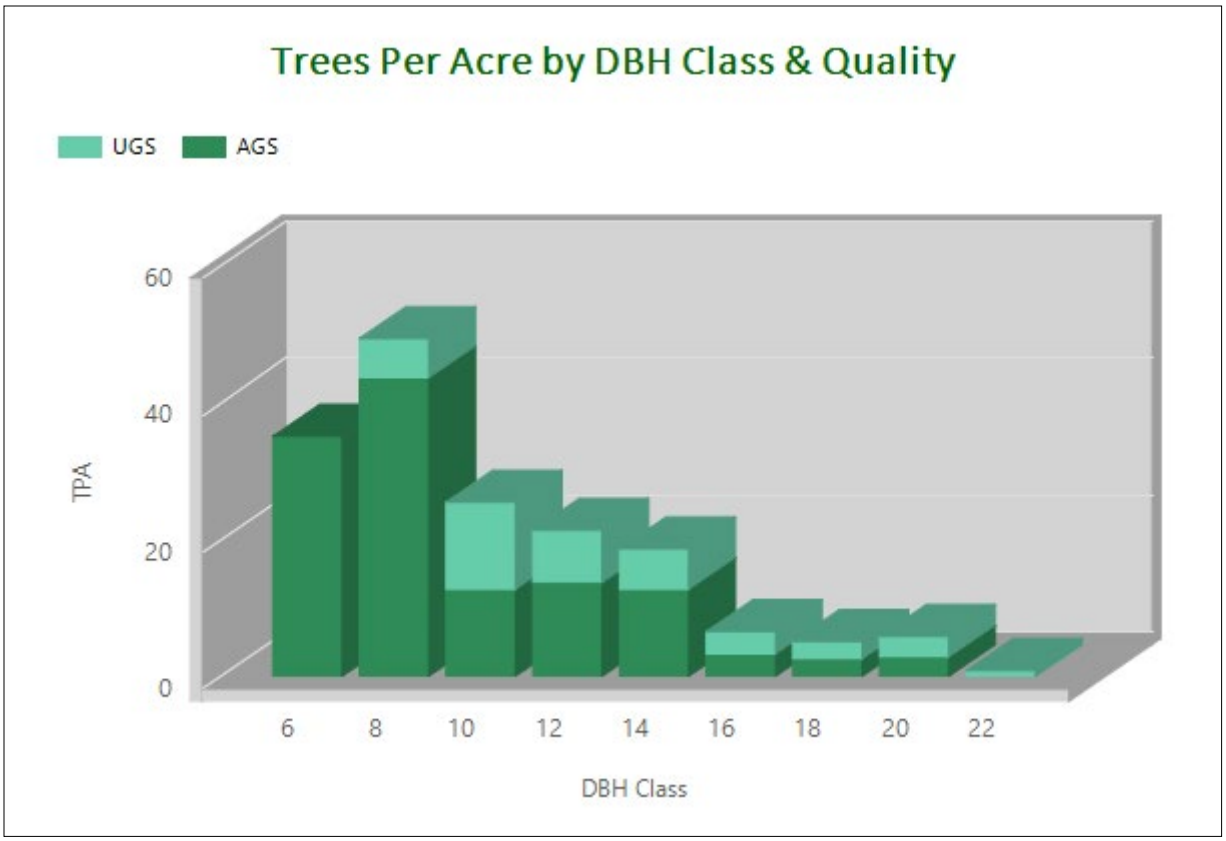
Acreage: 39.7 acres

Forest Type: *Northern Hardwood*

Composition: Sugar maple (43%), yellow birch (33%), beech (18%). Other species (6%) include red maple, paper birch, and pin cherry.

Understory Composition: Beech, yellow birch, sugar maple, and red maple.





Stand Description: Stand 2 contains northern hardwoods with an overstory dominated by sugar maple, yellow birch, and beech with lesser amounts of red maple and paper birch. The understory in this area is dominated by beech with scattered yellow birch, red maple, and sugar maple. There is a small, man-made pond located in the west-central portion of this stand, and two small streams bisect the area, draining north to the Lamoille River. This stand is situated in the westernmost portion of the property. The terrain is undulating with a generally northern aspect.

Regeneration: Adequate; beech, yellow birch, red maple and sugar maple seedlings and saplings are present in the understory. Scattered hobblebush is also present.

Age Structure: Even-aged

Size Class: poles to medium sawtimber

Stocking: Well-stocked, between the B-line and the A-line on the hardwood stocking guide.

Total Basal Area/acre: 98ft^2

AGS Basal Area/acre: 62ft^2

Quadratic Mean Stand Diameter: 10.34

Trees Per Acre: 168

Approximate Stand Age: variable; overstory stems are approximately 80-100+ years.

Stand Health: No significant forest health issues were observed. Beech bark disease is prevalent in the beech component. Historical browsing by deer has likely been a factor driving the predominance of beech saplings in the understory, due to preferential browsing on more desirable species such as sugar maple, white ash, and yellow birch by these voracious ungulates. Approximately 34 snags per acre are present in this stand, 39% of which are 12-16" in diameter.

Invasive Species: No non-native, invasive species were noted in this stand during the present inventory.

Site Index: 55 for yellow birch by soils

History/Previous Activity: Similarly to much of the land in Vermont, this area reverted to forest following the abandonment of farming activity in the 1940s to 1950s. The forest was thinned in the late 1990s to early 2000s by a previous owner, and poor-quality hardwoods were removed for firewood by a neighbor around 2009.

Silvicultural Management Objectives: Although this stand is currently even-aged, going forward it will be managed for the development of multiple age classes, increasing the structural diversity and resilience of the forest to changing climate conditions over time. Per recommendations by VT Dam Safety Engineers, the man-made pond within this stand will need to be maintained to ensure its continued structural integrity. Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: Stocking levels in this stand are not critically high and current stand conditions do not warrant commercial forest management activities. This area will benefit from being allowed to grow and continue to develop for the next 10 years. At the time of the next forest management plan update, evaluate opportunities for improving overall stand quality, wildlife habitat, forest health and resilience to climate change through improvement work such as crop tree release, crop tree release with canopy gap establishment, or group selection, focusing on providing more growing space to disease-free, well-formed, vigorous trees of a diversity of species and creating small openings in the forest canopy to encourage establishment and growth of a younger age class of trees. The more diverse a forest is in species and size classes, the more resilient it will be when facing the uncertainties associated with a changing climate. Trees that are cut while carrying out forest stand improvement work could be left on the forest floor to contribute to coarse woody material. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to live their biological lifespans.

Maintenance work associated with the man-made pond within this stand will require that trees and shrubs be removed from the earthen dam to ensure structural integrity and to prevent long-term damage. This work has been recommended by a VT Dam Safety Engineer and will be important to complete within this management period.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing brush and debris, and managing impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

Forest Stand 3

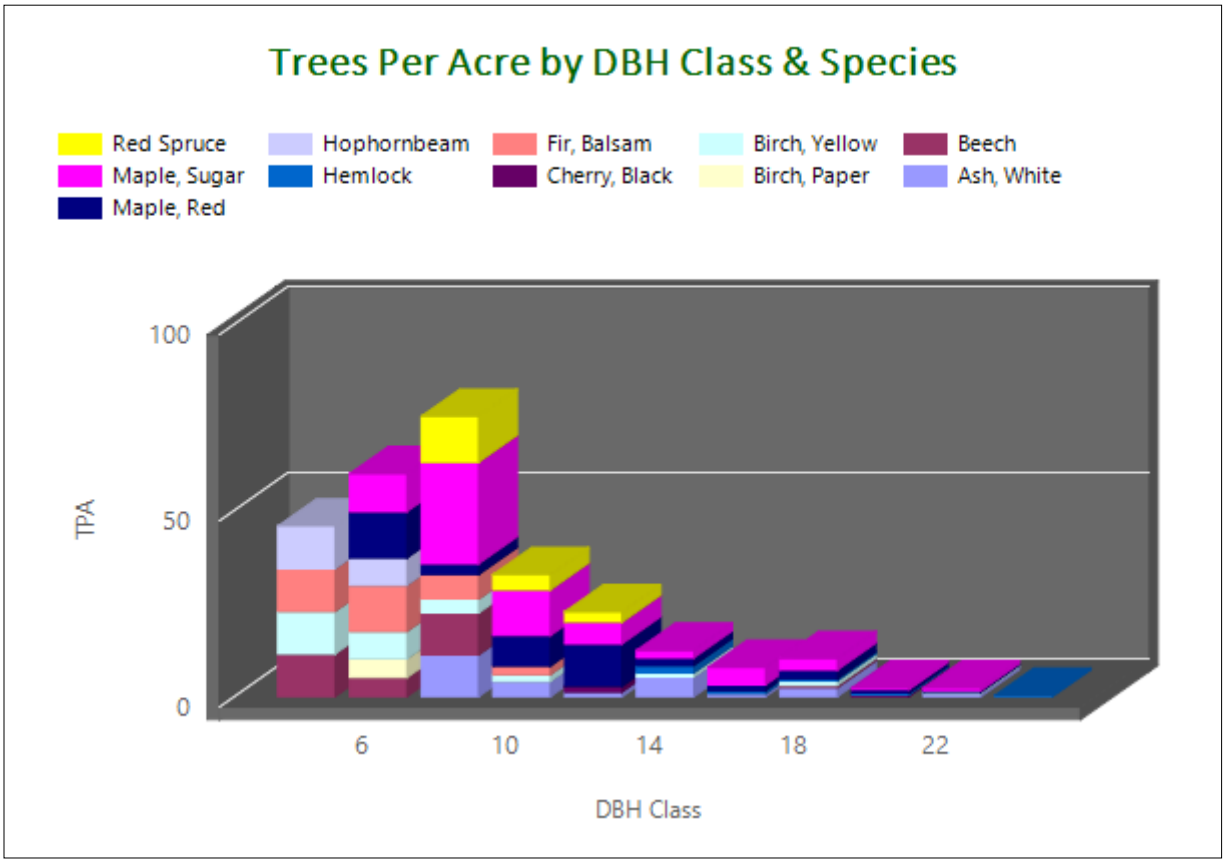
Reserve Forestland to be Managed for Old Forest Characteristics

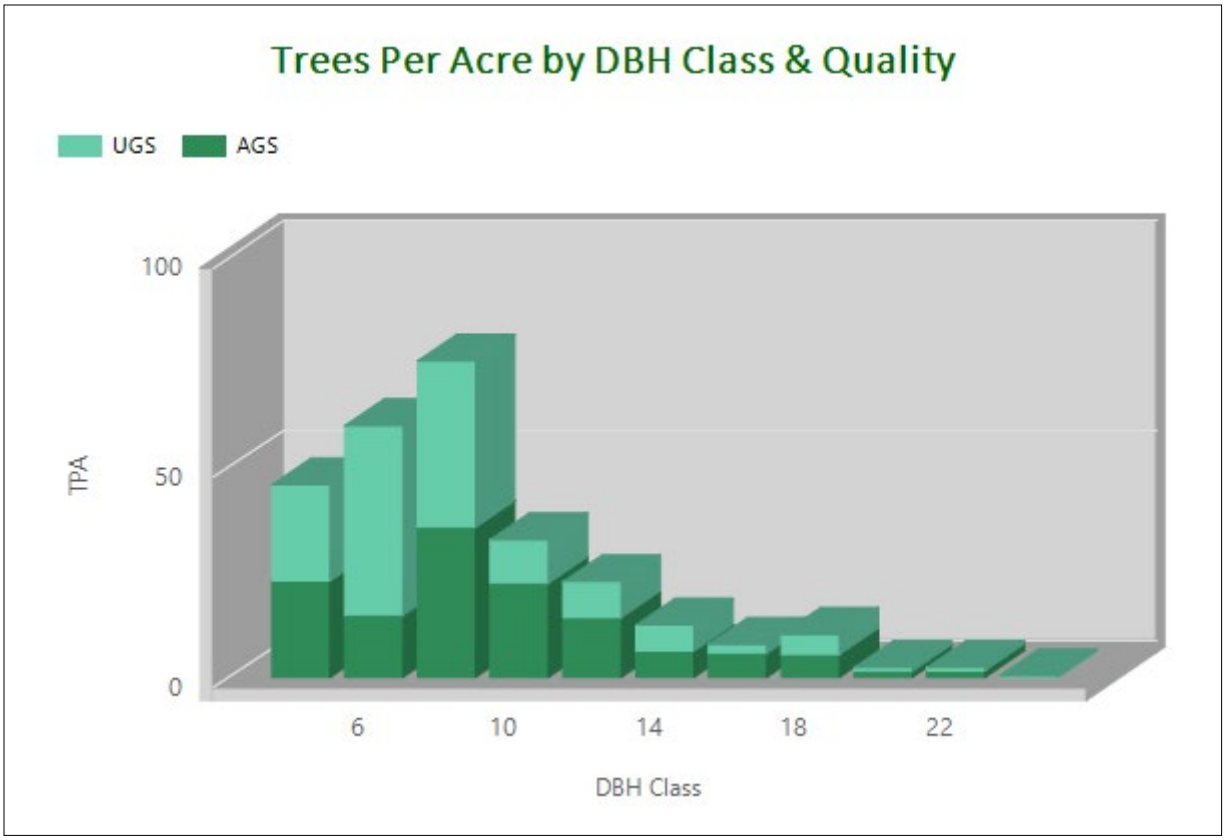
Acreage: 71.9 acres

Forest Type: *Mixed northern hardwoods and softwoods*

Composition: Sugar maple (30%), red maple (22%), white ash (15%), red spruce (7%), yellow birch (7%), beech (5%), hemlock (5%), balsam fir (5%). Other species (4%) include black cherry, paper birch, and hophornbeam.

