Forest Stewardship Plan for Town of Lyme Hartman Park
314.9 Mapped acres; 2025-2034
122 Gungy Road
Lyme, CT – New London County

Prepared for:

Town of Lyme
480 Hamburg Rd, Lyme, CT 0637
(860) 434-7733

Prepared by:

Ferrucci & Walicki, LLC
6 Way Rd.
Middlefield, CT 06455
Eric Hansen

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2 IDENTIFICATION

Landowner

Name: Town of Lyme
Address: 480 Hamburg Rd, Lyme, CT 06371

Phone: (860)-434-7733
Email: openspace@townlyme.org
Contact Person: Town of Lyme Open Space Coordinator, Wendy Hill

Property name: Hartman Park
Acres: 314.9
Address: 122 Gungy Road, Lyme, CT
County: New London County
Forested acres: 285.8

Plan Preparer

Name: Eric Hansen, CT Certified Forester F-720
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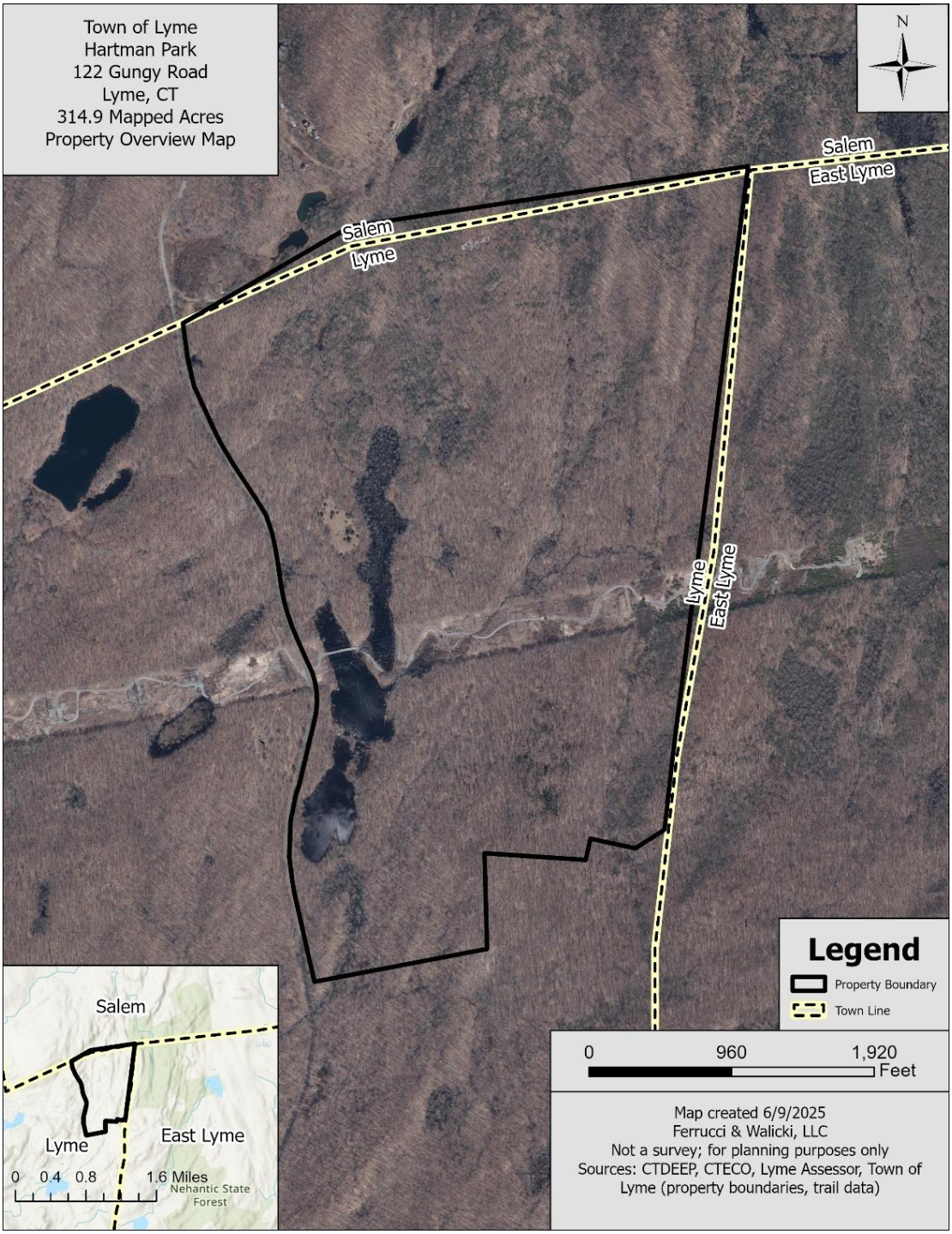
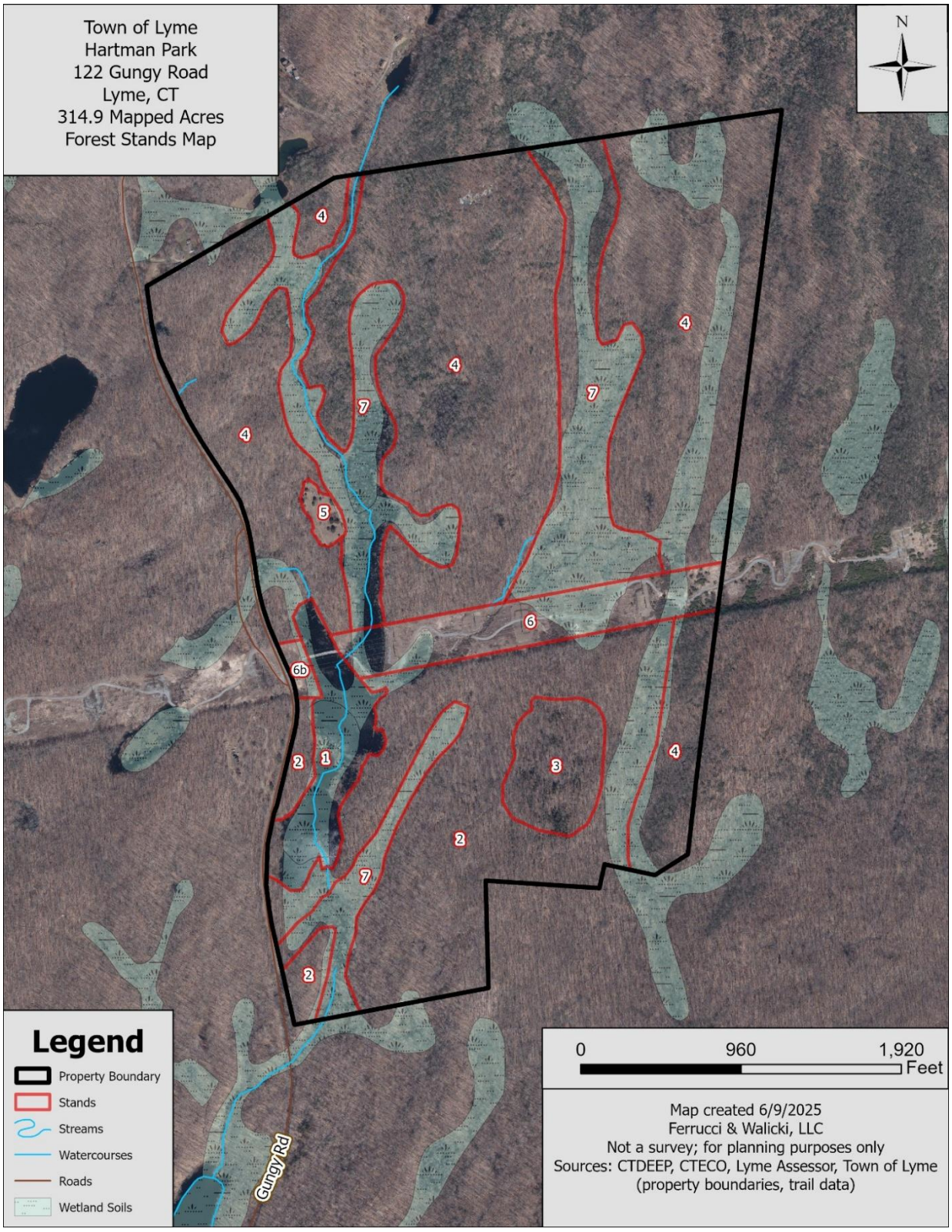
3 MAPS

This map set is intended to highlight notable features observed on the property. The maps do not show every occurrence or the exact locations for features displayed and are intended to serve as a visual aid for additional context on topics discussed throughout the plan.

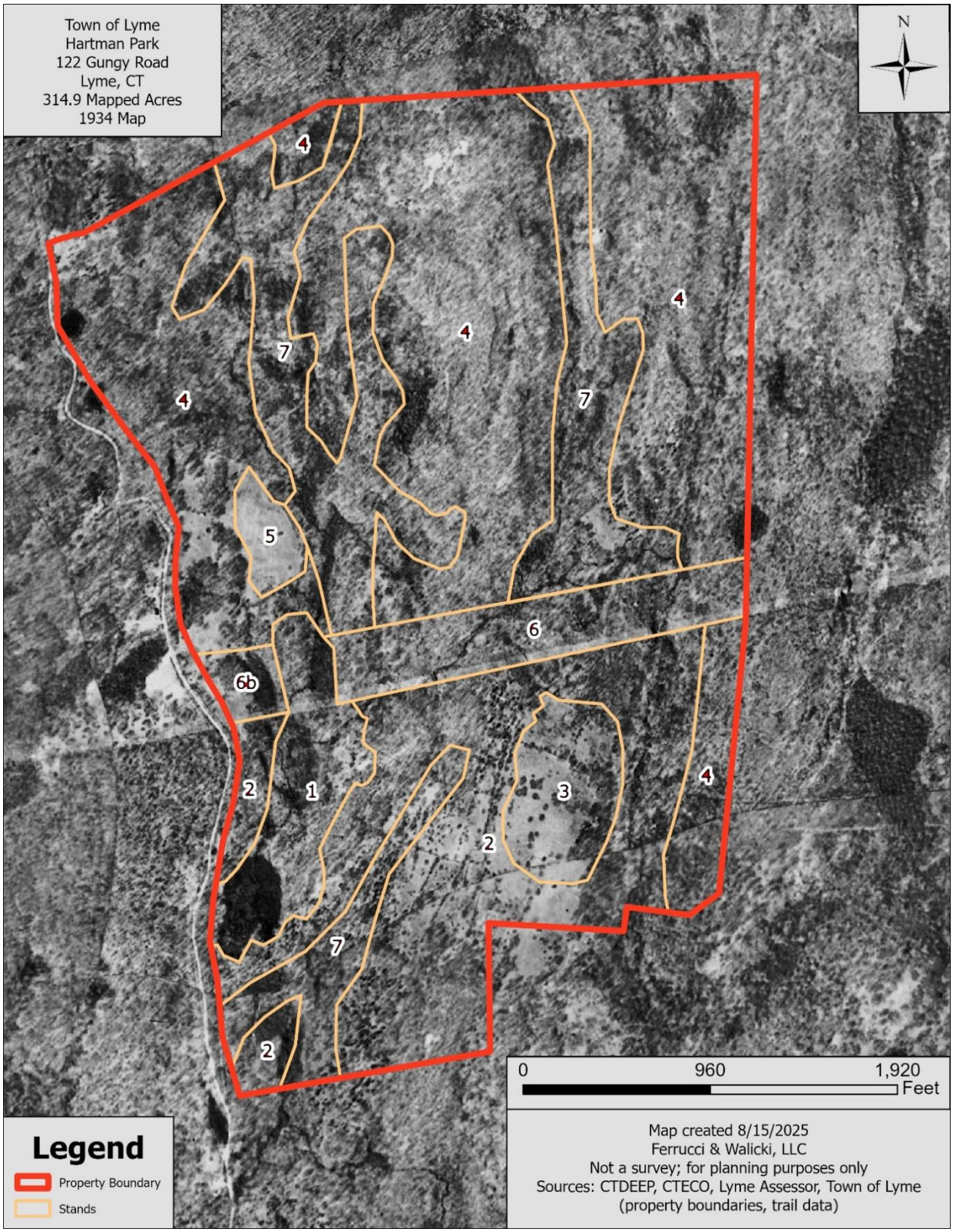
3.1 Property Overview Map



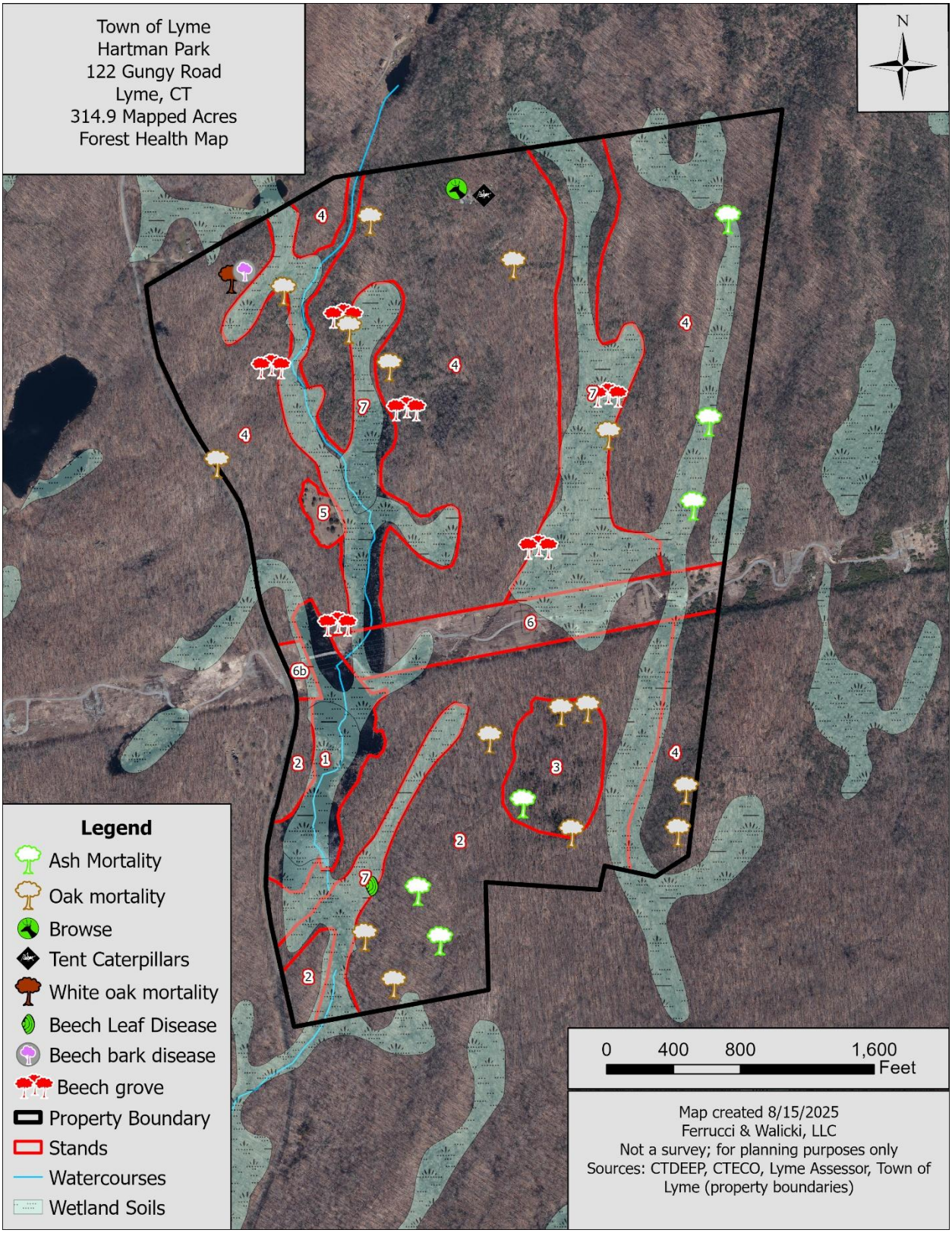
3.2 Stands Map



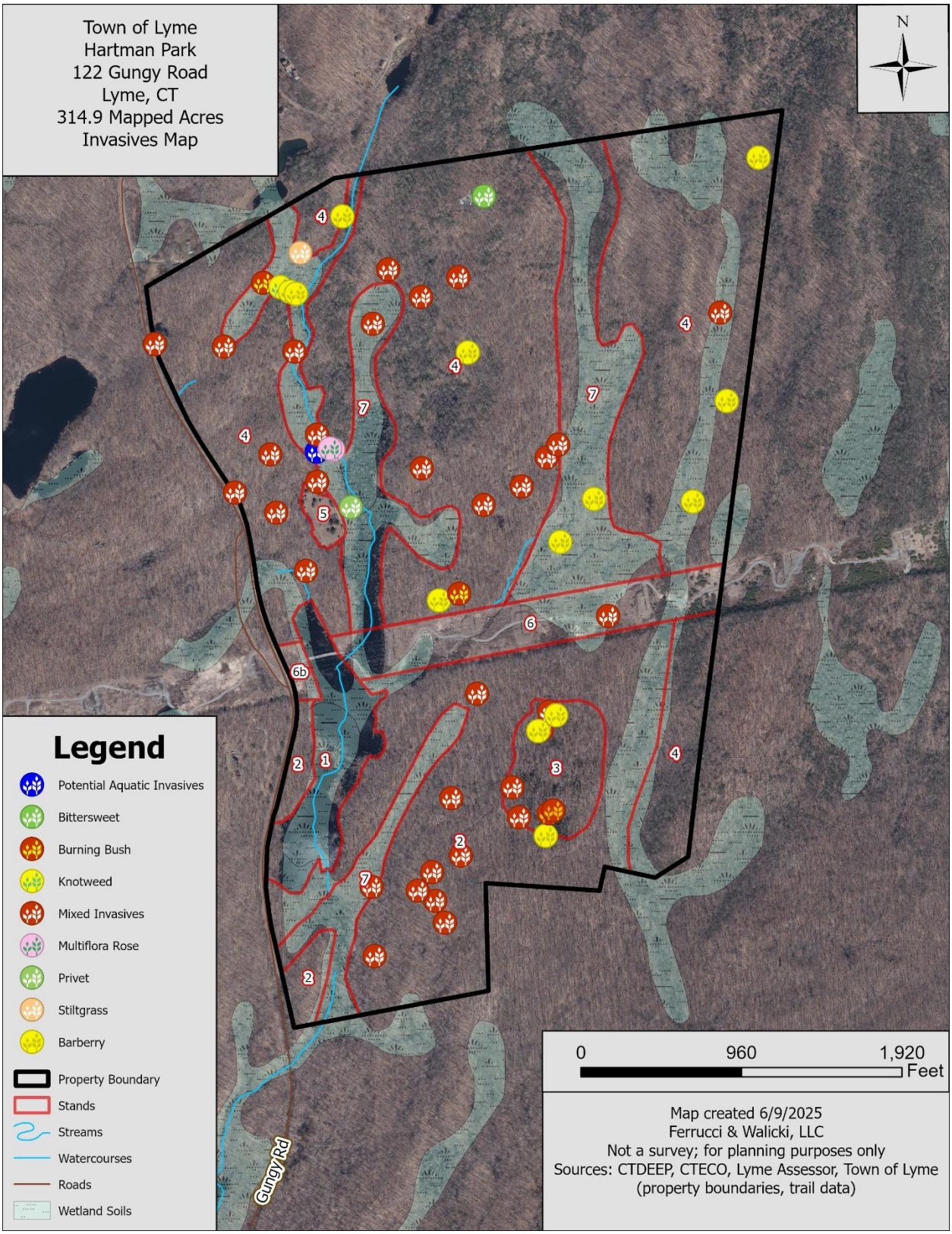
3.3 Historic Landcover (1934) Map



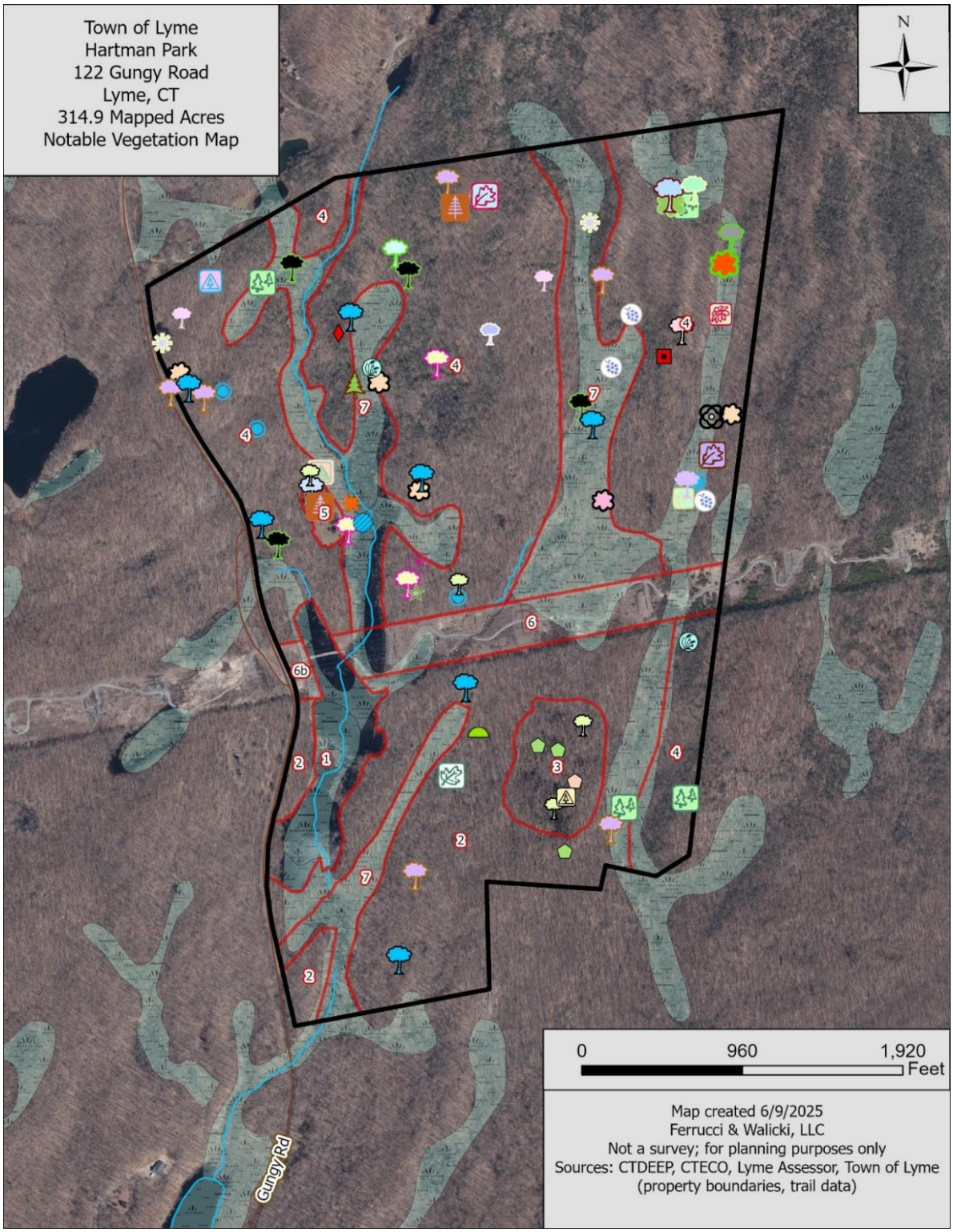
3.4 Forest Health Map



3.5 Invasives Map



3.6 Notable Vegetation/Features Map



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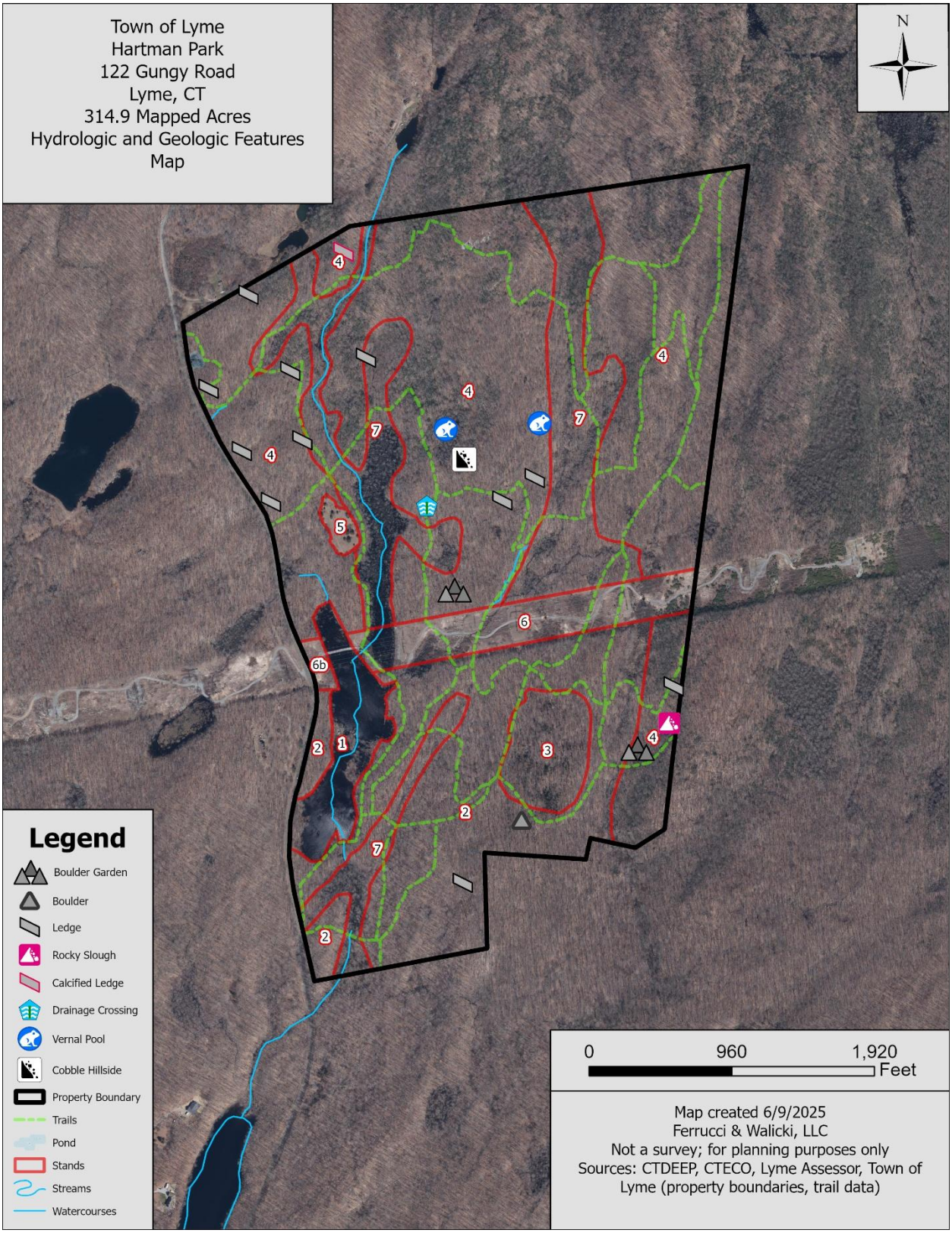
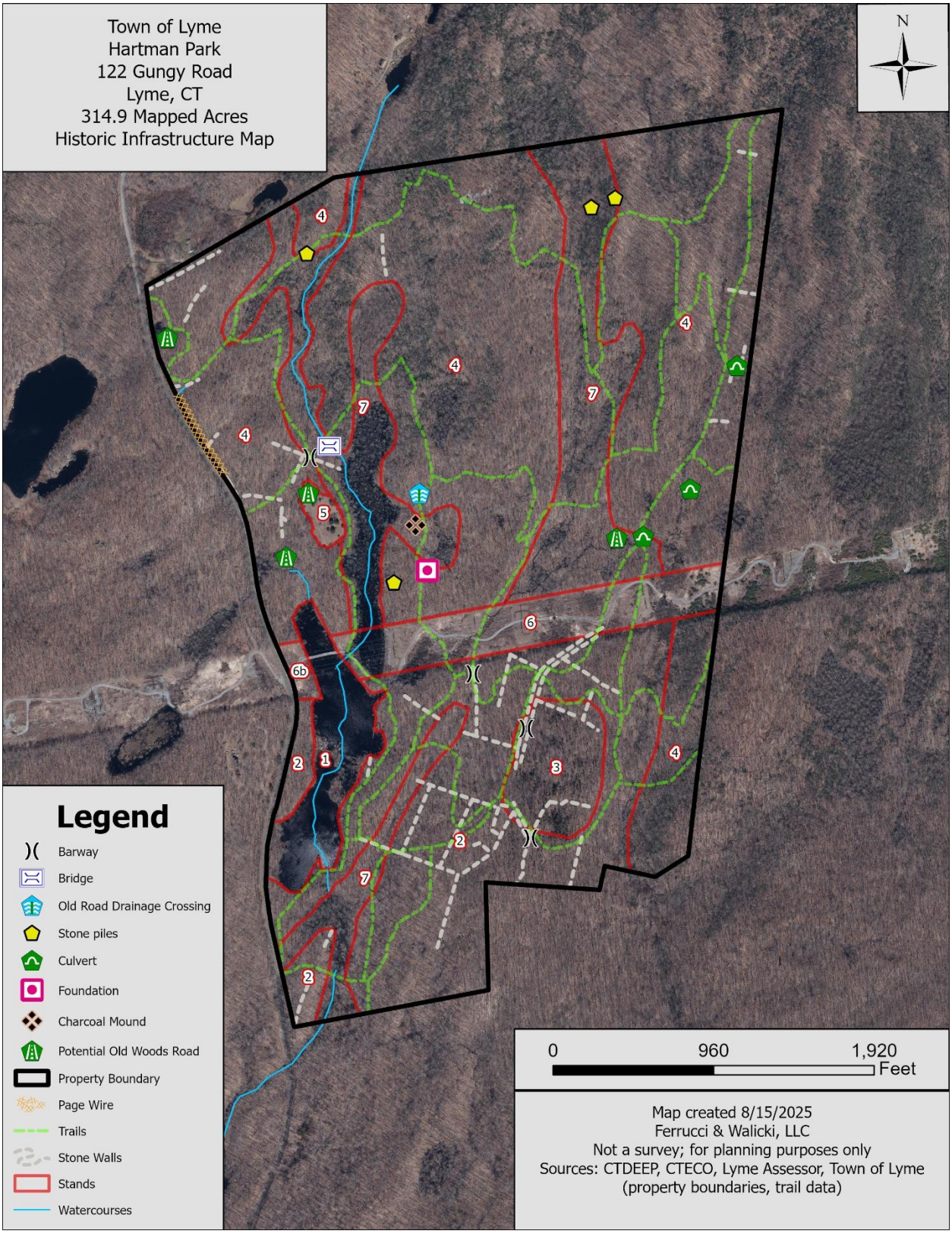
3.6.1 Notable Vegetation Map Legend

