

Forest Management Plan

BUFFALO MOUNTAIN TOWN FOREST

Emily Sayers | County Forester | VT Licensed Forester # 148.0125340

Forest Management Plan Approval

This forest management plan was prepared by Emily Sayers, County Forester, at the request of the Town of Hardwick.

Printed Name	**Signature**	**Date**
Printed Name	**Signature**	**Date**
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Printed Name	**Signature**	**Date**

We certify that we have read and approve of the 2026 Forest Management Plan for the Buffalo Mountain Town Forest 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 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

Forest Management Plan 1
Purpose of Forest Management Plan 4
General Property Description 4
Location 4
Rivers, Streams and Wetlands 8
Water Quality 8
Geologic Information 9
Native Biodiversity 9
Wildlife 9
Rare, Threatened & Endangered Species 13
Forest Health 13
Recreation 14
Management Goals and Objectives 14
Forest Resources 15
Forest Stand 1 20
Forest Stand 2 23
Forest Stand 3 27
Forest Stand 4 31
Forest Stand 5 35
Open Land / Old Landing Site / Orchard 39
Appendix 1: Soil Types and Descriptions 39

Purpose of Forest Management Plan

The following forest management plan is intended to provide information and guidance to the Town of Hardwick's Stewardship Committee for the management of the 329-acre forest owned by the Town of Hardwick. This plan will provide management guidance for a 10-year period beginning in 2026. The plan should be updated on a 10-year cycle starting in 2036, and a new forest inventory should be completed at that time. This forest management plan contains information collected from a forest inventory completed in the summer and fall of 2026. The information contained in this plan includes ecological, economic, and social considerations to help the Town of Hardwick's 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

There are eight distinct *biophysical regions* (Figure 1) in Vermont based on differences in elevation, vegetation, climate, geology, topography, land-use history, and hydrology. Caledonia County, and therefore Hardwick, and the Buffalo Mountain Town Forest, is partially in the Northern Vermont Piedmont biophysical region and partially in the Northern Green Mountains biophysical region. The Northern Vermont Piedmont is moderate in both its climate and topography, and is a hilly region bisected by many rivers. With rich soils derived from the underlying calcium-rich bedrock and gentle topography, this landscape is dominated by a dense network of roads connecting farms and small villages. Consequently, it contains fewer large forest blocks and has more fragmented wildlife habitat than in the Green Mountains and northeastern highlands. The calcium-rich bedrock is responsible for the abundance of rich northern hardwood forests, northern white cedar swamps, and rich fens – all characteristic communities of this region. In contrast, the acidic granite hills of Derby, Glover, and Groton State Forest support northern hardwoods with abundant spruce and fir. The granite quarried in Barre is world famous for its high quality. The Northern Vermont Piedmont has many lakes and ponds, including the larger Memphremagog, Seymour, and Caspian, as well as numerous smaller ponds in the vicinity of Woodbury and Groton State Forest. These lakes and ponds provide successful nesting habitat for the greatest concentration of common loons in Vermont. The Northern Green Mountains are part of the Appalachian Mountain chain extending from Alabama to Quebec. The Northern Green Mountains include Vermont's

highest mountain (Mt. 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 beech, birch 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).

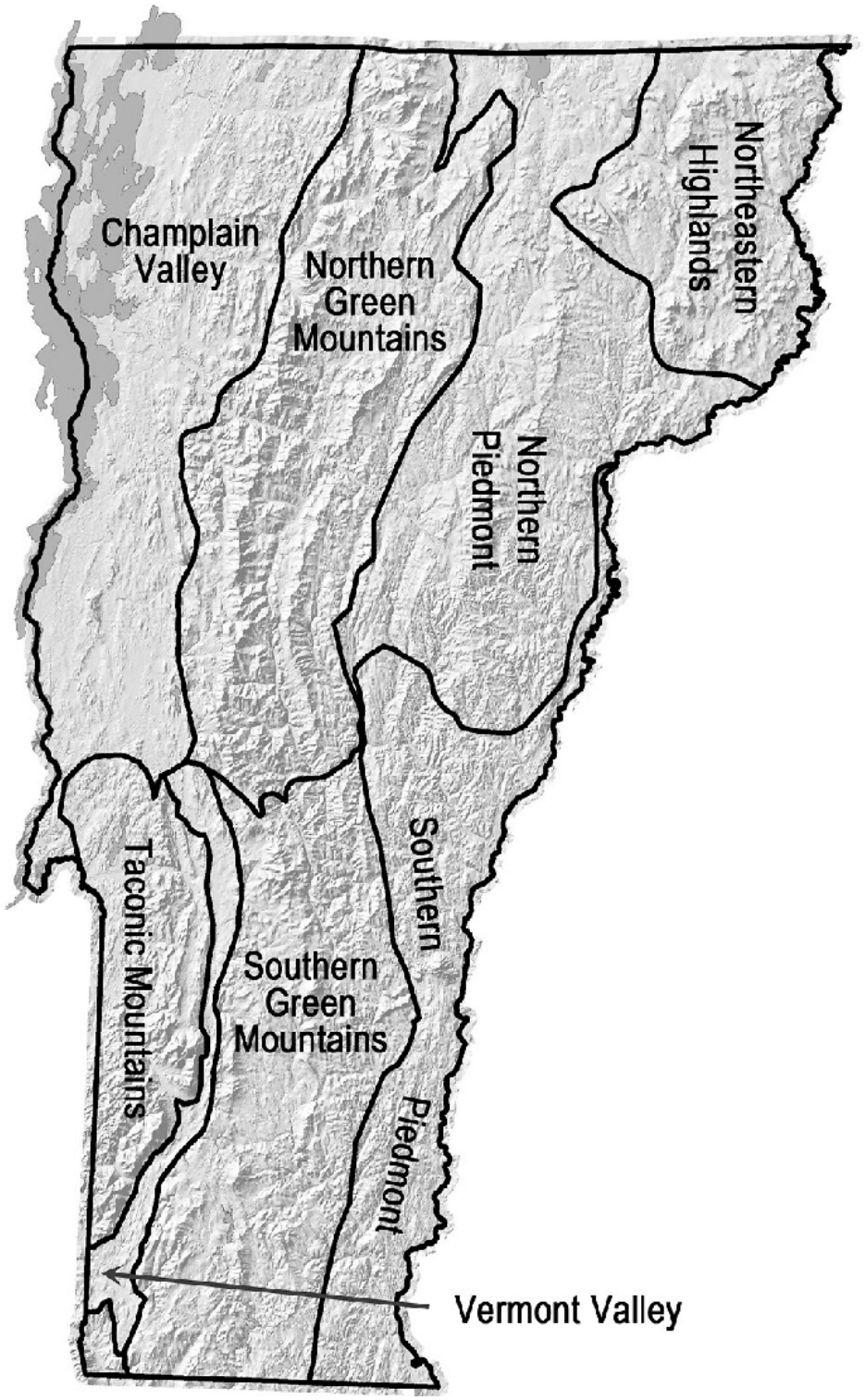


Figure 1: A map of the biophysical regions of Vermont. The Buffalo Mountain Town Forest is partially in the Northern Vermont Piedmont, and partially in the Northern Green Mountains.

The Buffalo Mountain Town Forest is the backdrop of the Town of Hardwick, standing at 1,555 feet in elevation. It is primarily accessed by the public from Atkins Field or Wright Farm Road. The Lamoille Valley Rail Trail crosses the property as does a roadbed used as a VAST and VASA trail. The Buffalo Mountain Town Forest is part of a 29,757-acre forest block (Figure 2).

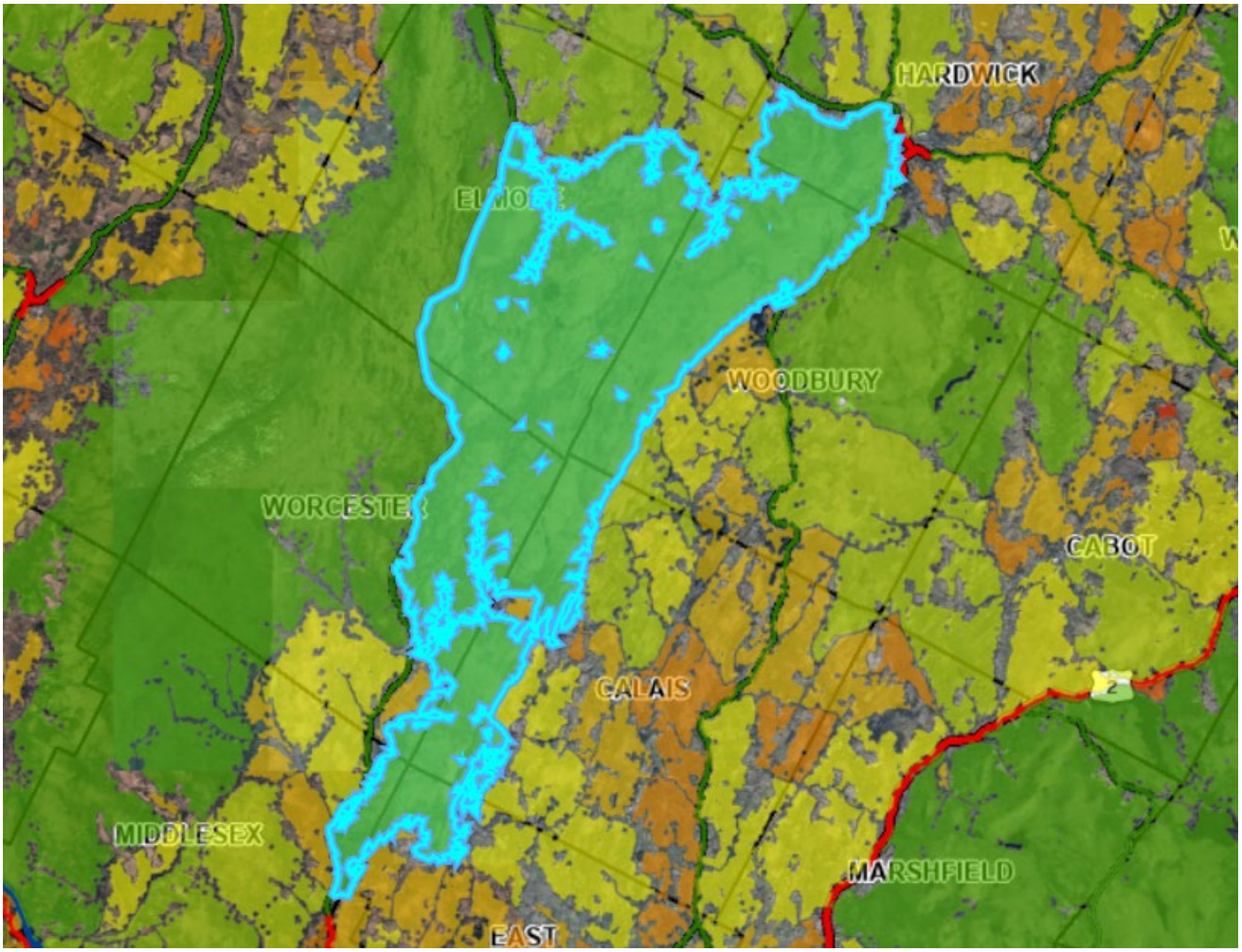


Figure 2: Map of forest blocks in the Hardwick area. Darker greens represent large habitat blocks that are less fragmented by development and roads and therefore higher priority areas for protection than lighter shaded areas. The Buffalo Mountain Town Forest is located within the blue highlighted area, an approximately 29,757-acre forest block.