Understory Composition: Beech, sugar maple, yellow birch and red maple seedlings and saplings with more scattered red spruce, hemlock, and balsam fir small saplings. Hobblebush is also present.





Stand Description: Stand 3 is a diverse mix of northern hardwoods with hemlock, red spruce, and balsam fir as associates with an understory composed of beech, yellow birch, sugar maple, hophornbeam and red spruce saplings with more scattered hemlock and balsam fir. Located in the easternmost portion of the property west of the Elmore Branch, the terrain in this area can generally be described as somewhat rugged, with steep ravines and otherwise undulating ground. Aspect in this stand is variable, with slopes facing north, south and west. A **Temperate Acidic Cliff, a State Significant Natural Community** was identified in this area during the Rapid Ecological Assessment. Atop the cliff is a small area of **Uncommon Red Spruce-Heath Rocky Ridge**, the overstory of which is dominated by densely growing red spruce with a patchy understory of blueberry, bracken fern, and a widespread carpet of moss. Interestingly, this area also has deep organic soils – ~2 feet deep, a depth normally only associated with wetlands.

Regeneration: Adequate; sugar maple, yellow birch, beech and red spruce seedlings and saplings are relatively abundant with more pockets of hemlock, red spruce, and balsam fir.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Fully stocked, approaching the A-line on the hardwood stocking guide.

Total Basal Area/acre: 119ft^2

AGS Basal Area/acre: 64ft^2

Quadratic Mean Stand Diameter: 8.95

Trees Per Acre: 272

Approximate Stand Age: variable; overstory trees are approximately 70-100+ years.

Stand Health: No atypical or significant forest health issues were observed. Beech bark disease and balsam woolly adelgid are present though not at alarming or unusual levels and have likely contributed to dieback in the beech and balsam fir components.

Invasive Species: No non-native, invasive species were observed in this area during the present inventory.

Site Index: 55 for yellow birch by soils

History/Previous Activity: Prior to more recent harvesting within the past 15 years, no activity had occurred in this stand since the 1990s. Approximately 10 years ago a single-tree selection harvest was carried out in portions of this area focusing on removal of diseased hardwoods, hardwoods with poor crowns, and mature or declining stems of both hardwoods and softwoods.

Silvicultural Management Objectives: Over time, allow this even-aged stand to develop uneven-aged and old forest conditions. Protection of the unique features of the Temperate Acidic Cliff and the Red Spruce-Heath Rocky Ridge are of utmost importance. Due to the presence of these rare and uncommon features, a 2-acre Ecological Protection Zone (EPZ; see Forest Stand Map) surrounding the Temperate Acidic Cliff and Red Spruce-Heath Rocky Ridge has been designated where strict limitations to access will be upheld to protect these unique and uncommon features. A passive management strategy will be employed in this area to allow the natural, low-intensity disturbance regime to unfold within this Natural Community. Monitoring the 2-acre EPZ should occur to ensure detection and control/removal of non-native, invasive plants, should they be found in the area. The remainder of the stand will be set aside as a reserve area where ecological forest management and in places, passive forest management, will be the strategy for accumulating old forest characteristics. Time and natural disturbances will enhance and foster the development of old forest characteristics in the stand while continuing to sequester and store carbon and provide habitat for wildlife dependent upon secluded areas with little or no human disturbance. It will be important to monitor the area for the presence of non-native, invasive plants to protect its integrity. Non-native, invasive plants can outcompete native plants, reduce biodiversity, degrade wildlife habitat, and forever change the character and composition of the forest. It will also be important to ensure that human disturbance in this area is kept to a minimum by closing any existing trails in the EPZ and routing new trails away from sensitive sites.

Silvicultural Prescription: Silvicultural activities in this stand will be focused on ecological forest management, and in the EPZ, passive forest management with the exception of monitoring for and removal of non-native, invasive plants. As with any passive management strategies, it will be important to monitor the area for the presence of non-native invasive plants to prevent their establishment or spread, and to ensure that human-caused disturbances to this area are kept to a minimum and limited to those areas that have been designated and demarcated for recreation in the stand. This strategy will allow natural disturbances to unfold within the sensitive EPZ and provide time for the accumulation of old forest characteristics such as the presence of big, old trees, young trees, standing dead trees (snags), coarse woody material in the form of fallen trees and branches on the forest floor. Over time, the area will also boast a diversity of species and age classes, a patchy forest structure including areas dense with trees and areas with canopy gaps where lots of light is reaching the forest floor, as well as an abundance of mosses and lichens.

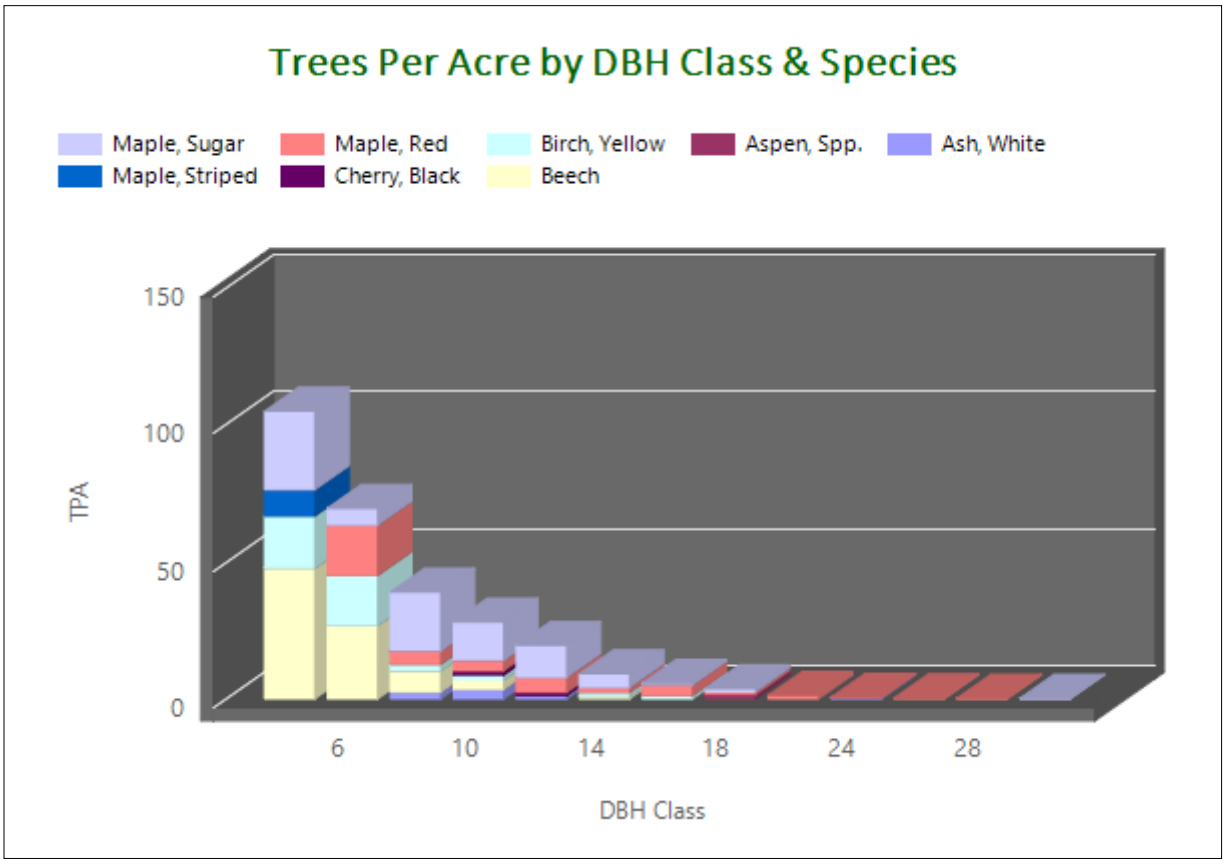
Forest Stand 4

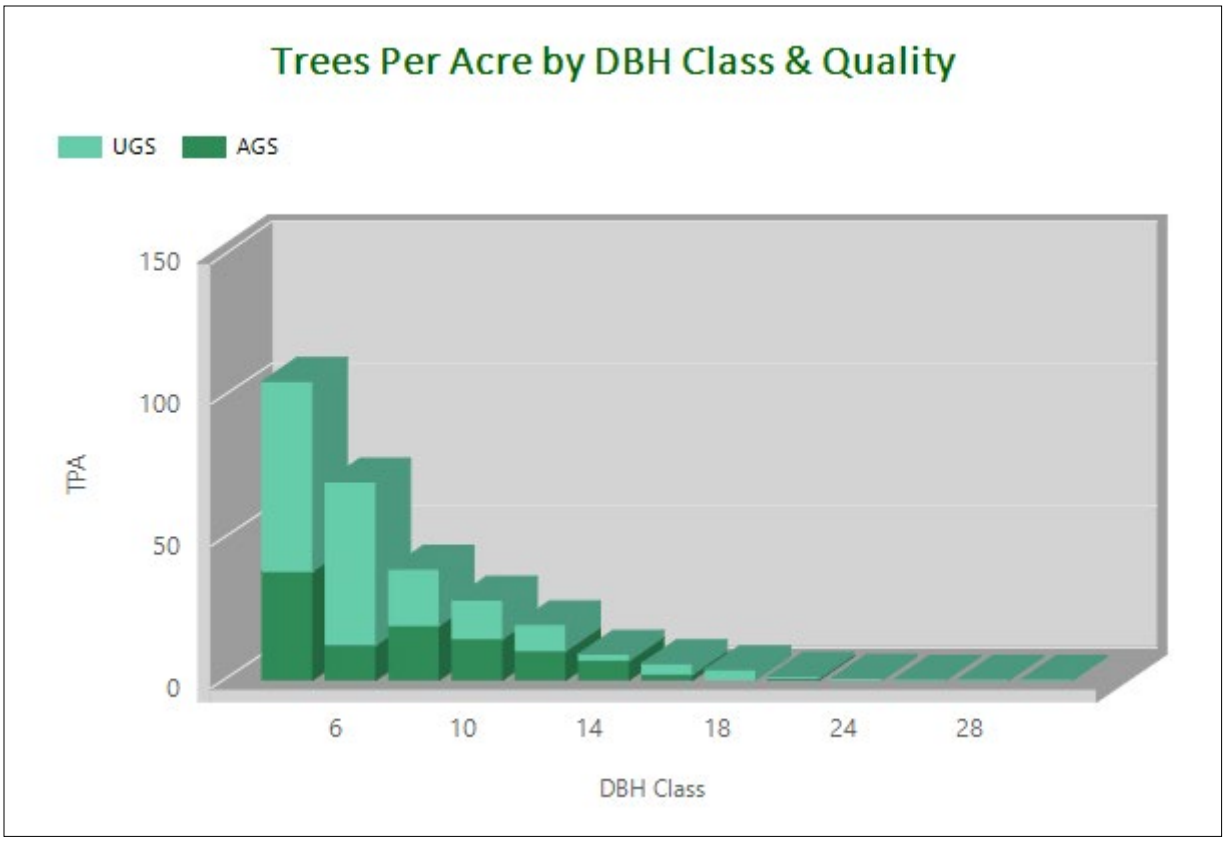
Acreage: 89.1 acres

Forest Type: *Northern hardwood*

Composition: Sugar maple (38%), red maple (26%), beech (15%), yellow birch (10%), white ash (5%), aspen (3%). Other species tallied (3%) include black cherry, and striped maple.

Understory Composition: Beech, yellow birch, and red spruce saplings are the main understory inhabitants. Hobblebush and striped maple are also present.





Stand Description: This northern hardwood stand is dominated by sugar maple and red maple stems with yellow birch, white ash, and black cherry in lesser amounts. Beech in this stand (as is common elsewhere on the property) is ridden with beech bark disease. The 1998 ice storm wreaked havoc on some overstory stems in this stand located at higher elevations, as evidenced by broken tops and poor crowns, and as reflected in the low percentage of AGS in relation to total basal area. The terrain is undulating, with some steeper slopes in the southern portion of the stand and gentler terrain near the western boundary. Aspect is variable, with slopes facing north, south, and west. A small stream originates in the east-central portion of the area and drains southwest into Whitcomb Brook.

Regeneration: Adequate; dominated by beech saplings which will inevitably be overtaken by beech bark disease; however, a promising amount of red spruce, yellow birch, and sugar maple saplings and small poles are also present. Hobblebush and striped maple were also noted.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Well-stocked; about halfway between the B-line and the A-line on the hardwood stocking guide.

Total Basal Area/acre: 89ft^2

AGS Basal Area/acre: 36ft^2

Quadratic Mean Stand Diameter: 7.62

Trees Per Acre: 282

Approximate Stand Age: 80 years

Stand Health: No significant or unusual forest health concerns were identified during the inventory.

Invasive Species: No non-native, invasive species were observed in this area during the present inventory.

Site Index: 52 for sugar maple by soils

History/Previous Activity: Portions of this stand were logged in the 1990s and focused on removal of mature hardwoods. A small portion of the stand was logged more recently, without the previous owners' knowledge or consent. More recently, a portion of this stand was harvested using a single-tree selection system focusing on removal of poor-quality stems of all species and sizes.