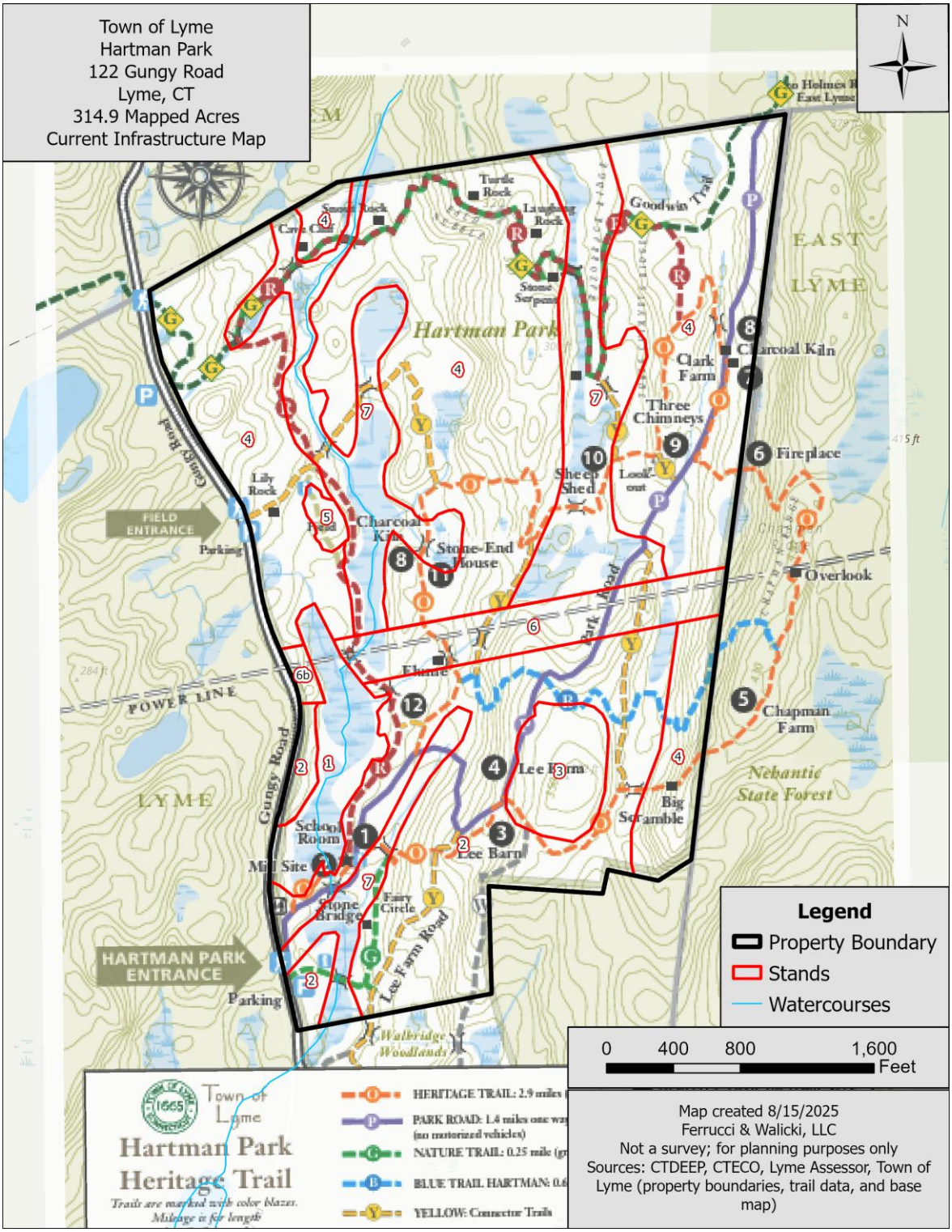
3.7 Hydrologic and Geologic Features Map



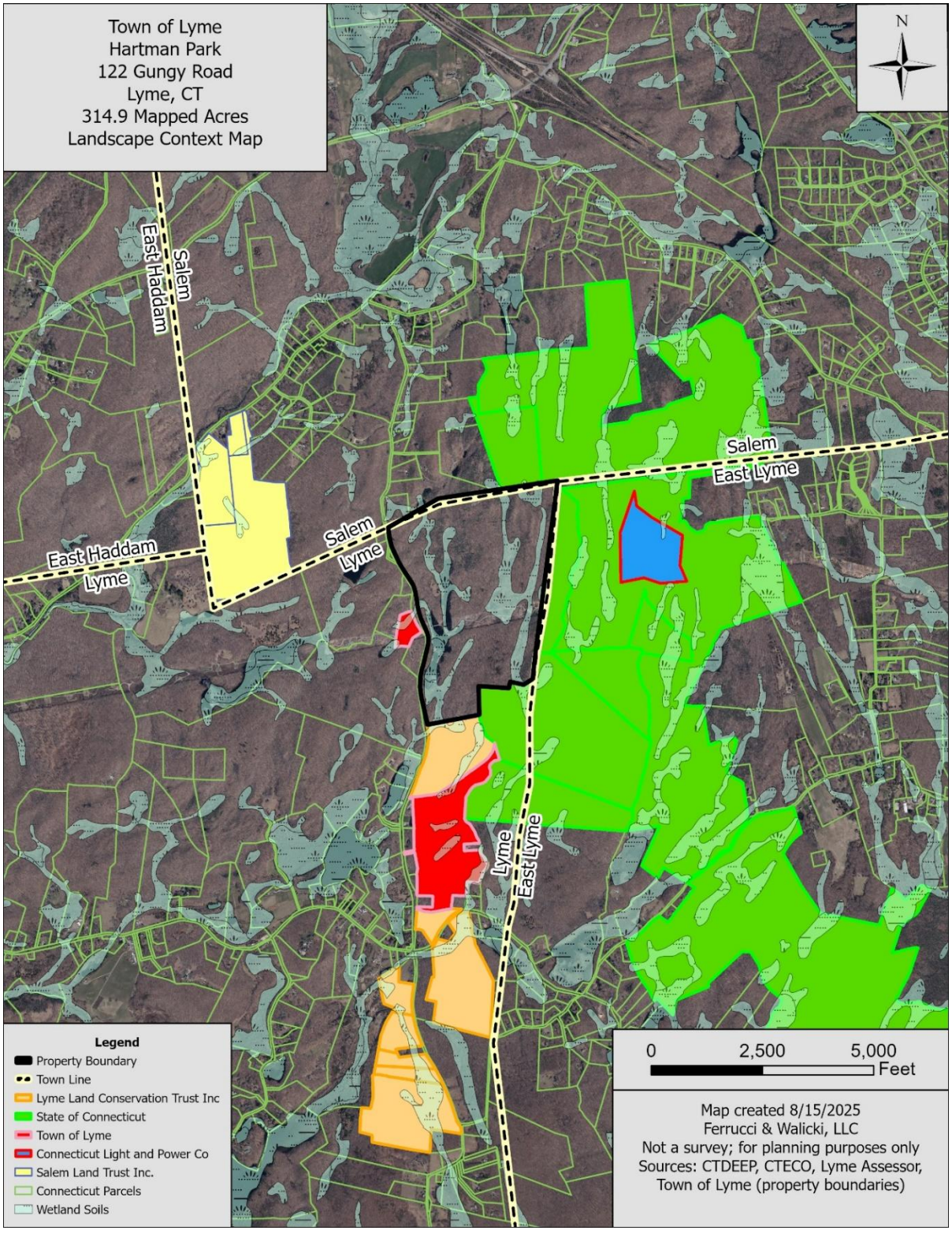
3.8 Historic and Current Infrastructure



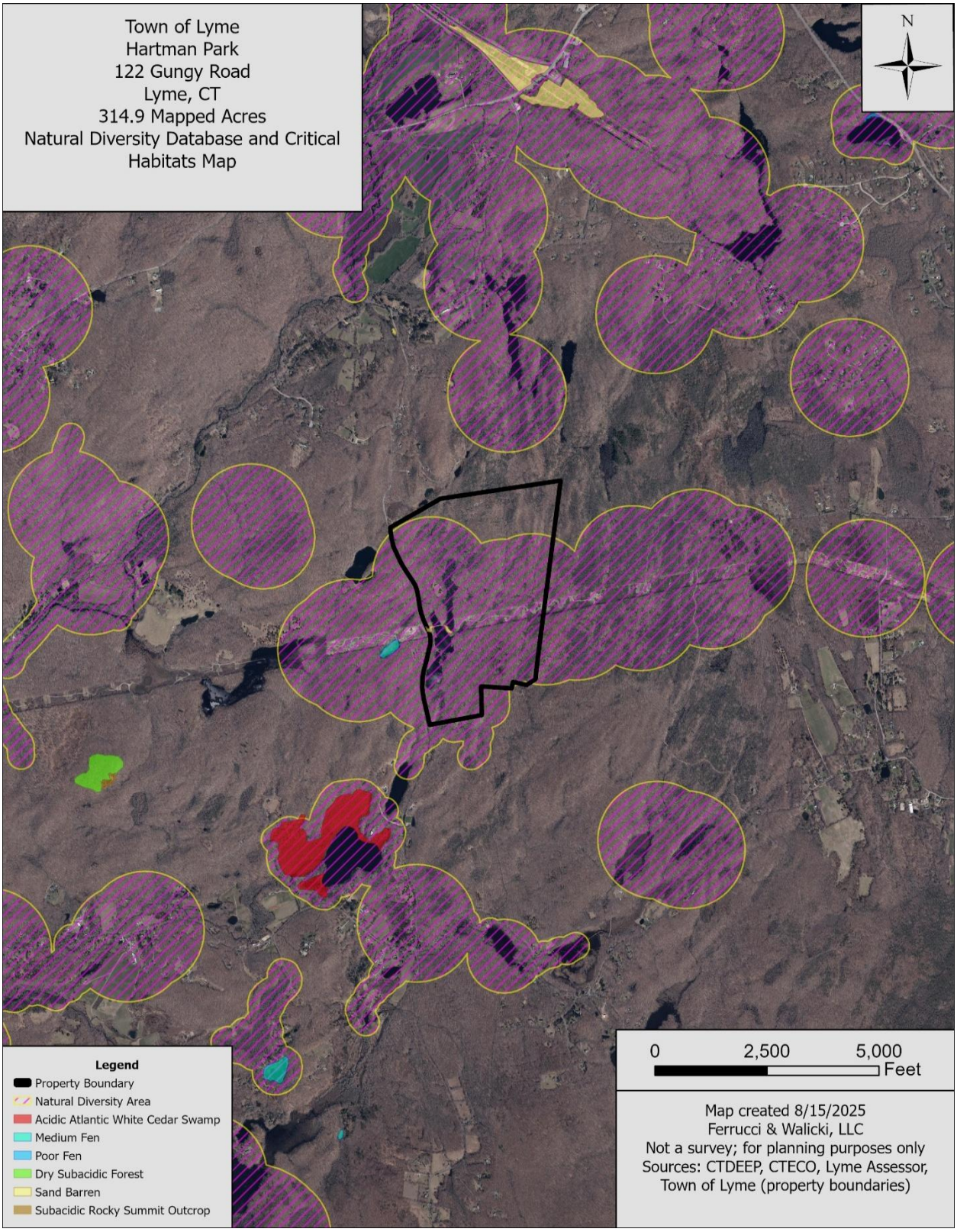
3.8.1 Current Infrastructure Map (Trails)



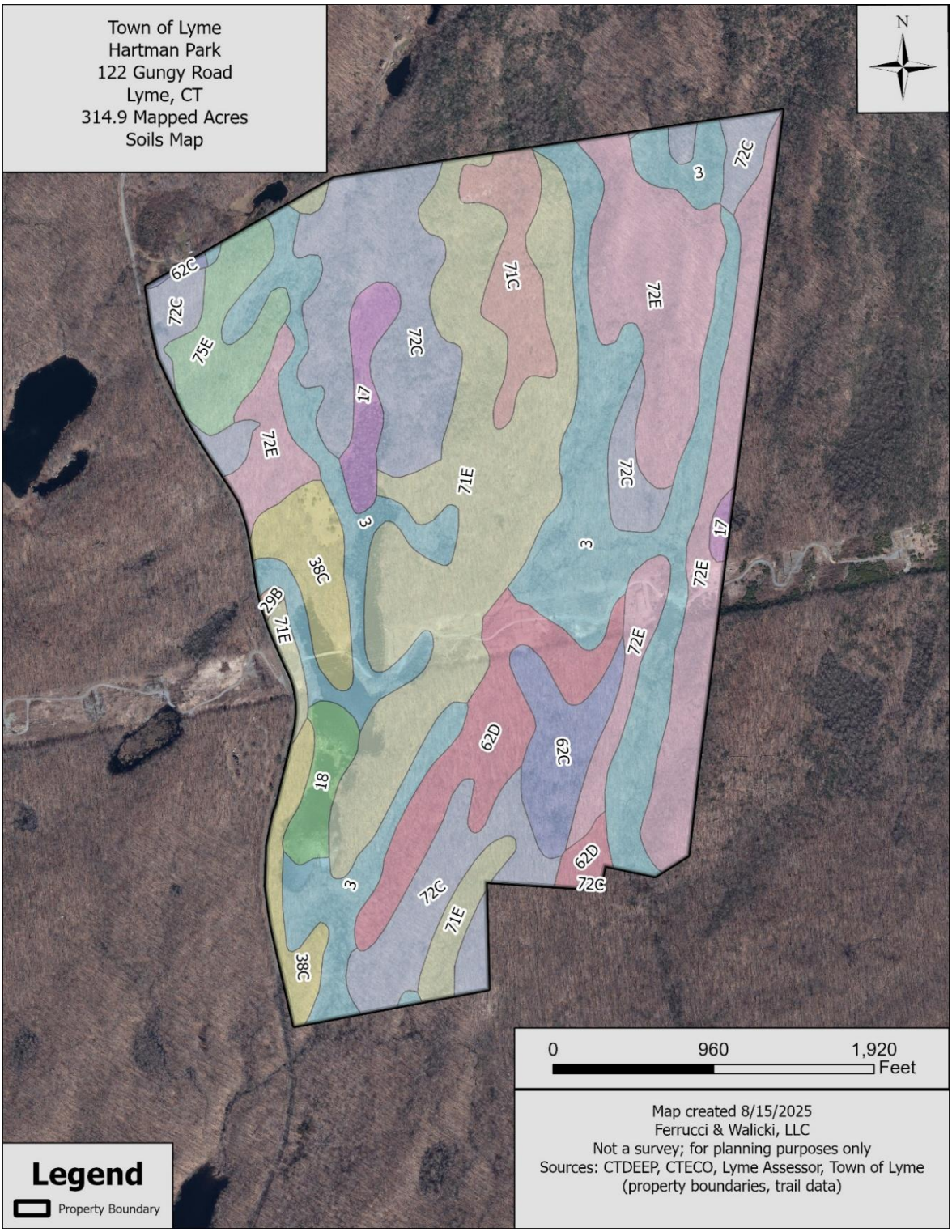
3.9 Landscape Context Map



3.10 NDDB and Critical Habitats



3.11 Soils



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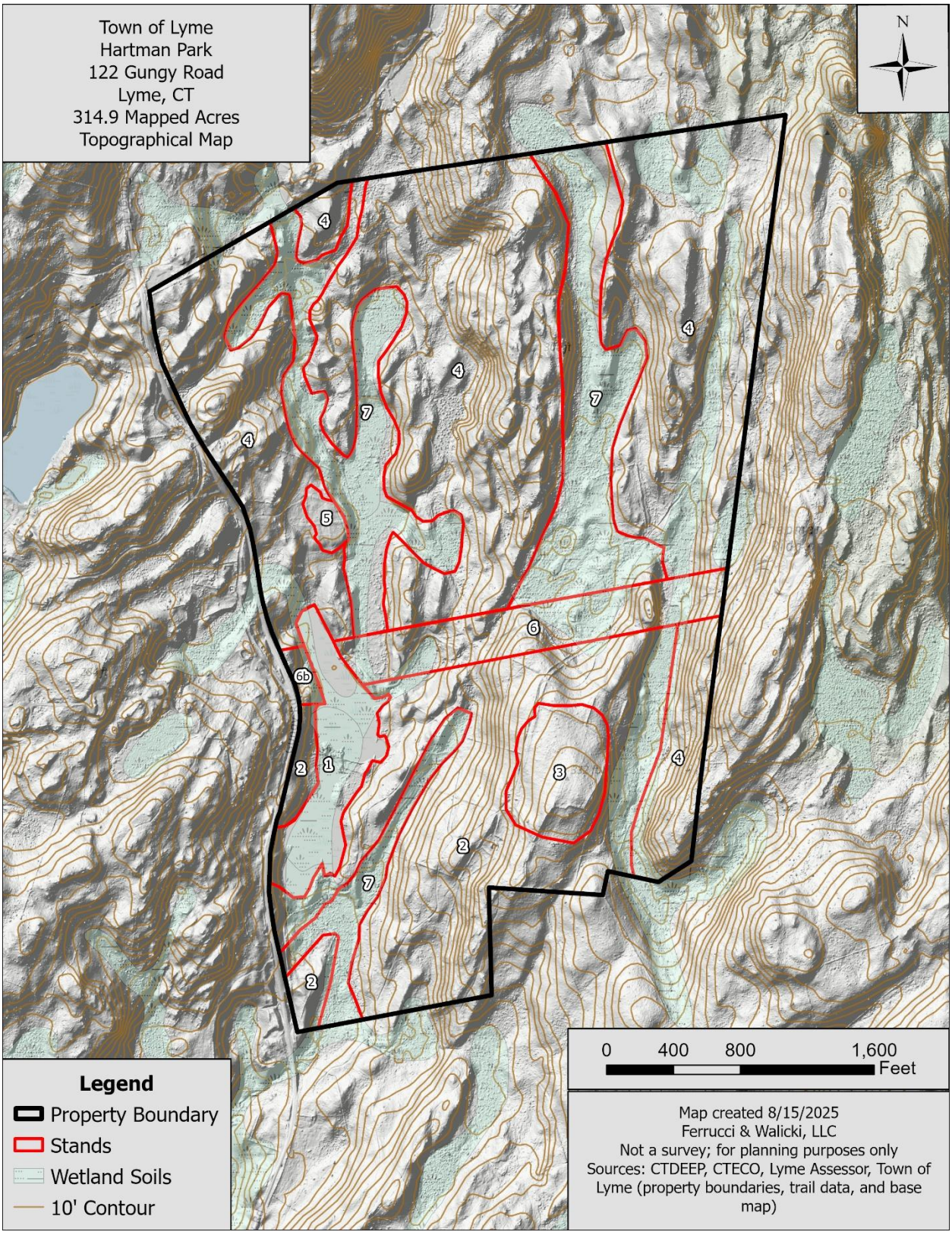
3.11.1 Soils Map Legend

Soil Map Unit	Soil Map Unit Name	Acreage
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	6
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	1
18	Catden and Freetown soils, 0 to 2 percent slopes	5
29B	Agawam fine sandy loam, 3 to 8 percent slopes	>1
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	37
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	4
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	19
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	10
38C	Hinckley loamy sand, 3 to 15 percent slopes	6
38C	Hinckley loamy sand, 3 to 15 percent slopes	9
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	10
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	>1
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	18
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	2
71C	Nipmuck-Brimfield-Rock outcrop complex, 3 to 15 percent slopes	10
71E	Nipmuck-Brimfield-Rock outcrop complex, 15 to 45 percent slopes	4
71E	Nipmuck-Brimfield-Rock outcrop complex, 15 to 45 percent slopes	2
71E	Nipmuck-Brimfield-Rock outcrop complex, 15 to 45 percent slopes	55
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	4
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	27
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	5
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	4
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	15
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	>1
72E	Nipmuck-Brookfield complex, 15 to 45 percent slopes, very rocky	18
72E	Nipmuck-Brookfield complex, 15 to 45 percent slopes, very rocky	23
72E	Nipmuck-Brookfield complex, 15 to 45 percent slopes, very rocky	6
72E	Nipmuck-Brookfield complex, 15 to 45 percent slopes, very rocky	6
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	11

3.12 Topographical Map



4 PROPERTY DESCRIPTION

Hartman Park is located in the Town of Lyme and is stewarded by the Town of Lyme Open Space Coordinator, Wendy Hill. East Lyme and Salem border the property on the north and east, respectively. Most of the property is forested and there are some open and semi-open water features. An east-west oriented transmission corridor runs through the center of the property roughly bisecting it into the corridor and the adjoining land provide important habitat conditions that can be beneficial for a variety of wildlife species. A wide-ranging trail network has been built throughout this property and connects to adjacent land.

4.1 Summary of Landowner Goals

Each landowner has a unique outlook for the future of the property they steward. In producing a plan for future management of any property it is valuable to clearly outline landowner goals to help inform stewardship recommendations and desired future conditions. These goals, as well as best management and silvicultural practices firmly based in science, inform foresters, landowners, and other stakeholders in how to achieve desirable outcomes over the long-term. The Town of Lyme has identified these primary goals for management of the property:

- Creating young forest habitat along the transmission corridor to create feathered or soft edges
- Providing wildlife that uses the transmission corridor a safe and useful habitat when clearing occurs within the corridor
- Less intensive treatments within the interior of the forest to enhance select tree vigor and diversity

4.2 Property History

Like most current forestland in Connecticut the property was cleared and used for agriculture for some period following European settlement in New England and appears to have been abandoned from agricutlural uses beginning the process of reforestation in the late 19th to mid-20th century. This assertion is based on the current condition of forested areas, the bulk of which is ecologically young second-growth, the stone walls scattered across the landscape, and the amount of maintained open space and very recently abandoned agricultural land in the 1934 aerial photo. This is especially the case in the southern half of the property. The presence of stone walls typically indicates that livestock grazing was at least a component of the agricultural use during this period.

A boulder incorporated into a stone wall within the central block of Stand 2.

Historic evidence of intensive and widespread agricultural use is still evident throughout the property today in the form of old woods roads, stone foundations, abandoned barn infrastructure, and an old mill. Historical records indicate the presence of a saw mill within the property as well, lending evidence to the

possibility that the forest within the parcel was logged every 50-75 years from the 17th century to the early 20th century (Pfeiffer 1993). "Timbering was at the center of the parks initial colonial history and it appears that this mill may have cut board and plank that were sent all the way back to England in the 17th and certainly the 18th century" (Pfeiffer 1993). Several parts of the trail system have signs at important historic sites which property visitors can view using the self-guided tour maps (The Heritage Trail: A Walk in Hartman Park, 1996).

Following agricultural abandonment, the land reverted to forest. The individual who donated the land and the Town of Lyme had considered converting the property into a public park and swimming hole. After an ecological study conducted by the Eastern CT Environmental Review Team was conducted in 1989, it was decided that the park would remain in its natural state in order to benefit local wildlife and be enjoyed for passive recreation (Environmental Review Team Report On Hartman Recreational Park, Lyme, Connecticut, 1989). The most intensive human activities now occur in the right-of-way (ROW) transmission corridor which is kept in a perpetual semi-open/shrubby condition through periodic clearing. Trail creation also has occurred since the parcel was donated. Fishing, hiking, dog-walking, biking, nature study, and other activities are done regularly by park users.

