Forest Stewardship Plan 2020-2030
Town Farm Forest
Total Forested Acres: 107

Presented to: Conway Select Board and The Residents of Conway, 32 Main Street- P.O. Box 240, Conway, MA 01341

Prepared by Wigmore Forest Resource Management

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MLF #250

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dcr

FOREST MANAGEMENT PLAN

Submitted to: Massachusetts Department of Conservation and Recreation
For enrollment in CH61/61A/61B and/or Forest Stewardship Program

CHECK-OFFS					*Administrative Box*			
CH61	CH61A	CH61B	STWSHP	C-S	Case No.		Orig. Case No.	
cert. ☐	cert. ☐	cert. ☐	new ☒	EEA ☒	Owner ID		Add. Case No.	
recert. ☐	recert. ☐	recert. ☐	renew ☐	Other ☐	Date Rec'd		Ecoregion	
amend ☐	amend ☐	amend ☐	Green Cert ☐		Plan Period		Topo Name	
			Conservation Rest. ☐		Rare Spp. Hab.		River Basin	
Plan Change: ____ to ____			CR Holder ____					

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) **Town of Conway**
Mailing Address **32 Main Street, Conway, MA 01341** Phone **413.369.4235**
Email Address

Property Location: Town(s) **Conway** Road(s) **Cricket Hill Road**
Plan Preparer **Wigmore Forest Resource Management** Mass. Forester License # **250**
Mailing Address **1601 West Road, Williamsburg, MA 01096** Phone **413.628.4594**

RECORDS

Assessor's Map No.	Lot/Parcel No.	Deed Book	Deed Page	Total Acres	Ch61/61A 61B *Excluded* Acres	Ch61/61A 61B **Certified** Acres	Stewshp *Excluded* Acres	Stewshp Acres
416	68	406	174	108				108
			TOTALS	108				108

Excluded Area Description(s) (if additional space needed, continue on separate paper)

HISTORY

Year acquired **1889** Year management began **1990's**

Are boundaries marked: Yes ☐ blazed/painted/flagged/signs posted (circle all that apply)? No ☐ Partially ☒

What treatments have been prescribed, but not carried out (last 10 years if plan is a recert.)?

stand no. ____ treatment ____ reason ____
(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Acres	Date
#					

(Form revised April 2010)

Landowner Goals-Town Farm

Please **check** the column that best reflects the importance of the following goals:

Goal	Importance to Me			
	High	**Medium**	**Low**	**Do not Know**
Enhance the Quality/Quantity of Timber Products*			✓	
Generate Immediate Income			✓	
Generate Long Term Income			✓	
Produce Firewood			✓	
Defer or Defray Taxes			NA	
Promote Biological Diversity	✓			
Enhance Habitat for Birds	✓			
Enhance Habitat for Small Animals	✓			
Enhance Habitat for Large Animals	✓			
Improve Access for Walking/Skiing/Recreation	✓			
Maintain or Enhance Privacy			✓	
Improve Hunting or Fishing			✓	
Preserve or Improve Scenic Beauty	✓			
Protect Water Quality	✓			
Protect Unique/Special/ Cultural Areas	✓			

*This goal must be checked "HIGH" if you are interested in classifying your land under Chapter 61/61A.

In your own words, describe your goals for the property:

Stewardship Purpose

By enrolling in the Forest Stewardship Program and following a Stewardship Plan, I understand that I will be joining with many other landowners across the state in a program that promotes ecologically responsible resource management through the following actions and values:

1. Managing sustainably for long-term forest health, productivity, diversity, and quality.
2. Conserving or enhancing water quality, wetlands, soil productivity, carbon sequestration, biodiversity, cultural, historical, and aesthetic resources.
3. Following a strategy guided by well-founded silvicultural principles to improve timber quality and quantity when wood products are a goal.
4. Setting high standards for foresters, loggers and other operators as practices are implemented; and minimizing negative impacts.
5. Learning how woodlands benefit and affect surrounding communities, and cooperation with neighboring owners to accomplish mutual goals when practical.

Signature (s): _____ Date: _____

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Acknowledgements

This work was made possible with the support of the Massachusetts Executive Office of Energy and Environmental Affairs and the Mohawk Trail Woodlands Partnership. Thank you for that support- it has made this process possible and yielded a great result and basis for moving forward. The Franklin County Regional Council of Governments also provided invaluable help coordinating and helping this project come together.

The authors would also like to thank the Conway Selectboard, the people of Conway, Beth Girshman in her role as the Mohawk Trail Woodlands Partnership Representative for Conway, and Tom Hutcheson for all their engagement, help, input, and enthusiasm.

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Executive Summary

Figure 1: Retained red maple, oak, and hemlock inclusions developed in Stand 2 from natural disturbance and harvesting ~12 years ago that established a new cohort of trees.

The Town Farm Property is an historic forest where the legacies of the Commonwealth's early history, the Town Farm era, and more modern forest management and planting combine. Nestled in the greater matrix of State Forests and covering one of the more beautiful beaver meadow complexes around, this forest supports a wide array of habitat types, forests, and opportunities for the future including forest carbon and climate chance mitigation. During the planning process leading to the development of this Plan, the Townspeople, Selectboard, and other Stakeholders have worked together to articulate a new vision for the management of these woods.

This vision is adaptive, community-based, and ambitious. It focuses on designating a significant portion of the property to be a reserve area where natural processes are allowed to play out over time. Paired with this, a focus on trail building and enhancement will highlight this forest's assets to the greater community. The active portion of management will focus on invasive plant control, and on an optional, a focus tree release treatment designed to help certain trees grow better.