Silvicultural Management Objectives: Over time, this forest will be managed to develop as a multi-aged forest. Future management activities should strive to perpetuate long-lived species such as sugar maple, yellow birch, and red spruce in this stand. Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: No silvicultural treatment is recommended in this stand at this time. Stocking levels do not warrant activity and the forest will benefit from being allowed to grow for this management period. At the time of the next forest management plan update, explore opportunities to increase the diversity and resilience of this stand through careful ecological forest management activities. This could include carrying out crop or mast tree release to increase the growth rate of healthy young trees of a diversity of species, including mast-producing trees such as black cherry which provide a food source for wildlife. Forest stand improvement work could be carried out to increase the percentage of healthy, vigorous trees while discriminating against diseased or declining stems. Trees that are cut while carrying out forest stand improvement work could be left on the forest floor to contribute to coarse woody material. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to live their biological lifespans.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing brush and debris, and managing the impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

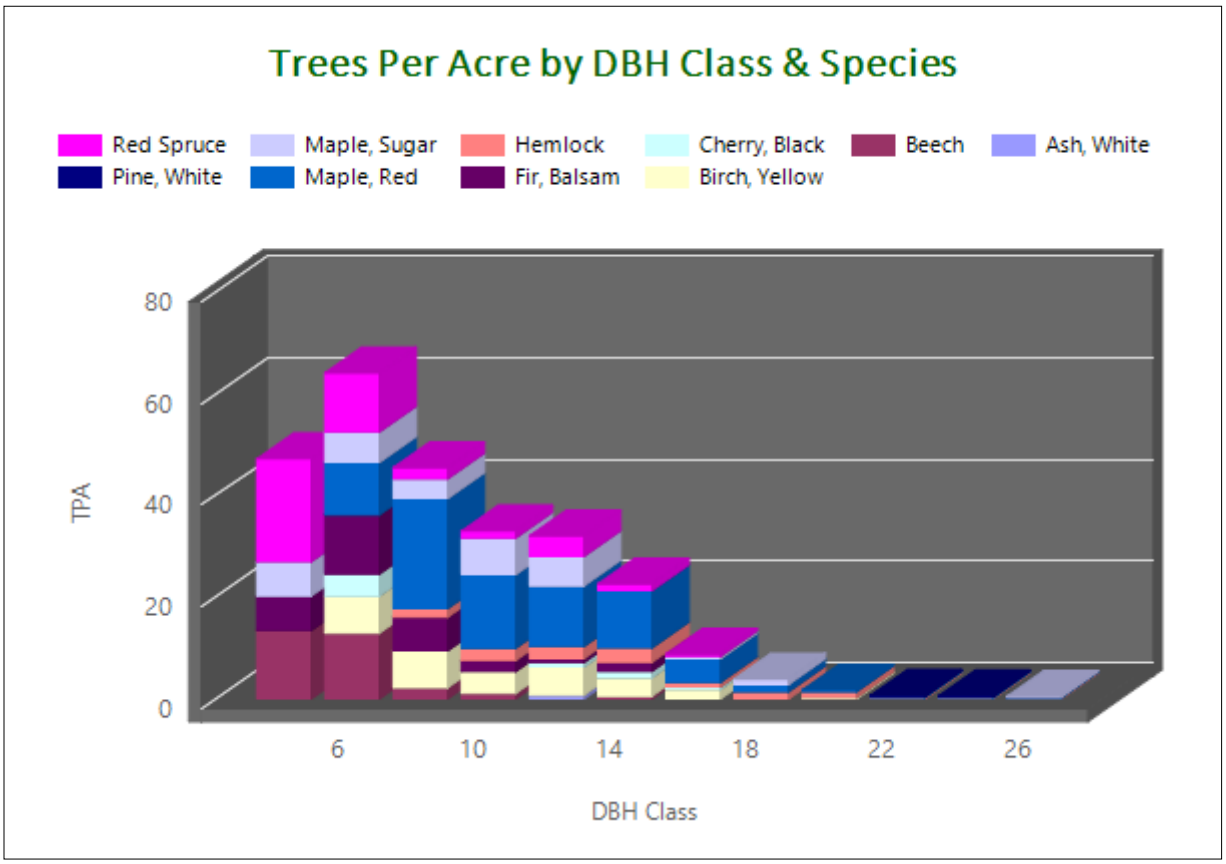
Forest Stand 5

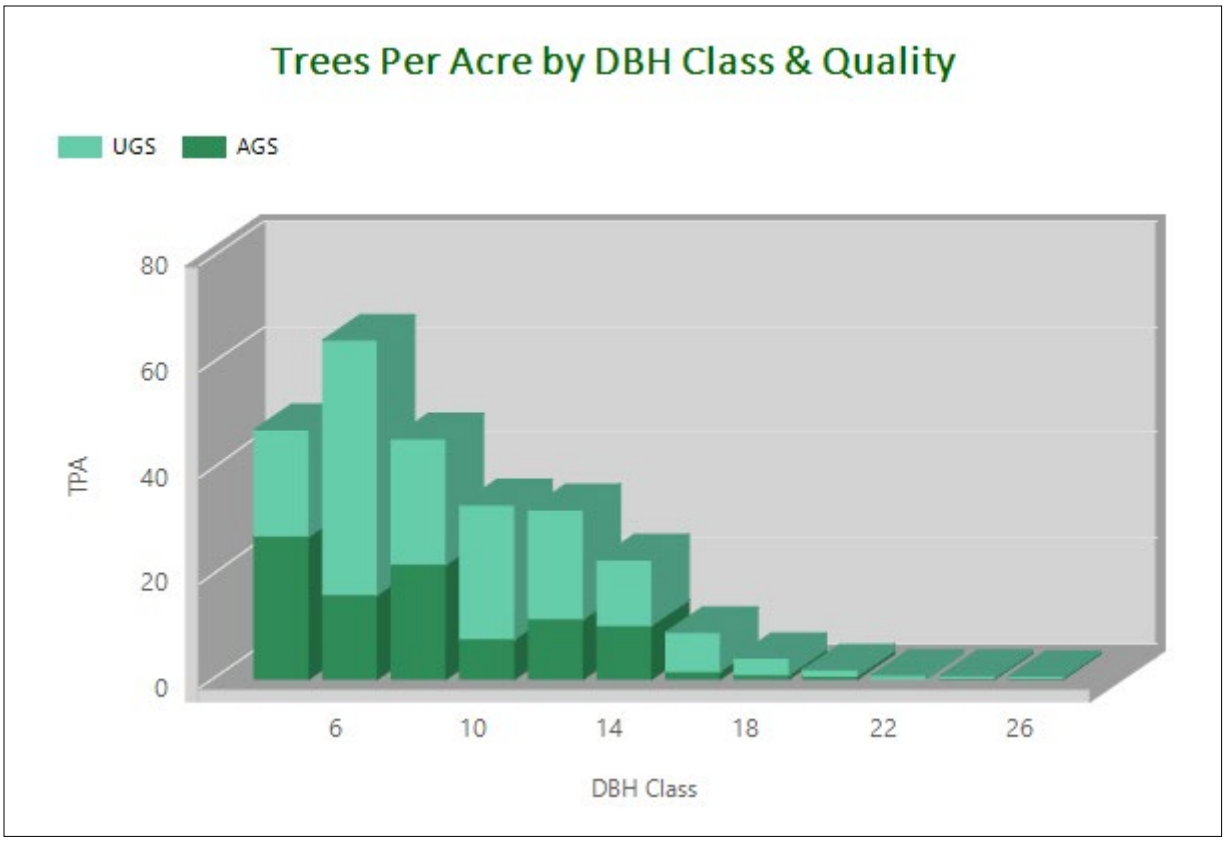
Acreage: 151.6 acres

Forest Type: *Mixed northern hardwoods and softwoods*

Composition: Red maple (39%), yellow birch (14%), hemlock (12%), sugar maple (12%), red spruce (8%), balsam fir (7%), beech (4%). Other species tallied (4%) include black cherry, white pine, and white ash.

Understory Composition: Red spruce and balsam fir saplings are the dominant regeneration in this stand. Scattered hemlock, beech, white ash, sugar maple, yellow birch and striped maple seedlings and saplings are also present.





Stand Description: This mixed composition stand is bisected by Whitcomb Brook, along the banks and slopes of which are denser amounts of softwoods. There are pockets of well-established red spruce and balsam fir saplings as well as areas where regeneration is generally lacking. Stem quality in this stand is variable; areas underlain by deeper, better-quality soils tend to have better quality stems such as sugar maple and yellow birch. The shallower soils on ridgetops in this stand tend to have more marginal overstory stems and a higher amount of beech and hemlock. Terrain is variable with slopes facing all aspects. A single-track recreation trail is planned to be built in the eastern portion of this stand, along the eastern edge of the field and above/to the northwest of the open land / riparian area of East Elmore Brook (see conceptual trail map on page 10 of this report).

Regeneration: Variable; dense pockets of red spruce and balsam fir saplings and poles, and scattered yellow birch, sugar maple and white ash saplings are present in some areas while in other areas regeneration is somewhat sparse and made up predominantly of striped maple, hobblebush and beech.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Well-stocked; close to the B-line on the mixedwood stocking guide.

Total Basal Area/acre: 116ft^2

AGS Basal Area/acre: 39ft^2

Quadratic Mean Stand Diameter: 9.03

Trees Per Acre: 261

Approximate Stand Age: 70-80+ years

Stand Health: No significant forest health issues were observed or noted during present inventory.

Invasive Species: No non-native, invasive species were noted during the present inventory.

Site Index: 50 for maple by soils

History/Previous Activity: Old stumps in the area indicate harvesting occurred around the 1990s.

Silvicultural Management Objectives: Over time, manage this forest to develop multi-age conditions. Any future management should strive to retain, encourage and enhance a diversity of age classes and species. Forest management activities in this area will complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand. The riparian area surrounding the stream which bisects this stand will be protected and appropriately buffered during any future management activities.

Silvicultural Prescription: No silvicultural activities are prescribed at this time. Allow this stand to continue to grow for this management period. At the time of the next forest management plan update, explore opportunities to increase the diversity and resilience of this stand through careful ecological forest management activities. This could include carrying out crop or mast tree release to increase the growth rate of healthy young trees of a diversity of species, including mast-producing trees such as black cherry which provide a food source for wildlife. Forest stand improvement work could be carried out to increase the percentage of healthy, vigorous trees while discriminating against diseased or declining stems. Trees that are cut while carrying out forest stand improvement work could be left on the forest floor to contribute to coarse woody material. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to live their biological lifespans.

The single-track trail that is going to be developed in the eastern portion of this stand around the perimeter of and along the east side of the open field may require some vegetative maintenance. This work will be limited to the cutting of sapling-sized stems in the trail corridor and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed. This light-touch strategy will allow for carbon sequestration and storage to continue. Monitor the area for the presence of non-native, invasive plants as these plants often originate in open areas and spread outwards.