4.3 Landscape Context[1]

The property is located near other large and important forested parcels, most notably the 1,900-acre Nehantic State Forest to the east/northeast and 400 acres of forested land to the south. In the southwest there are multiple protected open space properties that are privately owned. Nehantic is owned by the State of Connecticut, while the smaller parcels in the south are owned by the Lyme Land Conservation Trust and the Town of Lyme. Mostly privately owned undeveloped, but highly parcelized and unprotected forested land lies to the west of the property, with the exception of one small parcel that the Town of Lyme also owns. In the northwest there are multiple parcels of forest land owned by the Salem Land Trust. Refer to the map in Section 3.9 for a visual representation of nearby conserved land.

The trail system within the property connects to adjacent and nearby parcels in the south owned by both the Town of Lyme and the Lyme Land Conservation Trust.

A legacy "wolf" white oak tree in the northern-central portion of Stand 2.

Large, conserved forest blocks provide habitat for species sensitive to human related disturbance and facilitate genetic material exchange among both plants and animals, improving population resilience to stressors like changing climate regimes. Some species in the spotlight of conservation efforts in Connecticut, like ruffed grouse, are limited by short annual migration ranges. Well managed forests which provide suitable habitat for a diverse suite of species within that annual migration limit may allow individuals to migrate from a large forest block to smaller properties like the Hartman Park property and adjacent properties.

[1] For visual context, and additional information on nearby conserved areas see map in Section 3.9

4.4 Special Sites and Considerations

Multiple historical landmarks such as stone walls, foundations, mills, and abandoned barns remain on the property from its past agricultural use. These areas are culturally and aesthetically enriching while representing a vital part of the history of New England. These areas should continue to be highlighted and protected. The water features play an important role on the property and in the regional ecology of the area. Continuing to allow controlled access to water to provide people with the ability to interact with the ponds, wetlands, and watercourses here is important. Maintaining the trails and bridges to ensure water quality and soil stability is an important part of ongoing stewardship activities here. The shrubby habitat on this property is also an important feature for wildlife that use this condition. Another unique characteristic of this property is some of the places at the highest elevations where vegetation species and expression changes.

A vernal pool in the eastern block of Stand 7.

4.5 Water and Soil Protection

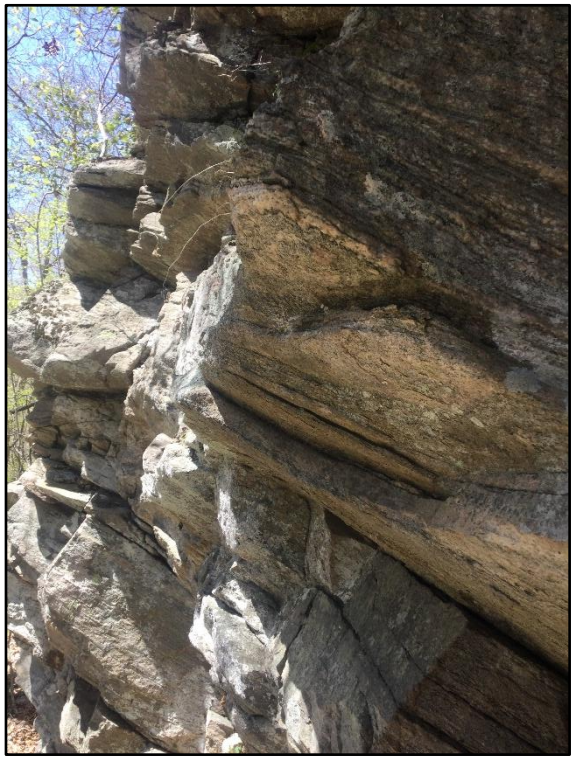
Protection of the invaluable functions of aquatic and soil ecosystems is a primary driver of the stewardship of this property. To ensure water and soil resources are maintained well, Best Management Practices (BMPs) based on scientific research are employed in and around sensitive areas. These guidelines aim to maintain the functions of sensitive ecosystems (flood mitigation, amphibian breeding habitat, water filtration, etc.) while recognizing that intentional human stewardship of forests can have beneficial impacts on these areas.

Multiple vernal pools are present on the property. These niche habitats are essential for the life cycles of a variety of wildlife – some of which only breed in such features – and should be protected wherever they occur. Stand 7 is an extensive forested wetland. Other important water features on the property include intermittent streams, and both small and large ponds. Using BMPs can help ensure that active forest management that takes place near this unique habitat feature does not have unintended negative consequences (Calhoun 2004). The many bridges already present on the property allow good access on foot while simultaneously protecting water quality and soil stability in the wetter soils and riparian corridors where the bridges are located.

4.6 Geology

Geology and topography are highly influential over the vegetation that grows on a site. Generally, soils at higher elevation, especially those with sandy compositions, are drier and less nutrient rich than those in lowlands, often with clay comprising more of the soil profile. Trees and other vegetation have evolved over millennia to establish on sites across the spectrum of soil composition, depth, moisture, and nutrient availability. The groups of species which typically inhabit sites of a certain soil/geologic character are known as "natural communities". Natural communities are regionally variable (different species mixes occur on similar sites in different regions) because of the role climate/disturbance regimes played in evolution of these communities. Soil is not the only factor driving the formation of natural communities, but they are perhaps the most influential factor[2].

Bald topographical feature within the southern-central block of Stand 2.



A calcified rocky outcropping.

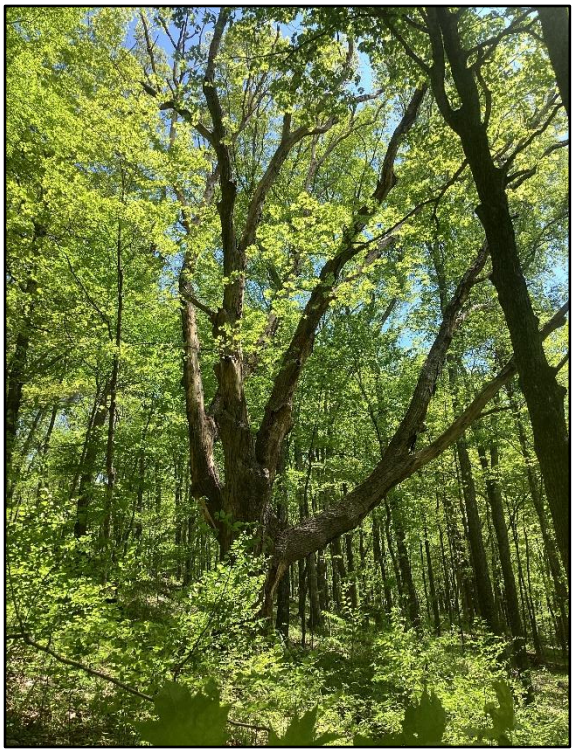
Hartman Park is mostly composed of upland geographical features in the form of rocky outcrops, elevated ridges, and sheer cliff faced ledges. Atop many of the ridges a rich variety of oak trees (white, red, and black) persist in the overstory with a bountiful heath understory. The northern portion of the property is higher in elevation compared to the southern extent. Differences in natural communities are evident between these two ends of the property, highlighting the extensive variety of tree and understory plant species present within the property. At the heights of land in portions of the property there are small slides or balds where sheer rock and limited vegetation grow. These areas provide unique microhabitat features.

[2] Historic land use and climate/disturbance regimes are also influential on the current expression of natural communities.

4.7 Fish, Wildlife, and Biodiversity

4.7.1 Structure and Composition

Many wildlife species use multiple habitat types and conditions to complete their life cycles. Providing diverse habitats can help ensure successful survival and reproduction of a variety of species. Lack of specific habitat features is often the limiting factor that determines whether or not a species can survive or thrive in a given area. Common habitat requirements include cover from predators, access to water, shelter from weather, suitable breeding areas, and places where wildlife can successfully forage or hunt for food.



A standing wolf red oak snag within the southern central block of Stand 2.

As a forest develops, vegetation size and species mixes can and frequently do change. Concurrently, its usefulness for satisfying the requirements of any given species also changes. Because of this, a mosaic of different habitat types is often beneficial and even necessary for most species of wildlife to be successful. For example, wild turkeys use mature forest with down woody material or shrubby areas for nesting habitat or breeding habitat. After the young have hatched, they use open fields where they feed on soft-bodied insects. As the young turkeys develop, they are able to use the mature forest for feeding on hard mast[3] from oak and beech trees[4].

Early successional habitat dominated by dense growth of tree seedlings and saplings is severely underrepresented in this region. There is a paucity of areas with large, contiguous patches of 0–15-year-old tree seedlings, saplings and shrubs as the featured[5] vegetation. Although not intended to create large stands of early successional habitat, some of the recommendations in this plan are intended to create areas in which seedlings, saplings, and understory vegetation grow densely to diversify the forest's structure, regenerate target species, and for that condition's utility to wildlife, especially where it can pair with and compliment the management that necessarily occurs along the transmission corridor the bisects the property.

[3] Mast is fruit or nuts produced by woody shrubs or trees. Examples include acorns (hard mast) and cherries (soft mast).

[4] DeGraff, R. M. and M. Yamasaki, New England Wildlife Habitat, Natural History and Distribution, University Press of New England, Hanover, NH, 2001, 126.

[5] Featured indicates that this is the primary (i.e., top) layer of growth in the stand or area.

On the other side of the spectrum, there are not many places in Connecticut and throughout the region that have old forests. Old forests frequently contain many of the features that managing for structural diversity and complexity creates. These include lots of coarse and some fine woody material, small canopy gaps, trees of various sizes and age classes, and large diameter live and dead trees. Old forests provide unique habitat conditions utilized by certain species of fungi that generally aren't otherwise present. Though there are no obligate old forest wildlife species in this area, many of the species that utilize diverse, well-managed forests will also use the structural attributes old forests provide. All treatments recommended in this plan will create some of these attributes, but it is also recommended that some areas of the property are intentionally designated for passive management and allowed to develop these characteristics on their own with limited or no human intervention.

Shallow root zone and windthrown tree in the eastern block of Stand 7.

Recent studies at the University of Vermont have helped increase our understanding of how to manage forests to increase carbon storage, maintain tree vigor, and emulate old forest conditions. These treatments include light thinning, retaining many of the larger diameter trees, creating small canopy gaps to encourage regeneration, allowing much of the woody material to remain on site, and in some cases purposefully toppling trees using machines with cables to pull trees over with root ball intact to simulate windthrown trees[6].

The current forest conditions on this property accommodate a variety of wildlife species but are limited to species that require a few conditions: young forest, dense understory of tree seedlings and saplings, semi-open woodland, and old-growth structure (multi-aged forest with abundant standing and downed coarse woody material) are some of the habitat conditions that are generally absent or in limited supply on the property. That said, the mix of forest cover and land types (i.e., mixed oak uplands, riparian corridors, forested wetlands, maintained open area, open water and semi-open wetland, shrubby area within the transmission corridor) and water features on the property all combine to provide a great starting point for habitat diversity. A small area in the western part of the property (Stand 5) is maintained as open. The open character and the herbaceous, shrubby, and tree species occupying this area add an important element of diversity that allows more field-oriented species of insects, pollinators, and wildlife to live here.

[6] Mimicking Mother Nature, UVM Scientists 'Nudge' Forests Toward Old Growth Conditions. Masterson. 2017.

Snapping turtle seen in the southeastern portion of Stand 1.

Sawtimber-sized trees, from small to medium[7], make up most of the basal area of this property with large numbers of poletimber-sized[8] trees growing between and beneath them. There are few areas in which seedlings and saplings[9] grow densely. Based on aerial photo interpretation, much of the forest cover adjacent to and surrounding this property generally contains similar size classes and mixes of species.

A wide variety of organisms use this property for all or parts of their habitat needs. This includes many native species of insects, birds, reptiles, amphibians, mammals, and others. One important species that may be present here but was not noted during field visits is the cerulean warbler. This neotropical migratory bird species is listed by the International Union for Conservation of Nature (IUCN) as "Near Threatened". Over the last decade or so Connecticut forests have been one of the bright spots for the cerulean warbler story which has otherwise seen precipitous declines. The Lyme Forest Block Important Bird Area (IBA) which encompasses this property is one of the places in the state where populations of cerulean warblers have been increasing (Audubon CT 2020).

Part of the reason for this is the high percentage of white oak of the composition of the forest in this part of the state. White oak is a preferred nesting species for ceruleans. Typically, they will nest in large diameter white oak with horizontal or near horizontal branching structure and a limited midstory. Understory cover is important because they can forage for food in that layer of the forest. A series of visits to various properties in the Lyme Forest Block by biologists from Audubon Connecticut in 2020 identified that ceruleans seemed to be attracted to canopy gaps created by spongy moth related mortality wherein the dead oak trees were still standing[10]. Recommendations to enhance structural components and species diversity of regenerating trees (including white oak) are included later in this plan in part to help ensure a viable long-term population of the species currently occupying the forest overstory on the property.

Other important species to consider when thinking about the stewardship of this property include New England cottontail (NEC) and a variety of species of bats. A management plan was developed for the transmission corridor in 2024 by Dr. Bryan Connolly within which there are a series of recommendations that will be discussed in Stands 4 and 6 in Section 7 of this plan. CT DEEP's Forestry Division also has an forest management plan for the Nehantic State Forest and is actively managing for NEC. Within the next

[7] For the purposes of this plan, small sawtimber-sized trees range from 12-16 inches dbh. Medium diameter is 16-20 inches and large is 20 inches plus.

[8] Poletimber sized trees range from 5-11 inches dbh

[9] Seedlings are trees less than 4.5 ft. tall. Saplings are trees that are over 4.5 ft. tall but are 5 inches dbh or smaller.

[10] For more information see the CT Audubon article, "Are Cerulean Warblers Increasing in Connecticut?" by Sharon Bruce.

year the state will begin implementing a 10-acre regeneration treatment adjacent to the transmission corridor east of Hartman Park. Planning work that occurs in Hartman Park in conjunction with treatments that have occurred or are planned for across the boundary can enhance the utility, productivity, and viability of these habitat conditions for obligate wildlife species that depend on young forest conditions over time. Young forest conditions are ephemeral (lose most of their utility for young forest obligates after about 15 years) so collaboratively planning a shifting mosaic of this kind of condition over different areas at different times can help ensure high quality habitat values remain part of the landscape here into the future.

The juxtaposition of the transmission corridor, trail systems with narrow open corridors, and the open water in Stand 1 and portions of Stand 7 combine to create an excellent location for bats. Because bats feed on the wing (in air) and use sound to find prey, having relatively open areas within which they can forage can increase hunting success (significant amounts of vegetation interferes with the sonar they use to find prey).

4.7.2 The Role of Primary Producers in the Forest Food Web

Forage from trees, shrubs, and all other forest vegetation are the foundation of the forest food web. Leaves, buds, berries, and nuts are consumed by herbivores, including many species of insects, which are preyed upon by mammalian, reptilian, and avian predators or by omnivores which may predate and/or be preyed upon. In this way the primary producers of a forest have a "bottom up" effect on the fauna that can persist in an ecosystem. This means that a forest with a more abundant and diverse palatable forage will support a broader suite of species than one with a simpler and less palatable composition. Properties with higher biodiversity of lower forage classes (i.e., understory vegetation) are also more attractive to long-ranging predators, like bobcat, bear, and red-shouldered hawk, and will likely become core habitat for these species (DeGraaf and Yamasaki 2009). Productivity is increased when the diversity is composed of mostly or exclusively native vegetation.

Dense heath understory in Stand 4. Overstory canopy closure is dense enough here that it is unlikely that the blueberry and huckleberry are producing heavy crops of flowers and berries, but the creation of some canopy gaps could enhance the volumes of both features.

Mast production is an important consideration for determining and improving habitat quality. Mast comes in two main forms: hard and soft. Hard mast includes nuts and other physically hard seeds produced by species such as oak, hickory, beech, and hazelnut among others. Soft mast is present in the form of berries and other soft fruits including black cherry, sassafras, dogwood, and black gum in tree form, but also blueberry, huckleberry, and many viburnums in shrub form. Forests with a mix of hard and soft mast from a diversity of trees and shrubs provide a fuller suite of food sources for foraging insects and wildlife. There is abundant hard mast,

in the form of large diameter oaks and hickories, and soft mast, heath (i.e., blueberry and huckleberry) in the understory, especially in the northwestern block of Stand 4.

Exposing this important wildlife food source to more sunlight will help to increase the amount of fruit the plant is able to produce on a yearly basis. This can be an effective management tool for dense heath understory where it occurs on the property and should be implemented if feasible. A light thinning of this region would expose the heath to more sunlight and allow also it to flower more, which would be beneficial to pollinators in the area. This will be expanded upon more in Section 7 "Stands".

Currently, valuable hard mast producing trees (especially oak) play a major role in many stands on this property. Wildlife species that depend on mast generated by this cover type include ruffed grouse, wild turkey, redheaded and red-bellied woodpeckers, blue jay, squirrels, chipmunks, mice, gray fox, red fox, black bear, striped skunk, and white-tailed deer among others. "Wood duck, American black duck and mallard can also benefit from hard mast where... [hard mast producing trees] occur adjacent to shallow water bodies, streams and other wetlands" (DeGraaf et al. 1992). Among hard masting species, specifically oaks, large diameter individuals produce disproportionately high volumes of nuts compared to smaller trees. Genetics also play a role in mast production so identifying and retaining heavy producers can improve mast production in the local genetic stock (Patterson et. al. 2023). Other trees like musclewood and ironwood that produce dry seeds can be valuable seed sources for species like turkey and grouse.

The Importance of Oak

Oaks are important to retain as a major part of this forest now and into the future because:

- They support a wide variety of insects and wildlife, the likes of which no other native genera (i.e., genus or group of species) does
- They have very specific associations with some species of birds that nest in our area including (but not limited to) scarlet tanager, cerulean warbler, black-throated blue warbler
- They are well-adapted to current climatic conditions and projected climate changes
- They grow well on this site
- They are historically significant on the property
- They are aesthetically pleasing and long-lived
- Besides *Lymantria dispar* (a.k.a. spongy moth, formerly known as gypsy moth), there is currently a lack of oak-specific insects and diseases that tend to have large scale negative health implications which makes them an important piece of the puzzle for resilience and forest health and diversity moving forward
- The wood from oak is very valuable and can be used for a variety of purposes from firewood to flooring.

Soft mast producing species including grapevine, blackberry, raspberry, winterberry, spicebush, blueberry, huckleberry, viburnums and some invasive plants are present in various places throughout the property. It is beneficial for many species of wildlife to have a combination of hard and soft mast in their diet as each mast source provides different dietary elements. Hard mast often has more protein and fats, whereas soft mast tends to be higher in sugars.

Leaves are fed upon by insects and some mammals. Each tree species hosts its own suite of insect herbivores, with oaks (especially white oak) being one of the most preferred genera for herbivores. These insects are essential links in the forest food web. Secondary, and to a lesser extent tertiary, consumers including bats rely on these insect herbivores as a food source. Many of the migratory birds, and all

migratory bats in our region breed in New England because of the diverse and abundant insect populations which are available in forests, fields, and aquatic ecosystems.

Buds contain densely packed nutrient stores and provide a winter food source for many resident species. Buds are relied upon by grouse, rabbits, deer, and other year-long residents to survive the long dormant species. Some insects (e.g., oak leaftier) have evolved their life cycle to feed as larva on buds as they begin to expand/open in spring. Others use buds as overwintering shelter.

Above: Oak trees provide a feeding substrate for more caterpillars than any of our other native species of trees (Tallamy, 2007). Slide courtesy of National Audubon Society and Audubon Connecticut.

Trees and other forest vegetation, including early spring ephemerals, are food sources for bees, moths, flies, and butterflies among others. Maintaining diverse sources of nectar from native vegetation that provide sources of flowers for nectar and pollen throughout the growing season is vital for sustaining healthy pollinator populations. Without adequate populations of nectar feeding species (especially insects), plants that can self-pollinate would have a competitive advantage which would simplify the species composition in an ecosystem, perpetuating a loss in biodiversity and productivity (Xerces Society 2025).

Joe pye weed in the southeastern portion of Stand 1.

4.7.3 Snags, Cavities, and Down Woody Material

As a forest develops and trees become stressed by competition, drought, disease, insects, or severe weather, some trees begin to decline and die. In our changing climate, more extreme storms are likely to occur more frequently. As processes of decline happen regardless of cause, columns of rot can develop in affected trees. Following the development of rot, insects often find their way into the tree, which in turn attracts predators including woodpeckers. Woodpeckers create larger openings in the trees, which can lead to the

An aspen with a sizeable cavity in the northeastern block of Stand 4.

development of cavities. Cavities are useful as shelter and feeding habitat for many small mammals and birds.

As trees die, some remain standing and continue to rot, becoming what are known as standing dead snags. Snags provide habitat for insects that birds and small mammals will eat. As these trees, or pieces of them fall, down woody material is created. Larger pieces (greater than 4" inches in diameter) are considered to be coarse woody material or CWM. Smaller pieces of down woody material are referred to as fine woody material or FWM. Coarse and fine woody material are both important as habitat features and for the purposes of habitat, nutrient cycling, hydrologic cycles, and other reasons on the site.

CWM can provide habitat for salamanders and other wildlife that use it for cover. Also, as downed logs enter late stages of decomposition, they retain significant moisture, acting as germination sites for seedlings. Yellow birch and white pine specifically do well germinating from "nurse logs". During the process of decomposition, carbon in coarse woody material is slowly released back into the atmosphere and reabsorbed into the soil. Fine woody material when aggregated (intentionally – in the form of slash piles – or otherwise) can act as nesting and foraging areas as well as cover for many species. The amount, size, and arrangement of woody material on the forest floor also impacts the variety and abundance of insects, fungi, and herbaceous plants, hydrologic regimes, and fuels characteristics of a forest (Mount 2002).

CWM over a watercourse in the northwestern block of Stand 7.

As a forest matures, large trees die and fall to the ground, increasing CWM. While some forms of active forest management generally result in a net increase in woody material, the increase is generally in fine woody material that has less long-term value than large diameter material and is much more ephemeral as it decomposes relatively rapidly. Wherever safety is not an issue, leaving large snags and active and potential cavity trees during management activities helps to ensure a supply of coarse and fine woody material over a longer time frame than a typical logging operation does. In addition, the purposeful retention of some large CWM can help recruit additional features which will be more long-lasting and have a greater ecological impact.

Current volumes of standing and downed material is satisfactory for providing the range of benefits mentioned above, but volumes of both course and fine woody material could be increased at a property wide level. In order to improve this condition recommendations regarding the retention and recruitment

of woody material are found in Section 7. General guidelines which are considered for these recommendations are below.

General management guidelines for coarse woody material (CWM)

1. Larger pieces of CWM are more valuable than smaller pieces.
2. CWM scattered across a site is more valuable than if it is concentrated (with some piles).
3. It is important to maintain a full range of CWM decay classes (from hard to crumbling).
4. Coniferous CWM is generally longer lasting than wood from deciduous trees.
5. For long-term management, consider the distribution and quantity of future CWM sources, including retention of snags and cavity trees where safety is not an immediate concern.

4.8 NDDB and Critical Habitat

Connecticut's Natural Diversity Database (NDDB) and Critical Habitats mapping indicates that some rare, threatened, endangered, or special concern species occur on this property. The Town of Lyme should request a report from the Department of Energy and Environmental Protection (CT DEEP) NDDB program to confirm which species are present within the property and what stewardship activities should be undertaken to help safeguard and/or enhance their populations.

4.9 Forest Products

The sale of sustainably produced timber products is not a goal of the landowner. That said, revenue may be generated as a result of the implementation of some recommendations in Section 7. Ideally, the sale of forest products will help or completely offset the costs of implementing some of the actions recommended in this plan. Specifically, recommendations in Stands 2, 3, and 4 may have the potential to do this. Sustainable production of revenue is not possible in all stands. Stands with little to no potential to generate revenue from timber include, 1, 5, and 7. As a region we import far more wood and wood products than we produce resulting in both a trade imbalance and a reliance on other places to grow, process, and manufacture the wood products we use[11].

4.10 Recreation and Aesthetics

This property is currently used for passive recreation by the public, with people recreating on the property to observe wildlife and unique fauna present. The extensive trail system within Hartman Park continues south and is intermixed with the abutting Lyme Land Trust properties, the Walbridge Woodlands, Young Preserve, and the Beebe Preserve. Recreational activities include hiking, dog walking, fishing, cross-country skiing, mountain biking, and equestrian use. The extensive forest cover, open pollinator meadow in Stand 5, and open water feature found within Stand 1 all provide a great array of aesthetic beauty for the public to enjoy.

4.11 Forest Health

In general, forest health throughout this property is fair to good. The major issues are infestations of invasive plant species, a lack of desirable[12] tree regeneration (both for softwoods and hardwoods) in some

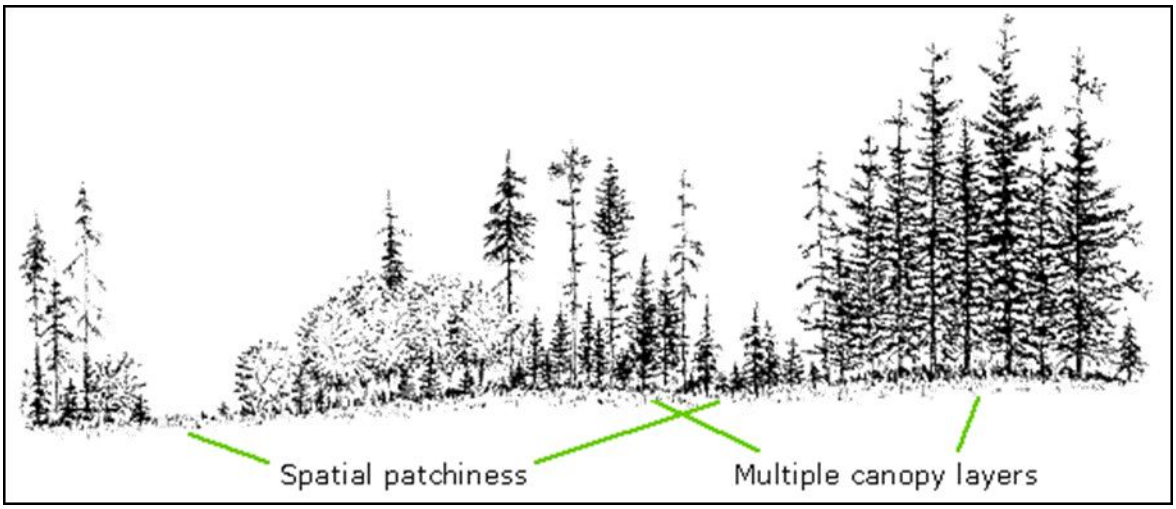
[11] For more information see "Beyond the 'Illusion of Preservation': Taking Regional Responsibility by Protecting Forests, Reducing Consumption, and Expanding Ecological Forestry in New England". March 2024. (https://masswoods.org/sites/default/files/Beyond-the-Illusion-of-Preservation-web.pdf)

[12] A desirable species is one that has high ecological, economic, or cultural value. For example, white oak hosts an extraordinary number of insects which provide biodiversity in their own right in addition to being a food source for birds and small mammals.

parts of the understory, some non-native invasive insect pests, and excessive densities of trees in places resulting in decreased vigor due to competition. Most of the trees on the property are hardwoods, with sparse pockets of softwoods, most notably eastern redcedar within Stand 5 and eastern white pine in the central northern block of Stand 4. Where softwoods are present in forested stands within the property, they are typically overtopped by hardwoods. Where feasible, softwood populations should be expanded. By doing so, tree species diversity would increase since the property is currently dominated by hardwood species. This is covered in greater detail within Section 7 "Stands".