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

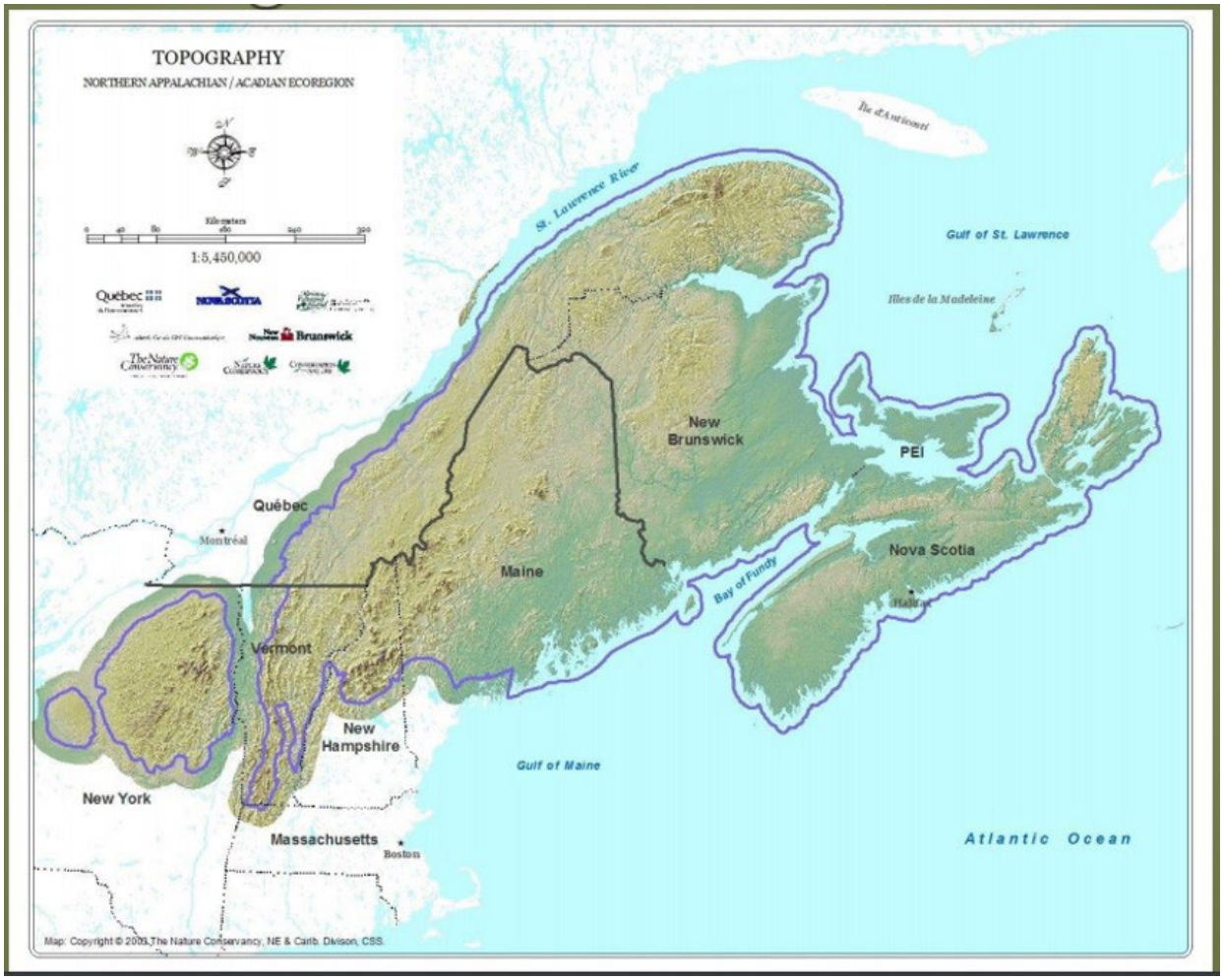


Figure 3: Map of the Northern Appalachian / Acadian Ecoregion, the largest, most intact, temperate broadleaf deciduous forest in the world. Viewed in this context, our forests in Vermont, including the Buffalo Mountain Town Forest, are globally significant.

Rivers, Streams and Wetlands

The Buffalo Mountain Town Forest lies within the Upper Lamoille River Watershed. There is one mapped stream on the property, originating east of Wright Farm Road and flowing northward into the Lamoille River. There is one mapped wetland on the property, along the southeastern boundary line. The property also boasts frontage along the Lamoille River, accounting for 9.3 acres of floodplain along the river, west of the village center. 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 during harvesting activities. Particularly, wetlands, vernal pools, and any sensitive areas with hydric soils 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 ideally, frozen winter ground. The Vermont Department of Forests, Parks and Recreation's publication to protect water quality, *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/documents/FullDocument-7.29.pdf

Geologic Information

The Buffalo Mountain Town Forest is underlain by the Richardson Memorial Contact, which is a geologic boundary separating older, pre-Silurian rocks from younger Silurian and Devonian rocks in the Moretown (circa Cambrian and Ordovician period) and Northfield (circa Silurian and Devonian period) Formations. These bedrocks are comprised of metasedimentary, metavolcanic and metaintrusive rocks. Devonian granite dikes also occur in these formations and are more abundant in the Silurian and Devonian era rocks. Dominant soil types within the Buffalo Mountain Town Forest include the Tunbridge-Lyman Complex, the Colonel-Cabot Complex, and the Tunbridge-Monadnock Complex. Tunbridge soils are relatively well-drained soils with moderate depth to bedrock, but Cabot soils are notoriously poorly drained, shallow soils.

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 (AMPs)* to protect water quality. A soil type map with descriptions of soil types can be found in the Appendix 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, they can be controlled most efficiently and cost-effectively, their negative impacts will be reduced, and the chance for further spread can be eliminated.

Wildlife

Wildlife habitat diversity and quality should be encouraged. Deer wintering grounds, vernal pools, wetlands, snags and den trees, and downed trees should be maintained, protected, and enhanced. A

diversity of tree species should be retained. The retention of hard mast (nuts and seeds) and soft mast (fruit) trees and shrubs should be applied to provide sources of food for various wildlife species.

The Buffalo Mountain Town Forest, situated within a 29,757-acre forest block, helps to provide wildlife habitat and travel corridors for a wide range of wildlife species. Species likely living in or passing through this forest include but are not limited to white-tailed deer, bear, coyote, turkey, bobcat, fisher, fox and porcupine, as well as a host of amphibians such as the red-backed salamander, wood frog, spotted salamander and tree frog, as well as reptiles such as snakes and turtles. Neotropical migrating songbirds, such as the black-throated blue warbler, black-throated green warbler, black-and-white warbler, red-eyed vireo, ovenbird, hermit thrush, wood thrush, veery, scarlet tanager, and blackburnian warbler (to name a few) could all potentially be seen nesting in or passing through the northern hardwood and mixedwood stands of the Buffalo Mountain Town Forest.

The forest has an abundance of habitat characteristics that are used by several species of wildlife, including hardwood and mixedwood forest, young forest and open land. Bear sign was observed in the upper elevations of the forest (Picture 1); and amphibians were noted in the cove-like areas below some of the steep cliffs on the eastern portion of the property (Pictures 2 and 3).



Picture 1: Bear claw marks on a clean, healthy beech tree in the upper elevations of the Buffalo Mountain Town Forest.



Picture 2: Pickerel frog observed in the forest understory.



Picture 3: Red eft observed in the forest understory.

Multiple species of trees which produce soft and hard mast, including black cherry, beech, yellow birch and red spruce are also present on the property and provide a food source for birds and other wildlife in the area.

Another habitat feature boasted by this property is the presence of large trees in varying stages of decay with the potential to develop (if they haven't already) 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 (such as the downy, hairy and pileated woodpecker), that feed on the insects inside of them. When large cavity trees fall to the ground, they provide habitat for amphibians, small mammals and a host of invertebrates, and contribute to soil moisture and nutrient cycling.

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 and three cavity trees greater than 16 inches in diameter per acre. Retaining three snags (standing dead trees) 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 through thoughtful management.

Based on information collected during the forest inventory of the property, there are currently approximately 25 snags per acre, the majority of which are less than 12 inches in diameter. There are approximately 9 snags per acre between 12 and 16 inches in diameter. Approximately 2 snags per acre over 16 inches in diameter were tallied. The inventory did not include an assessment of downed trees.

Rare, Threatened & Endangered Species

A review of the Vermont Department of Fish & Wildlife's database does not show any Rare, Threatened or Endangered plant or animal on or in close proximity to the property. The Ecological Assessment carried out by Matt Peters does document some rare and uncommon species on the property, however. Refer to the document *A Rapid Ecological Assessment of the Buffalo Mountain Town Forest Expansion Tracts in Hardwick, VT* for more information.

Forest Health

No significant forest health issues were observed or identified during the 2026 forest inventory. Common forest pests and diseases were observed on the property including excessive browsing 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 trees, and *Inonotus obliquus,* also known as chaga, on birch trees. Bush honeysuckle plants (*Lonicera spp.)* were observed in dense thickets in some of the more recently abandoned, previously open portions of the property and surrounding open land (see Picture 4, below). Bush honeysuckle is an introduced, invasive plant in Vermont. This means it has spread here from another part of the world, and its growth habits are such that it competes with our native flora, creating monocultures and reducing biodiversity where it becomes

established. Bush honeysuckle also produces fruit that is low in nutritional value compared to our native plants in Vermont. When migrating birds or other wildlife feed on honeysuckle berries, they are essentially eating "junk food" and also aiding in the distribution of the plant's seeds as they pass through their digestive systems. More information on introduced, invasive plants and tips for identification can be found at www.vtinvasives.org The County Forester is available to assist with identification and to provide guidance, suggestions, and methods for control and eradication.



Picture 4: Honeysuckle bushes retain their leaves later into the fall than many of our native plants in Vermont. The light green bushes can be seen in the mid-ground of the photo above. This area is densely infested with honeysuckle.

Recreation

The Buffalo Mountain Town Forest will provide a diversity of recreational opportunities to community members and visitors alike including but not limited to hiking, bird watching, hunting, fishing, cross-country skiing and general enjoyment of nature in the forest. The existing forest roads on the property could be improved through grading, shaping, installing water bars or broad-based dips, and rerouting out of low, wet areas to enhance the recreational potential of the trails and help to reduce and prevent erosion. Maintaining access to forestland is essential for forest management activities and enjoyment of the resource.

Management Goals and Objectives

Below are the goals and objectives of the Town of Hardwick for the Buffalo Mountain Town Forest.

- Manage the land with an emphasis on forest health, wildlife habitat and connectivity, and maintenance and enhancement of existing sensitive sites, riparian areas and unique features or natural communities.
- Provide opportunities for dispersed recreation including but not limited to hiking, cross-country skiing, hunting, fishing, biking, snowmobiling, and snowshoeing.
- Provide forest-based educational opportunities and nature study for students and the Hardwick community.
- Identify areas for permanent protection where forest management activities will be limited to those that maintain and enhance old-forest characteristics.
- Conduct forest management activities on the land in accordance with the best available science to improve forest health and resilience and provide the landowner with income through the sale of sustainably harvested forest products.

Forest Resources

To measure, map and evaluate the forest resources of the Buffalo Mountain Town Forest, a forest inventory was carried out on the property in the summer and fall of 2026. Eighty-four variable radius (using a 10-factor prism) plots were systematically located throughout the forest (approximately 1 plot per 4 acres). Using ArcGIS Pro (a geographic information systems (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 smart phones) 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 used (in this case, a 10-basal area factor prism). Data was collected using a tablet and then stored and processed using the State of Vermont's FOREX Inventory Database System. Five forest stands were identified, and 845 trees measured for their diameter at breast height (DBH; measured at 4.5' above the ground), 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 (but are not limited to) 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 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.*

In this forest management plan, the prescriptions for managing each forest stand focus on improving forest health, enhancing wildlife habitat, maximizing carbon sequestration and storage, enhancing the forests' resilience in a changing climate and sustainably harvesting in a way that allows for repeated entries over a long timeframe, thereby providing (an admittedly infrequent) source of income to the Town of Hardwick. There is currently much interest in old forests in Vermont, and it may make sense to manage a portion of the Buffalo Mountain Town Forest to enhance old forest characteristics on the property. 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 silvicultural objectives are included in the following report and are generally in line with the goals and objectives for the forest identified by the Hardwick 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 tree species and size classes is present, to focus on maintaining and improving forest health, and to sequester and store carbon.