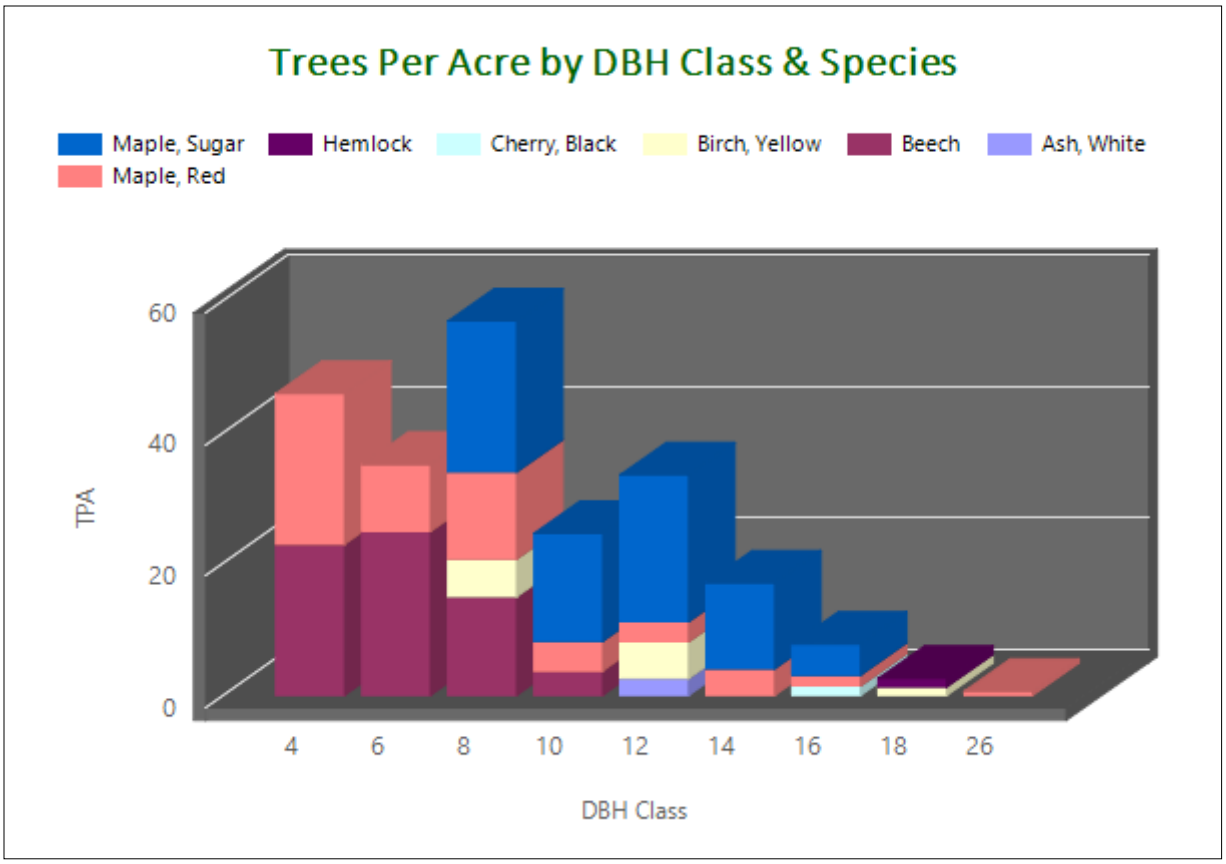
Forest Stand 6

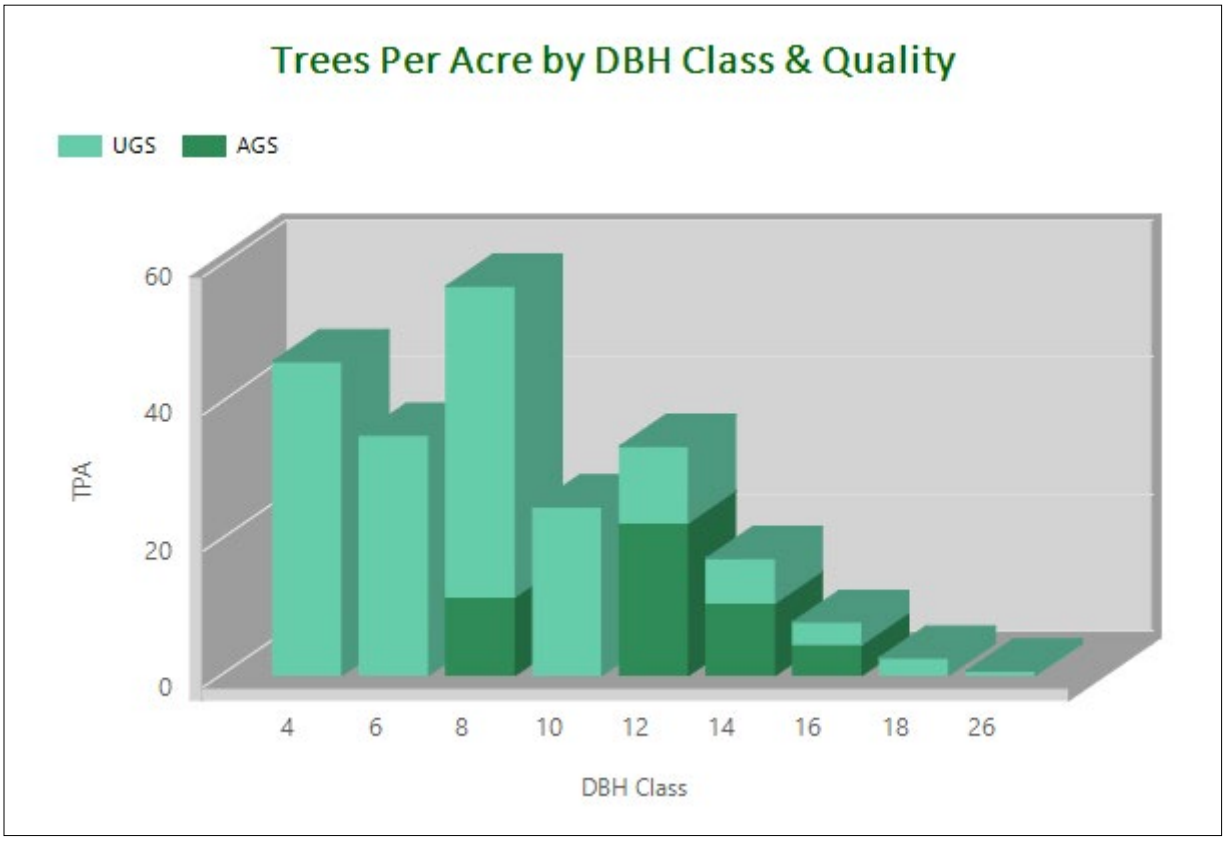
Acreage: 46 acres

Forest Type: *Northern hardwood*

Composition: Sugar maple (52%), red maple (21%), beech (13%), yellow birch (8%). Associates (6%) include white ash, black cherry, and hemlock.

Understory Composition: Sugar maple, yellow birch, beech, red spruce, balsam fir saplings and poles.


Trees Per Acre by DBH Class & Species
Maple, Sugar
Hemlock
Cherry, Black
Birch, Yellow
Beech
Ash, White
Maple, Red
TPA
60
40
20
0
4
6
8
10
12
14
16
18
26
DBH Class


Trees Per Acre by DBH Class & Quality
UGS
AGS
TPA
60
40
20
0
4
6
8
10
12
14
16
18
26
DBH Class

Stand Description: This northern hardwood stand is located along the southwestern boundary of the property. Aspect in this area is to the north and east, and terrain is undulating. Stem quality follows topography in that better quality stems are located in areas with deeper, more enriched soils, and poorer quality stems are located along ridgetops and areas of shallower soils. Whitcomb Brook bisects the northwestern corner of this stand.

Regeneration: Sugar maple, beech, yellow birch, red spruce and balsam fir seedlings, saplings and poles all noted. Hobblebush is also present.

Age Structure: Even-aged

Size Class: poles to medium sawtimber

Stocking: Well-stocked; between the B-line and the A-line on the hardwood stocking guide.

Total Basal Area/acre: 96ft^2

AGS Basal Area/acre: 36ft^2

Quadratic Mean Stand Diameter: 8.87

Trees Per Acre: 224

Approximate Stand Age: 70-80 years

Stand Health: No significant forest health issues were noted during the present inventory.

Invasive Species: No non-native, invasive species were identified in this stand during the field work.

Site Index: 52 for sugar maple by soils

History/Previous Activity: No recent activity. Previous harvesting likely occurred in the 1990s as evidenced by the presence of old, decaying stumps.

Silvicultural Management Objectives: Over time, convert this even-aged stand to develop multi-age conditions. Any future management activities should strive to increase the percentage and species diversity of high-quality, well-formed, healthy trees, and to establish new age classes of trees. Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting and natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: Opportunities exist to improve this stand's resilience to climate change through ecological forest management activities which strive to establish a diversity of tree species and to maintain and manage for a range of age classes. This can be accomplished by creating openings in the forest canopy to encourage shade-intolerant species to establish and by removing competing trees around the healthiest trees of a diversity of species outside of canopy gaps. Structural diversity is an important wildlife habitat feature that is lacking in many of our even-aged forests in Vermont. Ecological forestry techniques can help to enhance structural diversity by retaining large, older trees and creating canopy openings to regenerate new trees. A patchwork of conditions is ideal – areas with young trees growing in canopy gaps, dense areas of softwoods, large, old trees, snags, and coarse woody material on the forest floor all contribute to a structurally diverse forest condition and contribute to carbon sequestration and storage. Trees that are cut while carrying out forest stand improvement work could be left on the forest floor to contribute to coarse woody material. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to

live their biological lifespans. Any forest management activities that occur in this stand during this management period should work toward a target residual basal area 65ft^2-75ft^2/acre.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing brush and debris, and managing the impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

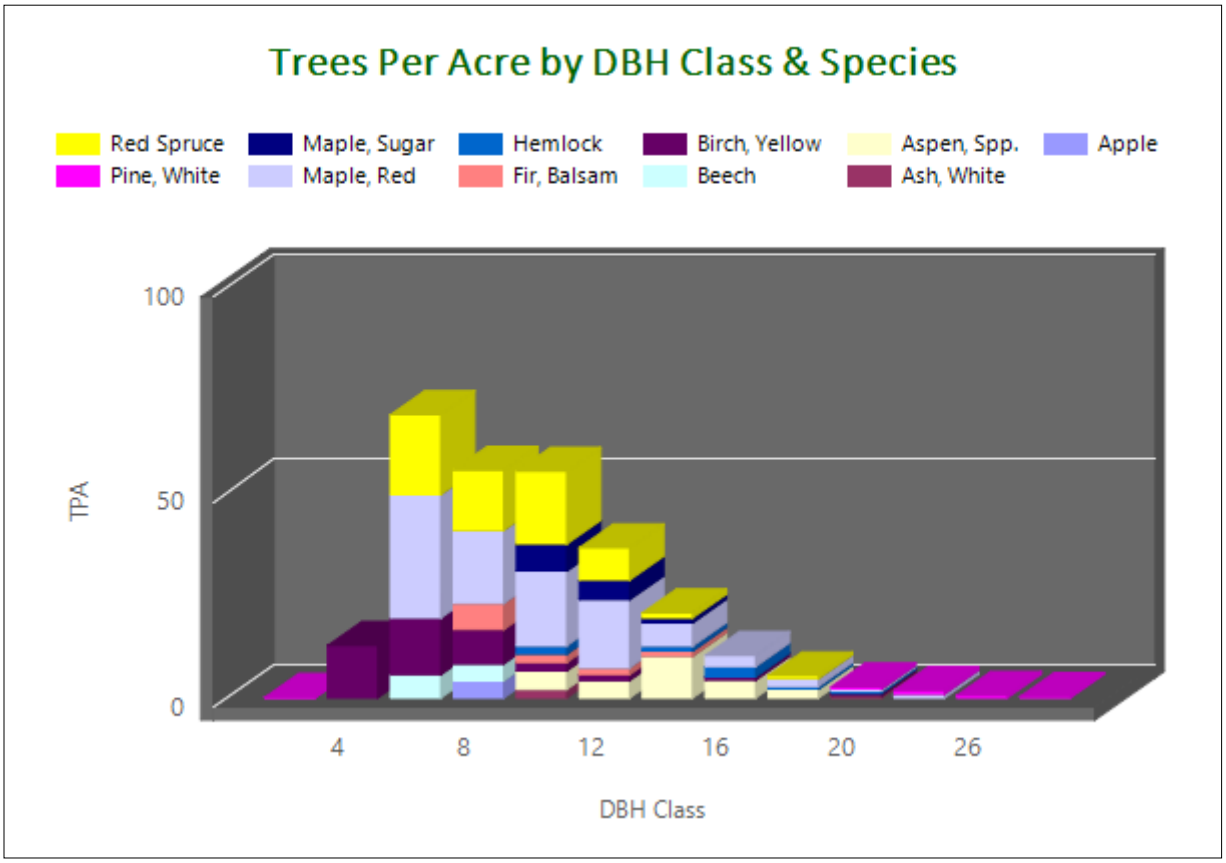
Forest Stand 7

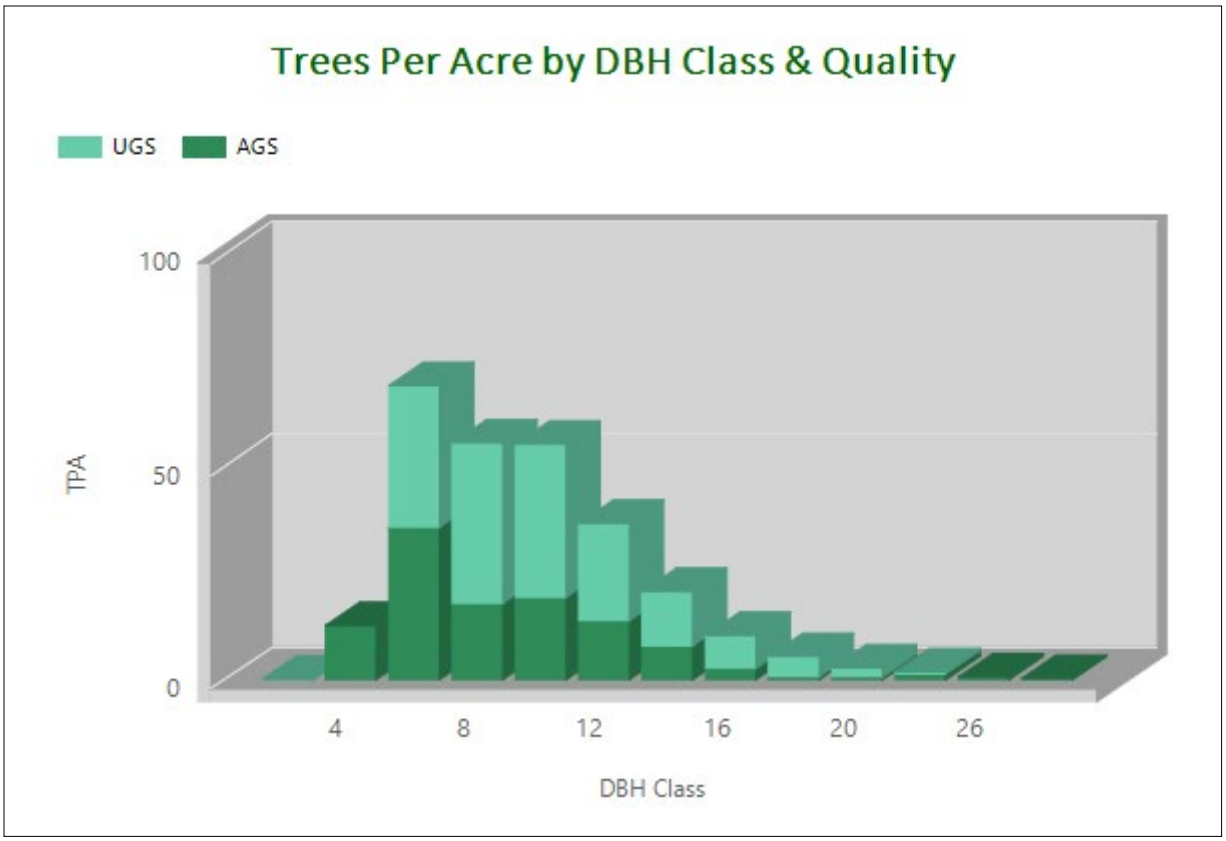
Acreage: 56.8

Forest Type: *Mixed composition northern hardwoods and softwoods*

Composition: Red maple (33%), red spruce (17%), aspen (17%), yellow birch (7%), sugar maple (6%), white pine (6%), hemlock (6%), balsam fir (4%). Associates (4%) include white ash, beech, and apple.