Without preparatory treatments of invasive populations, the other actions recommended in this plan, which are aimed at improving forest health by diversifying structure and species mixes, may have reduced positive impacts and could result in an unintentional increase in invasive plants which in turn would have negative impacts on long-term biodiversity, productivity, habitat values, and resilience.

Eastern redcedar established in Stand 3 (far left).



The figure above shows the multiple canopy layers in one spot representing vertical structure and the spatial patchiness of horizontal structure over a wider area, both described in greater detail below. Diagram courtesy of the British Columbian Ministry of Forests.

Forest structural diversity is described both vertically and horizontally. Vertical diversity is the presence of vegetation of various heights (also called strata) in a relatively small observable area. Horizontal

White oak wood is also very valuable, which makes managing around white oak economically feasible and desirable. Finally, white oak is culturally representative of the forests of this region and maintaining white oak on the landscape helps to perpetuate the unique aesthetic and recreational values of these forests. Hemlock is an example of a tree that is desirable for its ecological and cultural characteristics despite having limited economic value. Black birch, on the other hand, is not often actively managed for because it is already in a position to completely take over our forests if not controlled, and has lesser ecological and economic value than oaks, hemlock, etc.

diversity is the variation of vegetation types and heights on a larger landscape scale. Having a mix of successional and structural conditions on a property improves resilience. If a disturbance which impacts areas with a specific condition (e.g., a hurricane which breaks and blows down 95% of overstory trees growing in dense stands with shade tolerant regeneration in the midstory) there are areas outside of and vegetation within the disturbed area that are not susceptible to these impacts and will persist following the disturbance.

This property has a fair amount of both vertical and horizontal structural diversity. For horizontal diversity, the combination of the upland mixed hardwood forest and the open water (Stand 1), semi-open wetland features (Stand 7), perpetually open/shrubby transmission corridor (Stand 6), and maintained field (Stand 5), all combine to provide a good mix of habitat values and structural conditions across the property. The mostly closed canopy forest conditions with different ages (the southern portions of the property are generally younger than the northern portions) also provide a fair mix of structural diversity and habitat conditions (Stands 2, 3, 4, and 5).

4.11.1 Insect and Disease

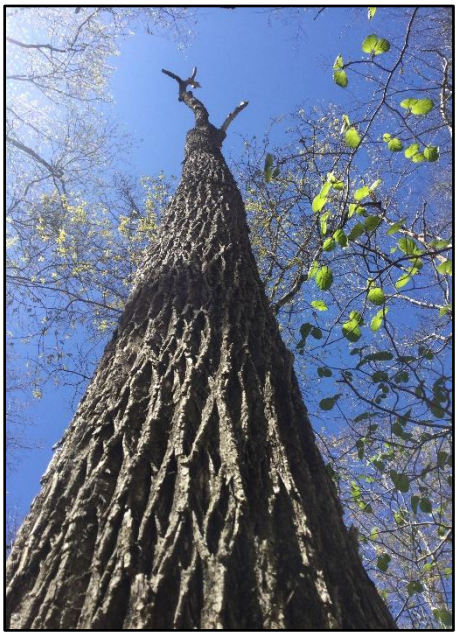
There are several insects and diseases that were noted on the property. They are described in this section.

The spongy moth is an early- to mid-season defoliator of a variety of species of trees, but it focuses primarily on oak and aspen. No new egg masses were noted during the inventory, which suggests that this coming year will, hopefully, not have a large spongy moth outbreak. Cool, moist spring weather helps build populations of fungus which help control the moth populations when they are in the larval (i.e., caterpillar) stages. There is also a virus which can help control populations when they reach a critical mass. More information regarding biological control methods: VA DOF Spongy Moth Control Methods

Oak mortality atop a ridegtop in the northern-central block of Stand 4.

One method of reducing the negative impacts of spongy moths on forests is to keep individual trees healthy and vigorous through periodic thinning and to manage for species diversity, including trees that the insect finds less palatable. For more information on spongy moth and its control see this website: DEEP: Spongy-Moth-Information-for-Tree-and-Woodland-Owners .

Many, if not all, ash on the property appear to be infested by emerald ash borer (EAB). Some have even been so damaged by this insect that they have died. EAB is an invasive insect from Asia discovered in Canton, Michigan in 2002. Since then, it has spread wherever there are sufficient populations of ash trees, including Connecticut as of 2012 most often colonizing new areas as a result of humans transporting infested logs or firewood. All Connecticut counties have populations of EAB. Currently, there are no forest management techniques known to ensure the survival of ash trees once infected, so ash is often cut to salvage economic value or maintain safety where these are landowner goals. Since EAB will



Ash mortality in the northeastern block of Stand 4.

only fly as far as they need to find a new host tree, it's important that not all ash trees in any given area are cut because doing so will hasten their spread.

Signs of EAB infestation include the telltale serpentine galleries beneath the bark in the sapwood and the small D-shaped exit holes formed when the larvae exit the tree. Symptoms of infestation include crown dieback, epicormic branching, blonding[13], and/or tree mortality. There are several ways to dispose of an ash infested with EAB once the tree is felled including chipping it into mulch, turning it into lumber, hiring a professional tree service to take it away, or burning it. Ash makes excellent firewood even when freshly cut. Since the larvae reside inside the bark, infected trees should never be transported long distances to avoid spreading the borer faster than it would naturally disperse.

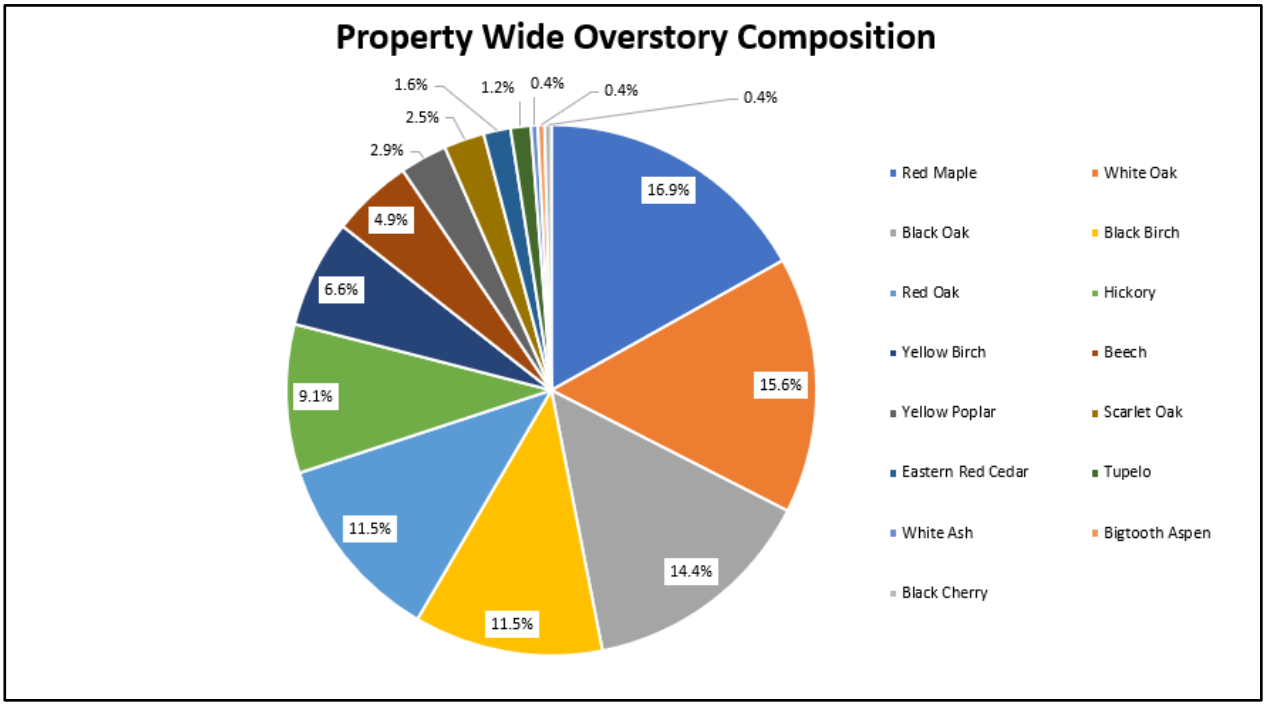
Beech leaf disease (BLD), which is new to Connecticut (first discovered in 2019 in Fairfield County), has begun to impact large swaths of beech trees in some parts of the state and was noted throughout this property. This disease is not yet well understood in terms of the dynamics of Connecticut's forests and beech's response here, but it has been established in different parts of the U.S. and Canada for over a decade. The disease is caused by a nematode (small roundworm-like insect) and its presence results in leaf discoloration, leaf curl, and early leaf drop, all of which can impact tree health. The Connecticut Agricultural Experiment Station is currently working on experimental solutions to help treat infested beech trees and have had some promising successes, but not for a forest-wide setting. For more information see: https://portal.ct.gov/-/media/DEEP/forestry/BLD/Beech-Leaf-Disease---Updates-2021.pdf

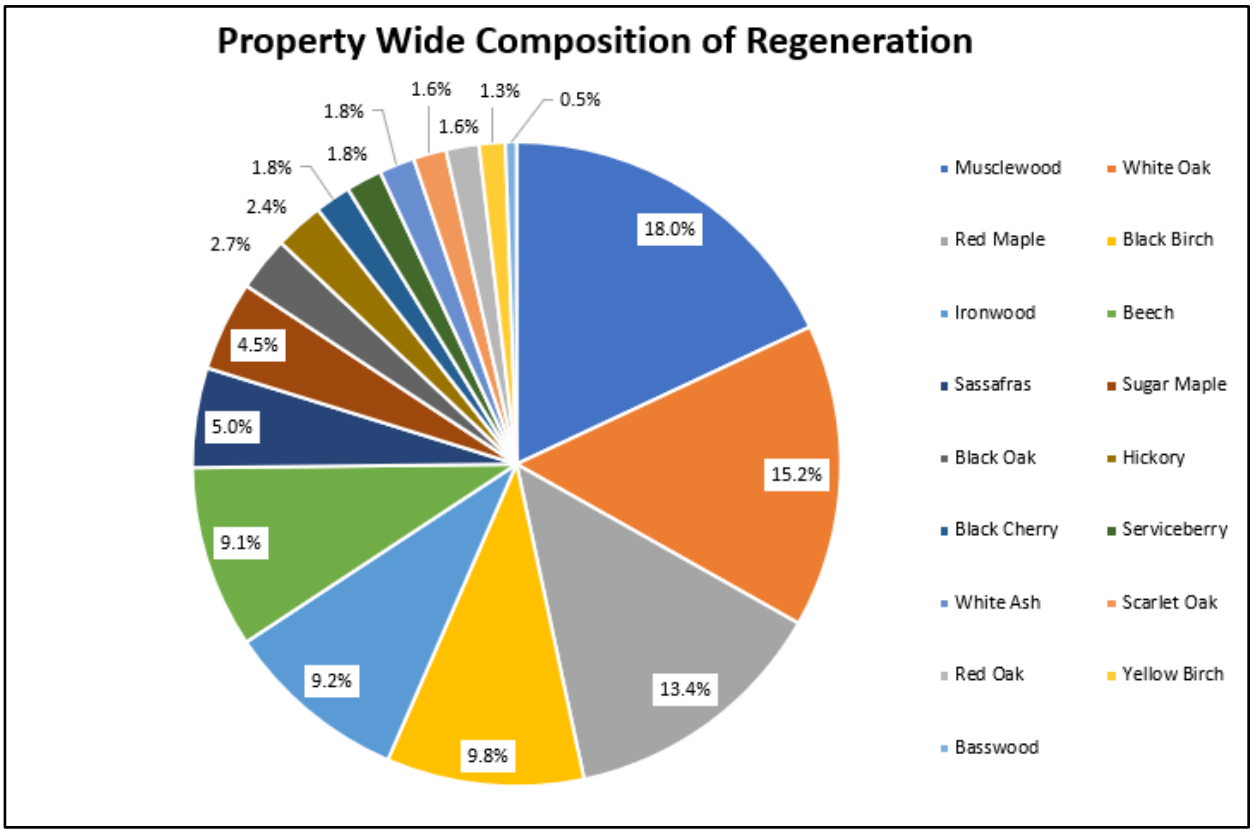
Beech infected with BBD in the northern-central block of Stand 4.

Beech bark disease is a complex introduced into the tree when an insect called the beech scale feeds on sap just under the bark by attaching itself to the outside of the tree and drilling into the tree through the bark. A fungus called *Nectria* then finds its way into the vascular system of the tree. The physical manifestation of this on beech trees is black pock marks on the normally smooth light grey bark of the beech. The result of infestation is a loss of vigor, introduction of rot, and frequently structural failure and mortality can occur. Since many beeches regenerate from root suckers, large areas of beech can be genetically identical.

[13] "Blonding" is the term used for the removal of outer bark by woodpeckers to access the beetles beneath the bark of the tree. The inner bark that is exposed by the woodpeckers' removal of the outer bark is significantly lighter in color than the outer bark, giving the tree a blonde appearance from a distance.

4.11.2 Regeneration and Resource Allocation





**Regeneration is composed of both seedlings and saplings*

Property Wide Overstory	
Species	% Composition
Red Maple	16.9%
White Oak	15.6%
Black Oak	14.4%
Black Birch	11.5%
Red Oak	11.5%
Hickory	9.1%
Yellow Birch	6.6%
Beech	4.9%
Yellow Poplar	2.9%
Scarlet Oak	2.5%
Eastern Red Cedar	1.6%
Tupelo	1.2%
White Ash	0.4%
Bigtooth Aspen	0.4%
Black Cherry	0.4%

Property Wide Regeneration	
Species	% Composition
Musclewood	18.0%
White Oak*	15.2%
Red Maple	13.4%
Black Birch	9.8%
Ironwood	9.2%
Beech	9.1%
Sassafras	5.0%
Sugar Maple	4.5%
Black Oak	2.7%
Hickory	2.4%
Black Cherry	1.8%
Serviceberry	1.8%
White Ash	1.8%
Scarlet Oak	1.6%
Red Oak	1.6%
Yellow Birch	1.3%
Basswood	0.5%

**White oak regeneration is made up entirely of seedlings*

During the forest inventory, regeneration was observed in two ways. The first was a nested 1/100th-acre plot at each inventory point that tallied saplings and a 1/1000th-acre plot in which seedlings were tallied. Seedlings were only tallied in this quantitative assessment if they were taller than 6 inches in height. Both nested plots were taken from the plot center at each inventory point. The second way in which regeneration data were collected was through visual observations made at each inventory point that recorded whether a species was present or not regardless of the sapling or seedling's height and regardless of whether the sapling or seedling fell within the nested plots.

Overall, forest regeneration is prolific enough and varied enough in terms of species to be considered healthy, and it is generally well distributed throughout the property. Most of the regeneration is found in places where small gaps in the overstory have allowed enough light to reach the forest floor for regeneration to become established. However, shade tolerant species like red maple and species which are shade tolerant as seedlings but less tolerant of shade as they grow, like white oak, are regenerating throughout the property, albeit at different abundances. Where desirable regeneration does occur, treatments to release it should occur where it makes sense to do so based on other forest characteristics including the species composition and condition of surrounding overstory and midstory trees. Treatments that will encourage the establishment of desirable regeneration should also be performed in some areas that currently lack regeneration so that some regeneration can be encouraged in those areas. More detail on stand management recommendations can be found in Section 7 "Stands".

Despite the fair amounts of regeneration present on the property, there are limited patches of young forest (i.e., areas between 0-15 years old). In addition, though oak regeneration is present in places, this regeneration is almost exclusively in the seedling size class based on qualitative and quantitative data collected. These seedlings are unlikely to become established into the overstory over time unless a significant canopy disturbance occurs. Most of the stands on the property are not currently at a

developmental stage at which regenerating the entire stand would be reasonable, but smaller, targeted treatments are appropriate in places.

Dense sugar maple regeneration (seedlings) in the central block of Stand 2.

In addition to using active forest management to attempt to increase vigor for the sake of healthier trees, a more vigorously growing forest can be more resilient when attacked by insects and/or infected with diseases. Forest management that increases structural diversity and complexity can also help a forest to be better prepared to respond to storm events and the threats posed by climate change, enhancing adaptive capacity.

Although it is important to attempt to ensure tree health and vigor through active management, not all trees that appear to be poorer quality should be removed. Having some trees (standing and on the ground) that show signs of rot etc. helps provide an element of ecological diversity that is important for a variety of

General lack of tree vigor was also noted in some places on the property. No trees were cored during the inventory, but visual observations indicate that trees in some places are growing relatively slowly[14]. Tree growth rates are frequently proportional to tree vigor and associated health for many of the species of interest, primarily oak. Tree growth rates are impact by several factors including:

- Site conditions (overall site and microsite)
- Genetics
- Slope position and aspect (i.e. direction the slope faces)
- Competition (primarily for sunlight)
- Species

Shade tolerant trees such as hemlock and some hardwoods (including beech) can be perfectly healthy but grow very slowly. For other species which require more sunlight, individual tree vigor and growth can be increased by active management techniques, such as thinning or crop tree release, that allow each individual more sunlight and room to grow.

Standing wildlife habitat snag in the northern-central block of Stand 4.

[14] This observation is based on crown sizes in many parts of the property as well as bark appearance.

species of insects, fungi, bacteria, and wildlife.

Deer are the primary large ungulate in southern New England. Deer feed on leaves throughout the growing season and buds during the dormant season and can play a significant role in what vegetation persists on a site. Because of high deer populations and a relatively low amount of regenerating forests in our region, less palatable species are becoming more abundant than they have been for the past 250+ years. A lack of predation pressure on deer has allowed relatively unimpeded foraging and removed the element of "top down" control which wolves and catamounts had on the landscape before they were extirpated from the area. The impact of browse pressure has simplified the structure and diversity of the forest understory and midstory.

Deer browse seen in the northern-central block of Stand 4 (circed in red).

Many parts of the state and the region, suffer from an overabundance of deer. In forests, deer impact the abundance and diversity of understory vegetation, including tree regeneration, by preferentially browsing some species and ignoring others. Some preferred browse species are oaks, sugar maple, yellow birch, hickory, hemlock, and pines, while they tend to ignore invasive plants, beech, ironwood, musclewood, and black birch. Accordingly, an excess of deer in a given area will make it extremely difficult to successfully regenerate the desired tree species. The level of deer browse on the property is moderate. Browse impacts on seedlings were noted throughout the property and - with the exception of some pockets of white oak - appear to be aiding in the shift toward species that are less preferred by deer (musclewood, black birch, ironwood, and beech listed in descending order of populations of regeneration). Most of the more ecologically important tree species (oaks and hickories) are more poorly represented in the regenerating age and size classes than in the overstory which has an excellent overall diversity of desirable tree species[15]. Oak and hickory species combine to form over 50% of the overstory canopy, but less than 25% of the regeneration which is composed of approximately 15% white oak. Over time, attempting to ensure the amount of desirable and ecologically important tree species that are well adapted for the site and projected climatic changes (most oak and hickory species) will be important to help maintain the productivity of the area.

4.12 Invasive Plants

Non-native invasive plants are established in many parts of the property at varying densities. Japanese barberry, winged euonymus, multiflora rose, privet, knotweed, phragmites, stiltgrass, knotweed, and

[15] It is important to note here that the lower abundance of these species in the regenerating age and size classes is likely due to a combination of factors including management history, current crown closure, insect and disease issues, invasive plants, etc. so this differential is likely partially but not solely attributable to deer browse.

Asiatic bittersweet are some of the species noted on this property. Refer to the map in Section 3.5 for a visual representation of where the invasive plants are located on the property.

Dense cluster of invasives in the southeastern block of Stand 7.

Generally, the highest concentration of invasive plants was seen in the northwestern portion of the property, particularly within the riparian corridor in the northwestern block of Stand 7. Scattered populations of Japanese barberry, multiflora rose, burning bush, and Asiatic bittersweet are present throughout the property at varying densities. In some areas on the property all four of these species and others are present together in mixed clumps. The invasive species phragmites was noted in the small pond in the northwestern corner of the property. Over time, this plant will greatly reduce the potential wildlife habitat and ecological values of this water feature, outcompeting important native freshwater vegetation such as cattails.

Not all non-native species are considered invasive. In fact, some non-native plants such as apple trees and some clovers have become naturalized in our region and are considered beneficial for a variety of reasons, including their values for pollinators, wildlife, and aesthetics. As opposed to native and beneficial naturalized species like those described above, invasive plant species have qualities that make them detrimental to the overall ecological health of an area. These qualities can give invasive plants a competitive advantage over native species and can lead to the development of monocultures of invasives, reducing species diversity. Such features include:

- Vigorous sprouting when above ground portions of the plant are cut;
- Prolific seed production;
- Rapid growth rates;
- Ability to colonize disturbed areas;
- Long periods of seed bank viability;
- Extended growing seasons due to early leaf out and ability to photosynthesize later in the season;
- A lack of wildlife species that browse on buds.

The reduction in species diversity noted above is important because a diverse ecosystem is more resilient to climate change and other environmental stressors and helps to provide habitat options for wildlife and insect populations, including pollinators. Wildlife and insect species have adapted to be able to utilize the pollen, seeds etc. produced by native species in an area. In general, fewer insect species utilize the nectar and pollen of invasive plants. Because significant populations of invasive plant species can have a negative effect on ecosystem health, it is best to treat known infestations while they are small and manageable. For more information on how to identify and control invasive plant species in Connecticut visit: https://cipwg.uconn.edu/control-information/#.

Invasive species control generally includes one or more of the following:

Chemical control – using herbicides/pesticides

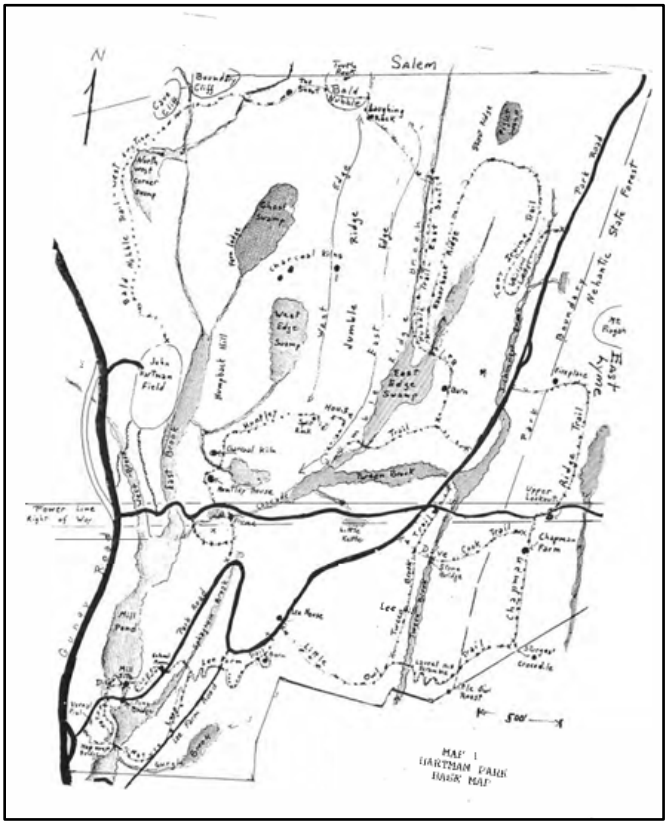
Mechanical control – physical removal of the invading species

Biological control – introduction of natural enemies or predators

Ecological control – manipulation of environmental factors to favor native species

4.13 Archaeological, Cultural, and Historic Sites

Hartman Park is filled with culturally significant historical sites. These mainly come in the form of old agricultural sites and potential past indigenous activity in the form of stone piles that were noted during forest inventory. Stone walls are present throughout the property, along with multiple foundations providing evidence of the past agricultural usage and habitation of the land. The property contains an excellent self-guided tour of many of the important historical features which is available on the property's trail map. In addition, there was a report produced by John Pfieffer in the early 1990s describing many of the cultural resources in the park. Of note from this report are small, unmarked fieldstones within the southwestern portion of the property, which are believed to be from less wealthy white people and enslaved African and/or Native American people. A follow up document produced a few years later by Marianne Pfieffer provides information in a more reader friendly version that has been updated and now contains the property's contemporary trail map as well.



Map from the 1990 report by John Pfieffer.

4.14 Wildfire Risk and Prescribed Fire

Forest fire is described in terms of severity and intensity. Fire severity is the extent to which damage occurs, in other words the long-term effect fire has on a site. High severity fire is synonymous with a stand replacing event where most or all vegetation is killed, essentially resetting succession. Intensity describes the characteristics of the fire while it is occurring (flame length and rate of spread). Low intensity fires are those which burn the forest floor at slow to moderate rates of spread. Low intensity fires with a mix of low and moderate severity impacts are the goal of most prescribed burns.

Dense mountain laurel in the northern-central block of Stand 4.

Fire is an agent of natural disturbance in all forests globally. Some forest types are adapted to persist or thrive with regimes of frequent low severity fires while others experience fire very infrequently and at stand replacing severity. Determining where each property and forest stand falls within this spectrum informs management, including controlled burning of appropriate sites and allows land stewards to prepare for wildfires.

The original stewards who co-evolved with and managed North America extensively used fire as a tool in landscape augmentation. Advances in scientific research have pointed to the utility of prescribed burning in achieving management goals. These advances have created a unique opportunity to build relationships between land stewards interested in prescribed burning and the indigenous people who originally practiced this management in the region.

Suppression[16] of fires in New England since the early 20th century has built up fuels[17] on sites which formerly experienced semi regular burning. In some forest types, suppression has created the potential for catastrophic landscape scale wildfire. This potential is notably less likely to occur in a given year than fires in the western and southeastern United States. While prescribed fire is a management option, it is not appropriate for some sites. On sites which may have historically experienced frequent fire but are not candidates for burning today there are mechanical means of reducing fuel loads and managing for the historical cover type.

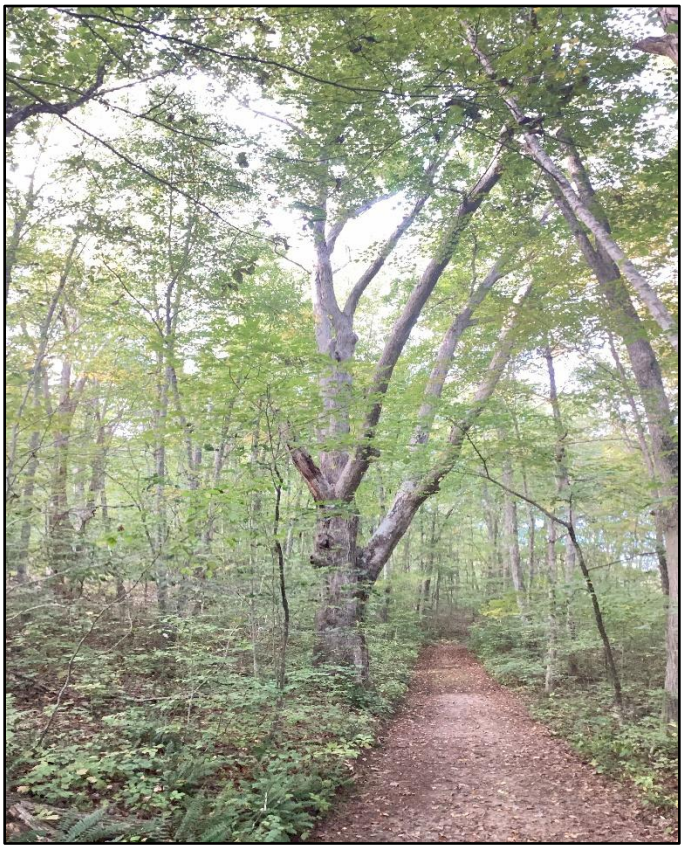
It is likely that no fires have occurred since reforestation of the property though fire has shaped parts of the property's history[18]. If an extended drought period were to occur the property would be at moderate risk of wildfire ignition. Wildfire on this property would likely kill a high percentage of overstory trees

[16] Fire suppression describes the practice of preventing and eliminating fires without consideration for the role fire plays in ecosystem function. This doctrine has been adapted in recent years by state and federal agencies to include the implementation of prescribed burning as a method for reducing wildfire ignition and spread to potentially hazardous or costly areas.