Overall, this will be an exciting 10 years as Conway, The Mohawk Trail Woodland Partnership, and the region embark on new paths and develop new paradigms of Forest Stewardship in the Commonwealth.

Section 2: Overview of the Conway Town Forest- Town farm

2.1 Landscape and Regional Context

The Town Farm lot rests in the hill towns of Franklin County, Massachusetts. This area supports a rich mosaic of forest, farmland, water features, sparse development, a modest rural population, and rolling topography that gives them their name. Conway epitomizes this mosaic based on a mixture of public and private lands managed in a variety of fashions. After its incorporation in 1767, the Town was known for its agrarian pursuits, specifically sheep farming.

2.2 Property's History of Disturbance

Settlement of this area began in 1762 with the development of a farm community. This land was cleared for hay production and livestock pasturing. The wood removed, along with the fast rivers and streams in Town, fueled a manufacturing boom that then began its decline in the early 20th century. During its peak, many farms like this were abandoned leaving pastures and fields to be reclaimed once again by forest.

As the forest succeeded the pasture, hay, and crop lands, it experienced a series of natural disturbance from Chestnut Blight's peak, the 1930 tornado winds, serial insect and disease problems with the most recent in the hemlock wooly adelgid threats since the late 1990's, emerald ash borer, and unknown future issues as our climate warms. The Town Farm residents used the property for fuelwood and lumber needs through the early 1900's. A red pine plantation was planted by the Civilian Conservation Corps in the later 1930's. This stand was removed in 2007-2010.
Most recently the 2008 ice storm ravaged an already opened the forest canopy after a Salvage Harvest and a Selection Harvest. Ice damaged trees were removed in 2009-2010.

The Town Farm was purchased by the Town in 1889 from Austin Bates for the creation of an alms farm. This was a common, inexpensive way for communities to provide for their indigent population. This practice continued for over 100 years in parts of New England. People grew, harvested their own food, and tended livestock. The intricate stone wall corrals along Johnny Bean Road near the Maynard Cemetery (historically known as 2nd Cricket Hill Cemetery) witnesses these activities. The cellar hole for the Bates homestead sits on a prominence south of Johnny Bean Road with an open view to the north across the wetland.

Figure 2: History runs deep at the Town Farm Lot. Here, the historic Bates cellar hole across from the Cemetery pays tribute to a lot of hard work that went on here.

2.3 General Property Overview

Location and Property Size: The Town Farm Lot, contains 107 acres of land as computed from the Mass GIS database system Tax Records maps. Access is gained from Cricket Hill Road extension near the Lee farm on Cricket Hill Road.

Topography, Land Formation and Hydrology: One enters the property along on (estimated one and a half miles) dirt roads with exposed bedrock and some low, wet depressions. The terrain of the property features rolling hilltops, a broad plain along Johnny Bean Road where the old homestead sits, and some steep slope along the southern and western bounds.