Understory Composition: Beech, red spruce, balsam fir, white pine, red maple and sugar maple seedlings and saplings. During the inventory, evidence of browsing by deer on desirable regeneration was observed.





Stand Description: This mixedwood stand is located in three different locations, all on the eastern side of East Elmore Road. The area is dominated by red maple, spruce-fir, and white pine stems of approximately 60 to 80 years in age. Terrain in this area is moderate and aspect is generally to the northwest. A network of recreational trails is planned to be located within this portion of the Community Forest which will wind its way in and out of each portion of this stand. A conceptual trail map is included in this report; see page 10.

Regeneration: Established; seedlings and saplings of red spruce, balsam fir, beech, red maple, white pine, white ash, sugar maple and yellow birch are fairly well-distributed throughout the understory of this stand.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Well-stocked, above the B-line on the mixed wood stocking guide.

Total Basal Area/acre: 140ft^2

AGS Basal Area/acre: 52ft^2

Quadratic Mean Stand Diameter: 9.73

Trees Per Acre: 271

Approximate Stand Age: 60-80+ years

Stand Health: No significant forest health issues were observed during the present inventory.

Invasive Species: No non-native, invasive species were observed in this area during the present inventory.

Site Index: 52 for red spruce by soils

History/Previous Activity: As with much of the rest of this property, this stand likely became established on old agricultural land. Little to no evidence of past harvesting was noted.

Silvicultural Management Objectives: As can be seen in the graph "Trees Per Acre by DBH Class and Quality" above, this stand is approaching an uneven-aged condition. Over time, this stand will be managed to encourage tree growth in a diversity of species and size classes, focused on the best quality stems, and to establish new age classes of trees. This can be accomplished using uneven-aged management techniques such as single tree selection and group selection. Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: No silvicultural activities are prescribed at this time. This stand is not critically overstocked and will benefit from being allowed to continue to grow and develop for this planning period. In the future, there may be opportunities to improve this stand's resilience to climate change through ecological forest management activities which strive to establish a diversity of tree species and to maintain and manage for a range of age classes. This can be accomplished by creating openings in the forest canopy to encourage shade-intolerant species to establish and by removing competing trees around the healthiest trees of a diversity of species outside of canopy gaps. Structural diversity is an important wildlife habitat feature that is lacking in many of our even-aged forests in Vermont. Ecological forestry techniques can help to enhance structural diversity by retaining large, older trees and creating canopy openings to regenerate new trees. A patchwork of conditions is ideal – areas with young trees growing in canopy gaps, dense areas of softwoods, large, old trees, snags, and coarse woody material on the forest floor all contribute to a structurally diverse forest condition and contribute to carbon sequestration and storage. Trees that are cut while carrying out forest management activities could be left on the forest floor to contribute to coarse woody material. Snags or trees with cavities or unique features that provide habitat for wildlife should be retained. Legacy trees could also be selected and somehow marked (with aluminum tags, for example) to reflect that they will be retained and allowed to live their biological lifespans.

The recreational trail network that is going to be developed in this area will require some vegetative maintenance. This work will be limited to the cutting of sapling-sized stems in the trail corridor and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

Forest Stand 8

Acreage: 2.9 acres

Forest Type: White pine plantation

Composition: White pine (100%)

Understory Composition: Understory regeneration is lacking in this stand, attributable to the dense overstory canopy creating low-light conditions.

Stand Description: This stand, located in the northwestern corner of the eastern portion of the property, east of East Elmore Road, is a white pine plantation that was planted approximately 50 years ago. The terrain in this area is gentle and soils are well-drained. Trees in this stand are competing for growing space and sunlight and would likely benefit from a thinning to create room for the crowns of the best quality stems to expand while removing poorer quality trees with small crowns, and to help establish desirable regeneration in the understory. Previous owners carried out pruning activities on many of the pines in this stand.

Regeneration: Inadequate; regeneration in this stand is generally lacking; however, a small amount of scattered red spruce and balsam fir seedlings were noted.

Age Structure: Even-aged

Size Class: poles to medium sawtimber

Stocking: Well-stocked; above the B-line on the stocking guide for managed, pure white pine stands.

Total Basal Area/acre: 100ft^2

AGS Basal Area/acre: 30ft^2

Quadratic Mean Stand Diameter: 10.19 inches

Trees Per Acre: 177

Approximate Stand Age: 40-50 years

Stand Health: No significant forest health issues were observed during the present inventory. A minor amount of damage to planted pine trees by white pine weevil was noted, as was a minor amount of white pine blister rust. Both of these forest pests are common in white pine stands.

Invasive Species: No non-native, invasive plants were noted in this stand during the inventory.

Site Index: 68 for white pine by soils

History/Previous Activity: As noted above, pruning of planted pines was carried out by previous owners. No evidence of past harvesting was observed.

Silvicultural Management Objectives: Manage this plantation with the goal of producing white pine sawtimber, using even-aged management techniques. This stand is presently approximately 50 years old; the rotation age for this stand is approximately 100 years. In order to maximize the potential of the best quality stems in this plantation, light thinnings should be employed around every 15 to 20 years to increase the amount of sunlight and growing space. White pine trees have potential to grow to very large sizes and are generally considered mature at diameters of at least 24 inches. Healthy white pine trees with large crowns benefit greatly from treatments that provide more growing space to their crowns.

This type of work also helps to reduce the potential for infection by white pine needlecast fungi by helping to increase airflow in their crowns by providing more space. There are a number of fungi which cause this type of malaise in eastern white pine, collectively known as White Pine Needle Disease, or WPND. Yellow needles and early needle-drop of non-roadside trees in June are indicators of disease presence. Infected needles remain asymptomatic in the first year, and the following spring they turn yellow, then brown, and eventually drop prematurely, resulting in thinner crowns. WPND is linked to the humidity and moisture levels from the previous spring. WPND does not usually kill trees outright, however, it can reduce their vigor, growth, and overall health. Infected though otherwise healthy trees typically recover from this damage.

Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas or features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: Explore opportunities for carrying out thinning work in this stand during this management period. Management activities such as thinning in this stand will provide growing space to the best quality white pine trees to allow them to grow taller, expand their crowns and increase in girth. Creating openings through removal of the poorest quality trees within this plantation will help to encourage natural regeneration of trees which, once established, will be present and eager to grow into canopy openings when the white pine trees die or are removed. Currently, the understory in this plantation is lacking, and any thinning work in the stand will increase the amount of light reaching the forest floor and initiate a regeneration response in the understory. Since white pine trees have the ability to grow to very large diameters and heights, thinning work to foster the growth and development of the best quality white pine trees in this stand will help to create an area with many large, tall trees – in essence a sort of forest cathedral where visitors can contemplate life's mysteries and wonders beneath the behemoth organisms that white pine trees can become when provided growing space and time to grow. Thinning work in this stand should aim to reduce the total basal area in this stand by approximately 10ft^2/acre, for a target residual basal area of 90ft^2/acre.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing brush and debris, and managing impact of erosion or wear in trail corridors and associated sight lines.

Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

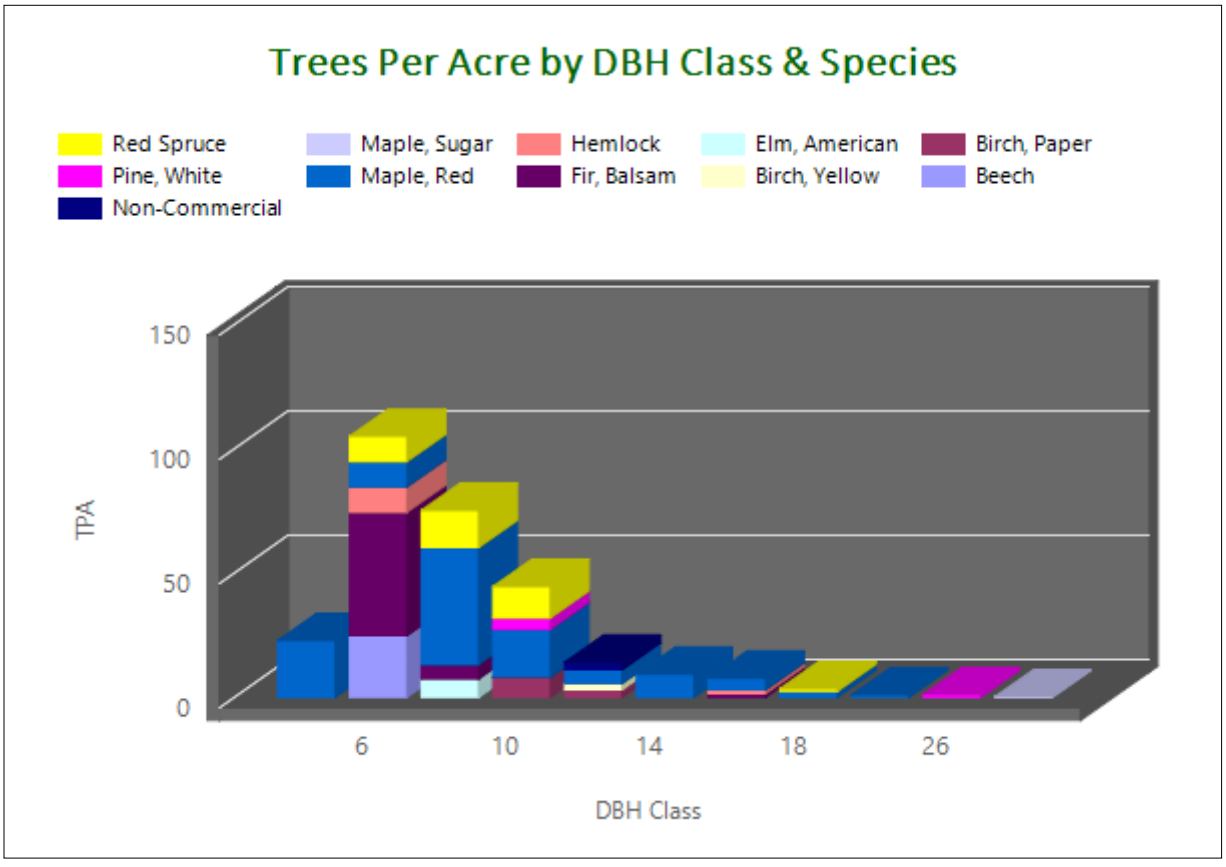
Forest Stand 9

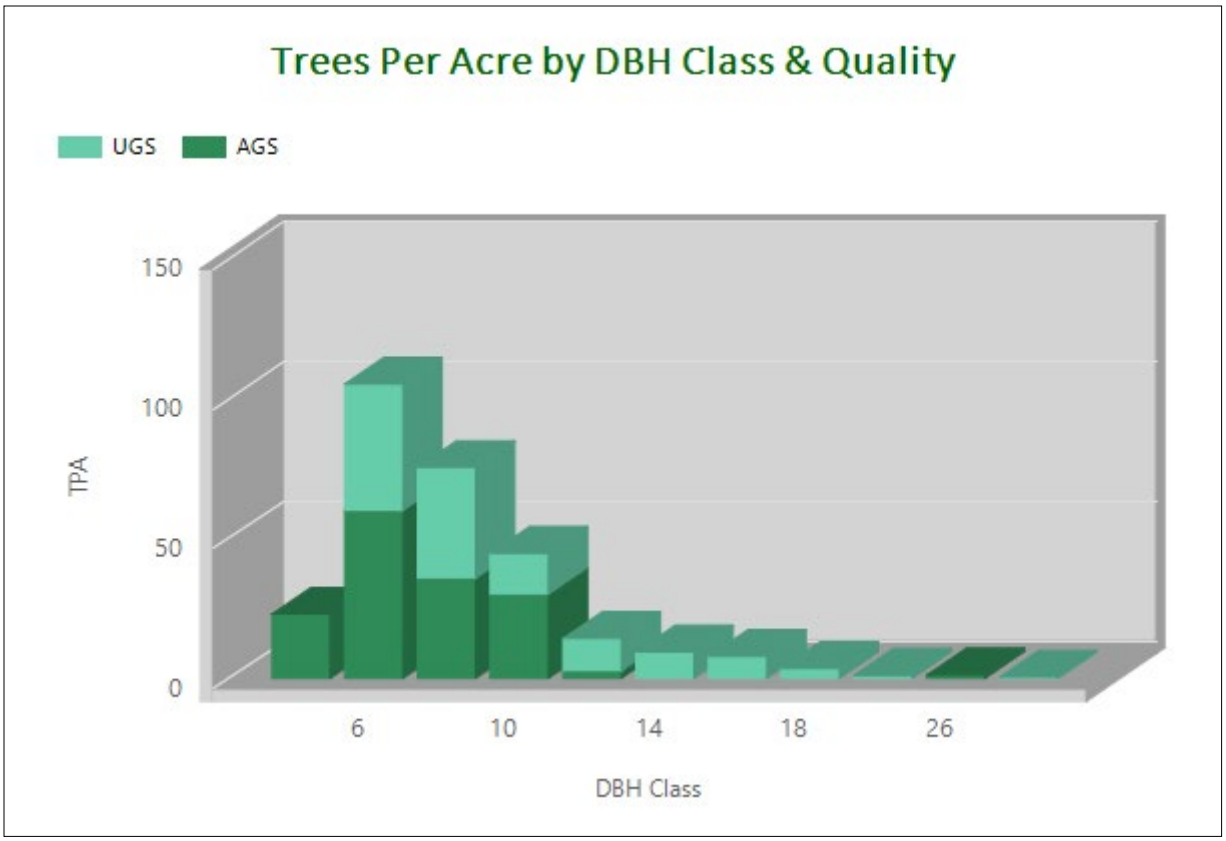
Acreage: 29.3 acres

Forest Type: *Mixed composition northern hardwoods and softwoods*

Composition: Red maple (50%), red spruce (13%), balsam fir (11%), white pine (6%), paper birch (6%), hemlock (4%), beech (4%). Associated species (6%) include yellow birch, sugar maple, striped maple, and elm.