[17] The term fuels describes any flammable material which will or could burn and spread fire. In fire prone areas reduction of fuels (leaf litter; fine woody debris; dense areas of complex vertical structure) mitigates the likelihood of wildfire ignition from natural or accidentally human caused sources.

[18] In the 1700s or 1800s the Lee Farmhouse was destroyed by fire (Pfieffer 1996).

because of the presence of ladder fuels in the form of saplings, highly flammable shrubs (i.e., mountain laurel), and the mostly closed canopy condition which would allow a crown fire to spread rapidly from tree to tree. Open water and wetland soils in places throughout the property act as both a potential fire break and a risk reduction for fire igniting.



Wolf white oak in the southern-central portion of Stand 2.

4.15 Carbon Sequestration

This property has not historically been managed for carbon sequestration or storage. The recommendations within this plan are likely to increase long-term carbon sequestration and storage, both on the property and within the durable forest products that will ideally be generated through forest management activities. This will be accomplished by maintaining much of the carbon stored currently on the property (in trees and soils) and by increasing carbon sequestration rates through the removal of invasive plants and release of native tree regeneration and retained mature trees that will sequester carbon more effectively and store it for longer. Limiting unnecessary soil disturbance can help retain the carbon stored in soils. Though not as prolific as the storage in trees and soils, it is important to recognize that long-lived forest products store carbon as well as serving human needs. Durable, long-lasting wood products continue to store carbon in their fibers while live trees retained in the forest can increase their rates of carbon uptake and storage due to increased resource availability, primarily sunlight. In addition, producing sustainably grown wood on conserved properties in southern New England can help ensure the forest management activities in our area help provide the wood we all use.

4.16 Forest Management

This property has relatively high stocking levels throughout. The lack of active management in the recent past has resulted in a mostly closed canopy forest with shade tolerant species regenerating in most places. A notable exception to this is the portion of Stand 4 east of Gungy Road which has abundant oak regeneration on ridgetops where sunlight is able to reach the forest floor. The regeneration was made possible by canopy gaps from past spongy moth defoliation combined with extended periods of drought, which resulted in increased rates of oak mortality in places. Moving forward, in accessible portions of the property where active management is appropriate, both even and uneven-aged forest management techniques should be practiced. This mix of approaches is representative of how natural agents of disturbance impact the landscape. Oaks are extremely ecologically valuable and currently play a major role in many parts of the forest on this property.

The long-term presence of oak in our forests is critical for many reasons (some of which are discussed in the Wildlife Habitat and Biodiversity Section – Section 4.7.2 – of this plan), but overall oak is declining

both on the property and regionally, particularly in the midstory. Where feasible, successfully regenerating oak over time in parts of this property can help to ensure the long-term sustainability and productivity of the forest. As Tom Worthley (Associate Extension Professor in Forestry from the University of Connecticut) would say, "If we want people 100 years from now to be able to experience 100-year-old oak trees, we have to start today with a seedling." Details regarding silvicultural recommendations can be found in Section 7 "Stands".

Some sparse individual eastern white pine seedlings are present on the property, most notably in the northern portion of the central block of Stand 4. The regeneration of these young individuals should be encouraged to grow free from competing hardwoods to further proliferate the diversity of the forest in these regions. White pine and other softwoods provide habitat value for various suites of species of birds including birds of prey, neo-tropical migrant songbirds like Blackburnian warbler and black-throated green warbler and some resident species of owls (New England Forestry Foundation 2022). Improving the softwood population in an otherwise mixed oak dominated woodland would be extremely beneficial in the long-term to diversify the species mix and enhance the productivity, resilience, and adaptive capacity of the forest.

An individual white pine regenerating in the northern-central block of Stand 4 (circled in yellow).

Silviculture[19] on this property will be driven by the goals stated at the beginning of this plan. Some of the treatments recommended in this plan will result in the cutting and removal of trees that have commercial value. Being able to sustainably produce a variety of forest products is not a goal for the property but can help facilitate the stated goals and can also provide an additional benefit to local, regional and global economies.

Using concepts from New England Forestry Foundations "Exemplary Forestry[20]" can help ensure the management activities undertaken can maintain and enhance resilience and productivity.

a. Continuously improving forest stands in terms of both quality and quantity.
b. Providing conditions which are well-suited to the umbrella wildlife species known to be representative of the habitat needs of the great majority of native species
c. Maintaining connectivity between habitats.
d. Achieving a diverse size class distribution of 5-15% of stands in seedlings, 30-40% in saplings and poles, 40-50% in sawtimber and including up to 10% of the landscape in large diameter multi-storied stands.
e. Growing tree species well-suited to each site (e.g., matched to soil and physiographic conditions as well as expected changes in climatic conditions).

[19] Silviculture is defined as the art and science of growing trees.

[20] Exemplary Forestry is a concept developed and promoted by the New England Forestry Foundation. It is intended to help increase the awareness of important and potentially measurable forest management outcomes with a wide breadth of goals driven in large part by regionally appropriate presence of wildlife species and site specific potential for production of wood.

f. Stocking that fully occupies the sites; this is an average of "B" line stocking for stands not currently being regenerated.
g. Growing and harvesting quality timber at an average of 0.5 cords/acre/year.
h. Addressing climate change

It is not the intent of this management plan to create a scenario in which all of the acreage in this plan receives some treatment. The entire property should be cared for and monitored, but not everywhere is appropriate for active management. Specifically, some parts of Stand 4 could be set aside as permanent reserves. This will be addressed further in the stand description and recommendation for this and other stands (Section 7).

Recommended actions in this plan are intended to achieve stated goals with care and balance for as many features and factors as possible. Dates and recommendations should be flexible based on changing conditions and goals. Ensure equipment is site specific and, if feasible, using animal power (horses or oxen) should be considered.

4.16.1 Summary of Silvicultural Objectives

- Encourage and release desirable regeneration where feasible
- Reduce black birch populations property-wide due to its tendency to outcompete more ecologically valuable native tree species and its susceptibility to *Nectria* canker
- Release healthiest most vigorous trees from competition to ensure they can maintain their vigor and productivity
- Identify and release crop trees from surrounding poorer quality trees to promote a vigorously growing seed source of quality genetic stock for the future forest
- Create variably sized canopy gaps in designated stands to diversify tree species, age and size class, increase structural complexity, and enhance spatial heterogeneity.

4.16.2 Management Design and Mitigation

- Retain at least 50% canopy closure adjacent to wetlands, streams, and vernal pools.
- Retain existing downed woody material on site unless removal or transport is necessary to facilitate access
- Minimize skid trail distances and avoid water crossings except as absolutely necessary.
- Leave tops and slash on site for both nutrient cycling and wildlife habitat. Use some tops and slash to create brush piles.
- Leave all snags, where not a safety concern, for wildlife habitat.
- Avoid disturbance to stone walls as much as possible. Leave other historic features undisturbed unless specific tree removals to maintain the integrity of the feature is necessary (i.e., large tree beginning to move stones with roots etc.).
- Require any harvest equipment to be pressure washed and thoroughly dried before being brought onto the property to reduce the risk of additional invasive seeds being transported into the forest.
- Any seed mix used to stabilize soils or skid trails must be certified invasive-free and should be composed of native (or at least non-invasive) plants. Where mulching is necessary use invasive-free straw as opposed to hay mulch to cover seed until successful germination can occur.
- Follow all Connecticut Best Management Practices not covered above to maintain water quality and soil stability. Published BMPs should be viewed as a minimum requirement and actual measures taken to protect water and soil resources will likely exceed legal requirements.

5 RESOURCE CONCERNS

Degraded Plant Condition

- Lack of size class diversity caused by complete canopy closure.
- Lack of soft mast productivity due to complete canopy closure
- Lack of free-to-grow seedlings and saplings of shade intolerant and mid-tolerant species
- Lack of vigor in some overstory trees due to competition for sunlight resulting in greater susceptibility to insect infestation and disease
- Lack of desirable species (especially oaks and hickory) within the midstory

Deer Browse Pressure

- Deer browse (combined with other factors) on desirable species reducing successful large-scale regeneration of native species property-wide

Plant Pest Pressure

- Dense invasive plants inhibiting growth of tree regeneration and native understory vegetation in places.

Terrestrial Habitat for Wildlife and Invertebrates

- Lack of early successional habitat in the forested portions of the property
- Edge habitat not providing full suite of potential habitat opportunities (i.e., hard edge/abrupt transitions from open areas to mature forest in some places)

Aquatic Habitat for Fish and Other Organisms

- Riparian buffers inundated with invasive plants preventing native cover from being established.

6 INVENTORY METHOD

To conduct the inventory presented in this plan, a series of plots were laid out throughout the forested portions of the property. At each plot, a 20 Basal Area Factor angle gauge was used to determine basal area. Individual tree measurements were recorded with a diameter tape and/or a Biltmore stick while tree health was determined by visual inspection. Abundance and diversity of tree regeneration and understory vegetation were also recorded at each plot. Resource concerns were identified using a combination of quantitative data from inventory plots and qualitative visual observations both at inventory plots and throughout the property as a whole.

7 STANDS

Hartman Park Property Stands

Stand	Description	Acreage
1	Open Water	11.7
2	Mixed oak with sawtimber	62.5
3	Mixed oak fully stocked	9.3
4	Mixed hardwood	161.1
5	Open Field	1.5
6	Transmission Corridor	15.9
7	Forested Wetland	55.5
	Total acreage	**314.9**

7.1 Stand 1

Acres: 11.3 (1 block) **Forest Type:** Open Water

Landowner Objectives – Maintain aesthetic features, removal of invasive species, maintain as high quality water source, allow beavers to continue their own management within the pond, continue to allow fishing access.

Forest Health and Risks – Invasive species are the largest health risk to this stand. Currently, the pond is a diverse open water feature with an impressive variety of native plant species, many of which are described below. The presence of invasive species threatens to reduce the biodiversity and wildlife habitat values this area offers.

Vegetation – Stand 1 has a wide variety of vegetation growing near the open water feature, including but not limited to alder, willow, swamp azalea, wild grape, black oak, red maple, sassafras, eastern redcedar, ironwood, shadbush, yellow-poplar, black birch, American chestnut, dogwoods, northern arrowwood, mountain laurel, buttonbush, cattail, spirea, poison ivy, lowbush blueberry, highbush blueberry, bayberry, sweetfern, a variety of grasses and sedges, and witch hazel among many others. Many late-season native wildflower species including goldenrod, asters, boneset, Joe-pye weed, and others help provide important sources of nectar and pollen.

Adjacent Ownerships – The western part of this open water feature is bordered by Stands 2, 6, and Gungy Road. The eastern and southern portions are bordered by Stand 2 as well. The northern section is bordered by parts of Stand 6b to the west and east.

Soils – Catden and Freetown soils, Hinckley loamy sand, Ridgebury, Leicester and Whitman soils.

Topography – Flat, little to no variation in elevation.

Open water feature within Stand 1.

Access – The main entrance to Hartman Park is just south and west of Stand 1. There are a series of trails including the orange, purple, and red trails that run along the southern and eastern edges of the stand.

Wildfire – The risk of wildfire is very low in this stand due to the saturated soils adjacent to the pond and its open water condition.

Wildlife – This area currently provides quality habitat for a variety of species that use open water and associated edge features. Many bird species including yellow warbler, prairie warbler, common yellowthroat, tree swallow, warbling vireo, red-winged black bird, blue-winged warbler, yellow-throated vireo, and American goldfinch were heard in the northern portion of this stand during the forest inventory in April 2025. Birds of prey, freshwater wading birds, and waterfowl are also present. In the context of the property as a whole, which is almost entirely forested, the open water character of the pond plays a crucial role along with its quality edge habitat that transitions into woodland. Other species noted during field visits to the property include snapping turtles, a variety of frogs, and snakes. Many pollinator species and others including a wide variety of Odonates (i.e., dragonflies) and other insects are also present.

The open water feature here also continues to provide excellent habitat for beaver and they have been present in the area for a while. Signs of beaver activity were noted along the eastern shoreline and there are lodges in the center and close to some edges of the pond. Many dead trees surround the pond though it appears as though they were killed by insects (primarily oak from spongy moth and ash from EAB) as opposed to being girdled by beaver. The dam at the southern end of the pond is covered in vegetation and is difficult to access.

Beaver damage in the southeastern portion of Stand 1.

No fish were noted in the pond during field visits, but there are likely a variety of species present here. Although there are no large outflow areas from the pond, the area is large enough to house some species of bass, perch, or others.

Invasive Plants – Honeysuckle, Asiatic bittersweet, autumn olive, multiflora rose, burning bush, ailanthus (a.k.a. tree-of-heaven), Japanese stiltgrass and others were noted. Invasives are most common in this stand in the northern portion near the boundary with the heavily and regularly disturbed transmission corridor (Stand 6).

Hydrologic Features – Multiple intermittent watercourses drain into the pond from the north and towards the south through Stand 2 and into Stand 7, the forested wetland. The open water feature found in this stand is the largest body of water property-wide.

Management History – According to aerial imagery from 1934, most of this stand was forested and some portions of it were maintained as open space back then, possibly as farmland. The open water feature was much smaller at that time and it has increased in size by +/- 6 acres since then. This is most likely due to the beavers moving into the area and damming up the watercourse that historically would have flowed through the stand.

7.1.1 Recommendations

2026 – Install two wood duck/merganser nest boxes along the edges. There may be sufficient amounts of dead and dying trees to satisfy needs but increasing habitat opportunities could be useful. In addition, ~~install a bat box to help provide suitable habitat for bat species adjacent to an area in which bats are sure to hunt.~~ If this is to be done, develop a plan for regular cleaning and maintenance working with interested volunteers or scout groups.

Standing dead oak trees near the shoreline in Stand 1.

The spongy moth-killed oak trees at the picnic area/fishing access along the eastern shoreline could be cut for safety. The trees wouldn't necessarily need to be fully removed from the site. Once cut, as long as the trees were not placed in regular traffic areas they could be left in the woods and/or deposited along the shoreline, partially submerged to serve as basking areas for amphibians, reptiles, and birds.

2026-2028 – Much of the vegetation in this stand is native, but some pockets and scattered individual invasive plants are present. Removal of these plants to help ensure the continued productivity of the vegetation surrounding the pond would be useful. Species to focus on treating include stiltgrass, ailanthus, and burning bush though ideally any invasive plants would also be treated concurrently.

Ongoing – Monitor for invasive plants over time and spot treat as necessary to maintain a mostly native mix of species.

Monitor for beaver activity. If excessive amounts of damage begins to occur (many shoreline trees being felled or girdled, water backing up in the pond more or more dams downstream resulting in flooding parts of the trail system or impacts to other infrastructure etc.) develop a plan for working with the beaver to help ensure a viable population can remain without unreasonable negative impacts to other important

property features. Options for this can include installation of a beaver baffle/deceiver to maintain water levels, fencing or painting some key shoreline trees to prevent damage, and trapping to remove some beaver to help manage population size.

7.2 Stand 2

Acres: 62.5 (3 blocks)

Forest Type: Mixed oak with sawtimber

Basal Area: 95 sqft. /ac.

Stocking: Fully stocked

Site Index[21]: 60

Trees per Acre: 116

Estimated Age: 70-80 years

Index Species: red oak

Estimated Canopy Height: 60-80 feet

Dominant and Codominant Trees: oak (white, red, black), hickory, beech, black birch, red maple

Landowner Objectives – Reduce invasive plant populations; regenerate desirable species (oak/hickory), identify and release healthiest most vigorously growing individual trees, enhance abundance and diversity of native understory vegetation, enhance structural complexity.

Forest Health and Risks – Invasive plants are established at moderate to high densities in some parts of this stand. Where they occur, invasive plants often outcompete native understory vegetation and tree regeneration, reducing diversity within the stand, as well as making the forest less resilient to disturbance. Although the patches of dense invasives in this stand do provide some cover to wildlife and likely some value for some pollinators, they do not provide the same high-quality food source and other habitat values that comparable native vegetation does, reducing overall habitat quality.

Some insects and diseases are also present in this stand including emerald ash borer, and BBD/BLD. Although beech bark disease has been present in Connecticut for a long time and many beeches have persisted in poor health, beech leaf disease is a relatively new (first noted in CT in 2019) occurrence and seems to cause mortality much more quickly than beech bark disease. Many of the beech in this stand appear to be infested with beech leaf disease which is having significant impacts

Beech infected with BLD in the central block of Stand 2.

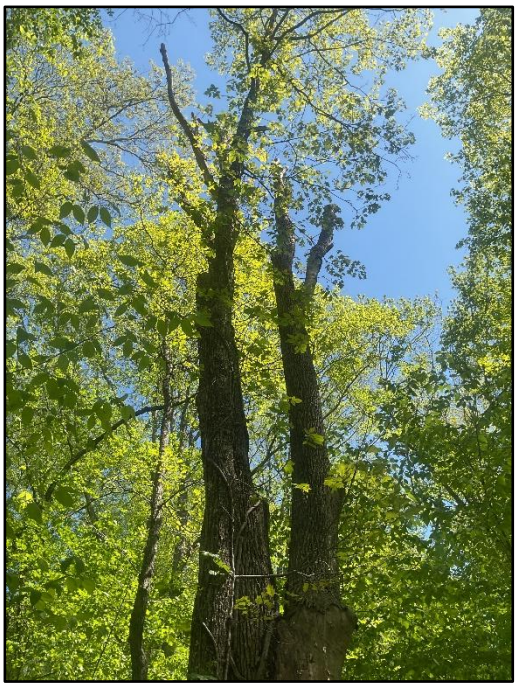
[21] Site index is a measure of a site's capacity to grow trees and is given in the form of expected height of dominant trees at a certain age (50 years is used by convention in this region). For instance, a site index value of 52 for red oak means that one would expect the dominant red oak on that site to be 52 feet tall at 50 years of age.

Regeneration within an oak mortality gap in the eastern portion of the central block in Stand 2.

on beech health especially for those trees in the midstory and understory. No forest-scale treatments have been found yet to reduce the impacts of either disease.

Some oaks in this stand, particularly in the southern portion of the central block, have been killed by spongy moths (formerly called gypsy moth), an invasive moth from Europe. Most of the trees killed by spongy moth appear to have died as a result of the 2015-2017 wave of defoliation combined with two successive years of drought which allowed spongy moth populations to grow exponentially. In some places, the small canopy gaps created by the deaths of small groups of trees have allowed some tree regeneration to become established. This includes some desirable species including white oak and white ash, as well as blueberry and other vegetation.

Many of the ash trees in this stand appear to have been killed by emerald ash borer, an invasive insect from north-eastern Asia. Because there is little that can be done at the forest level to prevent infestation which is almost always followed by mortality, ash trees are frequently cut to capture some of their economic value and/or to limit potential damage to infrastructure and future safety issues from dead and dying trees. However, in places where mortality appears to be nearly complete due to a wave of EAB already having moved through an area, ash trees that appear not to be infested (i.e., "lingering ash") should be retained because of their potential resistance to the borer. Some of the ash trees that are still alive in this stand look fairly vigorous, suggesting that they may have some resistance. The majority of these ash are within the southern portion of the stand. Since EAB typically only attack larger trees and people are working constantly on developing treatments for the insect, maintaining a seed source and some viable young ash trees is important to keeping the species as part of our forests.



Standing dead ash in Stand 2.

In the large eastern block of the stand, some forest tent caterpillars were feeding on typical host species (oak and hickory). Large outbreaks of forest tent caterpillar (FTP) can result in significant negative health impacts to infested trees to species such as oak, hickory, and aspen. Populations were low enough that it was not a pressing concern.

Tree Growth Potential – Site index values for red oak in this stand are good, indicating that desirable trees like oaks can grow well in all parts of this stand. Growing quality red oak and white oak in particular is entirely possible in this stand. This is especially important given all of the oak mortality present in the stand.

Regeneration – Regeneration of desirable tree species is present in this stand, particularly white oak, which is one of the most common species in the seedling size class; musclewood (a.k.a. American hornbeam) is the most common tree in the sapling size class, but its overall density is only moderate. Where this regeneration occurs, it is in fairly dense pockets in the midstory.

In addition to the highly ecologically valuable and productive oak and hickory species, other less productive native trees including red maple and black birch are also regenerating. Black birch and red maple are present in the midstory throughout the stand and are frequently outcompeting the more ecologically valuable oak and hickory species simultaneously providing enough shade on the forest floor to limit the diversity of trees and plants that can successfully regenerate in the understory.

Species	Seedlings Per Acre	% Composition
Musclewood	1182	31.0%
Red Maple	636	16.7%
White Oak	636	16.7%
Sassafras	273	7.1%
Serviceberry	273	7.1%
Black Cherry	182	4.8%
Black Oak	182	4.8%
Hickory	182	4.8%
Yellow Birch	182	4.8%
White Ash	91	2.4%
Total	**3819**	

Species	Saplings Per Acre	% Composition
Musclewood	118	37.2%
Beech	73	23.0%
Black Birch	27	8.5%
Ironwood	27	8.5%
Hickory	18	5.7%
White Ash	18	5.7%
Red Maple	9	2.8%
Sassafras	9	2.8%
Sugar Maple	9	2.8%
Red Maple	9	2.8%
Total	**317**	

Understory Vegetation – The understory in this stand primarily consists of musclewood, ironwood, sassafras, and serviceberry (a.k.a. shadbush) tree seedlings, as well as maple leaf viburnum, lowbush blueberry, wintergreen, witch hazel, Canada mayflower, Indian cucumber root, green briar, wild grape and dense pockets of various ferns. Some notable wildflowers seen include wild geranium, white baneberry, aster, jumpseed, tall meadow rue, jewelweed, and smooth Solomon's Seal among others.

Wild gernaium in the central block of Stand 2.

Musclewood and ironwood make up the majority of the lower midstory throughout the stand, with sparse patches of witch hazel as well. Serviceberry is present near the wet edges bordering Stand 7 and is irregularly spread out throughout the stand as well. Closer to the forest floor, ferns, Canada mayflower, and maple leaf viburnum blanket the ground. Intermittent clusters of wild grape and green briar also reside within the western central portion of the stand. Lowbush blueberry populations are mostly concentrated on the limited number of ridge tops present in the stand, but are also spread in sparse patches throughout the stand.

Adjacent Ownerships – The eastern block of this stand is bordered by Stands 3 and 4, while the western blocks are

separated by Stands 1 and 7. To the north, Stand 6 borders almost the entirety of the northern boundary of Stand 2. The southern boundaries of Stand 2 are bordered by both the Lyme Land Conservation Trust land and the Nehantic State Forest.

Carbon Sequestration Potential – This stand is currently storing a large amount of carbon in some of the large trees, primarily oaks and white ash. The carbon in the ash is at risk due to the presence of EAB which may kill the ash and slowly release the stored carbon as the dead trees decompose. This stand does not appear to currently be sequestering very much carbon due to slow apparent growth rates[22]. The presence of so much musclewood, black birch, ironwood, and beech in the midstory represent a long-term reduction in the capacity of the trees in the stand to sequester carbon. This is due in part to their relative growth rates, the relative sizes of the trees (especially the ironwood and musclewood), and their relative life spans all of which are lesser than much of the composition of the overstory trees, especially the hickory and oak species.

Reforestation/Afforestation Opportunities – This stand is fully forested.

Soils – Hinckley loamy sand, Canton and Charlton fine sandy loam, Nipmuck-Brookfield rocky out crop complex, Ridgebury Leicester and Whitman soils, and Nipmuck-Brimfield rocky outcrop complex.

Topography – Stand 2 has gentle rolling hilly terrain and generally more level topographical features compared to the northern portion of the property. Where ridgetops exist, they are elongated, continuous, and host different natural communities compared to the more level regions in this stand. There are a couple of places within the stand with exposed ledge.

Gentle rolling hilly terrain in the northern-central portion of Stand 2.

Access – Multiple trails are established in this stand and make access by foot relatively easy. A trailhead and parking area exists on Gungy Road. The green, yellow (Lee Farm Road), orange, blue, purple (Park Road) and white trails run through the stand from the south and west. Access with equipment to this stand would be easiest from Gungy Road to the west, but there are two drainages and a central wetland area in Stand 7 that would make access for management purposes difficult. Entering from the north through the transmission corridor would likely make more sense since there is already an established road running through the corridor. Permission from Eversource would be required to use this access.

Wildfire – Wildfire risk in this stand is relatively low due to the low fuel loading and lack of ready ignition source. Although it is unlikely that an ignition would turn into a significant wildfire due to the lack of fuels, there are some areas within this stand which are relatively dry, making it possible for an ignition to occur. The drainages and wetland soils also reduce the wildfire risk in this stand though the adjacency to the transmission corridor make fire more likely in the case of a downed line or other incident within the corridor. No supplemental activities to reduce the risk of wildfire in this stand are recommended at this time.

[22] Slow growth rate observations made based on apparent conditions of bark, crown size, and crown condition.

Prescribed Burn Opportunities – Portions of Stand 2 could benefit from small ground fires, especially the areas on ridgetops where oak regeneration and dense populations of lowbush blueberry are present. However, due to limited access for equipment and personnel to install appropriate control measures such as fire breaks, prescribed burning is not recommended at this time.

Wildlife – This stand currently provides fair wildlife habitat for generalist species but does not provide particularly good habitat for species that require habitat other than closed canopy hardwood forest. The habitat value of this stand could be significantly improved by diversifying its structure to provide both canopy gaps within which there is dense growth of seedlings and saplings, as well as understory vegetation like blueberry and huckleberry[23], and areas within which canopy closure has been greatly reduced with some large overstory trees retained. This latter condition also allows for dense growth of tree regeneration and understory vegetation with the added structure provided by large, complex-structured overstory trees. This type of habitat is useful to many species, most notably Cerulean Warbler, a globally "near threatened" species according to the International Union for Conservation of Nature (IUCN), but whose populations in Connecticut have been increasing – including within the Lyme Forest Block Important Bird Area (IBA). Habitat for pollinator species can be enhanced by increasing amounts of downed dead wood and increasing volumes of flowering and fruiting species like huckleberry, blueberry, wild geranium, aster, viburnums, and a variety of other native species (Xerces Society 2025).

Dense fern understory in the northern-central portion of Stand 2.