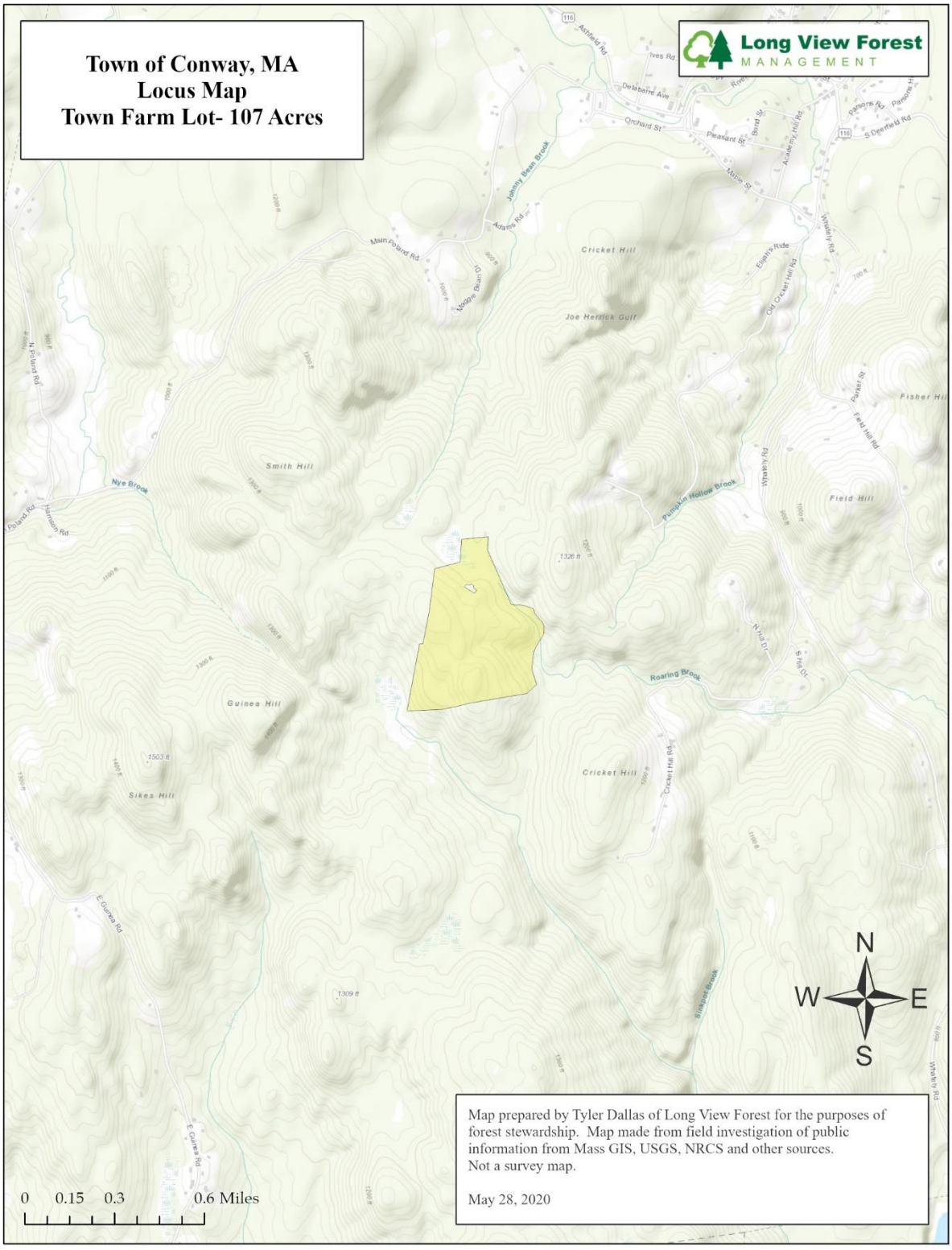


Figure 3: Locus Map showing property location

Figure 4: Woodcock actively use the early successional forest around the homestead. Here, a baby holds still to avoid detection during our inventory work.

The large wetland and ponds in the northern section split the property along Johnny Bean Road. Two large spring seepages drain their flow across the rocky soils. A small depression along the trail system in the south western section of the property holds water and supports a small marshy, hummocky site.

2.4 Forest Soils and Site Productivity

The United States Department of Agriculture classifies and rates soils, which they record in a Soil Survey for Franklin County. Site Index is a term used to describe the potential for trees to grow at a location or "site." The higher the index, the better the growth site is. The site index numbers vary on the woodlot with much of it having a Red Oak and White Pine Site Index of 70. Site index numbers are presented in Section 5: Stand Descriptions of this document. These metrics indicate the site's suitability for the productive growth of the tree species found here.

The soils on this property belong to the Millsite-Westminster Series, the Shelburne loams, the Wonsqueak mucks, and the Pillsbury loams. All these soils originated from glacial till, except for the muck. The upland soils drain water quickly. The Millsite-

Westminster soils are variably productive, with some rich veins of Millsite loams. The tend to be droughty and found on upper slopes or hilltops. The Pillsbury and Shelburne soils are deep, well-drained loams that grow forests well. The Wonsqueak muck soils lie in the depression zones with a high-water table and beneath the wetland area.

These soils have good structure and functionality, which makes all other forest ecosystem services possible. The soil functions beneath the forest floor include temperature regulation, carbon and nutrient cycling, water cycling and quality, natural "waste" (decomposition) treatment and recycling, and habitat building for most living things and their food.