Figure 4 below shows the species composition of trees in the Buffalo Mountain Town Forest based on the percentage of total basal area that they occupy.

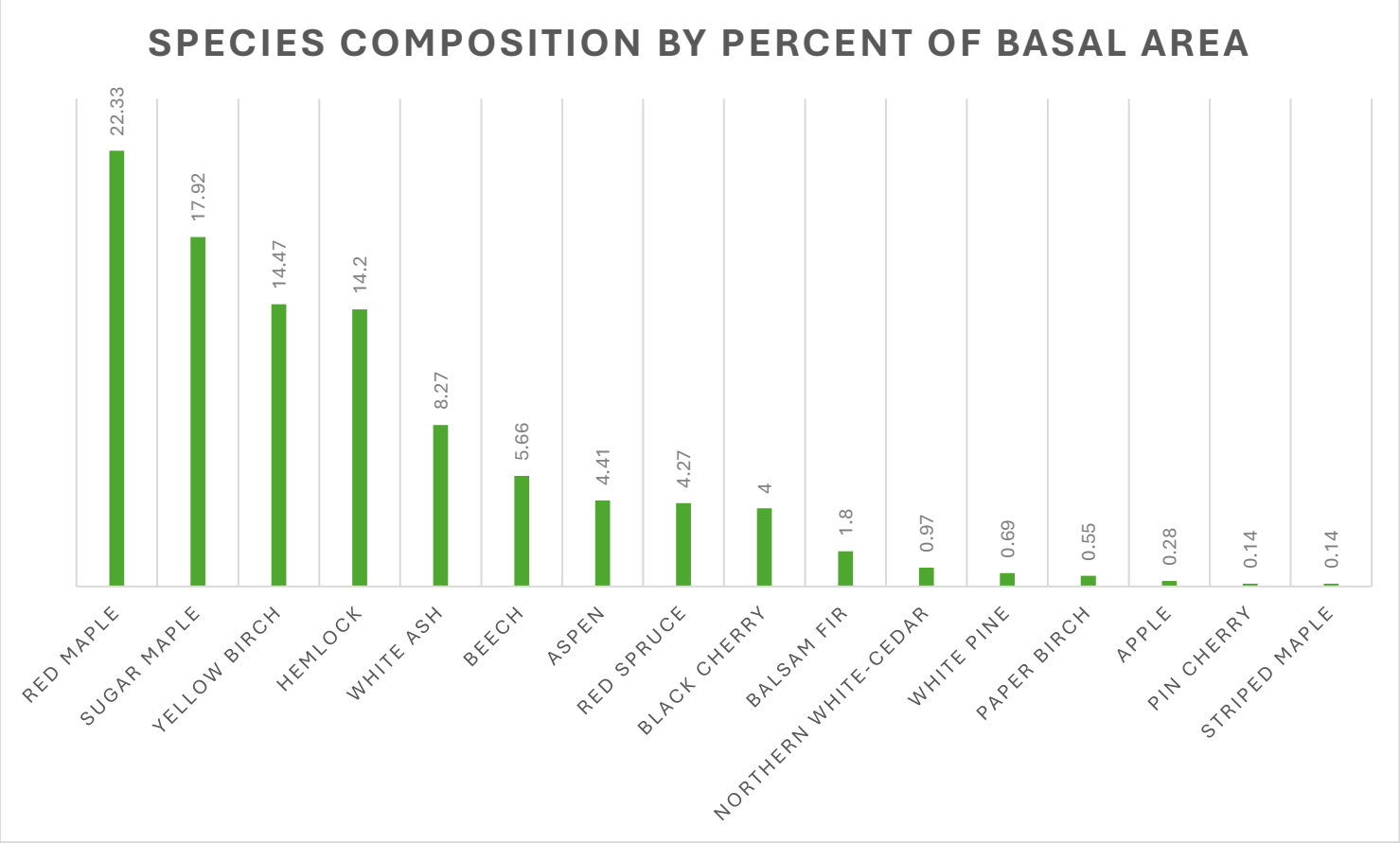


Figure 4: Species composition of the Buffalo Mountain Town Forest by percent of basal area.

Hardwoods account for approximately 78% of the trees measured, with 22% softwoods. Red maple and sugar maple are the most common species, accounting for 22% and 18%, respectively. Yellow birch (14%), hemlock (14%), and white ash (8%) were the next most common species tallied. Other species present include beech, aspen, red spruce, black cherry, balsam fir, northern white-cedar, white pine, paper birch, apple, pin cherry and striped maple. The graph in Figure 5, below, shows trees per acre (TPA) by quadratic mean diameter (QMD) and species. (Quadratic mean diameter is a statistical measure used in forestry to represent the average diameter of trees in a stand. It provides a more accurate representation of the trees in the forest, especially when calculating total basal area, or estimating timber volume. The quadratic mean diameter is calculated by taking the square root of the average of the squared diameters of all trees in a sample area).

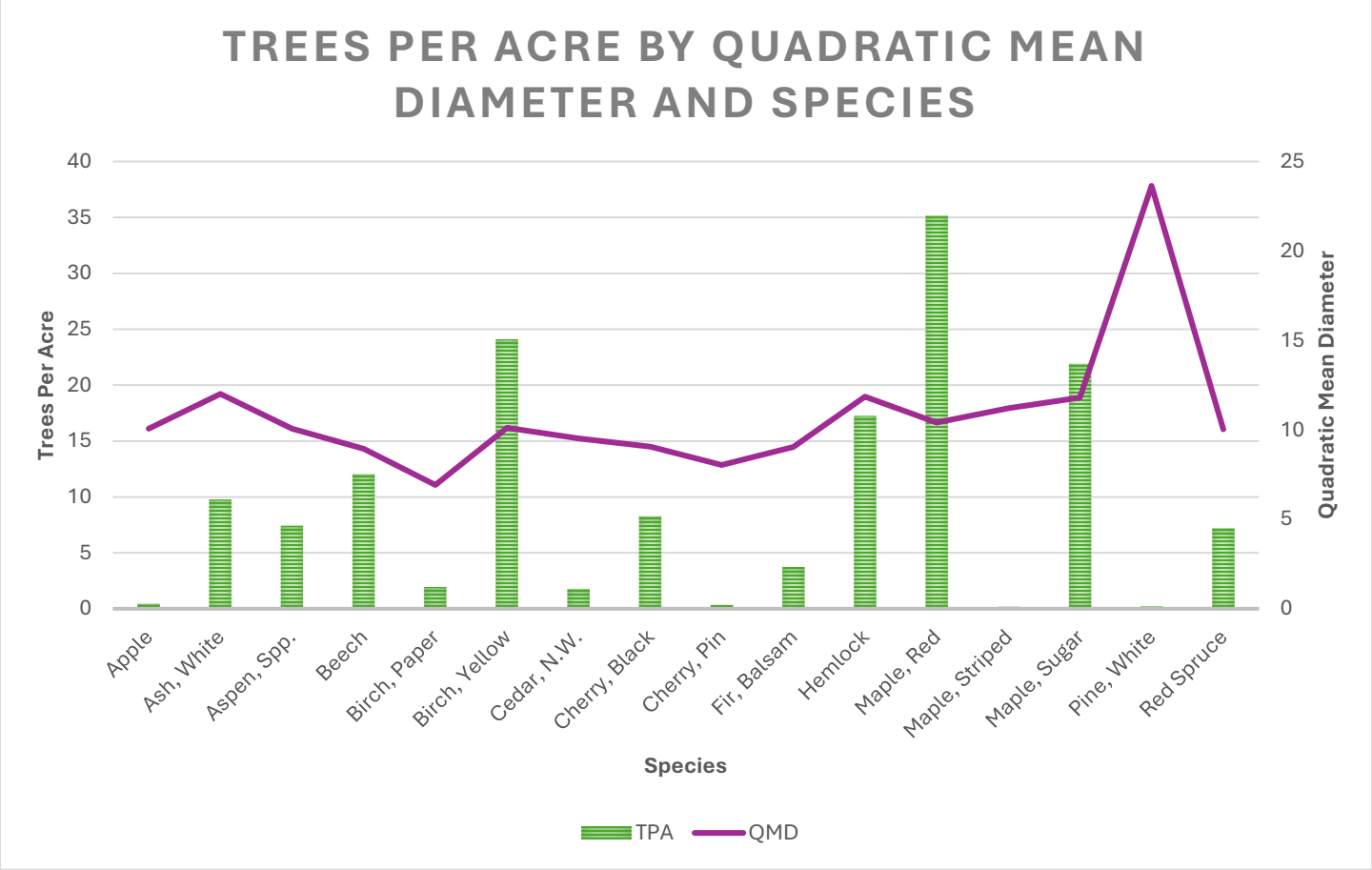


Figure 5: Trees per acre (TPA) by Quadratic Mean Diameter (QMD, in inches) and species in the Buffalo Mountain Town Forest.

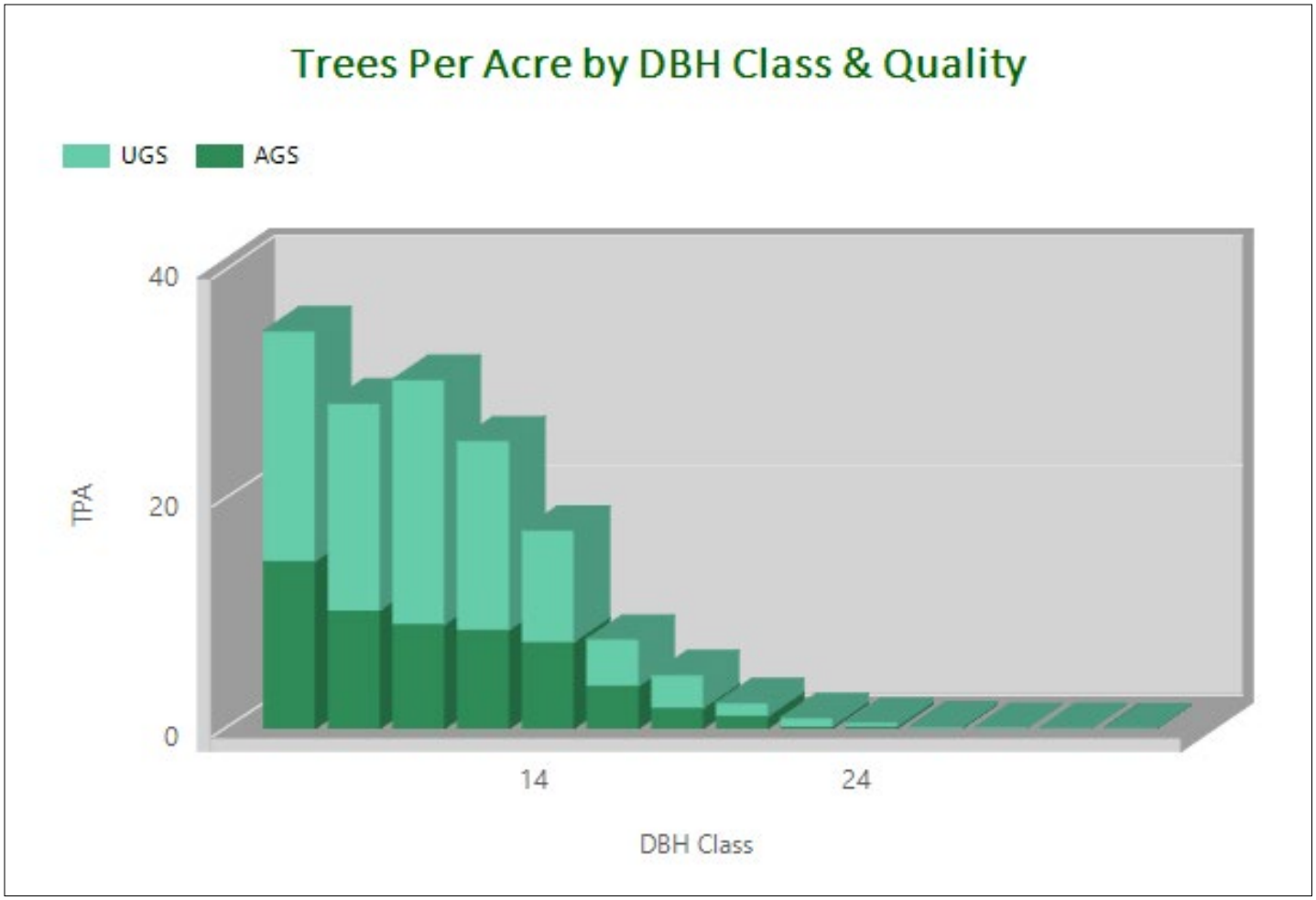


Figure 6: Trees per acre by DBH class and quality, shown as Acceptable Growing Stock (AGS) or Unacceptable Growing Stock (UGS) in the Buffalo Mountain Town Forest.