Hickory and white oak combined make up a sizeable component of the overstory tree cover in this stand (28.8%). Both of these tree species are vital for wildlife as a source of food (hard mast), early season flowering for pollinators, potential nesting, cover, and other features. Shagbark hickories in particular are excellent tree species for bat habitat, since bats are known to roost under the large flaky exfoliating bark of older shagbarks.

Invasive Plants – Invasive plants are established in this stand at varying densities. In some parts of the stand, particularly in the west-central they are densely established. In much of the rest of the stand they are present only at low densities. Because invasive plants inhibit the growth of native tree regeneration and understory vegetation, treating invasives should be a priority. Effectively treating invasives prior to any active manipulation of forest structure is especially important to ensure that any newly created canopy gaps are colonized by native vegetation instead of invasives.

[23] Though blueberry and huckleberry are already present in this stand, the closed canopy limits their ability to flower and fruit resulting in a reduction of nectar, pollen, and soft mast production. Additional sunlight reaching the forest floor where these species are found through the creation of canopy gaps can increase the abundance of all of these features.

Notable invasive species include Japanese barberry, burning bush, and Asiatic bittersweet. For the most part these species occurred in clumps together or were scattered as individuals throughout the stand.

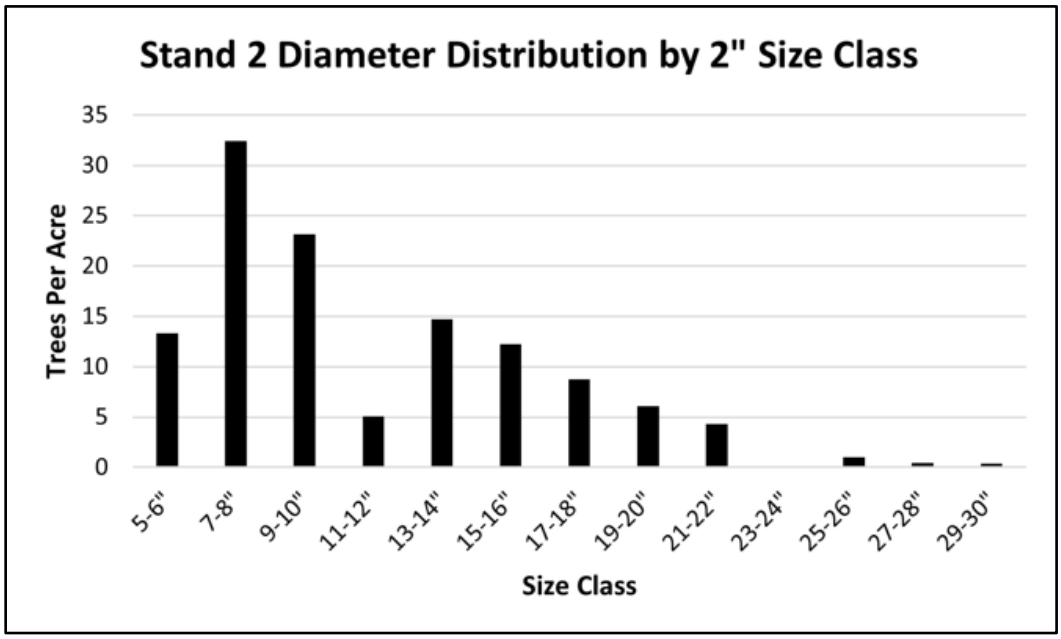
Hydrologic Features – There are several wet spots within this stand including the intermittent watercourse that runs through the western portion of the stand. Forested wetlands also border this stand, but these are entirely in Stand 7 as mapped. Additionally, there is a higher concentration of saturated soils in the east near the border with Stand 4.

Management History – According to aerial imagery from 1934, most of this stand was forested at that time, specifically the northeastern and southeastern blocks. Much of the large central block of the stand was previously farmland/pasture, which is evidenced by the numerous stone walls present in this section of the stand today and was just beginning to revert to forest in 1934 or was still open at that time. Agricultural abandonment appears to have occurred 80-100 years ago with abandonment somewhat earlier in the riparian areas surrounding the drainage in the eastern part of the stand and somewhat later in the central portion of the stand.

Current Stand Dynamics –

	BA/acre**	BA/acre AGS**	Trees/acre**	Trees/acre AGS**	Volume/acre (MBF)	Volume/acre AGS (MBF)	CD/Acre	CD/Acre AGS
Seedlings			3819					
Saplings			317					
Sawtimber trees	73	31	47	19	7.7	4.1	4.2	1.4
Poletimber trees	22	11	68	32			1.8	1.3
Snags	9		6					
Total	95	42	116	51			6.0	2.7
MSD*	12.2							

*Quadratic Mean Stand Diameter
** Total trees includes sawtimber and poletimber-sized trees only
MBF= Thousand board feet
BA= Basal area and is given in square ft./acre
CD= Cords (firewood)
AGS= Acceptable growing stock



Species	SqFt./acre	% Composition
White Oak	18	19.2%
Red Oak	15	15.4%
Red Maple	15	15.4%
Black Oak	15	15.4%
Black Birch	13	13.5%
Hickory	9	9.6%
Beech	5	5.8%
White Ash	2	1.9%
Yellow Poplar	2	1.9%
Eastern Red Cedar	2	1.9%
Total	**95**	

Species	Trees Per Acre	% Composition
Hickory	27	23.6%
Beech	18	15.5%
Red Maple	18	15.2%
Black Birch	14	12.1%
Black Oak	13	11.1%
White Oak	11	9.5%
Red Oak	7	6.0%
Eastern Red Cedar	7	5.9%
White Ash	1	0.7%
Yellow Poplar	0	0.4%
Total	**116**	

Desired Future Condition

- Reduced invasive plant populations
- Vigorous and diverse mix of native trees
- Regeneration of desirable species
- Diverse structural conditions for wildlife habitat and adaptive capacity
- Diverse native understory of herbs, tree seedlings, saplings, and shrubs
- Abundant mast and pollinator species

7.2.1 Recommendations

2026-2028 – Treat invasives throughout the stand.

2029 – If reasonable access can be gained (perhaps via Park Road) conduct a light thinning to tend areas that are getting overstocked. This is done to maintain vigor in retained trees by reducing competition and reallocating growing space to the trees that are growing best and are best suited to the site. The outcome of this treatment results in greater resilience and long-term sustainability and productivity. Focus removals on black birch with *Nectria* and declining individuals of other species. Retain individuals of all species that have good live crown ratios, produce hard or soft mast, have good form and other features that benefit the ecology of the area (i.e., shagbark hickory and their association with bats), releasing these trees on the east, south, and western sides is most important to increase the potential for direct sunlight warming during the day. Encourage a variety of native understory species that can provide early-, mid- and late-season sources of nectar and pollen.

In conjunction with the other treatments listed above, locate areas with high percentage of beech within the understory/midstory, and where it makes sense to do so based on overstory conditions, create canopy gaps to regenerate species other than beech.

Where exposed ledge is present and where it makes sense to do so based on overstory composition and condition, increasing exposure to sunlight by reducing the amount of overstory trees in the canopy can be beneficial in enhancing the potential basking habitat for any reptiles or plants that depend on these conditions.

White oak regeneration established on forest floor (circled in yellow) in the northern-central block of Stand 2.

Ongoing – Monitor for new invasive plant populations post treatment and re-treat as needed.

Standing small diameter non-commercial trees and tops can be cut and left on site to increase the amounts of CWM in the stand. Additional CWM in the stand can increase habitat values (cover, forage, perches, foraging, etc.) for a variety of wildlife and pollinators in all stages of wood decomposition. In addition, CWM adds to a different pool of carbon in the stand, aids in water retention, and as it decomposes acts as a substrate for regeneration. Focus removals and gap creation in areas with advanced white oak regeneration. Leaving some of the trees unlopped (not bucked or cut up into smaller pieces once felled) can help act as a temporary and limited impediment for deer to help ensure the regeneration can successfully continue to grow and become a viable component of the future forest. Over time, reducing the amount of seed-bearing black birch and red maple can help allow for increased regeneration of more desirable species.

Remnants of a stone foundation (Lee Farm) in the central portion of Stand 2.

Monitor for increased rates of oak mortality. If mortality occurs near advanced regeneration of desirable species, utilize the dead trees as anchors for the expansion of canopy gaps to release the regeneration.

If there are places within the central or western block of this stand that abut Stand 1 where trees are beginning to decline, hasten the process of decline and eventual mortality by cutting small groups of trees to intentionally create canopy gaps along the edges to further diversify the structural conditions along the pond as well as the age and size classes of those areas. The influx of early successional plant species can simultaneously create soft edges and enhance productivity for species that use young forest conditions in wet areas. The positions along the eastern and western shorelines are ideal for bird habitat during migration as the western shoreline will get the earliest morning sun and the eastern shoreline the last light of the day[24]. Maintain important shrubby species such as buttonbushes, dogwoods, viburnums, and limit disturbance to the forest floor. If access is not feasible with equipment to remove usable portions of trees, retain felled trees on site provided their presence will not create difficulty of access for trails or other necessary infrastructure.

Many important historic features noted on the trail map and self-guided tour of the property are in this stand. Continue to monitor these features, especially the laid stone features like foundations. If trees are growing or begin to grow within the stones such that roots would begin to degrade the integrity of the stonework, fell the trees to limit potential damage. The trees can remain on site but far enough away from the feature to ensure visibility to the feature and potential restoration work could be done if needed.

Work with adjacent landowners to determine if access is feasible from their properties (Eversource (ROW holder), State of CT – DEEP, and Lyme Land Conservation Trust) to address lack of feasible access from within the property.

7.3 Stand 3

Acres: 9.3 (1 block)

Forest Type: Mixed oak

Basal Area: 80 sqft. /ac.

Stocking: Fully stocked

Site Index: 50

Trees per Acre: 155

[24] The physical landscape position of the pond (in a small depression) will make the solar effects on east and west sides less impactful than a flatter area or that on higher ground (since the sun will be later to hit the west side in the morning and will set behind trees somewhat earlier in the day limiting the extension of daylight along the eastern shoreline), but it's still important.

Estimated Age: 50-80 years **Index Species:** black oak

Estimated Canopy Height: 70-80 feet

Dominant and Codominant Trees: black oak, eastern red cedar, red maple

Landowner Objectives – Reduce invasive plant populations; increase diversity of native regeneration, enhance wildlife habitat diversity.

Forest Health and Risks – Invasive plants are established at moderate densities in some parts of this stand. Where they occur, they are outcompeting native vegetation, lowering the overall biodiversity and wildlife habitat this stand provides. The two most common invasive species noted here are Japanese barberry and burning bush.

Some oaks in this stand, particularly in the northern and southern portions of the stand near the boundary with Stand 2, have been killed by spongy moths. In some places, the small canopy gaps created by the deaths of small groups of trees have allowed for increased growth of native plant and tree populations. Ash mortality from EAB has also occurred in this stand.

Oak mortality in Stand 3.

Eastern tent caterpillars were observed in this stand, and while they are a moderately low forest health concern, defoliation events from them can cause mortality in trees that are already stressed due to other factors such as extended periods of drought. Primary species impacted were black cherry.

Tree Growth Potential – Site index values for black oak in this stand are fair, indicating that oaks can grow well in most parts of this stand. Eastern redcedars still persist in this stand following agricultural abandonment, displaying the stand's ability to regenerate this softwood component if desired.

Regeneration – Regeneration of desirable tree species is present in this stand. Oak (white/black/red), sassafras, hickory, and white ash are some of the species present in the seedling size class. Black cherry, sassafras, and hickory saplings are also regenerating in the stand due to gaps created by oak mortality.

Species	Seedlings Per Acre	% Composition
Black Birch	4333	39.4%
Red Maple	4333	39.4%
Sassafras	1000	9.1%
Black Oak	667	6.1%
White Ash	667	6.1%
Total	**11000**	

Species	Saplings Per Acre	% Composition
Black Birch	100	37.6%
Black Cherry	100	37.6%
Hickory	33	12.4%
Sassafras	33	12.4%
Total	**266**	

Understory Vegetation – This is a relatively young stand with some densely growing trees interspersed with small canopy gaps created by oak mortality likely from spongy moth. In places where the overstory trees are growing densely, limited amounts of sunlight are reaching the forest floor which in turn limits the abundance and diversity of understory vegetation. The lack of understory vegetation in these areas is not necessarily concerning as exclusion of ground level plant species is common during this stage of forest development.

Where understory vegetation is present it is largely composed of briar patches of varying sizes that are distributed across the stand and are especially dense under canopy gaps, where *Rubus spp.* (wild raspberry) are intermixed with briar. The dense clusters of green briar (a native vine species with long thorns with potential wildlife uses such as cover and forage, that can also grow aggressively and exclude other vegetation) in the northern portion of the stand are hindering regeneration of desirable tree species and reducing the biodiversity of the understory overall. Other species noted include goldenrod, aster, yarrow, sedge, heath, witch hazel, ferns (including hay-scented which acts as an impediment to other species), grapevine, invasive plants, and other species typically found on meadow edges.

Dense green briar within Stand 3.

Dense regeneration of tree species is present in the understory mostly under gaps. Where present it is typically dominated by black birch with other desirable tree species mixed in, including black cherry, hickory, and sassafras.

Adjacent Ownerships – Stand 3 is surrounded by Stand 2 on all sides.

Carbon Sequestration Potential – This stand is currently storing moderate amounts of carbon in some of the larger trees, primarily the oaks that are still alive and growing, though to a certain degree carbon remains stored in the recently killed oaks as well. Portions of this stand could be sequestering carbon quickly due to the influx of young tree regeneration on the forest floor. Due to oak mortality related canopy gaps, surrounding live trees now have more growing space and also could have increased sequestration rates.

Reforestation/Afforestation Opportunities – This stand is fully forested. Though there are canopy gaps from dead trees, the gaps have filled in with a combination of tree regeneration and other mostly native vegetation.

Soils – Canton and Charlton fine sandy loams, Nipmuck and Brookfield complex.

Topography – This area is mostly flat with some minimal elevation gain to a high point in the eastern portion of the stand.

Access – Access to this stand is easiest from the surrounding Stand 2 by hiking in from either the blue or orange trail which run around the entirety of the northern and southern portions of the stand respectively. The yellow and purple trails also abut the eastern and western boundaries of Stand 3 respectively.

Wildfire – Wildfire risk in this stand is moderate to high due to its landscape position (at or near the height of land in the southern half of the property) and the densely growing understory vegetation combined with standing and downed dead trees and woody material. The standing dead redcedar skeletons would act as an effective ladder fuel increasing the potential severity of fire that could become a crown fire if ignition were to occur. No supplemental activities to reduce the risk of wildfire in this stand are recommended at this time.

Prescribed Burn Opportunities – N/A

Wildlife – This stand currently provides good wildlife habitat for a variety of species of pollinators, birds, and other wildlife. The strengths of this area include the presence of some live softwood trees – uncommon on this property – in the form of eastern redcedar (an indication of the area's agricultural history and relatively recent abandonment from that use), the presence of oak and hickory in the overstory, standing snags and downed dead material, canopy gaps and associated pockets of regenerating forest, some disturbed area specialists (rubus, black cherry) that provide sources of nectar, pollen, and soft mast, and some very dense vine areas that could be used for cover. The habitat value of this stand could be improved by continuing to diversify structural components. Quality habitat for pollinator species is present here due to the amounts of downed dead wood and volumes of flowering and fruiting species like brambles (*Rubus spp*.), viburnums, and other native species.

As mentioned above, the presence of eastern redcedar provides important habitat values including cover and a potential food source in the form of soft mast. Ensuring the redcedar does not get shaded out by surrounding hardwoods is important.

Eastern redcedar competing with surrounding hardwoods in Stand 3.

Invasive Plants – Invasive plants are established in this stand at moderate densities. Sparse patches of Asiatic bittersweet, barberry, multiflora rose, privet, stiltgrass, garlic mustard and burning bush, are present throughout the stand. Bittersweet in particular is established in the canopy of most overstory trees and is reducing the overall health, crown condition, and vigor of the affected specimens.

Hydrologic Features – The landscape position of this stand makes it mostly shed water as opposed to retaining it. No drainages or standing water bodies were noted in this stand, nor were there any wetland soil types present.

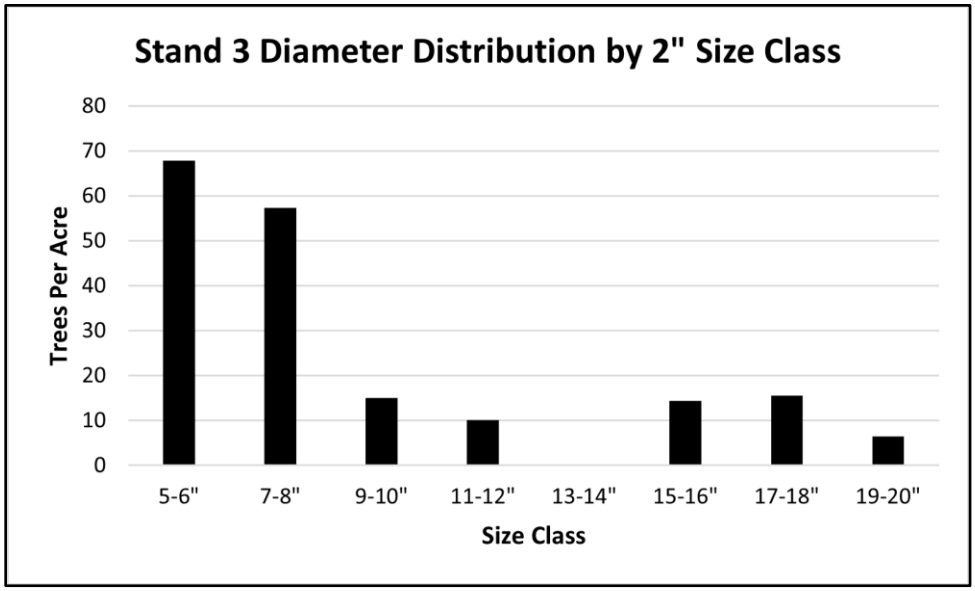
Management History – According to aerial imagery from 1934, the majority of this stand was open agricultural field or pastureland at that time. Stone walls in the area nod to this past use as well. All of this stand has regrown since then with eastern redcedar acting as a pioneer species originally seeding into the

area, lending further evidence to the fact that it was used for agriculture in some form in the past. Eastern redcedars in this stand were released from competition in the past and young forest conditions were created around them; these trees have since begun to be shaded out by various hardwoods.

Current Stand Dynamics –

	BA/acre**	BA/acre AGS**	Trees/acre**	Trees/acre AGS**	Volume/acre (MBF)	Volume/acre AGS (MBF)	CD/Acre	CD/Acre AGS
Seedlings			11000					
Saplings			266					
Sawtimber trees	40	13	24	8	2.8	1.6	4.6	0.7
Poletimber trees	40	33	131	121			2.0	1.2
Snags	33		80					
Total	80	47	155	129			6.6	2.0
MSD*	9.7							

*Quadratic Mean Stand Diameter
** Total trees includes sawtimber and poletimber-sized trees only
MBF = Thousand board feet
BA = Basal area and is given in square ft./acre
CD= Cords (firewood)
AGS= Acceptable growing stock



Species	SqFt./acre	% Composition
Black Oak	33	41.7%
Eastern Red Cedar	20	25.0%
Red Maple	27	33.3%
Total	**80**	

Species	Trees Per Acre	% Composition
Eastern Red Cedar	83	53.4%
Black Oak	43	27.7%
Red Maple	29	18.9%
Total	**155**	

Desired Future Condition –

- Reduced invasive plant species
- Enhanced wildlife habitat with increased production of hard and soft mast, flowering, fruiting, nectar and pollen production, and enhanced structural complexity including multiple size and age classes as well as standing dead and downed wood
- Regeneration of desirable tree species
- Increased species and structural diversity on forest floor

7.3.1 Recommendations

2026-2028 – Treat invasives throughout the stand.

2029 – Identify crop trees and perform a crown touching release on 3-4 sides of the crown to free crop trees from competition. Crop trees in this stand will include a variety of species and should focus on retaining the best quality individuals. Where desirable regeneration (hickory, cherry, oak, and flowering shrubs like blueberry) is present, create canopy gaps above the regeneration to create additional growing space and provide additional sunlight to help ensure these trees become a viable part of the future forest. Releasing this regeneration in some locations can add diversity to the structure in this stand, increase the resilience of this forest to climate change (target species noted above are all projected to do well in predictive models) , and encourage the presence of a variety of hardwoods on the property over the long-term. Thin around healthiest eastern redcedars to help ensure they remain a part of the stand. Fell and leave cull trees of poorest quality to increase CWM for pollinator and wildlife habitat values as well as the increased structure and hydrologic benefits the CWM represents.

Dense saplings near a canopy gap in Stand 3.

Ongoing – Monitor for new populations of invasive plants post treatment, re-treating if needed. Monitor for increased oak mortality. Where mortality occurs in the canopy and advanced desirable regeneration is present below, utilize the dead trees as a starting point for expanding on the canopy gaps where it makes sense to do so based on remaining overstory condition and composition.

7.4 Stand 4

Acres: 161.1 (five blocks)

Forest Type: mixed hardwood

Basal Area: 84 sqft. /ac.

Stocking: fully stocked

Site Index: 55

Trees per Acre: 150

Estimated Age: 70-90 years

Index Species: white oak

Estimated Canopy Height: 70-90 feet

Dominant and Codominant Trees: red maple, oak (white, black, red), black birch, hickory, yellow birch

Landowner Objectives – Reduce invasive plant populations, regenerate desirable species, enhance wildlife habitat.

Forest Health and Risks – Invasive plants are established at moderate to high densities in some parts of this stand. They are the most prevalent in the northwestern block of the stand, particularly along the border of Stand 7. Where they exist they are reducing the expansion of native plant species in the understory and hindering regeneration of desirable tree species.

Oak mortality in the western block of Stand 4.

Many of the beech in this stand appear to be infested with beech leaf disease (BLD) and beech bark disease (BBD). Beech will resprout prolifically with genetically identical root suckers, which are young beech seedlings and saplings that shoot up from the roots. Where these cloned understory and midstory beech grow densely they cast very dense shade on the forest floor and effectively prevent regeneration of desirable species. The partial reduction of leaf area that BLD represents has at least temporarily reduced the amount of shade the beech create on the forest floor. This may present a potential opportunity to increase the diversity of understory vegetation in areas previously dominated by beech.

Beech grove within the western block of Stand 4.

Some oaks in this stand have been killed by spongy moths. In some places, the small canopy gaps created by the deaths of small groups of trees have allowed some desirable tree regeneration to become established including oaks (white/red),

sugar maple, along with blueberry and other vegetation. Much of the ash in this stand (particularly in the northeastern block) has succumbed to the Emerald Ash Borer.
Deer browse is another significant issue that has impacts on the forest in Stand 4. Deer will preferentially browse on regeneration we consider to be desirable such as oak, hickory, yellow birch, and sugar maple which over time and with enough deer activity can negatively impact the diversity of species in an area. This is in part how black birch has begun to increase its presence in the regenerating age and midstory size classes in our forests within the last few decades as deer do not browse this species.

Eastern tent caterpillars were also observed in this stand with low overall populations.

Tree Growth Potential – Site index value for white oak in this stand is 55, indicating that the prospective growth of this species on this site is fair. In general, the abundance of hardwood species throughout the stand shows that a diversity of desirable species can grow here.

Regeneration – Regeneration of desirable tree species is present in this stand, particularly white oak and sugar maple, which are both two of the most common species in the seedling size class. Beech is the most common tree in the sapling size class, but its overall density is only moderate and is densest within beech groves. Managing for the regeneration of oaks, hickories, and other less common but still site appropriate species like tupelo, basswood, and yellow birch will help diversify the species mix of this stand, and can increase the resilience of this forest to climate change[25].

Established white oak regeneration on forest floor in the western block of Stand 4.

Species	Seedlings Per Acre	% Composition
White Oak	531	23.6%
Musclewood	469	20.8%
Ironwood	438	19.5%
Beech	156	6.9%
Sugar Maple	125	5.6%
Black Birch	125	5.6%
Red Maple	94	4.2%
Red Oak	94	4.2%
Scarlet Oak	94	4.2%
Hickory	63	2.8%
Black Oak	31	1.4%
Basswood	31	1.4%
Total	**2251**	

Species	Saplings Per Acre	% Composition
Beech	144	43.9%
Ironwood	81	24.7%
Musclewood	53	16.2%
Red Maple	16	4.9%
Black Birch	13	4.0%
Serviceberry	9	2.7%
Sugar Maple	6	1.8%
Yellow Birch	3	0.9%
Hickory	3	0.9%
Total	**328**	

[25] Sugar maple is projected to fare poorly in predictive climate models and that its range will shift northward significantly, but it is a native tree that provides an excellent source of early season pollen/nectar and unparalleled color palates in the fall. Ensuring its continued presence should still be a priority.

Dwarf ginseng, a native wildflower in the central block of Stand 4.

Understory Vegetation – The understory of this stand is composed of ironwood, musclewood, beech, and white oak in sparse to dense patches. Where the musclewood is present, it is typically dense in the midstory, but this is sporadic throughout the stand and not uniformly distributed. Dense heath and white oak understory is present on ridge tops in the northwestern block of Stand 4, and on other oak-dominant overstory ridgetops throughout the stand. Witch hazel, Canada mayflower, rattlesnake plantain, sweet pepperbush, mountain laurel, striped pipsissewa, maple leaf viburnum, ferns, and sedges make up part of the variable composition of the understory throughout the stand. Some notable wildflowers observed in the stand include aster, false Solomon's Seal, Virginia saxifrage and dwarf ginseng. Serviceberry is scattered sporadically throughout the stand as well. Mountain laurel is also present and is densest in the southeastern block of this stand, where it grows under an oak woodland overstory.

Adjacent Ownerships – This stand is made up of five blocks separated primarily by forested wetlands (Stand 7) and the transmission corridor (Stand 6). Most of the stand is located north of the corridor and is bounded on the west by Gungy Road, the north by private ownerships and Nehantic State Forest, to the east and south also by the state forest. The narrow block of Stand 4 found south of Stand 6 (transmission corridor) is bounded on the west by a band of wet soils in Stand 2.

Carbon Sequestration Potential – This stand is currently storing a large amount of carbon in some of the large trees, primarily the oaks and hickories. Over time, the carbon sequestration potential of this stand could increase due to the influx of light from gaps in the canopy due to oak mortality and increased rates of regeneration stand wide due to this disturbance. Dead trees in this stand are still storing carbon even as they release some while they decompose. The regeneration of white oak and sugar maple in particular is promising since these are both historically long-lived species which are adapted well to this site.

Reforestation/Afforestation Opportunities – This stand is fully forested.

Soils – Canton Charlton fine sandy loams, Nipmuck-Brookfield complex, Hollis-Chatfield rock outcrop, Nipmuck Brimfield rock outcrop complex.