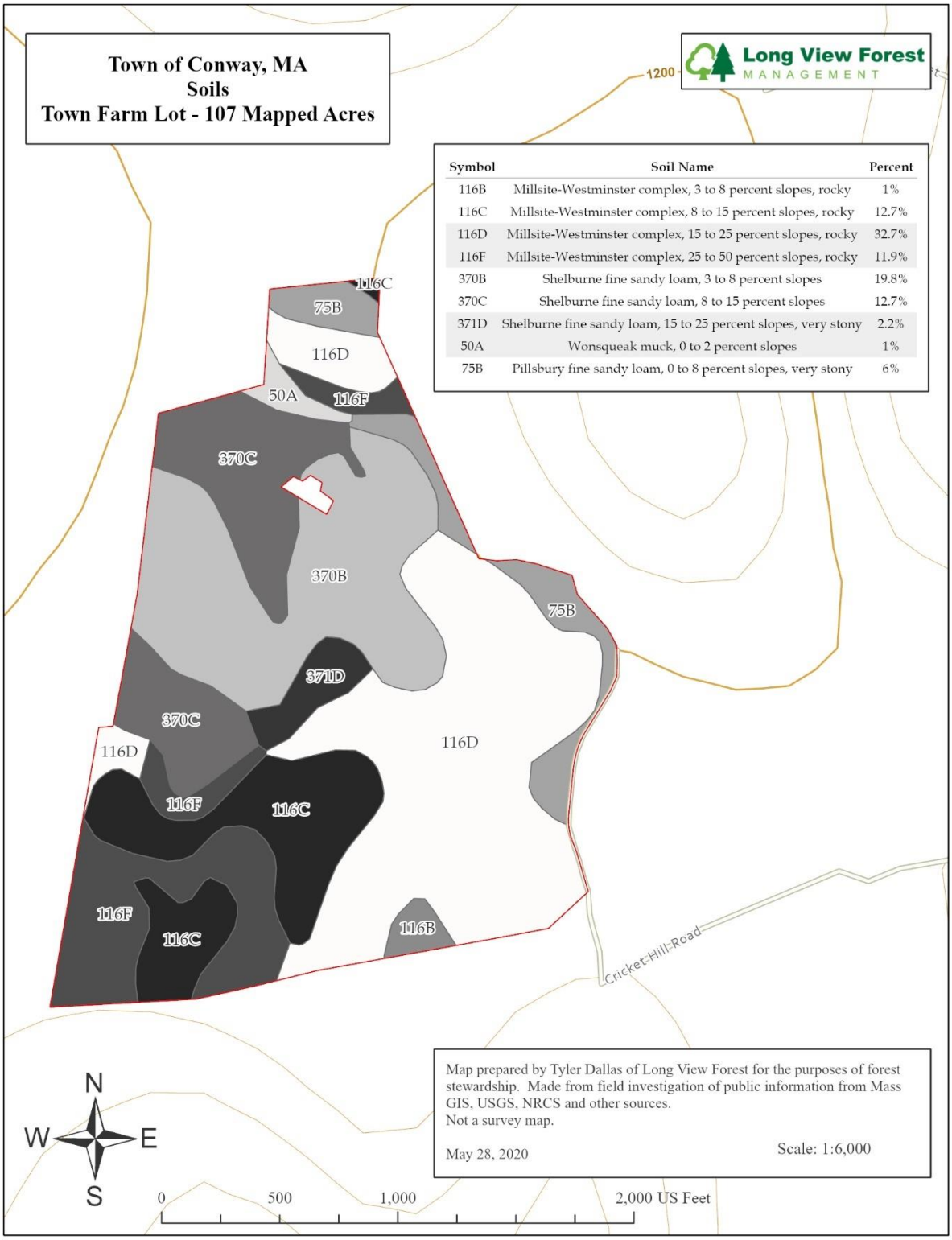


Figure 5: Soils Map

2.5 The Forest Ecosystem: Dominant Forest Types and Ages

The 107-acre forest ecosystem on this property is composed of six forest stands. They originated from the abandoned farmland and each have elements of a transitioning pine and hardwood groves typical in western Massachusetts. Each stand developed unique species composition and qualities because of its reaction to disturbance over time and the date of its reversion to forest. Viewed holistically, the forest ecosystem supports a rudimentary all-aged or un-even aged forest with three cohorts (age groups).

The average age range of the overstory trees (tallest and oldest trees in the canopy) is 80 to 120 years with some mature relics (large sized trees, which are remnants of an older forest closer to 200 years in age). Two younger age classes grow beneath this main canopy, a scattered stocking of large saplings, pole-sized trees, and small sawtimber, which range in age from 35 to 50 years, and the immature 13-year-old seedlings and small saplings that originated from the most recent harvesting activity here.

The species composition across the property is distributed by basal area (a term that denotes stocking density in a forest) as follows: white pine (43% of the stocking), red maple (13%), hemlock (11%), red oak (7%), black birch (7%), beech (4%), black cherry (4%), white ash (3%), and small contributions by yellow birch, sugar maple, aspen, black oak, paper birch, and hickory.

The forest ecosystem is lacking in high stocking of large sized trees and older trees due to its agricultural history. Harvest projects removed trees that were as old as the main canopy now, the only maturing wood exists in the relic trees (remnants of the farm days forest) scattered across the property. Sugar maple, black birch, red oak, and white pine support some of the oldest trees on the site (over 150- 200 years old). The forest supports thousands of immature saplings (with the highest concentration in the old red pine plantation zone from the 2007-2010 harvest projects and tornado disturbance). All the overstory species are represented with dominance by black birch, beech, and red maple.

The forest floor vegetation varies with the overstory shade. In general, a healthy, diverse mix of native shrubs and herbaceous plants are present. Some species include Christmas fern, hay scented fern, New York fern, lady fern, partridgeberry, aster, golden thread, maple leave viburnum, dogwood, black berry, blueberry, spicebush, ilex, and serviceberry. This layer is stocked and species rich.

A notable metric is the growth that occurred on the site since 2007-2010. Although the harvest reduced the timber volumes and tree stocking, the release of the crowns of the residual trees to increased sunlight, particularly the pine and oak, increased the site's productivity, and augmented total carbon stored in the older trees and accumulated in the seedlings and small saplings. This forest ecosystem is healthy, thriving, and

biologically rich. Forest resilience is high, and the forest is highly adaptive for survival in the future climate crisis. Many of the dominant species are suited to a warmer temperature. It connects to a vast unfragmented forest block, and it is protected by Town ownership as forest forever. This ecosystem functions well now as a carbon sink. Minor investment and maintenance will open an extensive trail network with numerous destinations. Overall, the Town Farm Forest's condition and vitality align well with the community's vision of it as a valuable forest ecosystem.

Table 1: Forest Stands

Stand #	Acres	Stand Type	Description
1	16.47	**HH-Hemlock and associated northern hardwoods and red oak.**	Hemlock trees growing with the birches, maples, beech, cherry, and white pine. A rudimentary all-age grove with some maturing statuesque hemlock and white pine growing above immature saplings and pole-sized trees. Adelgid sparse.
2	38.22	**OH-Red oak, maples, birches, cherry, ash, and beech.**	A complex mixture of hemlock with mostly northern hardwoods on flatter and wetter terrain featuring pockets of regenerating hardwoods with a thick beech component and vernal pools.
3	29.10	**WH-White pine and mixed hardwoods.**	Maturing white pines grow with scattered large sized red oak, black birch, red maple, sugar maple, ash, and cherry. The upper layer towers above seedlings and sapling hardwood and thickets of white pine.
4	13.56	**ESH-Early Successional Habitat-Young Forest- hardwood species with some white pine and hemlock.**	10-13 years old sapling grove that seeded into the cut-over red pine plantation. Excellent habitat zone for songbirds, grouse, woodcock, moose, deer, and rabbits. The occasional legacy red or white pine towers over the new forest.
5	4.99	**WP-White pine**	A naturally seeded pure white pine stand that is slowly adding hardwood species in natural openings across the canopy.
6	4.67	**RZ-Riparian Zone**	An open water marsh site with recent beaver activity, thriving hydric shrubs and plants, and high use by mammals and songbirds.
Total	**107**		