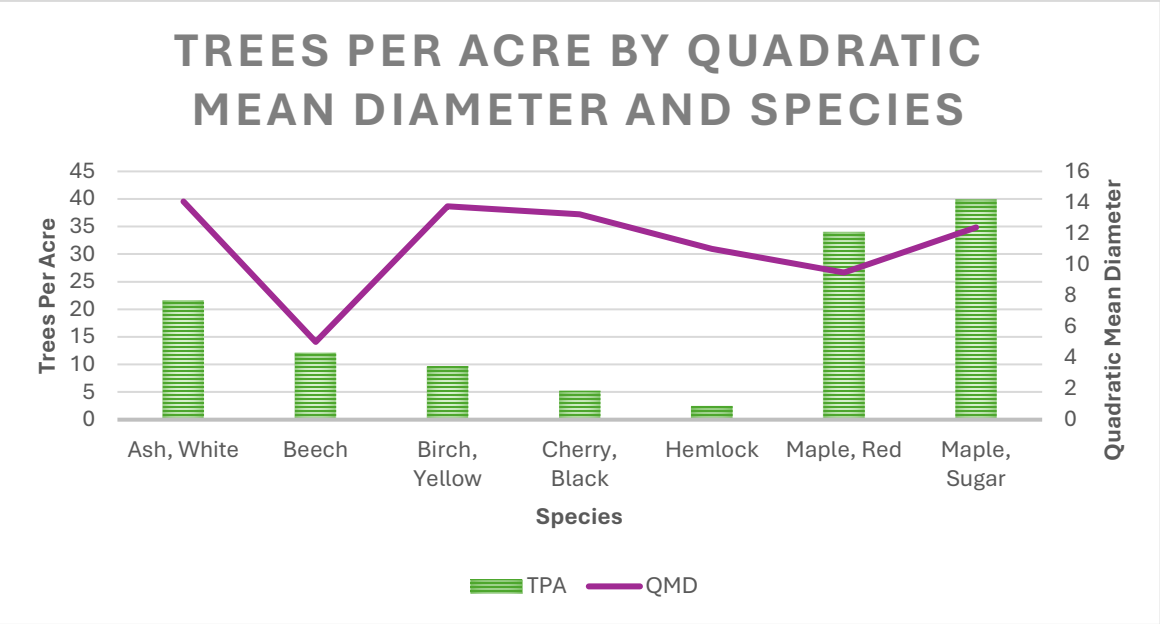
Forest Stand 1

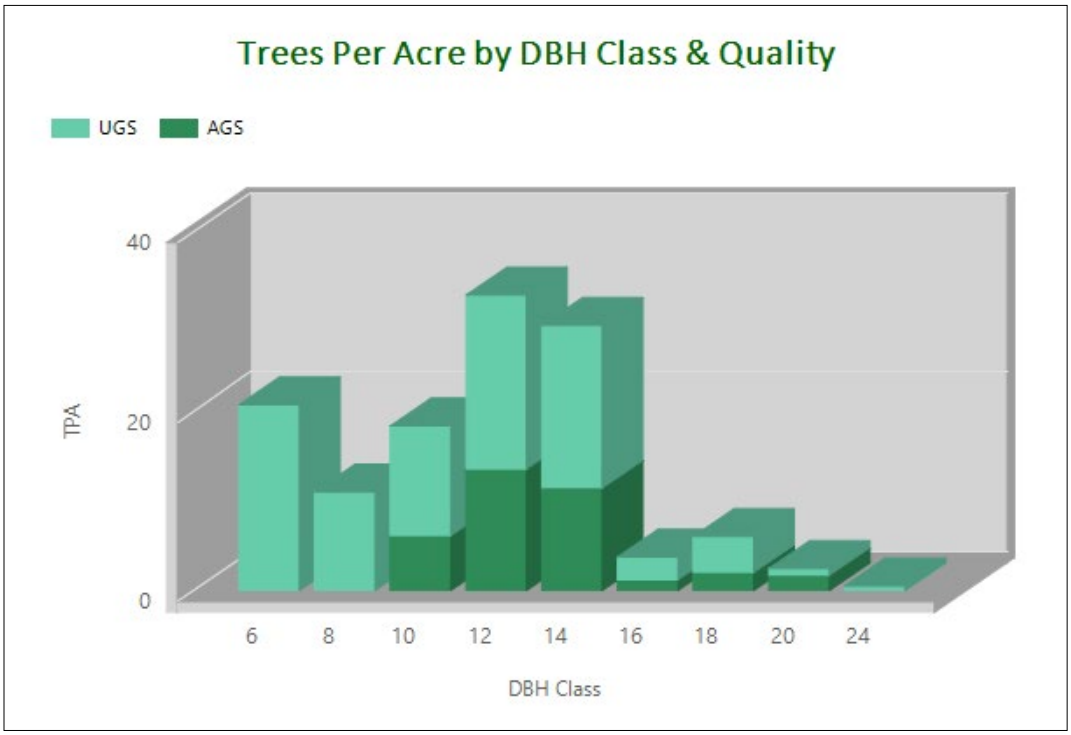
Acreage: 33 acres

Forest Type: Northern hardwoods

Composition: Sugar maple (37%), white ash (25%), red maple (18%), yellow birch (11%), black cherry (5%), hemlock (2%) and beech (2%).

Understory Composition: Beech saplings, scattered hobblebush, scattered hemlock and yellow birch saplings.





Stand Description: This stand encompasses some very steep slopes where there is very little evidence of logging since stand establishment. Defoliation by forest tent caterpillars in 2016-2018 likely contributed to sugar maple decline in this stand. Many of the white ash trees measured were also observed to be in decline, potentially due to Emerald Ash Borer presence in the area. This stand is in two areas: on the northwestern edge of the property along Wright Farm Road, and along the northeastern edge of the property. Terrain is quite steep in places; aspect is generally north and east.

Regeneration: Generally lacking, but where present is made up of beech saplings. Evidence of deer browsing is present and is likely one of the main hindrances to regeneration of desirable stems.

Age Structure: Two-aged

Size Class: poles to large sawtimber

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

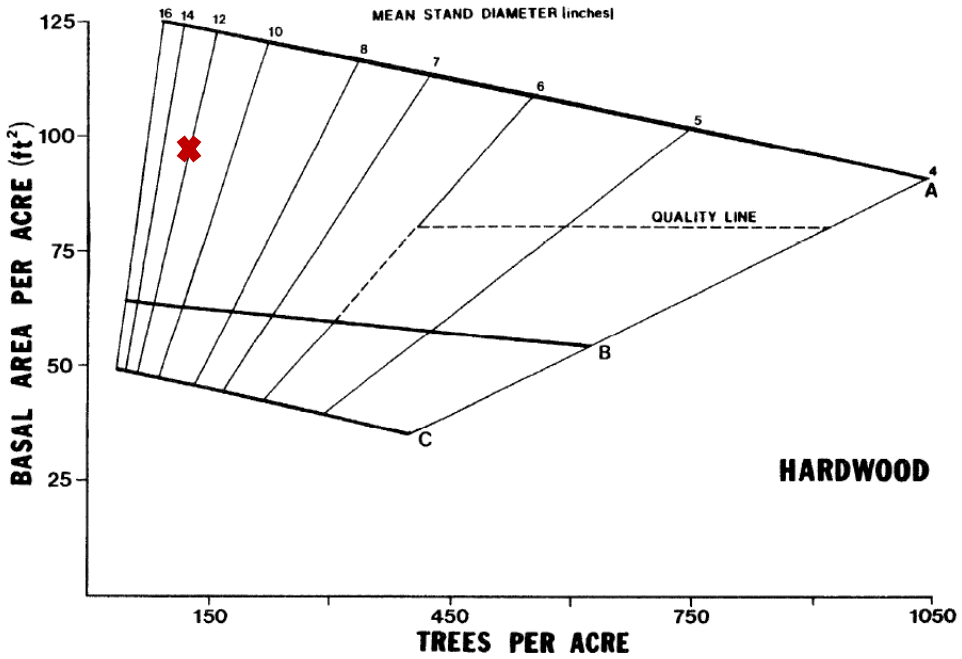


Figure 6.—Stocking guide for main crown canopy of even-aged hardwood stands (beech-red maple, beech-birch-maple) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking. The C-line is minimum stocking. The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

Total Basal Area/Acre: 92ft^2

AGS Basal Area/Acre: 33ft^2

Quadratic Mean Stand Diameter: 12 inches

Trees Per Acre: 125

Approximate Stand Age: two-aged; 50 years and 100 years +/-

Stand Health: No significant forest health issues were observed. Beech bark disease is common in the beech component. Browsing by deer is apparent in the understory and is likely inhibiting regeneration of desirable stems. Emerald Ash Borer may be present in the ash component. There are approximately 24 snags per acre in this stand, 58% of which are less than 12 inches in diameter. There are approximately

10 snags per acre between 12 and 16 inches in diameter. No snags greater than 16 inches in diameter were tallied during the inventory.

Invasive Species: No introduced, invasive plants were observed within this stand.

Site Index: 61 for sugar maple

History/Previous Activity: No evidence of activity occurring in this area was observed.

Silvicultural Management Objectives: Over time, this forest will be managed for the development of multiple age classes. Current stand conditions have limited structural diversity, and the forest is generally two-aged. Uneven-aged management and ecological forestry techniques can be employed to establish new age classes of trees and increase structural diversity.

Silvicultural Prescription: No activity is prescribed in this stand. This area will be allowed to continue to develop old forest characteristics through natural forest processes. Operability in this stand is limited due to steep slopes. There is not an existing skid trail system providing access to this stand. Should the town of Hardwick become interested in a more active approach to restoring old forest characteristics, refer to the guide *Restoring Old Growth Characteristics,* available here: https://fpr.vermont.gov/sites/fpr/files/doc_library/Restoring-Old-Growth-Characteristics.pdf