Understory Composition: Red maple, red spruce, beech, balsam fir, striped maple and hemlock seedlings and saplings.





Stand Description: This variable, mixed composition stand is located in the northeastern corner of the property adjacent to Route 15. Portions of the stand are dominated by northern hardwoods while other areas are dominated by softwoods. Terrain in this area is moderate and aspect is generally to the north. There are approximately 15 snags per acre that are 12-16 inches in diameter.

Regeneration: Adequate; a diversity of seedlings and saplings are present in the understory of this stand including red spruce, balsam fir, hemlock, red maple, beech, and striped maple.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Well-stocked, near the B-line on the mixedwood stocking guide.

Total Basal Area/acre: 108ft^2

AGS Basal Area/acre: 42ft^2

Quadratic Mean Stand Diameter: 8.33

Trees Per Acre: 285

Approximate Stand Age: 70-80+ years

Stand Health: No significant or unusual forest health issues were noted during the inventory.

Invasive Species: Two **mature, non-native, honeysuckle shrubs** were observed in this area during the inventory. These mature, fruit bearing bushes should be removed from this area as soon as possible. Honeysuckle plants can be uprooted, though it is difficult to pull out the entire root system of an established shrub. Another option is to cut the shrub down and subsequently return to the site to mow any regrowth for the next few years to deplete carbohydrate stores in the root system and eventually kill the plant. Targeted herbicide treatment is another option; the cut stump method would likely be

employed. Cut stump treatments involve cutting down the invasive plant and treating the stump with an herbicide. A very small amount of herbicide is needed for this type of treatment, and it is highly effective at killing the target plant. The Lamoille County Forester is available with more information and options/suggestions for management of these plants. Another good resource is www.vtinvasives.org

Site Index: 52 for red maple by soils

History/Previous Activity: As evidenced by old stumps, some harvesting activities occurred in this stand approximately 30 years ago.

Silvicultural Management Objectives: Manage this stand for the development of multiple age classes. Due to the land-use history, current stand conditions have limited structural diversity, and the forest is even-aged. Any future management activities will encourage a diversity of species and size classes of trees and strive to establish new cohorts of young trees.

Forest management activities may occur in this stand to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: Stocking in this stand is not critically high. Allow this stand to continue to grow for this management period. Plan to remove the honeysuckle plant(s) in this stand as soon as is feasible. The Lamoille County Forester is available to assist.

Work related to recreational opportunities will be limited to the cutting of sapling-sized stems, clearing brush and debris, and managing impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

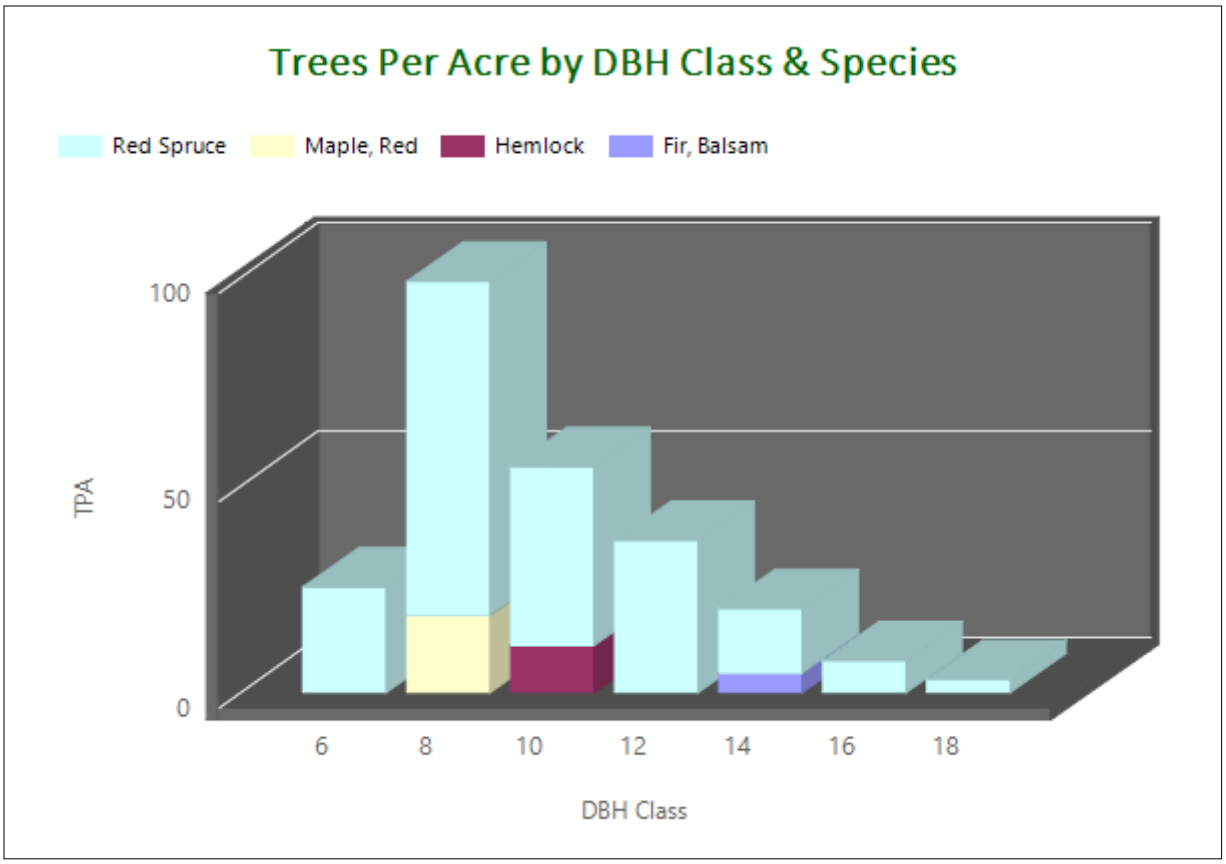
Forest Stand 10

Acreage: 21.5 acres

Forest Type: *Spruce-fir*

Composition: Red spruce (88%), balsam fir (4%), hemlock (4%), and red maple (4%).

Understory Composition: Well-established seedlings and saplings of red spruce, balsam fir, hemlock and white pine.


Trees Per Acre by DBH Class & Species
Red Spruce
Maple, Red
Hemlock
Fir, Balsam
100
50
0
TPA
6
8
10
12
14
16
18
DBH Class

Trees Per Acre by DBH Class & Quality
UGS
AGS
100
50
0
TPA
6
8
10
12
14
16
18
DBH Class

Stand Description: This spruce-fir stand is located in the eastern portion of the property. Aspect is westerly and slopes are moderate. This area is dominated by good quality red spruce stems with smaller pockets of balsam fir. Portions of this stand have been affected by windthrow in the past, though the majority of trees in this area are of good quality and are considered AGS. Approximately 9 snags per acre are present in this stand, all 12 inches and smaller. A recreational trail is planned to be built along the western edge of this stand (see conceptual trail map on page 10).

Regeneration: Established; red spruce and balsam fir seedlings and saplings are well-distributed in the understory.

Age Structure: Even-aged

Size Class: poles to medium sawtimber

Stocking: Well-stocked, above the B-line on the spruce-fir stocking guide.

Total Basal Area/acre: 120ft^2

AGS Basal Area/acre: 105ft^2

Quadratic Mean Stand Diameter: 9.44 inches

Trees Per Acre: 247

Approximate Stand Age: 70-80 years

Stand Health: No significant forest health issues were noted during the present inventory. There is evidence of some windthrow in this stand, though not at an alarming level.

Invasive Species: No non-native, invasive plants were observed in this stand.

Site Index: 52 for red spruce by soils

History/Previous Activity: No evidence of previous activity was observed in this stand.

Silvicultural Management Objectives: Using uneven-aged management techniques, convert this stand to a multi-age condition. Any management activities that occur in this area will strive to retain and enhance a diversity of tree species and age classes and encourage regeneration of new age classes of trees.

Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas and features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: No silvicultural activities are prescribed in this area at this time. Current stocking of trees is not critically high; allow the stand to continue to develop for the next 10-year period. The recreational trail that is going to be developed in a portion of this stand will likely require some vegetative maintenance. This work will be limited to the cutting of sapling-sized stems in the trail corridor, clearing brush and debris, and managing impact of erosion or wear in trail corridors and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