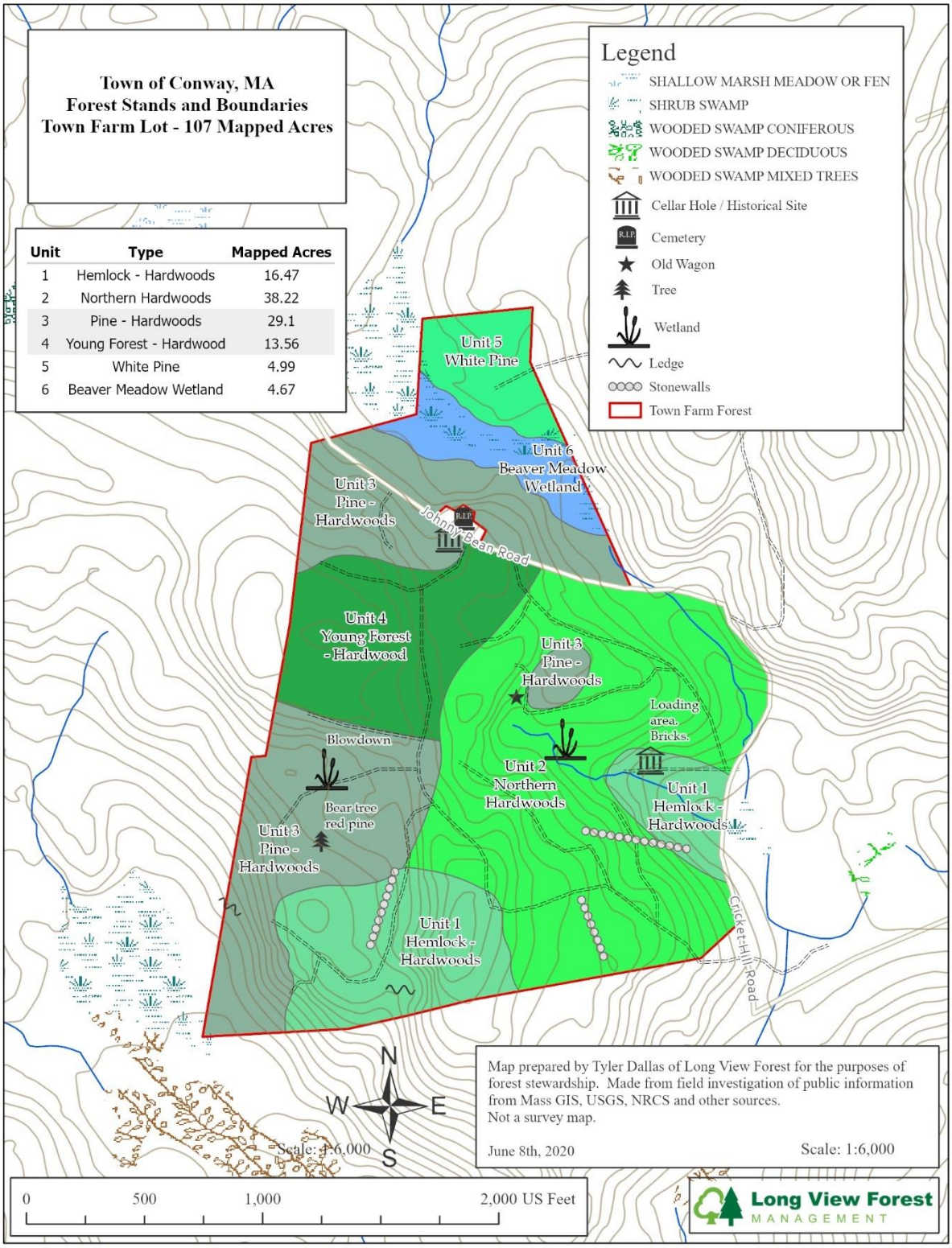


Figure 6: Forest Stands and Features Map

The Surrounding Land Use Map (Figure 9 below) highlights the greenspace connectivity of the area as well and the importance that this small forest plays in it. This map demonstrates this land's proximity to numerous other properties with long-term protection through Conservation Restrictions and classification under Chapter 61/61A/61B inclusive of woodlots, farms, abandoned farms, and habitat refuge zones. Within a few miles of the property are several large parcels of land managed for conservation purposes inclusive of the Conway State Forest, the Lee Family Tree Farm, Northampton Water Supply watershed lands, South Deerfield Water District watershed lands, and numerous private conservation restriction, APR, and Chapter 61 Forest land program protected parcels. Efforts by the Town to track the management practices on these lands would inform future Conway decisions for the development of forest conditions that either support this work or complement it.

2.6 Forest Health and Threats

In crowded forests trees compete for sunlight, water, and nutrients for their sustenance. The 2007-2010 silvicultural projects opened the crowns of the residual trees to more sunlight. Trees grow and thrive by photosynthesis; therefore, more vigor equates to a healthier forest. With an array of size classes, a diversity of species, and a legacy of thoughtful management, this forest is well-positioned to thrive into the future.

More traditional forest health concepts have broadened as our understanding of the interconnectedness of the forest ecosystem has grown. Not only pests and diseases are considered threats to forest health, but we consider many other agents as health threats today. For examples, invasive plant intrusions to the native plant community threaten the symbiotic relationship of trees and their herbaceous, fern, fungal, and microbial associates in their ecosystem and prevent new tree growth. The extreme weather conditions driven by a changing climate in some cases threaten forest structure, tree vigor, and tree crown health as well.