Cutting Cycle: N/A **Target Diameter:** N/A

Rotation Age: N/A

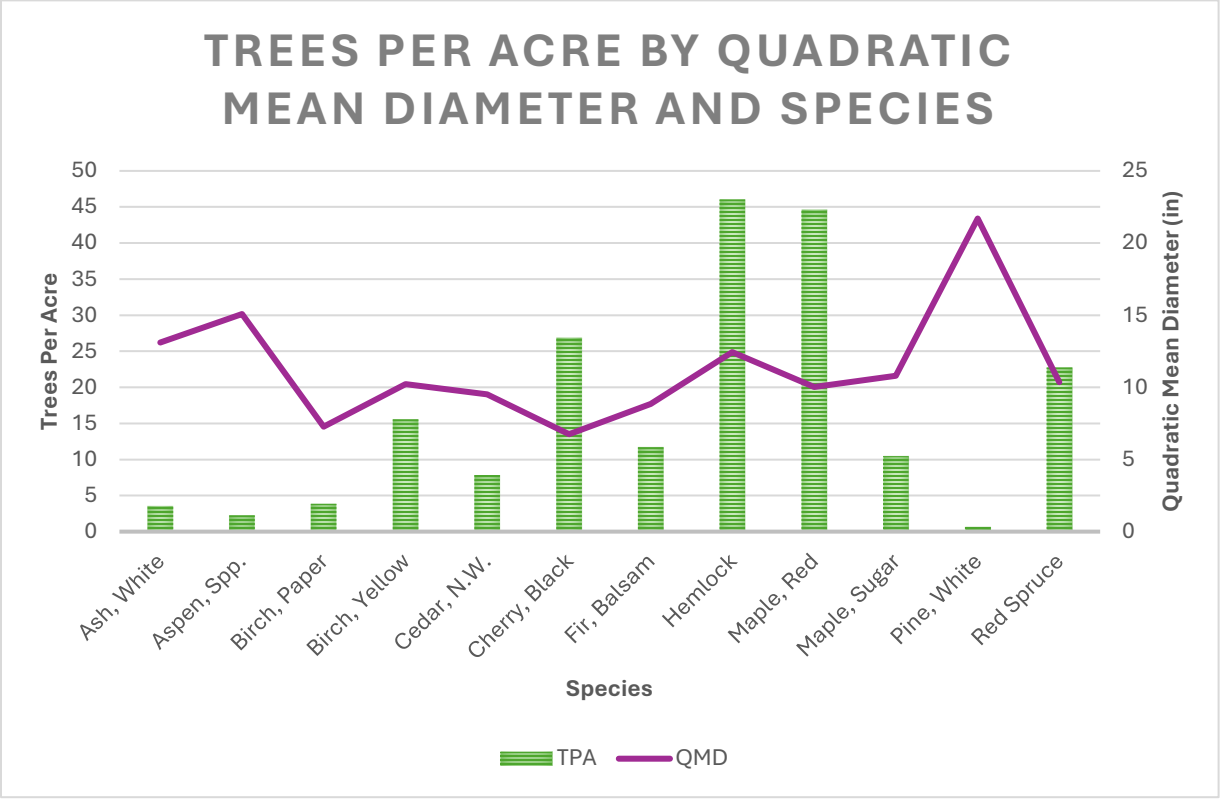
Forest Stand 2

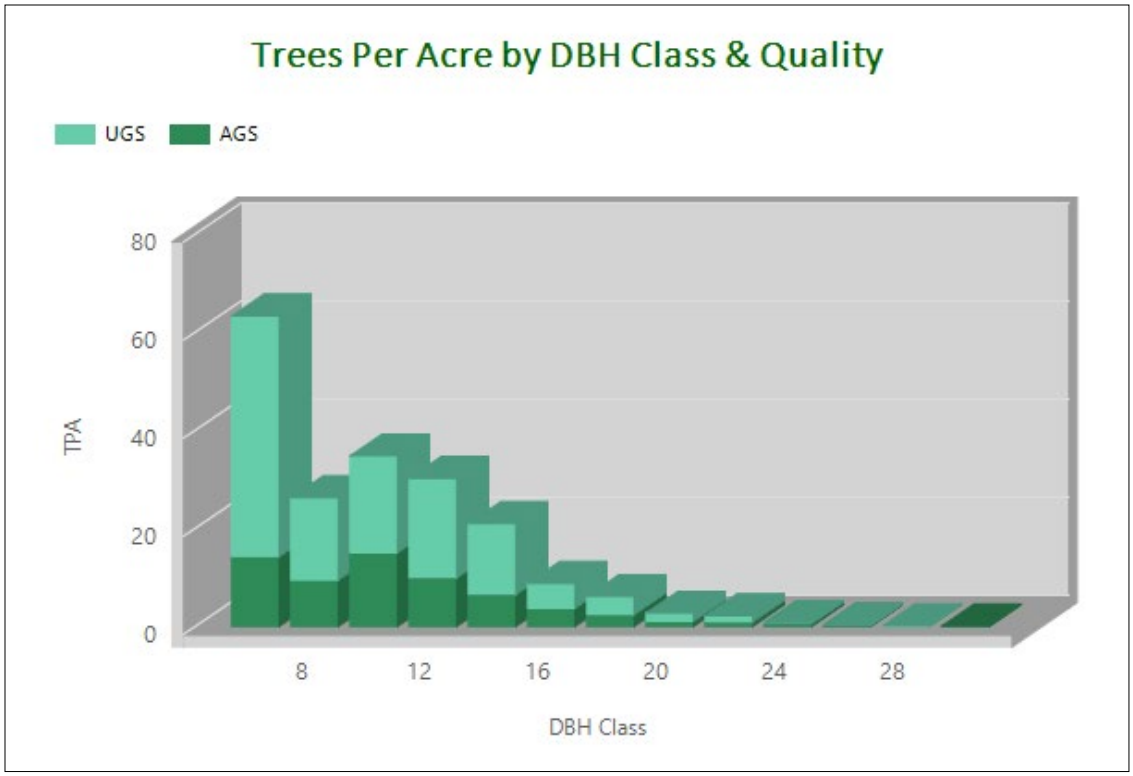
Acreage: 65 acres

Forest Type: Mixedwood

Composition: Hemlock (34%), red maple (21%), red spruce (11%), yellow birch (8%), sugar maple (6%), black cherry (6%), balsam fir (4%), northern white-cedar (3%), white ash (3%), aspen (2%), white pine (1%), paper birch (1%).

Understory Composition: Generally lacking. Scattered beech, red spruce, hemlock and red maple saplings, striped maple and hobblebush. Beech and hobblebush are browsed by deer which is unusual; an indication of a lack of other food options in the area.





Stand Description: Stand 2 is a relatively diverse stand of multiple age classes that have developed as a result of previous harvesting (approximately 30 years ago). There are areas of yellow birch and red maple poles that likely became established in group openings, as well as mature, sawtimber-sized stems. This stand is in the northern portion of the property. Terrain is variable with some gentle slopes and areas of steeper ground. Aspect is generally northerly.

Regeneration: Present though not abundant. Scattered red spruce, hemlock, red maple and beech seedlings and saplings. Pole sized yellow birch and red maple indicate regeneration success in the past under open canopy conditions.

Age Structure: Multi-aged **Size Class:** Poles to large sawtimber

Stocking: Well-stocked, just above the B-line on the mixedwood stocking guide. See below.

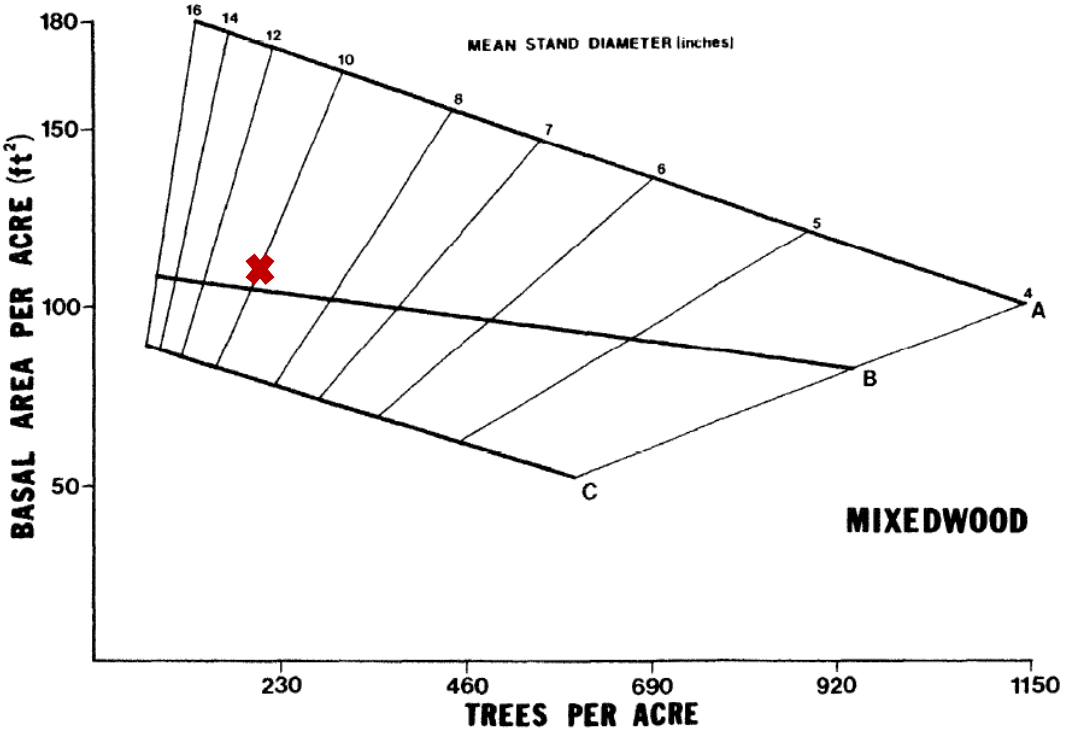


Figure 7.—Stocking guide for main crown canopy of mixedwood stands (25 to 65 percent softwoods) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking, the C line is minimum stocking.

Total Basal Area/Acre: 117ft^2 **AGS Basal Area/Acre:** 43ft^2

Quadratic Mean Stand Diameter: 10 inches **Trees Per Acre:** 196

Approximate Stand Age: multi-aged; approximately 30, 60 and 100 years +/-

Stand Health: No significant forest health issues were observed. Beech bark disease is common in the beech component. Balsam fir is in decline and much of this component has already died. Browsing my deer is apparent in the understory and has likely inhibited regeneration of desirable stems. There are approximately 25 snags per acre in this stand, 60% of which are less than 12 inches in diameter. There are approximately 8 snags per acre between 12 and 16 inches, and there are about 2 snags per acre greater than 16 inches in this stand.

Invasive Species: Bush honeysuckle was observed along Wright Farm Road on the northern end of this stand. No invasive plants were observed deeper into the forest in this area.

Site Index: 61 for sugar maple

History/Previous Activity: Field evidence suggests harvesting occurred approximately 30 years ago in this stand. Groups of pole-sized stems indicate group openings in the canopy may have been created at that time.

Silvicultural Management Objectives: This forest will continue to be managed for multiple age classes. Historical management activities in this area have resulted in multiple cohorts of trees. Uneven-aged and multi-aged management techniques can be employed to enhance and continue to diversify stand conditions, establishing additional cohorts of trees and increasing structural diversity.

Silvicultural Prescription: No activity is prescribed in this stand. Stocking in this stand is at the optimal level for tree growth in this stand, and the forest will continue to develop and grow during this management period. Monitoring for invasive plants is a good idea considering the presence of honeysuckle along the northern edge and south of this stand on the property.