Topography – Stand 4 in the north is situated on multiple elongated, north-south running rocky ridges with variable elevations and a notable degree of plucking[26]. The nature of the varied terrain combined with geologic history in Stand 4 results in a higher number of rocky outcroppings and exposed ledges than in any other stand on the property. The diverse mixture of rocky areas, ridges, and lower elevation wet spots provide unique and diverse habitat features for a variety of wildlife and growing conditions for vegetation. The southeastern block of Stand 4 is relatively steep and mostly west facing with less diversity of aspect and fewer rocky outcrops and ridgetop features. The toe of the slope along the western

[26] This process refers to glacial ice tearing leeward surfaces of rock outcrops producing steep cliffs and underlying heaps of erratic boulders (Pfeiffer 1993)

boundary of this block is the wet portion of Stand 2. Many of the outcrops are highlighted in the trail system, particularly the green and red trail in the northern portions of the northern blocks of the stand.

A unique topographical feature found in the central northern block of Stand 4 is a section of exposed bed rock which hosts the only noted population of eastern redcedar within this stand. This geological feature is also home to some grasses, mosses, and lichen that are uncommon property wide.

Exposed bed rock in the northern portion of the central block within Stand 4.

Access – Access to and throughout the northern blocks of this stand is fairly easy due to the adjacency to Gungy Road and presence of some old woods roads. Multiple trails that run through the northern blocks of this stand make it easy to access the area on foot, though some of the trails run through challenging terrain. There is a small parking area and trailhead ("Field Entrance") along the Gungy Road side of the western block of the stand from which equipment access is feasible. The southeastern block is more complicated to access due to its isolation from nearby roads and the borders it shares with the Nehantic State Forest. Access to this part of the stand would likely be easiest using the trail system already in place or entering through the north via the access road in the transmission corridor (Stand 6[27]).

Dense laurel understory in the central block of Stand 4.

Wildfire – Wildfire risk in this stand is moderate due to the high amount of saplings and small poles in the midstory that could act as ladder fuel and spread fire into the crowns of larger trees if ignition were to occur. Steep hillsides and dry ridges also increase the potential flammability of this stand. Spread from potential wildfire is reduced in the various northern blocks of the stand due to the bands of forested wetland (Stand 7) that interrupt the northern blocks here. The wildfire risk in the southeastern block of Stand 4 is also moderate due to the presence of more flammable mountain laurel and the oak mortality noted there.

[27] During field visits this access was under construction and the western portion of the access road (through 6b) no longer connected over the wetland and into the eastern portion of Stand 6. This may have been a temporary break in continuity but if this is not the case, access to the southeastern block of Stand 4 via the transmission corridor will not be feasible.

Prescribed Burn Opportunities – Due to the difficulties of access – due mostly to variable terrain and lack of substantial road systems – control of a prescribed burn would be difficult. The landscape position of parts of the stand (close to private residences, Gungy Road, and the transmission corridor) also make this less feasible. The species mixes (oak, hickory, heath, etc.) would likely benefit long-term from fire, but ability to safely conduct a burn is likely too limited to outweigh the benefits.

Wildlife – This stand currently provides useful habitat for a variety of species based on some of the unique and/or important features it contains including the presence of oak and hickory, some pockets of regenerating trees and shrubs, some dead trees providing both structural benefits and canopy gaps, and some pockets of water. One of the greatest attributes this stand possesses is its adjacency to forested wetland bands (Stand 7) and the transmission corridor which is to be managed as young forest/shrub in perpetuity by Eversource. The exposed outcrops frequently contain unique assemblages of vegetation often including herbaceous and other flowering plants. Many native pollinator species benefit from the variety of flowers associated with these areas. In addition, the outcrops – especially when in full or mostly full sunlight – can provide excellent basking areas for reptiles including snakes. Some of the outcrops with greater complexity may provide temporary or wintering habitat for species like bobcat. The presence of large diameter, large crowned white oak trees with limited midstory and a dense understory provides ideal conditions for Cerulean Warbler.

A few vernal pools in the northern central portion of the stand and the small pond and associated watercourse in the northwestern corner of the stand also provide excellent habitat for birds, amphibians, and reptiles.

Shagbark hickory near a broken beech tree in the northwestern portion of central block within Stand 4.

Shagbark hickory is present in this stand; mature vigorously growing trees of this species can be important for bat habitat. Bats can roost in the large exfoliating strips of bark that appear as the tree matures. Large exfoliations are most effective when they have direct sun exposure on the east, south, and west sides of the tree to facilitate warming during the day. Groups of shagbark hickory, especially where concentrated near water and potential travel corridors increase the utility of this potential habitat feature. In addition, many insect species and associated gleaning predators like birds and some small mammals can also use the bark for refugia and foraging. Releasing notable specimens from competition will encourage them to grow faster and become larger, creating even better habitat for bats in the area.

Invasive Plants – Invasive plants are established in this stand at varying densities. Where they exist, they are usually mixed, composed of burning bush (winged euonymus), Japanese barberry, and the occasional

privet. Areas with wetter soils tended to have higher concentrations of invasive species and typically consisted of Japanese barberry. Of note are phragmites in the northwestern block of the stand within the pond. This species creates a dense monoculture where it is found and greatly reduces native biodiversity.

Hydrologic Features – There are several wet spots within this stand, including a pond in the northwest corner bordering Gungy Road, and some small intermittent watercourses in the western block of the stand in the north. Two vernal pools were noted in the northern central portion of the stand, both of which are in close proximity to the forested wetland, Stand 7.

Management History – According to aerial imagery from 1934, most of this stand was forested at that time. Major exceptions to this include the western block of the stand within with the southern half and a small block in the northwest adjacent to Gungy Road was still open or partially open at that time. Stone walls in most of the northern blocks indicate the previous clearing and maintenance of the area as agricultural land. Several important historical features (The Clark Farm, Stone End House, and some charcoal kilns among other features) are noted on the trail map and the self-guided tour of the property. These features speak to the initial clearing of the forest for agriculture.

Panoramic view of Stand 4 within the central block.

Current Stand Dynamics –

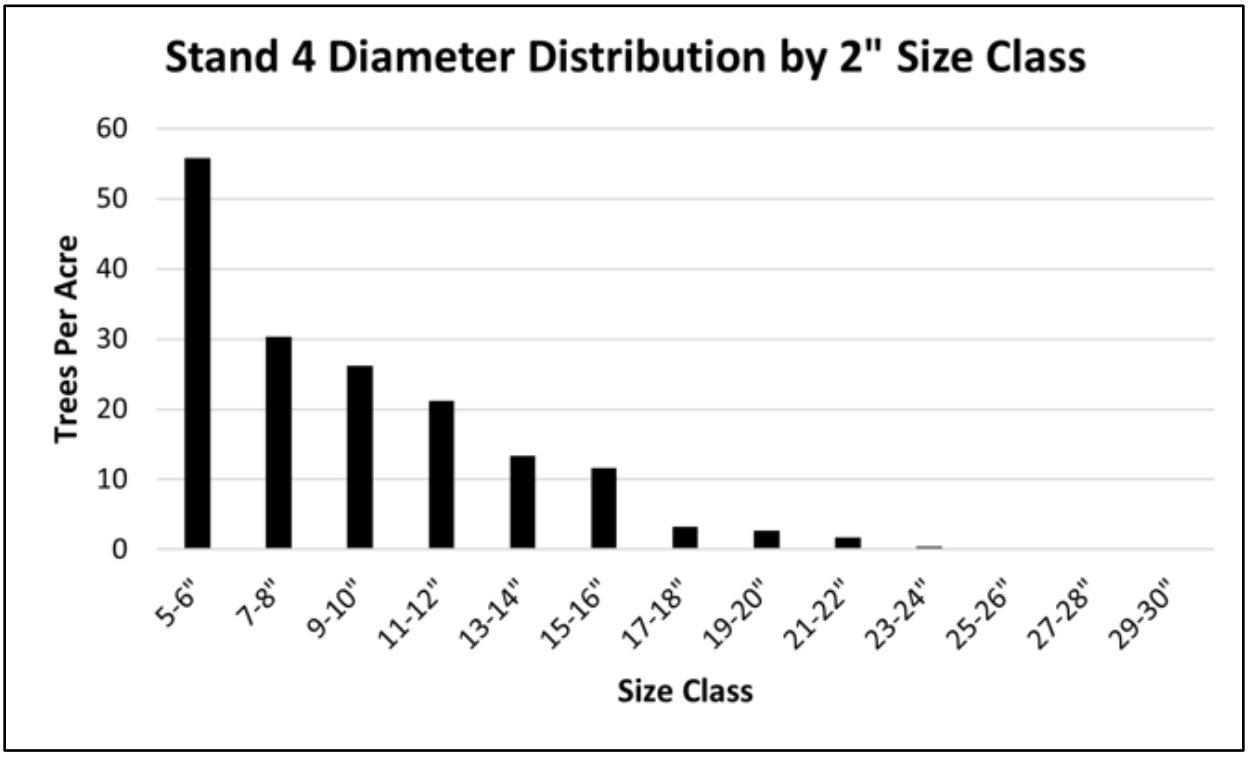
	BA/acre**	BA/acre AGS**	Trees/acre**	Trees/acre AGS**	Volume/acre (MBF)	Volume/acre AGS (MBF)	CD/Acre	CD/Acre AGS
Seedlings			2251					
Saplings			328					
Sawtimber trees	52	31	43	25	3.7	2.9	3.1	1.6
Poletimber trees	32	14	107	58			1.7	0.7
Snags	10		17					
Total	84	45	150	83			4.8	2.3
MSD*	10.1							

*Quadratic Mean Stand Diameter

** Total trees includes sawtimber and poletimber-sized trees only

MBF= Thousand board feet

BA= Basal area and is given in square ft./acre
AGS= Acceptable growing stock
CD= Cords (firewood)



Species	SqFt./acre	% Composition
White Oak	14	16.4%
Red Maple	13	14.9%
Black Birch	11	12.7%
Black Oak	11	12.7%
Hickory	10	11.9%
Red Oak	9	11.2%
Yellow Birch	5	6.0%
Scarlet Oak	4	4.5%
Beech	3	3.7%
Yellow Poplar	2	2.2%
Tupelo	2	2.2%
Bigtooth Aspen	1	0.7%
Black Cherry	1	0.7%
Total	**84**	

Species	Trees Per Acre	% Composition
Red Maple	34	22.9%
Black Birch	30	19.6%
Yellow Birch	18	12.0%
Hickory	16	10.4%
White Oak	13	8.8%
Red Oak	13	8.4%
Beech	10	6.6%
Black Oak	9	6.2%
Scarlet Oak	5	3.2%
Black Cherry	1	0.8%
Tupelo	1	0.7%
Yellow Poplar	0	0.3%
Bigtooth Aspen	0	0.2%
Total	**150**	

Desired Future Condition –

- Reduction of some densely growing species such as black birch and red maple
- Diverse regeneration of desirable species, oaks (white/red/black), sugar maple, yellow birch, hickory, tupelo, black cherry, basswood, bigtooth aspen and yellow-poplar
- Enhanced wildlife habitat, diverse canopy structure, and reduction of invasive species
- Diverse native shrubby understory

7.4.1 Recommendations

2026-2028 – Treat invasives throughout the stand.

2029 – If invasive plants can be controlled in these areas, following the recommendations from Dr. Bryan Connolly's Hartman Park Lyme, CT New England Cottontail Management Plan (2024), attempt to regenerate approximately 12 acres of forest approximately 50 ft. from the transmission corridor (Stand 6). This would be done to increase habitat potential for New England cottontail[28] among other species that would utilize additional young forest and edge habitat conditions. Choose areas with limited slopes and wet soils to limit potential soil and water quality impacts. Avoid and protect historic features. Retain tops of felled trees on site for nutrient cycling, to help provide cover, and as a temporary partial deterrent to deer browse. Wet soils, steep slopes, and otherwise healthy well, functioning forest conditions may hinder the feasibility of this work but it is worth exploring based on the potential benefits for a variety of species. Create some brush piles with tops to enhance habitat conditions.

White oak regeneration under beech within the western block of Stand 4.

Identify locations of existing canopy gaps created by oak and/or ash mortality and expand them to create larger gaps. These areas should focus on places where existing advance tree regeneration of desirable species and/or desirable understory species like heath are present. Retain and promote the oak component (especially white oak) and hickories and remove declining trees, poorly formed individuals, and black birch and red maple. The primary reason for focusing removal on these species is to reduce seed production to increase the likelihood of successful regeneration of other species.

In conjunction with the other treatments listed above, locate areas with dense populations of beech in the midstory and understory, and where it makes sense to do so based on overstory canopy conditions, create canopy gaps to regenerate species other than beech.

[28] New England cottontail (NEC) is our only native rabbit and is a state-listed species that requires young forest conditions for most of their life cycle needs. This block of forest is within what the State of Connecticut DEEP Wildlife Division has mapped as a NEC Focus Area so work within this area has the potential to have the greatest positive impact for this species.

Create younger forest conditions on the stand boundary shared with Stand 7 (forested wetland) to enhance potential woodcock habitat[29]. An opening in the central block of this stand north of Stand 6 and along the boundary with Stand 7 could create ideal conditions for woodcock and other species that require young forest, open/shrubby areas, and moist soils.

Release shagbark hickory from competition to enhance vigor and bark structure.

Ongoing – Monitor stand for increased oak mortality. Identify resprouting invasives or encroachment into new areas and re-treat as necessary.

If portions of Stand 4 bordering Stand 6 are regenerated to soften the edges, create a more gradual ecotone, and provide additional habitat opportunities, regular monitoring of these areas will be important. Monitor for species use (to determine if the treatments have had the intended outcomes), invasive plant populations (and spot treat as necessary to limit establishment), and species mixes of regeneration returning to the site. Over time, the utility of these areas for species that require young forest conditions decreases and ends at around 15 years after initiation. Because of this, if the Town would like to continue to provide these conditions the areas will either need to be cleared again and/or additional areas would need to be cleared so there is a rotating or shifting mosaic of young forest conditions along the corridor. Based on Dr. Connolly's plan, managing for at least 12 acres of functional young forest conditions along this edge would be ideal.

Black birch dominance within the midstory in the western block of Stand 4.

The southeastern block's adjacency to the Nehantic State Forest provides an opportunity to potentially work with the State of CT to cooperatively and intentionally manage this block of the stand as more of a forested "reserve" to potentially compliment work happening across the boundary where they may be creating young forest conditions over time. When and if active management to create young forest conditions were to occur near this portion of stand within Nehantic, this block of Stand 4 could act as an adjacent (albeit small and narrow) mature forest grove abutting younger forest conditions. That mix of conditions could provide important cover, breeding, nesting, and foraging habitat values. This portion of the stand should continue to provide high quality habitat to a variety of species that rely on closed canopy forest.

[29] Woodcock populations have been declining within their range during the last 50 years, primarily due to habitat loss. Woodcock require a variety of different habitats throughout their life cycle. They are not restricted to specific vegetation types, as long as the habitat provides the necessary early successional structure.

Habitat for pollinator species can be enhanced by increasing amounts of downed dead wood and increasing volumes of flowering and fruiting species like serviceberry, blueberry, huckleberry, viburnums, Virginia saxifrage, and other native species. Increased amounts of downed dead wood around vernal pools can also benefit overwintering wildlife in the area.

7.5 Stand 5

Acres: 1.5 **Forest Type:** Open field

Dominant and Codominant Trees: Eastern redcedar, spruce, gray birch

Landowner Objectives – Reduce invasive plant populations; maintain or enhance native vegetation present, maintain open space characteristic, improve edge habitat quality, maintain or enhance softwood component.

Forest Health and Risks – The largest health risk in this stand is invasive plants. They are mostly scattered and where present are mostly at low densities. Since the majority of the stand is composed of native vegetation it seems to be preventing most invasives from encroaching and gaining a foothold.

Regeneration – Regeneration of desirable tree species is present primarily in the eastern redcedar and the spruce that is within the stand. Black cherry, gray birch, dogwood, serviceberry, and oak species are also regenerating though most of these are scattered individuals or small pockets of seedlings and saplings. Having viable and vigorous softwood species as a component of the overall property and regenerating them is important.

Understory Vegetation – There is a wide variety of understory vegetation including some tree species noted above. Many shrubby and herbaceous species are also present including goldenrod, field pennycress, cinquefoil, false Solomon's Seal, yarrow, rubus spp. (a.k.a., raspberries/brambles), whorled loosestrife, deer tongue, violets, highbush blueberry, and the occasional grapevine near the edges.

Adjacent Ownerships – This meadow is bordered on the west by Stand 4 and on the east by Stand 7.

Soils – Hinckley loamy sand.

Topography – This stand is flat and has little to no elevation change or unique geologic features.

Panoramic view of Stand 5.

Access – Access to this stand is easiest via the trail system from Stand 4. The orange and red trails provide good access to this stand. Access with equipment is feasible from the gate at the Field Entrance on Gungy Road.

Wildfire – Wildfire risk in this stand is moderate due to the dry soils, and the grassy/shrubby characteristics found here.

Prescribed Burn Opportunities – Fire would be a useful tool to maintain the current conditions of this stand and to enhance the growth and production of some of the vegetation here including blueberry, but maintenance with periodic mowing is easier and safer.

Wildlife – This stand currently provides excellent wildlife habitat for species that require open field areas and edge habitat. The combination of the open condition with the adjacent forested wetland (Stand 7 to the east) and the shrubby area of the transmission corridor (Stand 6 +/- 500 ft to the south) increases its utility, though this stand is still very small. The variety of native herbaceous species mixed with islands of taller shrubs and some small trees, as well as softwoods (which are largely absent from much of the rest of the property) provide a wide variety of sources of nectar and pollen for a variety of native species of bees, moths, butterflies and other pollinators. Birds noted during the inventory include swamp sparrow, blue-winged warbler, and brown-headed cowbird.

A view of the western edge of Stand 5.

Invasive Plants – Invasive plants are established in this stand mainly along the edges but there are some species in the interior portions of the field as well. Species present include multiflora rose, Asiatic bittersweet, barberry, and autumn olive. There is at least one Callery pear in the field which is regenerating.

Management History – According to aerial imagery from 1934, this stand was completely open at that time. Few to no trees appear in that photo. The red cedars in the field are a pioneer species and are frequently some of the first species to regenerate when an area is abandoned from agriculture. The field is mowed once per year in the fall (October or November) to maintain its open characteristic.

Desired Future Condition –

- Open/semi-open field with wide diversity of native flowering and fruiting vegetation that flower and fruit at different times throughout the growing season to benefit pollinators and wildlife.
- Reduction of invasive species
- Diverse structure within the field itself; some select areas within the field to grow more shrubby overtime then resetting them back to open field conditions

7.5.1 Recommendations

2026 – Replace the rotting roof structure on kiosk.

2026-2028 – Treat invasives throughout the stand, including (but not limited to) the Callery pear tree and associated regeneration. Once invasives are controlled, where feasible and desirable, replace areas previously occupied by invasive plants with desirable native alternative herbs, wildflowers, and if appropriate, small shrubs.

2029 – Create a shifting mosaic of small patches of shrubby vegetation within the field to improve habitat value and structure. Species to focus on retaining include highbush blueberry and other shrubs that provide sources of nectar, pollen, cover, and soft mast. Shrubs can be mowed after a few years as other areas are allowed to grow.

Soften edges of the field abutting mature forest in Stand 4, focusing removal on poor quality trees directly competing with beneficial wildlife species such as oak and hickory. The intended outcome of this can enhance the habitat conditions for a variety of wildlife species that utilize structurally diverse edge habitat transition zones. This can be conducted in conjunction with recommendations prescribed for Stand 4.

Ongoing – Continue to regularly mow a path through the center of the stand to facilitate safe access for recreation. Continue to mow remainder of the field annually to maintain semi-open meadow characteristics. Monitor for new invasives/encroachment, and re-treat if needed. If ground conditions will allow, consider modifying the maintenance regime to mow in late winter or very early spring (February or beginning of March). The benefit of not mowing in the fall is to allow some overwinter cover and provide some seed sources for winter resident wildlife. The reasons to mow so early are to avoid turtles during the active season and avoid the beginning of the bird migration season.

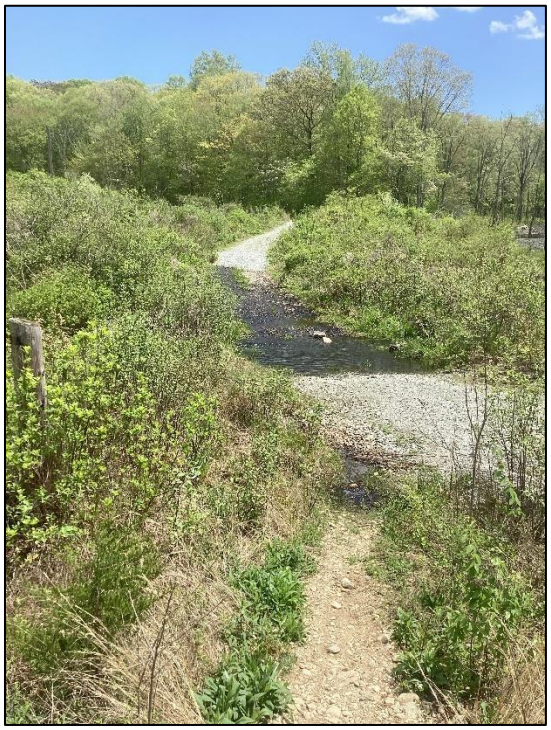
7.6 Stand 6

Acres: 15.9 **Forest Type:** Transmission corridor

Landowner Objectives – Reduce invasive plant populations; soften edges along mature forest, enhance wildlife habitat, maintain trail access, protect important cultural features

Forest Health and Risks – The most significant health risk this stand faces is localized dominance of invasive species that could eventually outcompete native species present within the stand. Further degradation of habitat quality, resilience, biodiversity, and productivity is possible as well if the invasive species present resprout with more vigor following the next clearing of the area. Coordination with Eversource during future maintenance activities will be important to help limit habitat degradation.

Above: This area within the transmission corridor just west of Pole 5515 shows the results of the mowing that occurred during the winter of 2022-2023 which is the last time that the vegetation under the lines was cleared. (Photo taken from Hartman Park Lyme, CT New England Cottontail Management Plan by Bryan Connolly (Figure 5 page 10)). Below: In many places, vegetation has regenerated, and it has done so vigorously. This is especially the case in and near the wetter areas within which a great diversity of vegetation currently exists. Many species of birds were observed during the inventory in spring of 2025.



Understory Vegetation – Vegetation present within the stand includes tree regeneration of black oak, red maple, sassafras, eastern redcedar, ironwood (a.k.a., American hornbeam), serviceberry, and yellow-poplar as well as many shrubby and vine species including alder, willow, swamp azalea, grapevine, northern arrowwood, mountain laurel, cattails, spirea, lowbush blueberry, bayberry, sweetfern, and witch hazel. Cattail is another important species present in some of the wetter areas. All of these occur at varying densities throughout the stand and no one species is concentrated to a certain area. There are many native species of herbs throughout the area as well. For a more complete list of the species present in the corridor, see the Hartman Park Lyme, CT New England Cottontail Management Plan by Bryan Connolly, PhD pages 12-20 (Connolly, 2024).

Adjacent Ownerships – Stand 6 is bounded to the north by Stands 4 and 7, while the open water of Stand 1 cuts through it in the west. To the south, Stands 2 and 4 also share a boundary with this stand. The transmission corridor itself continues to run east through the entirety of the property and off the property into the Nehantic State Forest.

Soils – Nipmuck-Brookfield rocky outcrop complex, Canton and Charlton fine sandy loams, and Nipmuck-Brimfield rocky outcrop complex.

Topography – This stand has a variation in topography from steep higher elevation slopes to lower elevation flat wet areas adjacent to the open water feature in Stand 1 and the edge with Stand 7. Some hilltops are present and evident in the eastern portion of the stand but these are not uniform throughout.

Access – Access to Stand 6 is easiest directly from Gungy Road to the west. The extensive trail network within Hartman Park also lends easy access to this stand from either the north or south within the property since two trails run through the western-central portion of the stand and three trails run through the eastern portion of the stand. An access road maintained by Eversource was under construction during field visits in spring of 2025 and there was no equipment or walking access from the western portions of the stand (6b) across the wet areas in Stand 1. Trail access did not appear to be impacted.

Wildfire – Wildfire risk in this stand is moderately high due to the presence of the power lines and the portions of the corridor with drier site conditions combined with slopes. During periods of extended drought, portions of this stand would become increasingly dry and could potentially ignite if a transmission wire came in contact with vegetation here. Maintaining the area as shrubby and free of tall trees is key to mitigating wildfire risk within the stand.

Wetland habitat within Stand 6.

Wildlife – This stand currently provides good habitat for a variety of migratory birds and other wildlife species that depend on these open shrubland corridors abutting mature forest. This variation in structure and habitat near the open water feature in Stand 1 and the forested wetland of Stand 7 creates a very useful mix of conditions in close proximity to each other beneficial for a wide variety of species. The current edge habitat abutting the forested stands is also beneficial for birds in the area and other wildlife species such as reptiles, amphibians, and a variety of small to large mammals. While the edge is "simple[30]"

[30] A simple edge refers to an abrupt transition zone from shrubby/semi-open area to mature forest. Refer to the picture on page 11 of Bryan Connolly's *Hartman Park Lyme, CT New England Cottontail Management Plan (Figure 6)* for an example of a complex/structurally diverse edge habitat condition.

Swamp azaleas in Stand 6.

right now in certain places (most notably in the eastern portion of the stand abutting Stand 7) it can be improved upon over time.

Due to the property's inclusion in the State of Connecticut's New England cottontail focus area and the shrubby wetland conditions adjacent to mature forest found within this stand, it is possible that this area could support the cottontail and management tailored around this species and others including but not limited to American woodcock should be considered.

Bird species noted in this stand include yellow warbler, prairie warbler, common yellowthroat, tree swallow, warbling vireo, red-winged blackbird, blue-winged warbler, yellow-throated vireo, and American goldfinch. Maintaining the diversity of native vegetation and continuing to enhance the structural characteristics in this stand can help ensure a wide variety of species of insects, birds, and other wildlife find suitable habitat here.

Invasive Plants – Honeysuckle, Asiatic bittersweet, autumn olive, multiflora rose, winged euonymus, mugwort, stiltgrass, privet, buckthorn, and ailanthus (a.k.a. tree-of-heaven), are present in this stand at varying densities and in scattered populations stand wide. These invasives can outcompete native vegetation, lowering the overall percentage of native biodiversity, and reducing the overall wildlife habitat quality this stand provides.

Hydrologic Features – There are several water features within this stand, including the northern tip of Stand 1 and its open water feature which cuts through the western portion of the stand. Further east, portions of the forested wetland (Stand 7) and saturated soils extend into the corridor from the north as well. These unique wetland areas with limited tree cover represent important habitat features.

Flume in Stand 6.

Management History – According to aerial imagery from 1934, this stand was partially forested at that time. This corridor was last cleared by Eversource in the winter of 2022-2023. On the trail map for the property there is an area labelled as "Flume" along the southern portion of the corridor downstream of the bridge crossing on the orange trail. This is a smooth, human made waterway for transporting things.

This corridor is regularly maintained as part of Eversource's requirements for transmission reliability. This necessarily includes cutting vegetation that Eversource considers incompatible with transmission and distribution infrastructure within these corridors.