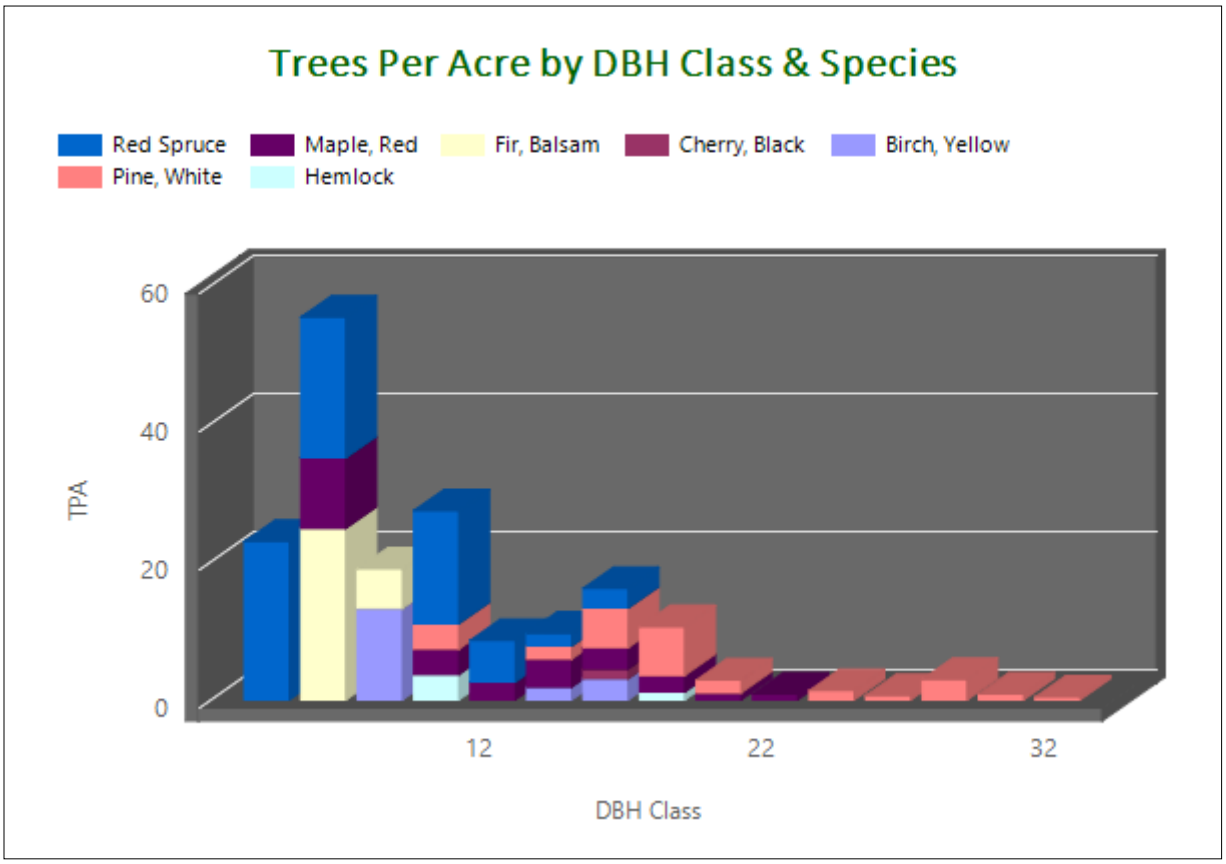
Forest Stand 11

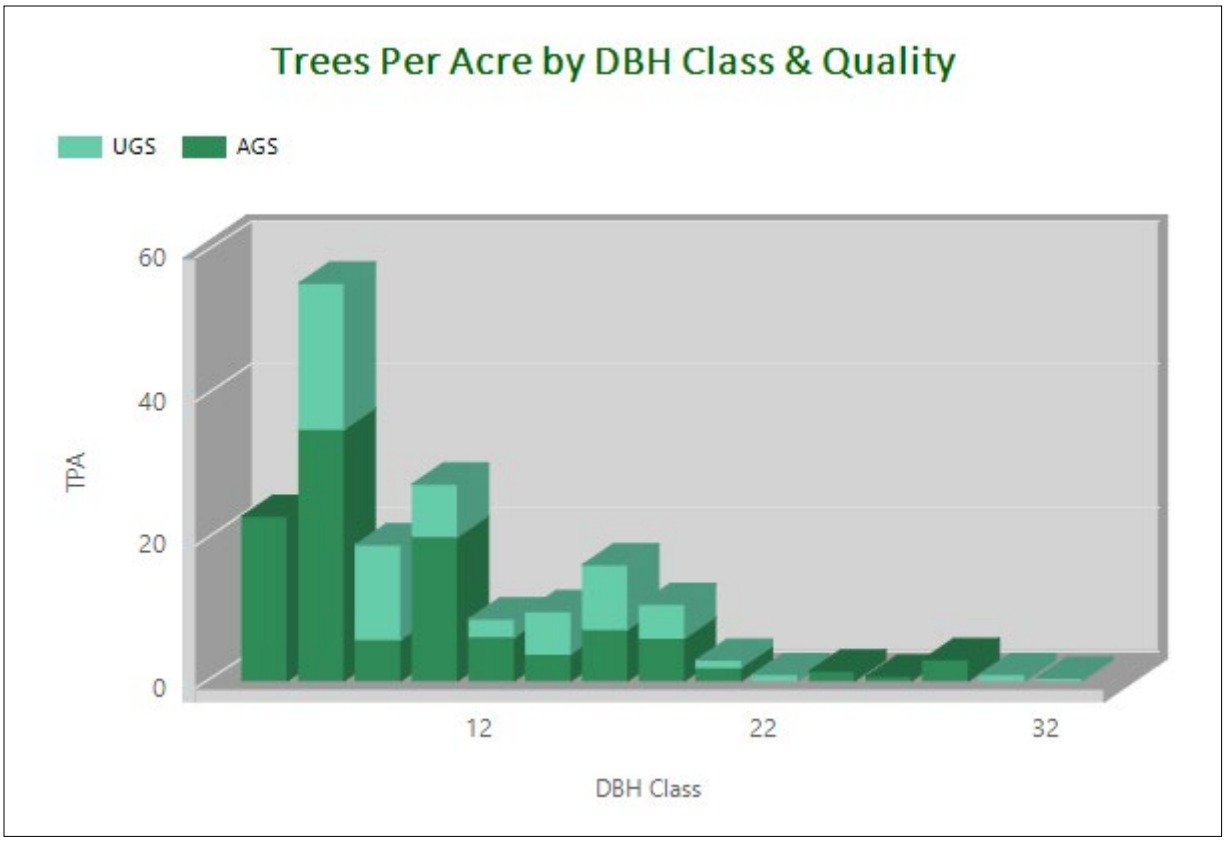
Acreage: 52.6 acres

Forest Type: *Mixed composition softwoods and northern hardwoods*

Composition: White pine (43%), red spruce (20%), red maple (18%), yellow birch (9%), balsam fir (5%), hemlock (3%), black cherry (2%).

Understory Composition: Red spruce, balsam fir, white pine, beech, red maple and yellow birch seedlings and saplings, well distributed.





Stand Description: This mixedwood stand is located in two areas in the central and southern portions of the property, east of East Elmore Road. Notably, there are some quite large and very well-formed white pine trees with very large crowns in this stand. The terrain in this stand is gentle to moderately sloped, situated on well-drained soils. A network of recreational trails is planned to be built in this area of the Community Forest, winding its way from the parking/access area on East Elmore Road east and south. A conceptual trail map is included in this report – see page 10.

Regeneration: Established; red spruce, balsam fir, white pine, red maple, beech and yellow birch seedlings and saplings are abundant and well distributed in the understory.

Age Structure: Even-aged

Size Class: poles to large sawtimber

Stocking: Well-stocked; above the B-line on the mixedwood stocking guide.

Total Basal Area/acre: 120ft^2

AGS Basal Area/acre: 70ft2

Quadratic Mean Stand Diameter: 11.07

Trees Per Acre: 179.45

Approximate Stand Age: 80-90+ years

Stand Health: No unusual or significant forest health issues noted in this area during the present inventory.

Invasive Species: A **single honeysuckle shrub** was noted during the inventory of this stand. Mature, fruit bearing honeysuckle bushes should be removed from this area as soon as possible. Honeysuckle plants can be uprooted, though it is difficult to pull out the entire root system of an established shrub.

Another option is to cut the shrub down and subsequently return to the site to mow any regrowth for the next few years to deplete carbohydrate stores in the root system and eventually kill the plant. Targeted herbicide treatment is another option; the cut stump method would likely be employed. Cut stump treatments involve cutting down the invasive plant and treating the stump with an herbicide such as glyphosate. A very small amount of herbicide is needed for this type of treatment, and it is highly effective at killing the target plant. The Lamoille County Forester is available with more information and options/suggestions for management of these plants. Another good resource is www.vtinvasives.org

Site Index: 68 for white pine by soils

History/Previous Activity: Very little evidence of past harvesting was noted in this stand.

Silvicultural Management Objectives: Over time, this forest will be managed for the development of multiple age classes. As a result of the land-use history of this forest and past harvesting activities, current stand conditions have limited structural diversity, and the forest is generally even-aged.

Forest management activities may occur in this area to complement or enhance recreational opportunities by improving safety of recreational trails through hazard tree removal along trails, by showcasing interesting natural areas or features and potentially by improving access throughout the stand through creation of new trails.

Silvicultural Prescription: No silvicultural activities are prescribed for this planning period. Allow this stand to continue to grow and develop. **Plan to remove the honeysuckle plant(s) in this stand as soon as is feasible. The Lamoille County Forester is available to assist.**

The recreational trail that is going to be developed in this stand will likely require some vegetative maintenance. This work will be limited to the cutting of sapling-sized stems, clearing of brush and debris, and managing impact of erosion or wear in the trail corridor and associated sight lines. Trees posing a hazard to trail users because of decay, disease, broken tops, mortality, etc., may also be removed.

Open Land Management

The open land, fields and recreational trails/open areas associated with recreation on the property will be maintained in an open condition through mowing/brush hogging. Field management strategies can enhance wildlife habitat while maintaining the desired open conditions. Rotational or mosaic mowing is one option, whereby the field is divided into sections and mowed on a rotational basis, allowing some areas to continue to grow while others are mowed, and rotating those areas that are mowed each year. This type of mowing allows vegetation to grow up in the years that it is not mowed and provides browsing opportunities and cover for wildlife moving through the area. Each area should be mowed at least every three years. Mowing fields annually or semi-annually will help to maintain dominant grasses and prevent the establishment of shrubs and other woody vegetation. **Mowing should be delayed to mid-July or occur after August 15** to ensure that any birds that may have decided to nest in the field are able to fledge and to avoid nest loss due to mowing and to protect any young mammals that are utilizing the field during the growing season (i.e. deer fawns).

Maintaining a “soft edge” along the field boundaries will be beneficial for wildlife movement. This type of field maintenance involves feathering the edge of field vegetation by retaining shrubs and shorter

plants on the edge to lessen the abrupt change from forest to open field. This provides travel corridors, cover, and browsing opportunities for wildlife. Islands of trees within open areas should also be maintained and monitored for non-native, invasive plants. Pruning and release of apple trees within open areas can help to strengthen branches and help with their ability to withstand snow-loads in winter, increase fruit production and improve overall health of these sun-loving trees.

Monitoring should be carried out to ensure that non-native, invasive plants are not becoming established and spreading in open areas of the property. This also helps to ensure that non-native, invasive plants do not have a chance to become established in the forest.

Riparian Area Management

The riparian area along the southern portion of the Elmore Branch on the property, west of East Elmore Road, could benefit from planting of trees and shrubs. Planting could be carried out along the stream to increase shade, reduce erosion potential by stabilizing riverbanks and provide habitat for wildlife. Native trees or shrubs that could be planted in this riparian area should be tolerant of “wet feet”, such as silver maple, willow, dogwood, elm, red maple, and speckled alder. A native seed mix could also be sown in the riparian area (for example, a native pollinator seed mix could be spread 50-100 feet from the river while native trees and shrubs are planted within 50 feet of the river). Live stakes (cut stems) of willow and dogwood could be directly planted along the banks of the river to quickly stabilize banks and over time, become more established throughout the riparian area.

Appendix 1: Stocking Guides

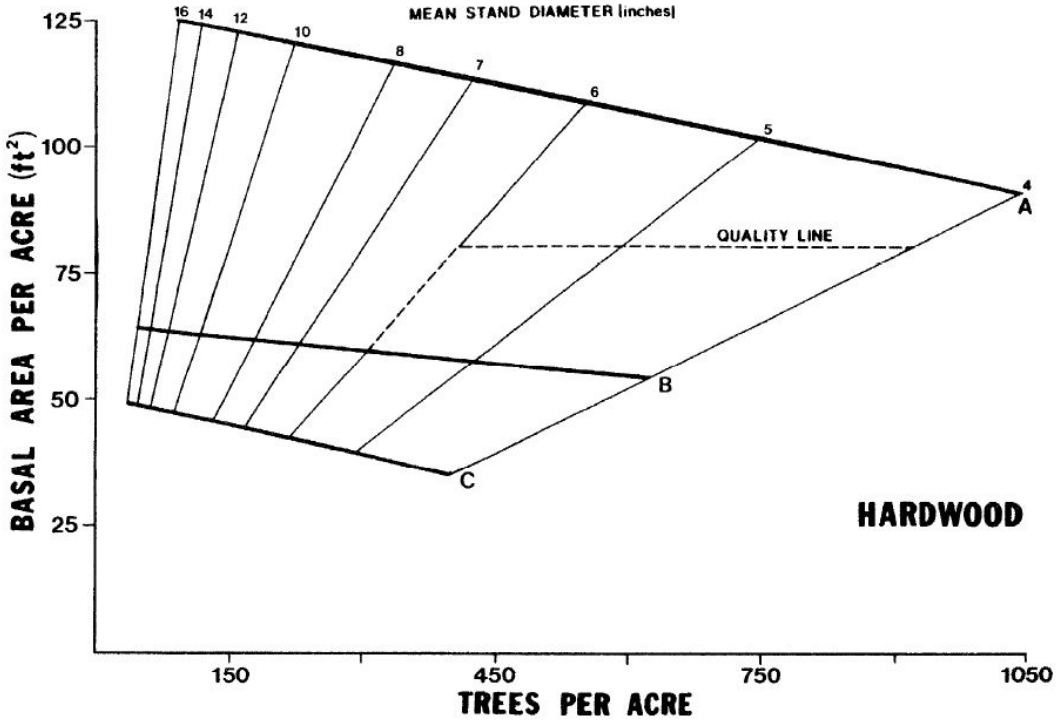


Figure 6.—Stocking guide for main crown canopy of even-aged hardwood stands (beech-red maple, beech-birch-maple) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking. The C-line is minimum stocking. The quality line is the density required to produce high quality stems of beech, sugar maple, yellow birch, and red maple.

Source:

Leak, William B.; Solomon, Dale S.; Debald, Paul S. 1987. **Silvicultural guide for northern hardwood types in the Northeast (revised).** Res. Pap. NE-603. Broomall, PA; U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 36 p.

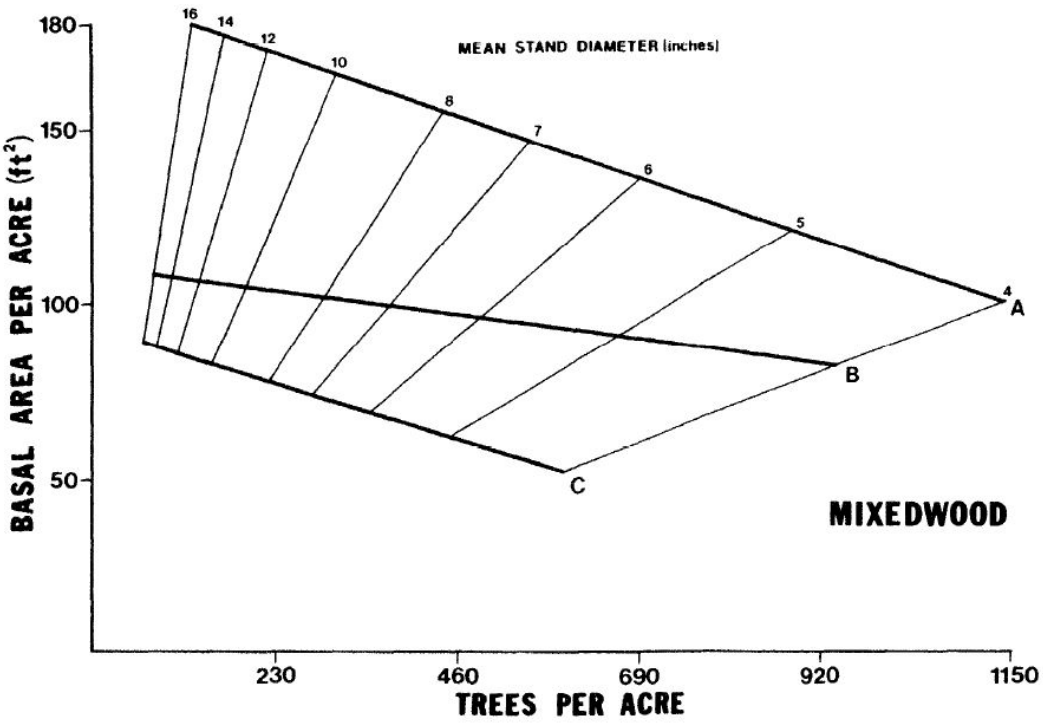


Figure 7.—Stocking guide for main crown canopy of mixedwood stands (25 to 65 percent softwoods) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking, the C line is minimum stocking.