Cutting Cycle: N/A

Target Diameter: N/A

Rotation Age: N/A

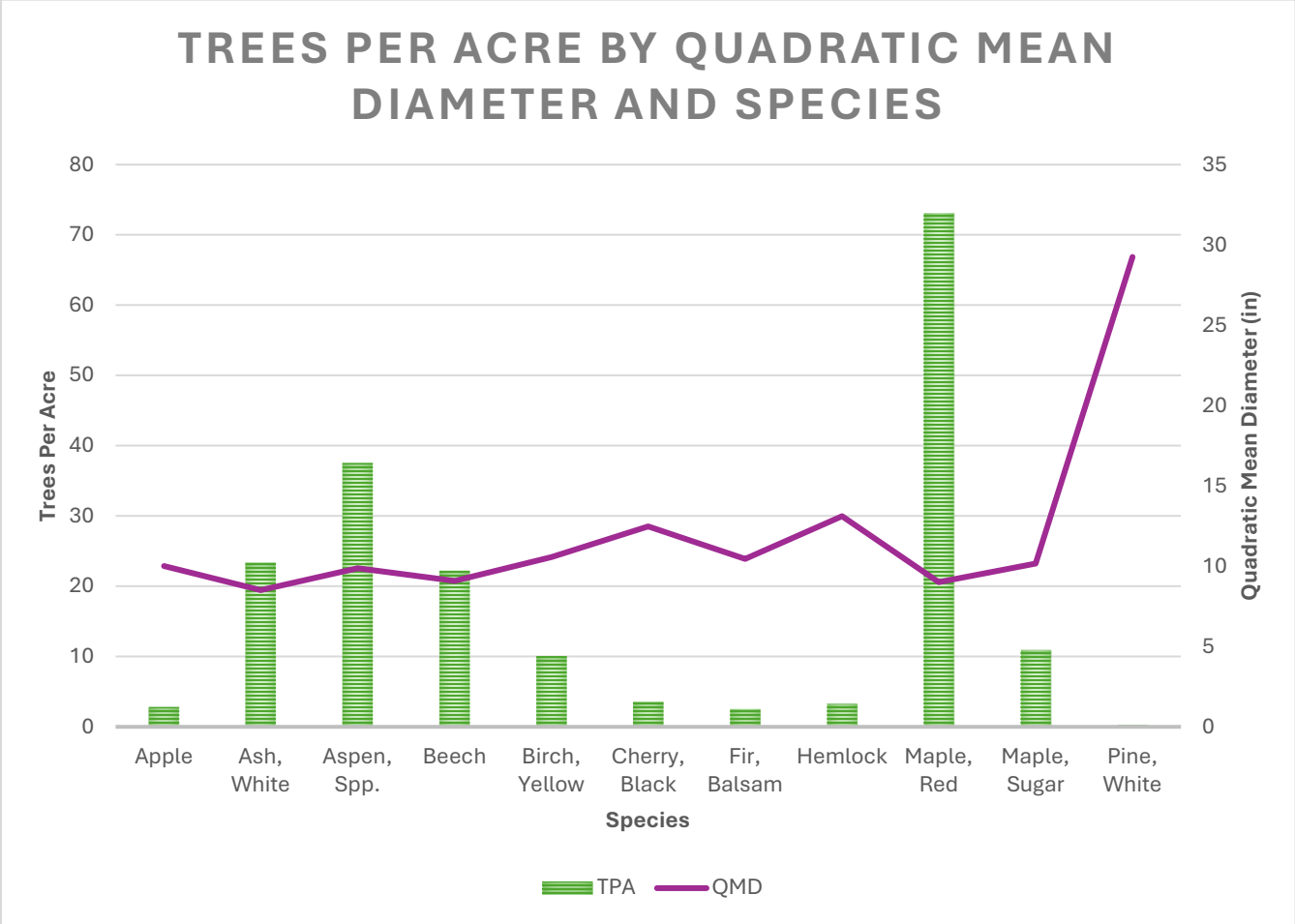
Forest Stand 3

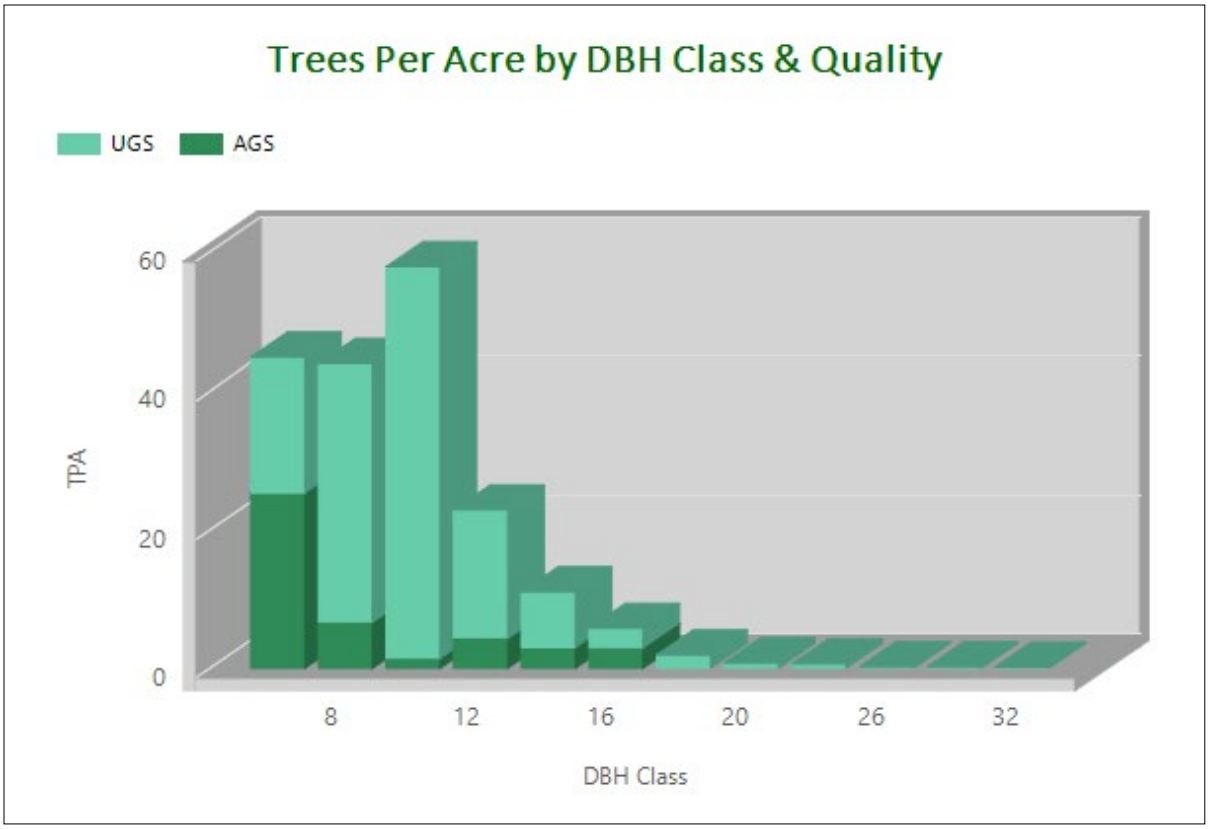
Acreage: 54 acres

Forest Type: Northern hardwood (red maple)

Composition: Red maple (34%), aspen (21%), beech (11%), white ash (10%), sugar maple (7%), yellow birch (7%), black cherry (3%), hemlock (3%), balsam fir (2%), white pine (2%).

Understory Composition: Lacking. Very few beech seedlings observed, as well as fern cover.





Stand Description: This red maple dominated northern hardwood stand is the result of pasture abandonment approximately 50 years ago and it is still in a phase of development. Terrain is relatively gentle and aspect is generally northerly. Honeysuckle bushes are a problem within this stand; portions of the stand near the open area are more densely infested. Many of these bushes are mature and fruit-bearing.

Regeneration: Generally lacking. There are few scattered beech seedlings. Ferns are present in much of the understory, as is spirea. Evidence of deer in the area was relatively abundant (tracks, scat and browsed stems) and is likely contributing to low levels of regeneration in the area.

Age Structure: Even-aged **Size Class:** Poles

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

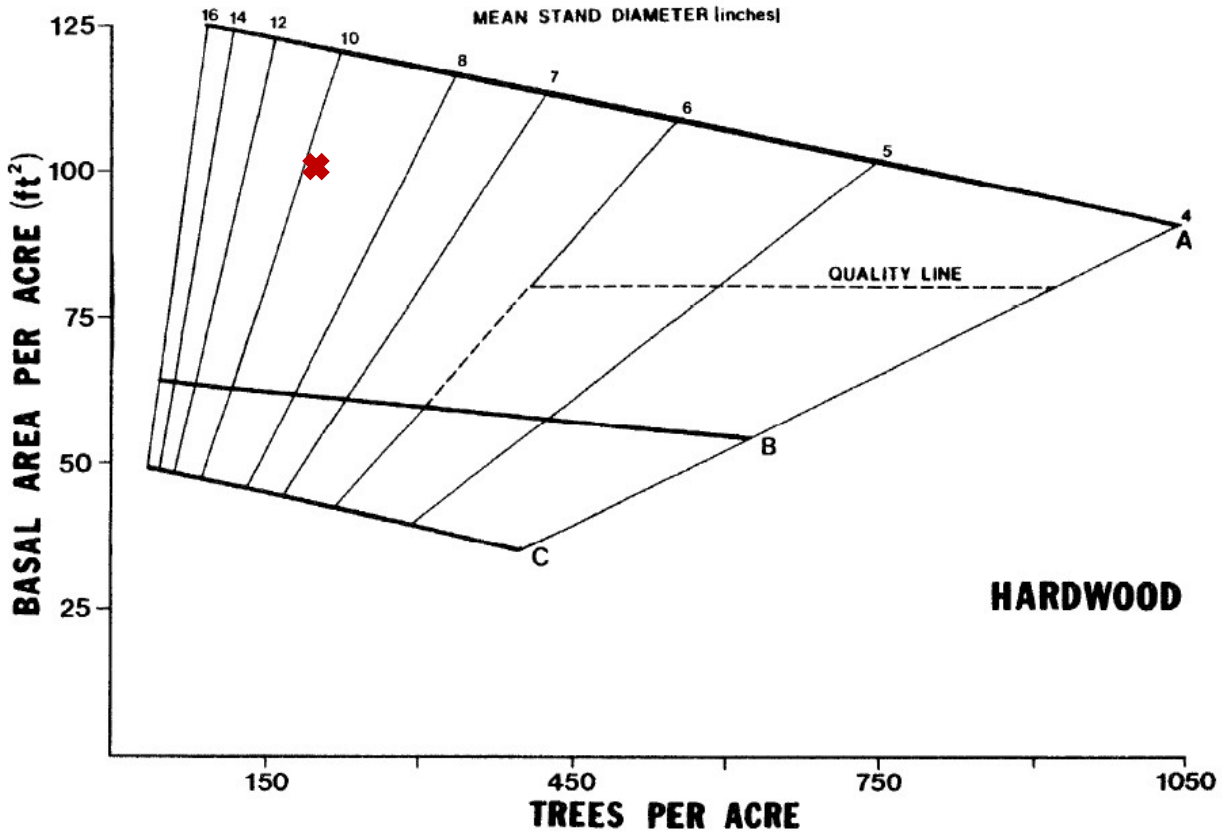


Figure 6.—Stocking guide for main crown canopy of even-aged hardwood stands (beech-red maple, beech-birch-maple) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking. The C-line is minimum stocking. The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

Total Basal Area/Acre: 95ft^2

AGS Basal Area/Acre: 18ft^2

Quadratic Mean Stand Diameter: 10 inches

Trees Per Acre: 190

Approximate Stand Age: 50 years

Stand Health: No significant forest health issues were observed in this stand. Red maples in this stand are often multi-stemmed and of poor quality. Honeysuckle bushes are present and fruit-bearing.

Invasive Species: Honeysuckle bushes are present at moderate levels and are fruit-bearing.

Site Index: 61 for sugar maple

History/Previous Activity: No evidence of management was observed in this stand; area is regenerating following pasture abandonment.

Silvicultural Management Objectives: Over time, this stand will be managed for the development of multiple age classes. As a result of the land-use history, current stand conditions have limited structural

diversity, and the forest is even-aged. Uneven-aged management techniques can be employed to establish new age classes of trees and increase structural diversity.