The main forest health concerns for the Town Farm Property is invasive plants, future increases in pest infestations, and extreme weather patterns due to its hilltop location. The concentration of invasive plants has been mapped, and a control plan is suggested in this document. The ice storm of 2008 demonstrates the impact of weather on this forest, subsequent high wind events drop branches and damage crowns each season. Maintenance of forest health and retention of good stocking levels acts as a buffer to extreme wind or heavy snow and ice loads.

In terms of invasive plants, this property has a population of oriental bittersweet (*Celastrus orbiculatus*), Japanese barberry (*Berberis thunbergii*), honeysuckle (*Lonicera spp.*), and Multiflora rose (*Rosa multiflora*). They mostly emanate out from the old homestead and are present in Stand 3, 4 and 5. Having robust wildlife habitat often goes together with invasive plant seed pressure as birds move seeds into an area. To

maintain the wonderful balance of native plants here that provide, among other values, preferred food for wildlife, we recommend a focused control effort to reduce the stocking levels of these plants.

During the spring of 2016, a dramatic decline in the health of the eastern white pine was observed throughout Southern New England. This caused much consternation among the forest health community. Needles of mature trees become straw-colored to brown before they are prematurely shed from the canopy. In some cases, only a few main branches are symptomatic, whereas on other trees, the entire canopy exhibits the symptoms. On this property, the pines appear to have retained their vigor- likely thanks to having better airflow around their crowns after the 2007 management work.

Beech Bark Disease (BBD) is widespread, but not severe on the property where beech is a component. BBD is the outcome of an insect-fungus complex, which results when a non-native beech scale insect (*Cryptococcus fagisuga*) feeds on beech bark, creating cracks through which native canker fungi (Nectria canker) can enter the tree. 50-85% of infected beech trees die within 10 years of infestation. The effects of the disease are severe cankering on beech trees, deformation of the stem, and eventual tree death. Beech is not currently a large component of this forest, but it is present and will thrive in the dappled light environment here. As such, we recommend close monitoring for BBD presence and severity.

Although the hemlock trees appear healthy now, hemlock wooly adelgid is present in the stands and small inclusions of hemlock. These eco-niches protect the spring seep sites and provide good winter habitat. Their preservation is important to the resilience and ecological function of this forest. Although any treatment for pest reduction is impractical forest wide, monitoring the hemlock growth and advance of either the adelgid or hemlock elongated scale will prepare the town for future adaptive management decision. Planting white pine for softwood cover or even hardwoods might retain dense cover surrounding the seeps.

2.7 Quality and Variety of Habitat

Forest habitat connotates the idea that the Town Farm forest ecosystem is a place in which trees and other organisms live. Our acceptance of the community-level and biodiversity conservation approach to forest habitat frames the following discussion. This site supports an array of mostly upland, middle-aged forest habitat that balances maturing trees (although super-large specimens are rare due to the forest age), sufficient stocking of younger trees in the middle canopy, and a well-stocked seedling and sapling class across the forest floor.

Tall, maturing white pine trees provide terrestrial habitat elements in unique ways. As a food source, they provide seeds, needles and buds, bark, and the insects that can be

gleaned from their substrates. Seed provides a food source for bird species such as red-breasted nuthatch, common grackle, and evening grosbeak. Black-capped chickadee glean insects from white pine bark, needles, and twigs. Pine and hemlock seeds are a food source for eastern chipmunk, gray squirrel, red squirrel, northern and southern flying squirrels, and white-footed mouse. They are an emergency winter food source for herbivores such as white-tailed deer, and the porcupine is well-known for its tree-barking habits on white pine and winter needle browsing on hemlock, as well as the rectangular-shaped excavations of foraging pileated woodpeckers searching for carpenter ants.

In addition to Stand 1, which features most the property's hemlock, the pockets of dense hemlock stocking in other stands significantly increase the shelter and foraging value of the resulting overstory canopy and as well as horizontal cover value for wintering white-tailed deer. Northern goshawk, great horned owl, and common raven all use larger white pine and hemlock trees among others to nest. Red squirrels will often construct stick nests in the upper canopy of white pine stands. The scattered hardwood inclusions improve avian habitat diversity compared with pure pine stands.

The past harvest retained an adequate amount downed woody material on the forest floor. This material recycles nutrients trapped in the wood and provides food and habitat. The list of organisms dependent on this coarse woody material (CWM) for habitat or as a food source includes bacteria, fungi, lichens, mosses, invertebrates (termites, ants, beetles, and snails), amphibians, birds, and mammals. Large fragments of CWM that provide such habitat for herbs, shrubs, and trees are called nurse logs.

Figure 7: A monster white ash tree was retained near a regeneration zone in 2007. Note the Coarse Woody Material (CWM) that as intentionally retained as well. Helmet for scale.

The stratified and regenerating forest on this site currently supports particularly strong bird habitat values. During our early spring inventory, we observed 13 bird species and noted ample habitat for them. These included raven, ovenbird, blue jay, ruffed grouse, woodcock, chickadee, winter wren, hermit thrush, red winged blackbird, tree swallow, turkey vulture, black and white warbler, and black throated green warbler. Other important songbird habitat attributes found here include: a thick, rich, partially decomposing leaf and needle layer (supports invertebrate and insect populations for substrate foraging), the dense thickets of young hardwood and white pine seedlings and saplings (cover and nesting sites for birds such song chestnut sided warblers), and the statuesque white pine trees (owl and bird of prey nesting and perching sites).

The richness and diversity of habitats indicate strong forest ecosystem functionality. Species diversity (high number of species), ecosystem diversity (the variety of physical environments and biotic communities on this landscape), and genetic diversity (unique organisms within a species necessary for long term survival against climate change) all interconnect here.