Source:

Leak, William B.; Solomon, Dale S.; Debald, Paul S. 1987. **Silvicultural guide for northern hardwood types in the Northeast (revised).** Res. Pap. NE-603. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 36 p.

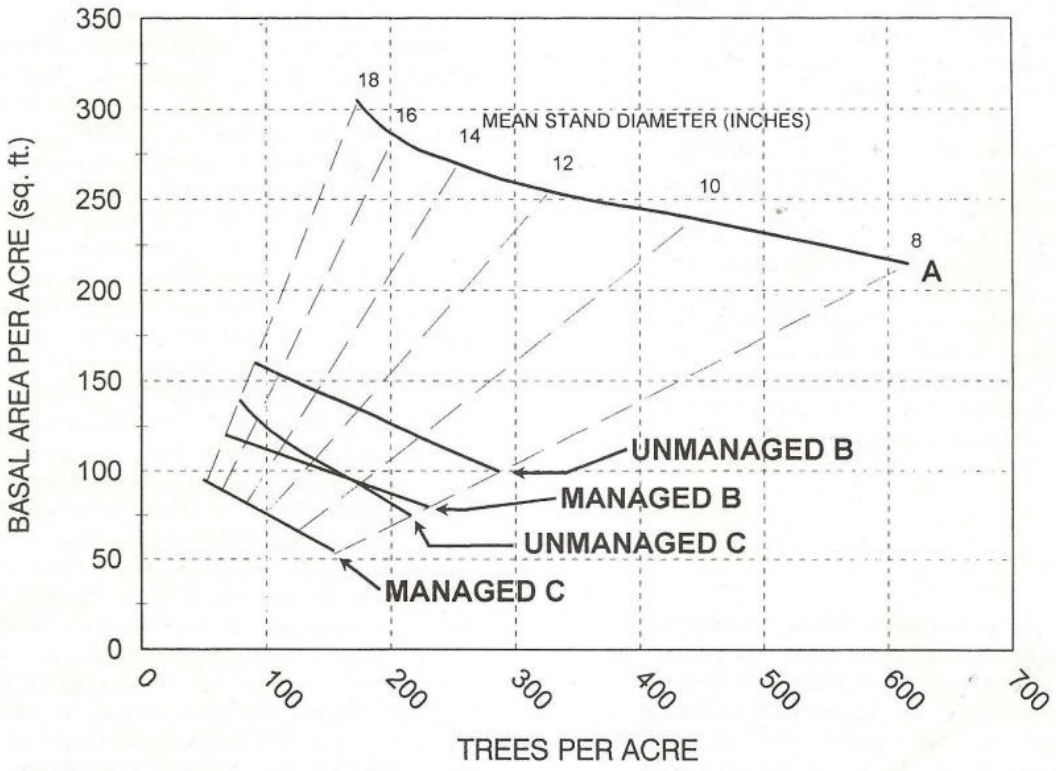


Figure 1. Revised white pine stocking guide for managed stands

Source:

Leak, William B.; Lamson, Neil I. **Revised White Pine Stocking Guide for Managed Stands.** NA-TP-01-99. U.S. Department of Agriculture, Forest Service, Northeastern Area State and Private Forestry. 2 p.

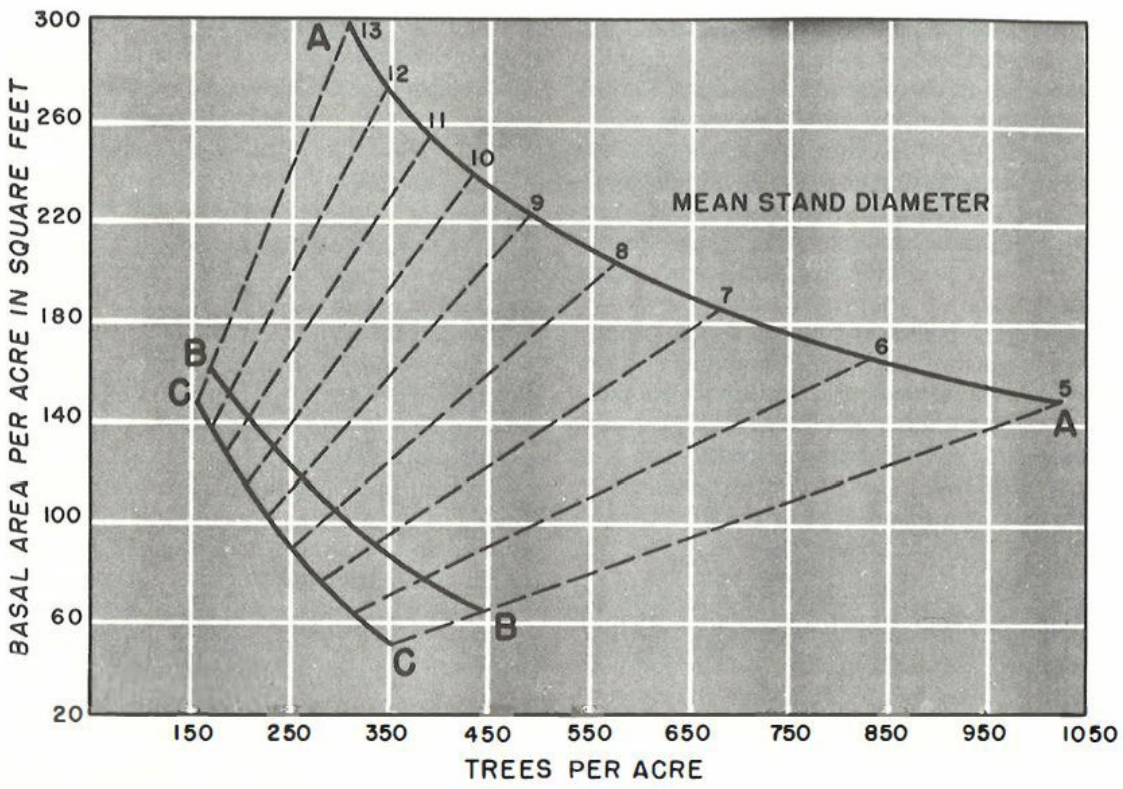


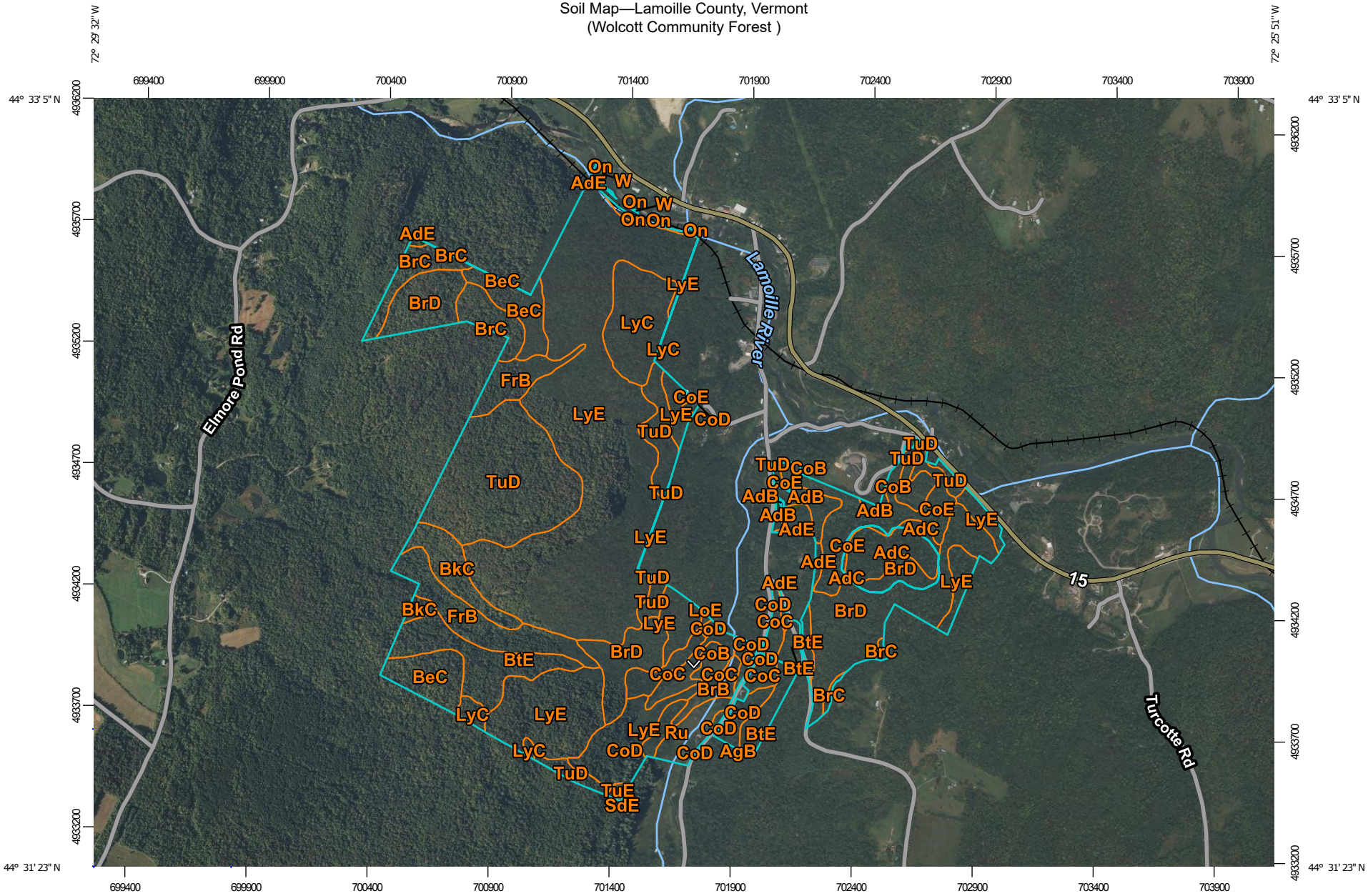
Figure 7.—Growing-stock guide for even-aged spruce-fir, based on the number of trees in the main canopy, average diameter, and basal area per acre. The area above the A-level represents overstocked stand conditions. Stands between the A- and B-levels are adequately stocked. Stands between the B-and C-levels should be adequately stocked within 10 years or less. Stands below the C-level are understocked.

Source:

Frank, Robert M.; Bjorkbom, John C. **A silvicultural guide for spruce-fir in the Northeast.** Gen. Tech. Rep. NE-6. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1973. 29 p.

Appendix 2: Soil Types and Descriptions

Soil Map—Lamoille County, Vermont
(Wolcott Community Forest)



Map Scale: 1:22,300 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 300 600 1200 1800

Feet
0 1000 2000 4000 6000

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.

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: Lamoille County, Vermont
Survey Area Data: Version 28, Sep 10, 2023

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

Date(s) aerial images were photographed: Jun 1, 2020—Sep 21, 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
AdB	Adams loamy sand, 3 to 8 percent slopes	9.1	1.3%
AdC	Adams loamy sand, 8 to 15 percent slopes	16.4	2.3%
AdE	Adams loamy sand, 25 to 60 percent slopes	5.3	0.7%
AgB	Allagash very fine sandy loam, 2 to 8 percent slopes	0.7	0.1%
BeC	Berkshire fine sandy loam, 8 to 15 percent slopes	26.5	3.6%
BkC	Berkshire fine sandy loam, 8 to 15 percent slopes, very stony	16.6	2.3%
BrB	Berkshire-Tunbridge complex, 3 to 8 percent slopes, rocky	5.6	0.8%
BrC	Berkshire-Tunbridge complex, 8 to 15 percent slopes, rocky	21.4	2.9%
BrD	Berkshire-Tunbridge complex, 15 to 25 percent slopes, rocky	83.8	11.5%
BtE	Berkshire and Marlow soils, 20 to 50 percent slopes, very stony	45.1	6.2%
CoB	Colton-Duxbury complex, 2 to 8 percent slopes	9.3	1.3%
CoC	Colton-Duxbury complex, 8 to 15 percent slopes	15.1	2.1%
CoD	Colton-Duxbury complex, 15 to 25 percent slopes	27.8	3.8%
CoE	Colton-Duxbury complex, 25 to 50 percent slopes	30.2	4.1%
FrB	Cabot silt loam, 0 to 8 percent slopes, very stony	35.2	4.8%
LoE	Londonderry-Stratton complex, 25 to 60 percent slopes	0.3	0.0%
LyC	Tunbridge-Lyman complex, 8 to 15 percent slopes, very rocky	28.8	4.0%
LyE	Lyman-Tunbridge-Rock outcrop complex, 25 to 60 percent slopes	253.7	34.8%
On	Ondawa fine sandy loam, 0 to 3 percent slopes, occasionally flooded	2.3	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ru	Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded	9.6	1.3%
SdE	Salmon variant-Salmon very fine sandy loams, rocky, 25 to 50 percent slopes	0.2	0.0%
TuD	Tunbridge-Lyman complex, 15 to 25 percent slopes, very rocky	84.3	11.6%
TuE	Tunbridge-Lyman complex, 25 to 60 percent slopes, very rocky	0.9	0.1%
W	Water	0.0	0.0%
Totals for Area of Interest		**728.3**	**100.0%**