Silvicultural Prescription: No activity is prescribed. This stand is in a phase of development, and stocking is not critically high. Invasive plant control is strongly recommended. There are multiple strategies for controlling honeysuckle bushes. Pulling bushes up by the roots, being careful to try to remove all root fragments from the ground is one option for manual control. Since many of these bushes are fruit-bearing, it would be beneficial to break stems of all mature plants by bending them and stripping them – this would inhibit fruit production in the coming growing season. Honeysuckle bushes are also easily killed using herbicide. An application of glyphosate to a cut honeysuckle stump will usually kill the bush. Cutting bushes, allowing them to resprout and spraying the resprouts with glyphosate is another option. Any chemical controls should be carried out in the fall when the plants are allocating energy to their roots; this means when they are treated with herbicide, they are pulling the chemical into their roots and helping to ensure death. The County Forester is available to provide more information and tips for control. The VT Invasives website is another good resource: www.vtinvasives.org

Cutting Cycle: N/A

Target Diameter: N/A

Rotation Age: N/A

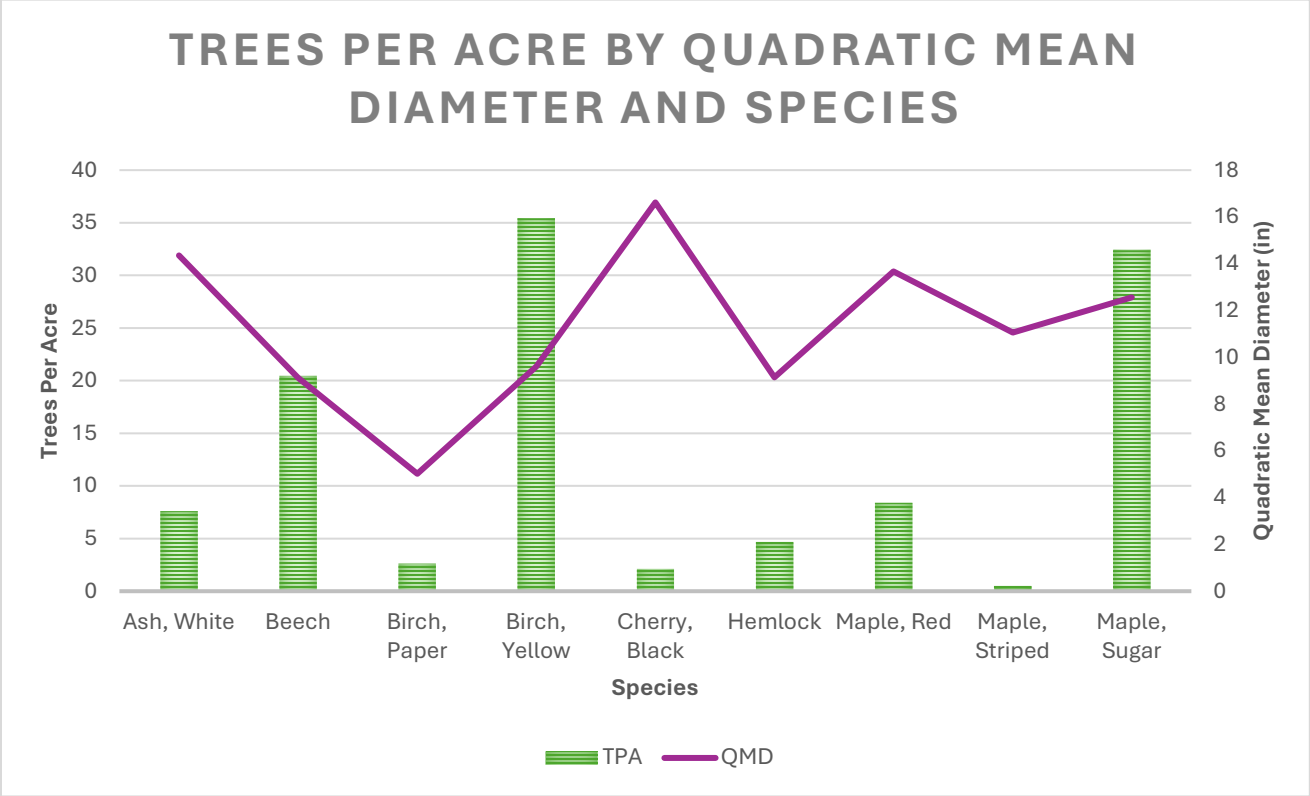
Forest Stand 4

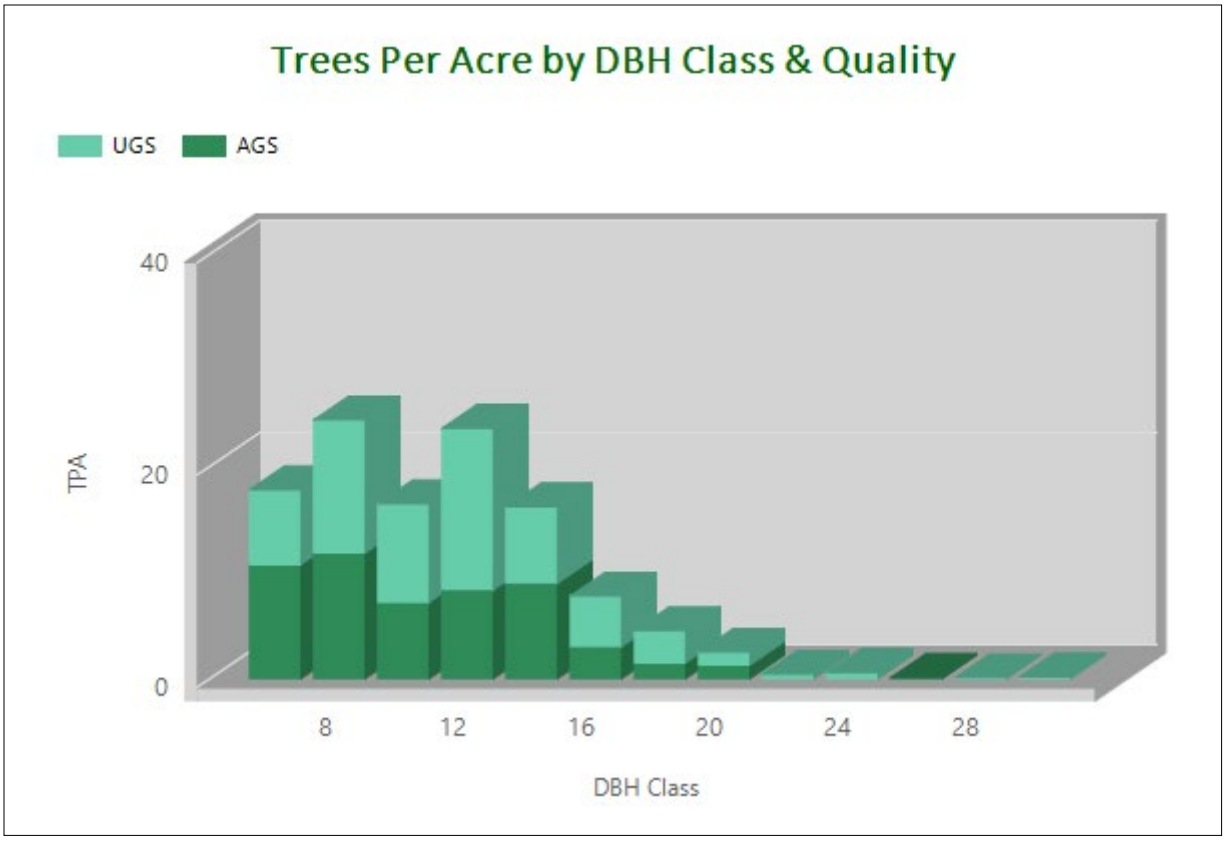
Acreage: 105 acres

Forest Type: Northern hardwoods

Composition: Sugar maple (36%), yellow birch (23%), beech (12%), white ash (11%), red maple (11%), black cherry (4%), and hemlock (3%).

Understory Composition: Lacking. Mainly beech saplings. Scattered red spruce saplings, hobblebush.





Stand Description: This sugar maple dominated northern hardwood stand is in the central and southern portion of the property, and it encompasses much of the ridge top. Defoliation by forest tent caterpillars in 2016-2018 likely contributed to sugar maple decline that is observed in this stand. White ash trees also appear to be in decline, possibly due to the presence of emerald ash borer. Terrain is variable with areas of gentle topography and some steeper ground. Aspect is generally to the north and east.

Regeneration: Dominated by beech saplings. Most of the beech trees in this area have beech bark disease. The imminent threat of beech leaf disease is another concern for regeneration in this stand. Hobblebush is also present in the understory, and most has been browsed.

Age Structure: Two-aged **Size Class:** sawtimber

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

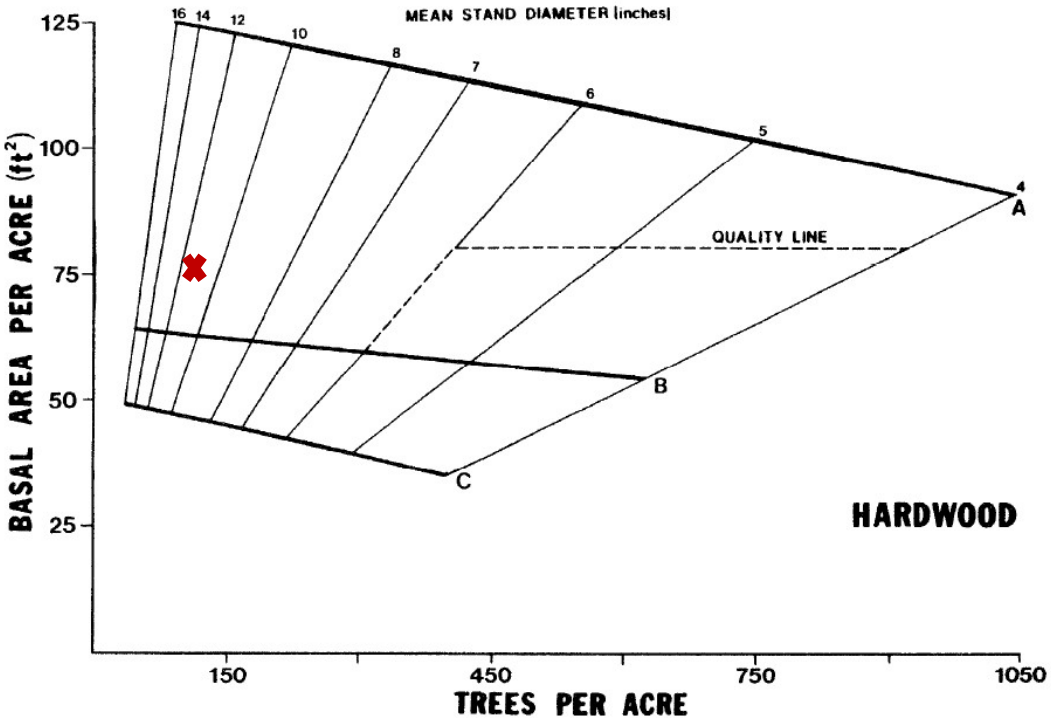


Figure 6.—Stocking guide for main crown canopy of even-aged hardwood stands (beech-red maple, beech-birch-maple) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking. The C-line is minimum stocking. The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

Total Basal Area/Acre: 78ft^2 **AGS Basal Area/Acre:** 33ft^2

Quadratic Mean Stand Diameter: 11 inches **Trees Per Acre:** 114

Approximate Stand Age: Two aged; approximately 50 and 100 years +/-

Stand Health: No significant forest health issues were observed. As noted above, beech bark disease is present in beech trees. Decline in ash trees may be due to presence of emerald ash borer. Sugar maple trees have experienced some decline likely in response to defoliation by forest tent caterpillar outbreak in 2016-2018.

Invasive Species: Honeysuckle bushes were noted in this stand in very low levels and are in proximity to skid trails.

Site Index: 61 for sugar maple

History/Previous Activity: Skid trails and old stumps in this stand indicate past harvesting, likely 30+ years ago.

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 and past management activities, current stand

conditions have limited structural diversity. Uneven-aged management techniques can be employed to establish new age classes of trees and enhance structural diversity.

Silvicultural Prescription: No activity is prescribed for this planning period. Stocking levels in this stand are below the "quality line" on the stocking chart, indicating that there is still room for growth and a harvest is not critical to ensure continued forest health. The white ash component of this stand is not likely to survive into the next planning period; should the Town decide that they'd like to take an active approach, a small group selection harvest involving removal of ash trees (as well as mature stems of other species and poor quality trees of all size classes) to capture their value before they are killed by emerald ash borer may be explored. This plan may be amended – contact the County Forester.