Figure 8: Large healthy red pines that were retained provide preferred sign-trees for black bear who use them to communicate with other bears. Here, note the scratch marks and tooth scrapes.

The Massachusetts Department of Fisheries and Wildlife and The Nature Conservancy developed the BioMap2 project, which is a strategic tool for the support of biodiversity protection. It defines landscapes that are most critical for the long-term sustainability of rare and other native species and their habitats and natural, diverse communities. Figure 10: The BioMap2 delineates these valuable, resilient landscapes across the Town farm forest as Critical Natural Landscapes. These areas are necessary for the long-term persistence of rare species, exemplary natural communities, intact ecosystems, and Species of Conservation Concern (species that meet the criteria for protection under the Massachusetts Endangered Species Act).

2.8 Unique Physical and Cultural Features

One can imagine not only the Bates family traveling down Cricket Hill to Pumpkin Hallow to church meeting or herding their cows along the central farm lane, but one

can also see those fortunate residents who found respite in working this hilltop farm for sustenance in the later 1800's. The stone wall structure is extensive and well-preserved inclusive of a livestock corral, several larger pasture enclosures, the Bates homestead cellar hole, and the 2nd cricket Hill Cemetery. The robust, highly resilient forest ecosystem itself is a unique feature growing amongst lands heavily managed for timber production.

Figure 9: The headstone of Malachi Maynard- an underappreciated, important Revolutionary Period figure.

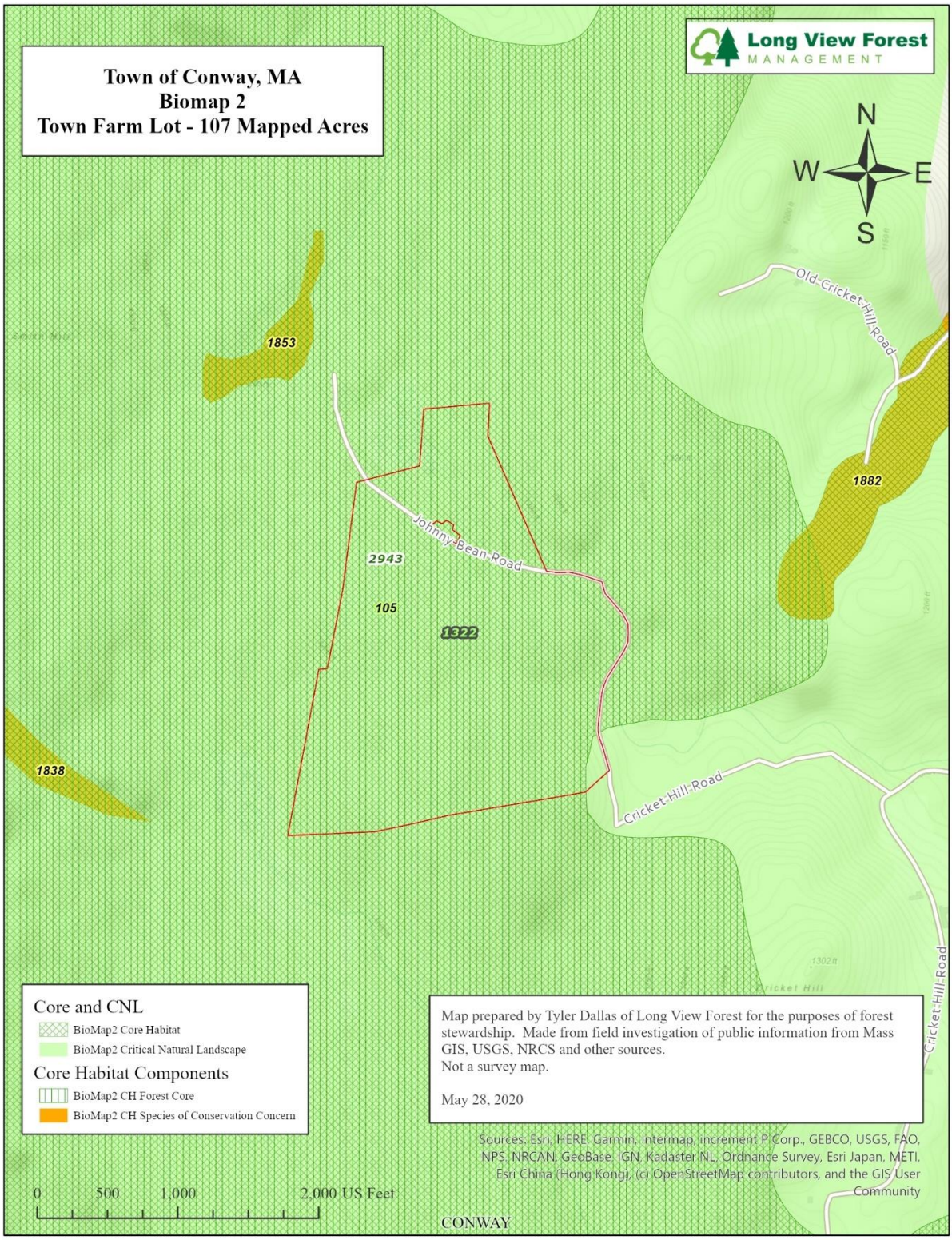


Figure 10: BioMap2 displaying the landscape-wide habitat conditions for protection

2.9 Recreational Uses

An extensive through-trail system connects the interior paths to Conway State Forest and subsequently the Ashfield Trail System, paths through the Northampton Water Supply lands, and numerous other local trails. The old town roads are wide and pleasant to walk, bike, or horse ride. Without much effort or time, one is removed to deep woods with its quiet and beauty on the Town Farm. The interior trails seeded heavy to hardwood saplings, which now, at 10-13 years, obstruct passage. As part of this Plan, we recommend mulching some of these trails to make them passable again. We also recommend leaving some alone – the property is quietly used by discrete individuals who appreciate the solitude of unmarked and covert trails as well.