Desired Future Condition –

- Diverse mix of site-appropriate native species of herbs, wildflowers, shrubs, and small trees compatible with Eversource requirements within a transmission corridor
- Diverse native nectar, pollen, and mast resources that bloom and fruit throughout the growing season
- Enhanced structure that may include softened edges along abutting forest as well as islands of shrubs within the corridor etc.

7.6.1 Recommendations

2026-2028 – Treat invasives throughout the stand where they occur. Work with Eversource to determine if this is something they can help with.

2027-2028 – Work with a consulting botanist to determine if the plant species listed in Dr. Connolly's 2024 plan that can facilitate habitat for threatened and state-listed species are present within the transmission corridor (Connolly, 2024 p 4-5). If these species are not present, consider augmenting with plantings. Work with Eversource to determine most appropriate locations where the plant species would be compatible with maintenance work and would be least/less likely to be unintentionally killed or damaged during future work. Work with CT DEEP Wildlife Division to determine if NEC is present.

2029 – Soften edges along the stand boundaries to increase habitat values and options for species that use edge and young forest habitat conditions such as the New England cottontail. For more detailed prescription see Stand 4. Coordinate with CT DEEP foresters to cooperatively manage across boundaries on the Nehantic State Forest portion of the boundary to help ensure the benefits of a shifting mosaic of young forest conditions can persist over time.

Ongoing – Continue to develop a relationship and work with Eversource to cooperatively manage the vegetation within the corridor to ensure compatible vegetation, biodiversity, and habitat values are maintained or enhanced. Monitor for new populations of invasives, and re-treat as needed. Close or reroute trails with excessive volumes or times of year with encroaching water.

7.7 Stand 7

Acres: 55.5 (3 blocks)

Forest Type: Forested wetland

Basal Area: 90 sqft. /ac.

Stocking: fully stocked

Site Index: 55

Trees per Acre: 156

Estimated Age: 70-90 years

Index Species: red maple

Estimated Canopy Height: 60-80 feet

Dominant and Codominant Trees: red maple, yellow birch, oak (white/red/black), beech, black birch, yellow poplar

Landowner Objectives – Reduce invasive plant populations; maintain water and soil quality, enhanced wildlife habitat quality

Forest Health and Risks – Invasive plants are established at moderate to high densities in some parts of this stand. They are most densely populated in the northern portion of the western block of this stand along the watercourse. The highest diversity of invasive species lies within this area as well.

Some insects and diseases are also present in this stand including spongy moth, emerald ash borer, beech bark disease (BBD), and beech leaf disease (BLD).

Invasives on the bank of the watercourse in the northwestern block of Stand 7.

Some white oaks in this stand, particularly in the northwestern block, have been killed by spongy moths. The canopy gaps created by the deaths of small groups of trees have allowed some tree regeneration to become established. This includes some desirable species like white oak, sassafras, and yellow birch.

Though not necessarily a health issue there is some windthrow noted in parts of the stand. Windthrow (when a tree blows over in a storm) is a natural part of forest dynamics and helps increase the structure and complexity of the area which has benefits for ecological function and wildlife habitat values. The potential issues arise if there is a major storm with heavy winds and precipitation. This combination of weather conditions can result in the toppling of trees anywhere, but the shallow rooting zones common in wet areas increase the likelihood of wind damage in these areas. In addition, the landscape position of this property (relatively close to the Long Island Sound from which storms can intensify as they travel across water) also puts the area at greater risk.

Tree Growth Potential – Site index values for red maple in this stand vary from 50-55, indicating that this is an average site for red maple. Given the wet nature of the stand red maple along with yellow birch are highly prevalent in this stand and can regenerate well.

Regeneration – Regeneration of desirable tree species is present in this stand, particularly white oak which is one of the most common species in the seedling size class; beech is the most common tree in the sapling size class, but its overall density is only moderate. Where this regeneration occurs, it is in fairly dense pockets (beech groves), but is not well distributed. Because of how densely they grow and how much shade they produce, beech groves can hinder regeneration of desirable species.

Species	Seedlings Per Acre	% Composition
Beech	500	33.3%
White Oak	400	26.7%
Sassafras	300	20.0%
Musclewood	200	13.3%
Red Maple	100	6.7%
Total	**1500**	

Species	Saplings Per Acre	% Composition
Beech	140	70.0%
Yellow Birch	20	10.0%
Black Birch	10	5.0%
Hickory	10	5.0%
Musclewood	10	5.0%
Red Maple	10	5.0%
Total	**200**	

Understory Vegetation – The understory of this stand contains a diverse mixture of species including Canada mayflower, various moss/fern species, sweet pepperbush, false Solomon's seal, both high and lowbush blueberry, sarsaparilla, skunk cabbage, spicebush, wood anemone, rue anemone, false hellebore, goldenrod, jewelweed, Jack-in-the-pulpit, blue-bead lily, wild oats, wild geranium, aster, tearthumb, poison ivy, violet and a variety of sedges. Mountain laurel is present in varying densities in the northwestern block of the stand as well.

Adjacent Ownerships – The northwestern block of this stand is bordered by Stands 4, 5, and 6 to the west, and Stand 4 to the east. The northeastern block of Stand 7 is bounded by Stand 4 to the east and west, and by Stand 6 in the south. The northern boundaries of both northern blocks of the stand are bounded by privately owned land and a small portion of Nehantic State Forest. The southern block of Stand 7 (south of the pond) is bordered mostly by Stand 2. The southern portion of this block abuts a parcel owned by the Lyme Land Conservation Trust and there is a narrow finger that is abutted by Gungy Road.

Stone bridge on the orange trail within Stand 7.

Carbon Sequestration Potential – This stand has significant potential for both carbon sequestration and storage. Growth rates are somewhat limited because of the wet soils, but many site-appropriate species are growing well there. The yellow birch in particular is long lived and though not fast growing can store significant amounts of carbon. The rapid sequestration rates of the pockets of younger trees can increase over time with additional encouragement of young trees and the retention of dead, dying, and downed trees and limbs can help ensure that most of the stored carbon remains on site (some is lost to the atmosphere as it decomposes). The large diameter yellow-poplar are storing significant amounts of carbon in their wood fibers and the relatively large crowns indicate they may still be sequestering carbon as well.

Reforestation/Afforestation Opportunities – This stand is fully forested.

Soils –Ridgebury, Leicester, and Whitman wetland soils, Timakwa and Natchaug soils.

Topography – The majority of this stand is relatively level and has little change in elevation.

Access – Access within the northern blocks of this stand is easiest from the trail system that runs through portions of it and Stand 4. The southwestern block of this stand contains trails within and along its edges so access on foot is relatively easy. Due to the wet soils found throughout this stand several footbridges are present that facilitate better access.

Wildfire – Wildfire risk in this stand is relatively low due to the saturated soils and wetland characteristics present in this stand. No mitigation measures to reduce wildfire risk are recommended at this time.

Prescribed Burn Opportunities – N/A

Wildlife – This stand currently provides excellent habitat for a variety of wildlife species that depend on forested wetland ecosystems. Wetlands are essential for a variety of bird species, mammals, amphibians, and reptiles. CWM is present which provides a variety of functions for pollinators and wildlife including cover, forage, perching, and nesting areas. Invasive plant populations threaten the diversity and associated productivity currently present in the stand. Red maple provides an excellent source of early season nectar and pollen. The peeling bark of the yellow birch is rich with small niches for insects and associated bark gleaners. Some important forest breeding bird species like eastern wood-pewee[31] preferentially use yellow birch for nesting and foraging. The standing water features within these areas may act as vernal pools which are essential habitat for vernal pool obligates like some salamanders and frogs. The presence of yellow-poplar offers important nectar sources for honeybees and tupelo offers important nectar, mast, and potential cavity habitat opportunities.

Drainage within the western block of Stand 7, a clump of Japanese barberry can be seen in the background (circled in yellow).

Invasive Plants – Invasive plants are established in this stand at varying densities. In some parts of the stand, particularly in the northern blocks, they are densely established. In much of the rest of the stand they are present mostly at low densities. Because invasive plants inhibit the growth of native tree regeneration and understory vegetation, treating invasives should be a priority. Effectively treating invasives prior to any active manipulation of forest

[31] Listed as one of Connecticut's Birder's Dozen by Audubon Connecticut.

structure is especially important to ensure that any newly-created canopy gaps are colonized by native vegetation instead of invasives.

Invasive plants noted during the inventory include Japanese knotweed, barberry, stiltgrass, burning bush, multiflora rose, and Asiatic bittersweet. Where these are found they most typically are in dense clusters, occasionally forming impenetrable thickets that completely cover the forest floor and greatly reduce regeneration of native vegetation.

Hydrologic Features – A watercourse runs through the northwestern block of this stand with multiple intermittent drainages that feed into the wetland. Wetland pockets are present throughout. Some standing water was noted in places.

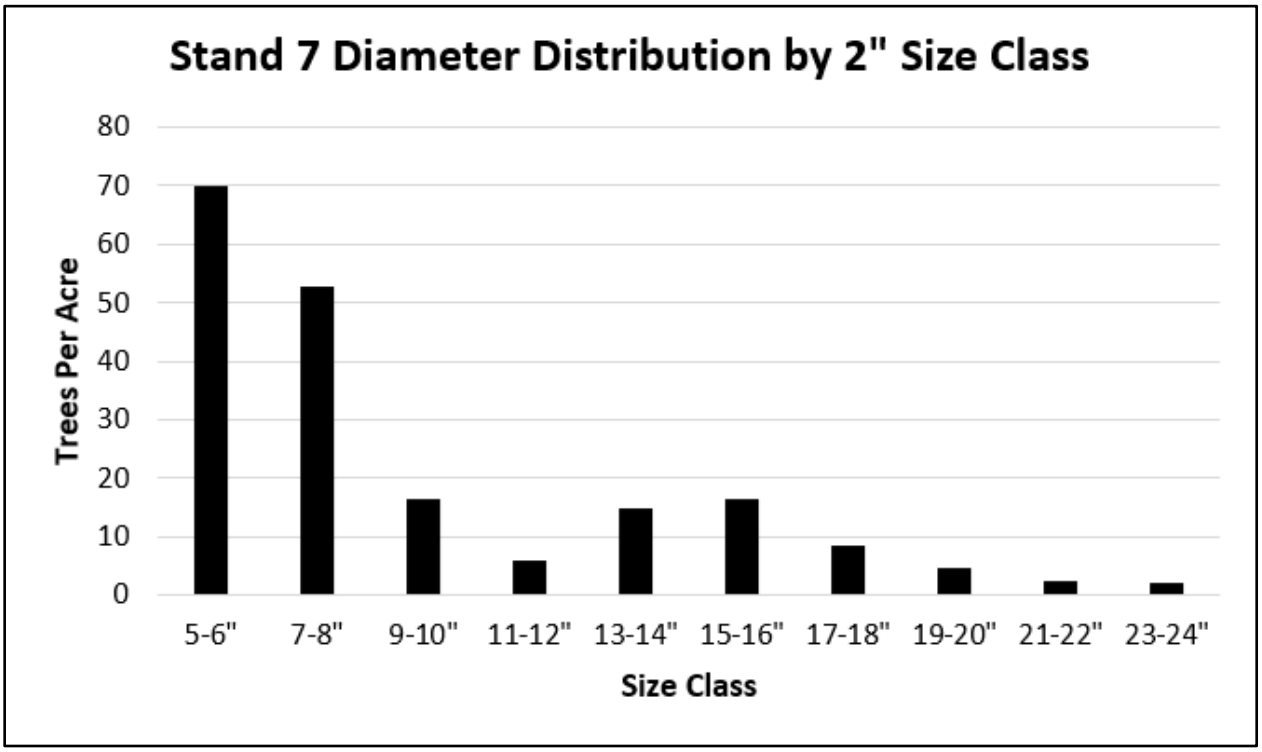
Dense population of skunk cabbage on forest floor within the northwestern block of Stand 7.

Management History – According to aerial imagery from 1934, the majority of this stand was forested at that time though there were some open areas still maintained as such in the southern portions of the northern block and in the northern portion of the southern block of the stand. Limited active management appears to have taken place since agricultural abandonment occurred but the presence of charcoal kilns along the edges of this stand indicate that some trees were probably cut from the accessible portions of this stand following abandonment.

Current Stand Dynamics –

	BA/acre**	BA/acre AGS**	Trees/acre**	Trees/acre AGS**	Volume/acre (MBF)	Volume/acre AGS (MBF)	CD/Acre	CD/Acre AGS
Seedlings			1500					
Saplings			200					
Sawtimber trees	60	36	40	24	5.2	4.0	3.2	1.6
Poletimber trees	30	14	116	56			1.6	0.9
Snags	22		38					
Total	90	50	156	81			4.9	2.5
MSD*	10.3							

*Quadratic Mean Stand Diameter
** Total trees includes sawtimber and poletimber-sized trees only
MBF= Thousand board feet
BA= Basal area and is given in square ft./acre
CD= Cords (firewood)
AGS= Acceptable growing stock



Species	SqFt./acre	% Compostion
Red Maple	18	20.0%
Yellow Birch	16	17.8%
White Oak	12	13.3%
Black Oak	10	11.1%
Red Oak	10	11.1%
Beech	8	8.9%
Black Birch	8	8.9%
Yellow Poplar	6	6.7%
Hickory	2	2.2%
Total	**90**	

Species	Trees Per Acre	% Composition
Yellow Birch	44	28.3%
Red Maple	36	23.0%
Beech	27	17.3%
Black Birch	15	9.6%
Black Oak	13	8.2%
White Oak	9	5.9%
Red Oak	8	4.9%
Yellow Poplar	3	1.8%
Hickory	1	0.9%
Total	**156**	

Desired Future Condition –

- High levels of water and soil quality
- Reduced invasive plant populations
- Improved wildlife habitat conditions
- Diverse native understory composition
- Enhanced structural complexity including different age and size classes of vegetation and greater concentrations of downed wood in varying stages of decomposition

7.7.1 Recommendations

2026-2028 – Treat invasives throughout the stand.

2029 – In conjunction with work planned in Stand 4, identify locations with desirable regeneration including white oak, yellow birch, hickory, black gum and/or other site appropriate native species and release them by cutting overtopping trees where it makes sense to do so based on condition and composition of overstory trees. This treatment is intended to help ensure the advance regeneration growing in the stand currently can successfully become a viable part of the future forest. This not only helps to ensure the long-term biodiversity of the site but also provides enhanced structural complexity with the tops and potentially main stems of the trees on the ground as well as the creation of canopy gaps. Canopy gaps are especially important in these areas because insect populations tend to increase in small patches of sunlight. This in turn enhances foraging opportunities for a variety of birds and other wildlife. Where canopy gaps already exist due to windthrow, stem breakage, mortality or other causes, expand these gaps to allow greater amounts of sunlight to reach the forest floor. In slightly drier parts of the stand this could encourage less shade tolerant species like tulip poplar and white oak to establish.

Ongoing – Monitor for new populations of invasives post treatment. Spot treat invasive plants before they can re-establish.

8 GENERAL PROPERTY RECOMMENDATIONS

- Locate, maintain, and mark all boundary lines. Boundaries should be marked in paint that will differentiate between blazed trails.

- With any activity undertaken on the property, attempt to:
  1. Improve vertical and horizontal structural diversity and complexity, including retaining and recruiting snags and cavity trees where doing so is not counter-productive to the goal of the activity
  2. Ensure water quality and soil stability
  3. Increase accessibility
  4. Limit spread of invasive plant species. Treat populations of invasives in and adjacent to the area where trees are to be cut prior to forest management activities.
  5. Where doing so does not conflict with other resources, attempt to create softer edges and/or transition zones from open areas to mature forest.
  6. Improve forest health and species diversity
  7. Protect historic features including foundations, stone walls and mounds, and other important attributes on the property
  8. Maintain aesthetic values

- Attempt to limit populations of invasive plant species. Keep abreast of information regarding invasive insects. Amend plan to salvage imminently infested stems if necessary. **Vigilance and re-treatment of invasives will be critical.**

- Attempt to maintain and enhance populations of softwood tree species on the property.

- Whenever possible, avoid cutting trees during the songbird breeding and migration seasons (i.e. mid-April to mid-August) if it makes sense given operational concerns and goals of the treatment. Given the presence of trails, open water, and the transmission corridor, consideration for bats should also

be given. Current guidance further extends the season within which tree cutting is discouraged until the beginning of November. If this guidance is followed that should also limit unintended negative impacts to turtle and other species as well.

- Recruit some large trees scattered throughout the property, even if these trees are not "wolf trees" to increase structural diversity. These large trees could become "legacy trees" and be allowed to mature and die naturally.

- Where it makes sense to do so based on current conditions and goals, expand existing gaps to increase structural heterogeneity.

- Monitor health of American beech trees and their response to BLD/BBD.

- Retain vigorous "lingering ash" trees that appear to have not yet been killed by the EAB.

- Maintain roads and trails to maintain access and limit erosion throughout the property. Conduct regular inspections of all trails and respond accordingly as erosion occurs. Implement best management practices by creating water bars on sloped trails and ensuring sections of trail through wet soils are stilted with bridges and/or boardwalks.

- Where and when appropriate work with adjacent landowners to "manage across boundaries". This is particularly appropriate for portions of Nehantic State Forest.

- During or after forest management activities that involve cutting trees, consider piling tops of some felled trees to increase value for wildlife. Pile tops near edges of openings where they exist and do not create more than 2-3 piles/acre.

- Follow Connecticut's Field Guide for Best Management Practices for Water Quality while Harvesting Forest Products during any forest management operations.

- Consult with the CT DEEP to determine which listed species may be present on the property (according to NDDB/New England Cottontail Focus Areas Mapping).

- Where important cultural/historic features are found, remove competing vegetation that could result in damage. Specifically, this refers to cutting and removing trees growing on or adjacent to foundations or other important stone structures (not necessarily stone walls). (https://townlyme.org/wp-content/uploads/2022/05/Hartman-Park-Archeological-Cultural-Study1993.pdf - recommendations on page 52-53).

9 SUMMARY OF RECOMMENDATIONS BY YEAR

Timing	Stand	Recommendation
Ongoing	**See Section 7 for stand specific ongoing recommendations*	
2026-2028	*All*	Treat invasive plant populations
2026	*1*	Install two wood duck/merganser nest boxes, and bat boxes.
2027-2028	*6*	Work with a consulting botanist and determine if the plant species listed in Dr. Connolly's 2024 plan that can facilitate habitat for threatened and state-listed species are present within the transmission corridor.
2029	*2, 3, 4, 7*	Gap expansion based on current canopy gaps.
2029	*2*	Light thinning.
2029	*3*	Crop tree release.
2029	*4*	Young forest regeneration near transmission corridor (+/- 12 acres).
2029	*4, 5, 6, 7*	Soften edges where appropriate.
2029	*5*	Create shifting structural composition within field.

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11 GLOSSARY

acceptable growing stock (AGS)
Trees that are vigorous and now or in the future are capable of producing a sawlog that is at least 8 feet long

aspect
The general direction in which land slopes

basal area
A commonly used measure of forest density or stocking. It is measured as the cross sectional area of a tree in square feet at 4.5 feet above ground.

B-level
The stocking level considered optimal for sawtimber growth.

board foot
A measurement unit for lumber volume. One board foot is a piece of wood 1 foot long by 1 foot wide by 1 inch thick (Abbreviated b.f.)

breast height
Measurement at which diameter is generally measured for inventory and timber tally purposes. Breast height is measured at 4.5 feet above the ground. Where there is any slope, breast height is always measured from the highest part of the slope where the ground intersects the tree.

clearcut
An even-age silvicultural technique in which all the trees in an area are severed and – typically – removed. Silvicultural clearcuts generally remove all trees above 2 inches dbh. Commercial clearcuts or “high-grades” remove all the trees of value leaving poorer quality trees of a variety of diameters.

clearcut with reserves

A modified clearcut in which the majority of the trees in an area are cut, but some minimal trees are left standing. Typically reserve trees will allow to mature and will not be cut. This differs from a shelterwood or seed tree harvest in that residual trees following the initial regeneration cut are intended for removal.

clear log
A length of tree stem or cut log that has no horizontal (i.e. side) branches.

coppice
A sprout from roots or stumps. Or a practice of cutting a tree or group of trees to cause them to resprout from the stump or roots.

continuous forest inventory (CFI)
An inventory of this type is based on a mechanically laid out network of permanent one-fifth acre plots which are to be measured and re-measured periodically on our state forests. Due to the periodic measurement of all trees above sapling size on these plots, a very accurate record is made of growth, drain and mortality of the forest area from time to time.

cord
A measurement unit for firewood. One cord of stacked wood measures 4 feet by 4 feet by 8 feet. 1 cord contains 85 cubic feet of solid wood. (Abbreviated cd)

crown
The top of the tree, including the live branches and the leaves.

cruise
An inventory of standing trees during which information about species, size and other characteristics is gathered.

cull
A tree of such poor quality that it is not suitable for sawtimber. Culls are sometimes sold for firewood.

dbh
Diameter of a tree outside the bark measured at breast height

den tree
A tree with a hollow or cavity large enough to potentially be used by wildlife (a.k.a. cavity tree)

desirable
From the silvicultural perspective desirable trees are typically healthy/vigorous individuals of species which have potential to benefit landowner goals (economic, ecological, or otherwise) for the planning cycle. These may be high value timber trees or large diameter declining cavity trees or individuals of species which are not highly represented on the property/landscape. This term is not inherently economic and is completely dependent on goals and objectives.

even-age management
Managing trees in such a way that it creates a single or two age classes in a stand.

free-to-grow

A condition in which seedlings, saplings, or other smaller, younger vegetation has sufficient sunlight to allow them to continue to develop. This is achieved when there is little to no competing vegetation overtopping the smaller vegetation.

functional habitat
areas which provide required components for a given species and are in close enough proximity to other quality habitat sites to allow for the exchange of genetics over the broader landscape; important metric for species with minimal yearly migration potential or which have specific and uncommon habitat requirements.

glacial erratics
often simply called erratics, or erratic boulders, are rocks that have been transported by ice and deposited elsewhere. The type of rock (lithology) that the glacial erratic is made from is different to the lithology of the bedrock where the erratic is deposited.

girdle
To attempt to kill a tree by cutting through the outer bark and cambium around its entire circumference.

hardwood
A deciduous, broadleaf tree. Angiosperm.

heath
Common and widespread species of flowering plants commonly found in acidic and infertile growing conditions, species include low bush blueberry, and huckleberry.

high-grade
A logging practice in which only the best trees are removed leaving poorer quality and/or damaged trees.

International ¼ Rule
A type of log (measuring) rule. The International Rule is the legal standard for measuring sawtimber in Connecticut.

live crown ratio
The ratio of live crown length to total tree height.

mast
Seeds and nuts produced by trees and shrubs. Mast is often discussed in terms of hard and soft and is crucial to providing food for wildlife.

mbf
One thousand board feet (of sawtimber) or "a thousand".

midstory
Level of strata of the forest layer from between 6-30 feet in height. Dense foliage in this stratum is important for nesting and cover for many forest breeding birds and other wildlife.

mixedwood
A forested area that contains both hardwood and softwood tree species in the main canopy. Typically a mixedwood stand contains between 25-75% softwood.

old forest
A second-growth forest that exhibits a critical mass of old-growth characteristics. Old-growth characteristics may be achieved through both passive and active management (Connecticut DEEP Forestry Division).

Old-growth forest
Forests that were never directly affected by intensive human land use, such as the uses implemented by Europeans (Connecticut DEEP Forestry Division).

overstory
The portion of trees in a stand which form the upper canopy.

overstory removal
An even age silvicultural treatment type in which most or all of the overstory trees are removed in order to release established regeneration.

poletimber
Trees from 5 to 11 inches diameter at breast height (4.5 feet above ground). Also pole or pole tree.

regeneration
New trees, generally seedlings, saplings and sprouts. Regenerating a forest involves replacing existing trees with new ones.

release
To free a desirable tree from competition by cutting or otherwise killing one or more adjacent competing trees or shrubs.

root grub
Large anchoring root of oak seedling which stores energy during early establishment period. Following disturbance oaks put out a prolific sprouting response using the significant store of energy to gain competitive advantage over other regenerating species/individuals.

sapling
A tree from 1 to 5 inches diameter.

sawlog
A log that is straight, large and sound enough to be sawn into boards. Sawlogs are usually at least 8 feet long and ten inches or larger in diameter.

sawtimber tree
A tree large enough to contain at least one sawlog. (Saw)timber trees are usually twelve inches or larger in diameter outside the bark at breast height.

Second-Growth Forest
Forests that are not old growth; these are forests that established and grew following intensive human land use. Second-growth forests are not age specific (Connecticut DEEP Forestry Division).

seedling

A tree from newly germinated up to 1 inch diameter.

Selection System
A silvicultural system involving the removal of individual trees or groups of trees at regular intervals. This system tends to promote the development of uneven aged forests.

Shelterwood System
A silvicultural system whereby new trees are regenerated under the partial shelter of other trees. This system is one of the options available to regenerate a stand or part of a stand to create an even aged or two-aged forest. (The latter occurs when the overstory trees are not removed following the successful regeneration of trees in the understory).

silvicultural system
A planned program of silvicultural treatments during the entire life of a stand. The main focus is on the methods used to obtain desirable regeneration.
silviculture
The science and the art of growing and tending trees for a variety of purposes.

slash
The debris left after logging, pruning or thinning. Slash can include tree tops and unused or unusable portions of the main stems of trees.

softwood
A coniferous, frequently "evergreen" tree. A gymnosperm. Common examples include pine, hemlock, spruce, fir, cedar, and larch (though the latter is not evergreen).

stand type
A group or community of trees sufficiently uniform with respect to size, species composition, spatial arrangement, age or condition to be distinguished from other groups of trees.

stocking
An indication of the amount or density of trees in a stand.

strata
The different heights of vegetation in the forest. Typically divided into understory, midstory, overstory or superstory. The latter exists when a few trees are at least twice as tall as most trees in the stand.

stumpage
Standing trees, usually associated with volume information and intended for sale.

thinning
A cutting done in immature stands in order to maintain tree health and vigor, stimulate the growth of the trees that remain and increase the total yield of useful material from the stand.

tolerance
The relative ability of a tree species to survive and/or grow in shade.

timber stand improvement (TSI)
Improving a stand of trees, usually by pruning, cull-tree removal or pre-commercial thinning.

Umbrella species
An organism (typically an invertebrate) which has a specific set of known habitat requirements which are also preferential for some or all life functions of a broad suite of other organisms. These species are usually charismatic (humans have a warm attitude toward them). Managing for multiple umbrella species which have unique requirements is a proven approach to restore diversity to the landscape.

unacceptable growing stock (UGS)
Trees which are either incapable of producing at least an 8 foot long sawlog now or in the future due to defect, rot, branches, etc. or are in poor health, have significant decline/dieback, or are likely to succumb to insect or disease mortality in the near future.

understory
Vegetation in the lower levels or strata of the forest. Frequently is composed of tree seedlings and saplings, shrubs, herbaceous species and/or invasive plants. Dense low-growing vegetation and foliage is important for many species of wildlife which use this stratum of the forest for cover, nesting, and forage opportunities. Can be considered between ground level to 5 feet in height.

uneven-age management
Managing trees in such a way that it creates three or more age classes in a stand. The selection system is most often used to develop uneven-age stands.

wolf tree
A large, open-grown tree that was present in an area before it reverted to forest