Cutting Cycle: N/A

Target Diameter: N/A

Rotation Age: N/A

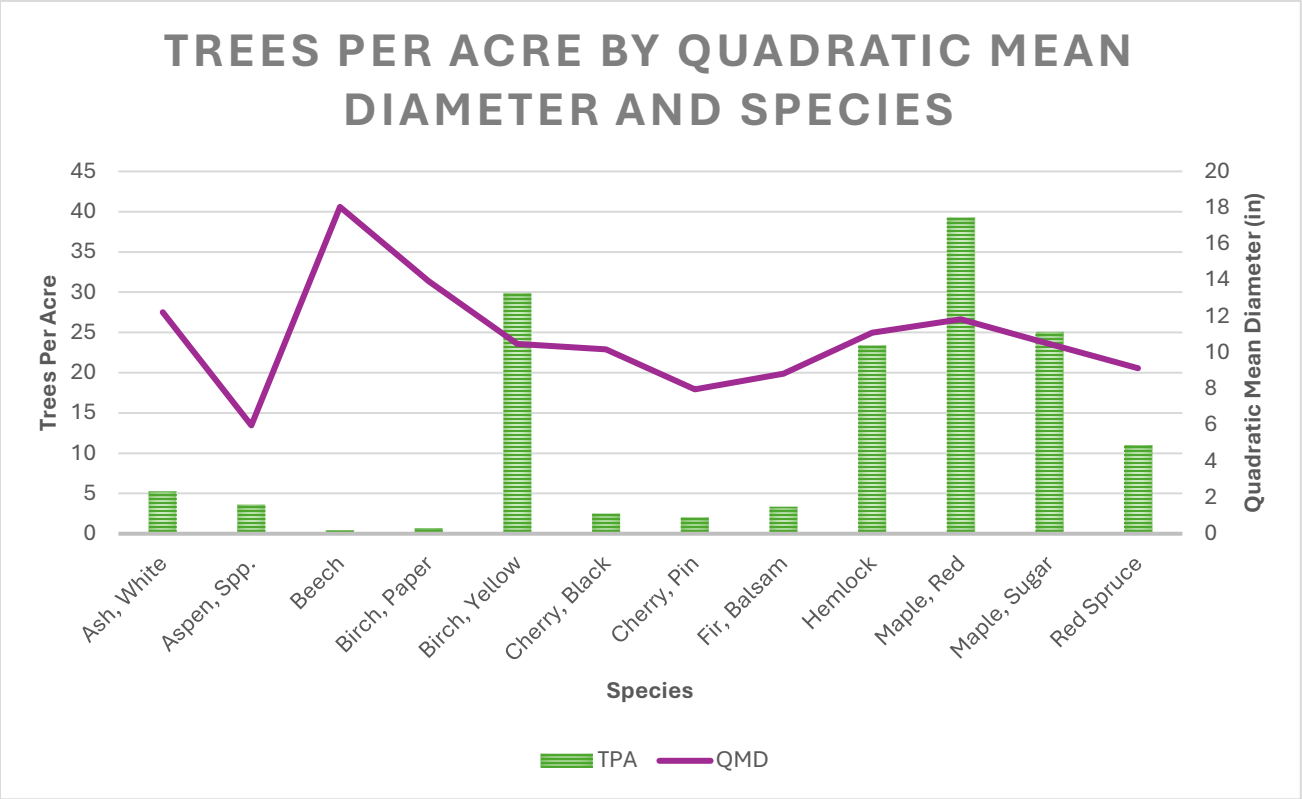
Forest Stand 5

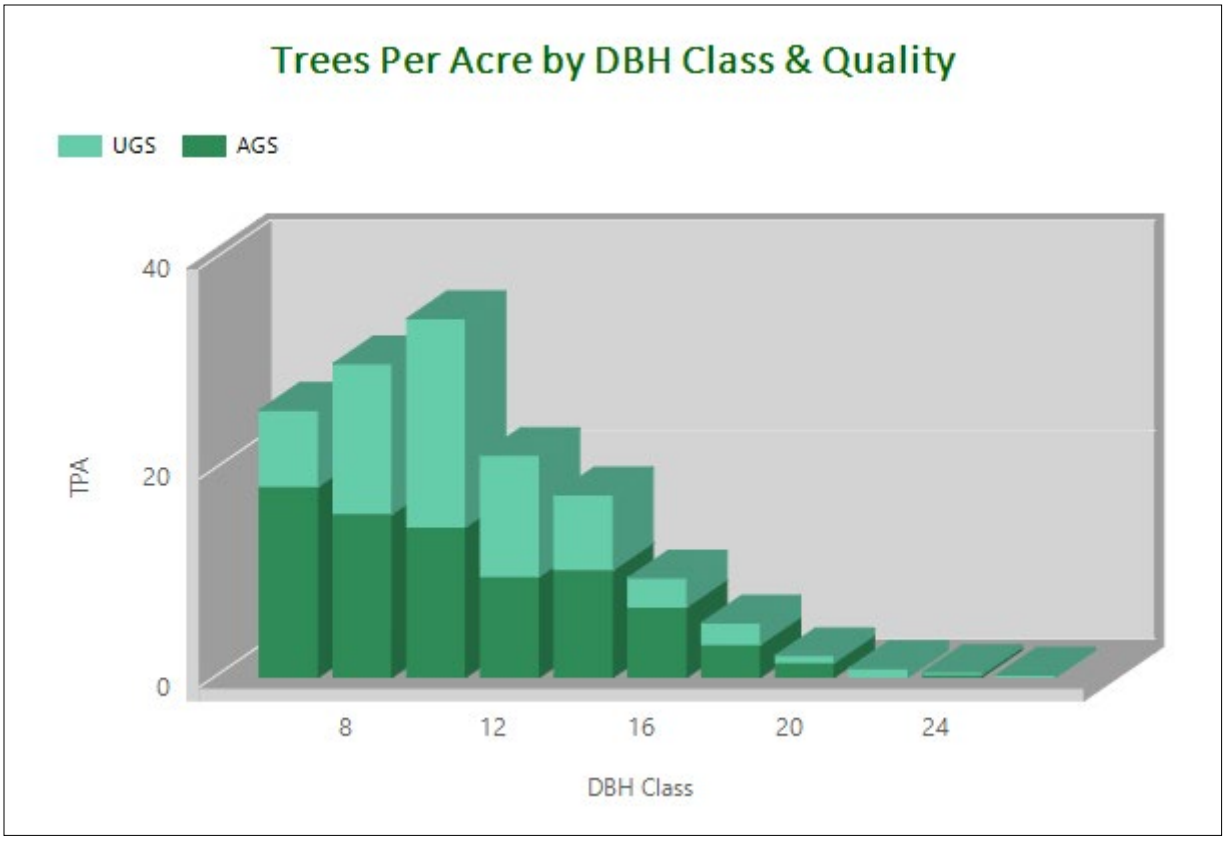
Acreage: 49 acres

Forest Type: Mixedwood

Composition: Red maple (32%), yellow birch (19%), hemlock (17%), sugar maple (16%), red spruce (6%), white ash (5%), balsam fir (2%), black cherry (2%), and less than 1% each of aspen, beech and birch.

Understory Composition: Generally lacking. Beech saplings and scattered yellow birch saplings; hobblebush.





Stand Description: Stand 5 is in the eastern portion of the property, above Hardwick Village. It is a red maple dominated mixedwood stand. Once the leaves have fallen, this area offers some good views of Hardwick below. The area is quite steep, and the softwood component is dominated by hemlock outcrops on top of the steep dropoffs. Aspect is mainly to the east and north.

Regeneration: Generally lacking. Scattered beech and hemlock saplings are present but not abundant.

Age Structure: Two-aged **Size Class:** sawtimber

Stocking: Well-stocked, below the B-line on the mixedwood stocking guide (see below), and in a good position to continue to develop.

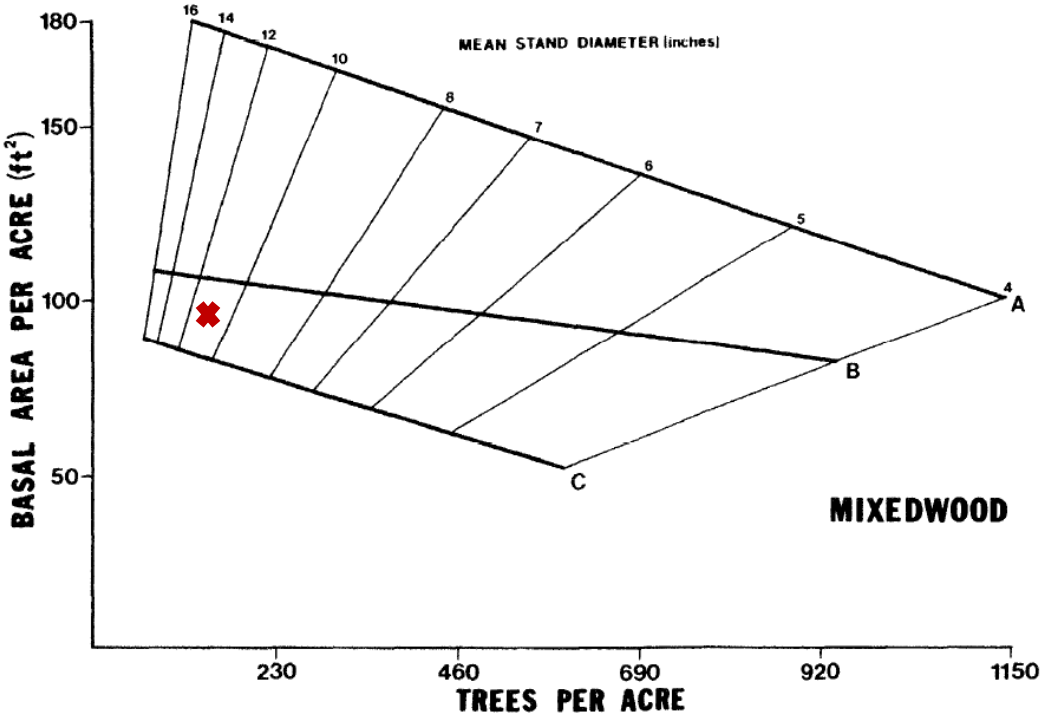


Figure 7.—Stocking guide for main crown canopy of mixedwood stands (25 to 65 percent softwoods) shows basal area and number of trees per acre and quadratic mean stand diameter. The A line is fully stocked, the B line is suggested residual stocking, the C line is minimum stocking.

Total Basal Area/Acre: 94ft^2 **AGS Basal Area/Acre:** 50ft^2

Quadratic Mean Stand Diameter: 11 inches **Trees Per Acre:** 146

Approximate Stand Age: Two-aged; approximately 50 and 100 +/- years.

Stand Health: No significant forest health issues were observed.

Invasive Species: Honeysuckle bushes were observed along main trail originating from Atkins Field. No other invasive plants were observed other than those associated with the trail in this stand.

Site Index: 61 for sugar maple

History/Previous Activity: No activity has occurred in approximately 30 years in this area, and some of the steeper sections may never have been cut.

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 two-aged. Uneven-aged management techniques can be employed to establish new age classes of trees and increase structural diversity.

Silvicultural Prescription: No activity is prescribed in this area at this time. In the future, explore opportunities for enhancing old forest characteristics. This area has a lot of steep ground and interesting, cove-like areas below steep ground where nutrients pool, creating areas of enriched soils. Ecological forestry techniques could be used to enhance growth on crop trees or to create small canopy openings to encourage regeneration, for example. Legacy trees could also be demarcated to indicate they will never be cut, and will be allowed to live out their biological lifespans and serve as some of the biggest, oldest trees in the forest.

Cutting Cycle: N/A

Target Diameter: N/A

Rotation Age: N/A

Open Land / Old Landing Site / Orchard

This area is located along the eastern side of Wright Farm Road, at the western edge of Stand 3. Apple trees are scattered throughout the area, and unfortunately, introduced, invasive honeysuckle bushes are quite prevalent. Many of the honeysuckle bushes are large, mature, and fruit-bearing. It would be a good idea to explore ways of controlling the invasive plant infestation in this area. Because of the density of these bushes, control will be time consuming and potentially expensive. Manual control efforts over many years could potentially help to steward this area into a more natural state. If left to proliferate, this area will continue to be a seed source of the introduced, invasive honeysuckle, and the infestation will likely worsen and continue to spread. Honeysuckle bushes produce a fruit that is considered a low-quality food source for birds and other wildlife. Encouraging native plants in this area and working to control the honeysuckle infestation would provide better quality wildlife habitat.

Appendix 1: Soil Types and Descriptions