2.10 Property Boundaries

Conway State Forest and the lands of Cowls Lumber Company surround the Town Farm forest. These properties have blazed and signed perimeters. Physical evidence marks the Town Farm property. Signage around the boundaries would be directional and welcoming to the through-trail user.

2.11 What value or role does the Town Farm Forest play in relation to other protected lands and the broader forested landscape?

Roaring Brook fonts within the broad wetland in the north of this property. Its waters run clean directly into the Roaring Brook Reservoir. The pristine nature of these lands ensures high quality water and aquatic habitat along the way.

The Nature Conservancy designated the 41,622 acres (about twice the area of Manhattan) south of the Route#116 as Tier 1 Matrix Forest Block (TNC Tier 1 Matrix Forest) Matrix sites are large contiguous areas whose size and natural condition allow for the maintenance of ecological processes, viable occurrences of matrix forest communities, embedded large and small patch communities, and embedded species populations. Town Farm forest rests within this matrix.

Matrix community types are often influenced by regional-scale disturbances such as hurricanes, insect outbreaks, or other extreme weather events. They are important as "coarse filters" for the conservation of most common species, wide-ranging fauna such as large herbivores, predators, and forest interior birds. The size and natural condition of the matrix forest allows for the maintenance of dynamic ecological processes and meet the breeding requirements of forest interior songbird species. Furthermore, they aid in climate change adaptation by allowing species to move across gradients of ecological values.

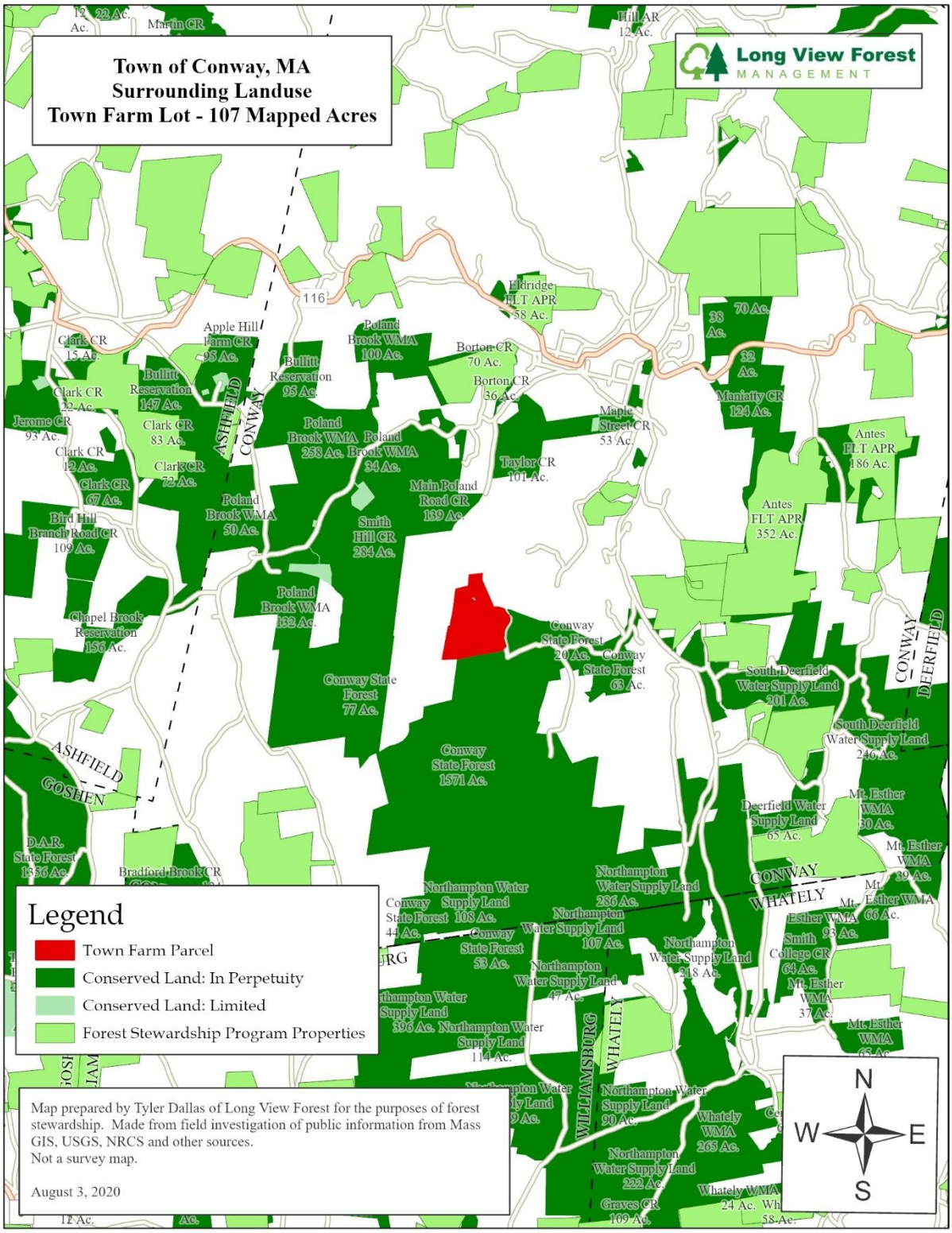


Figure 10: Surrounding Land Use Map

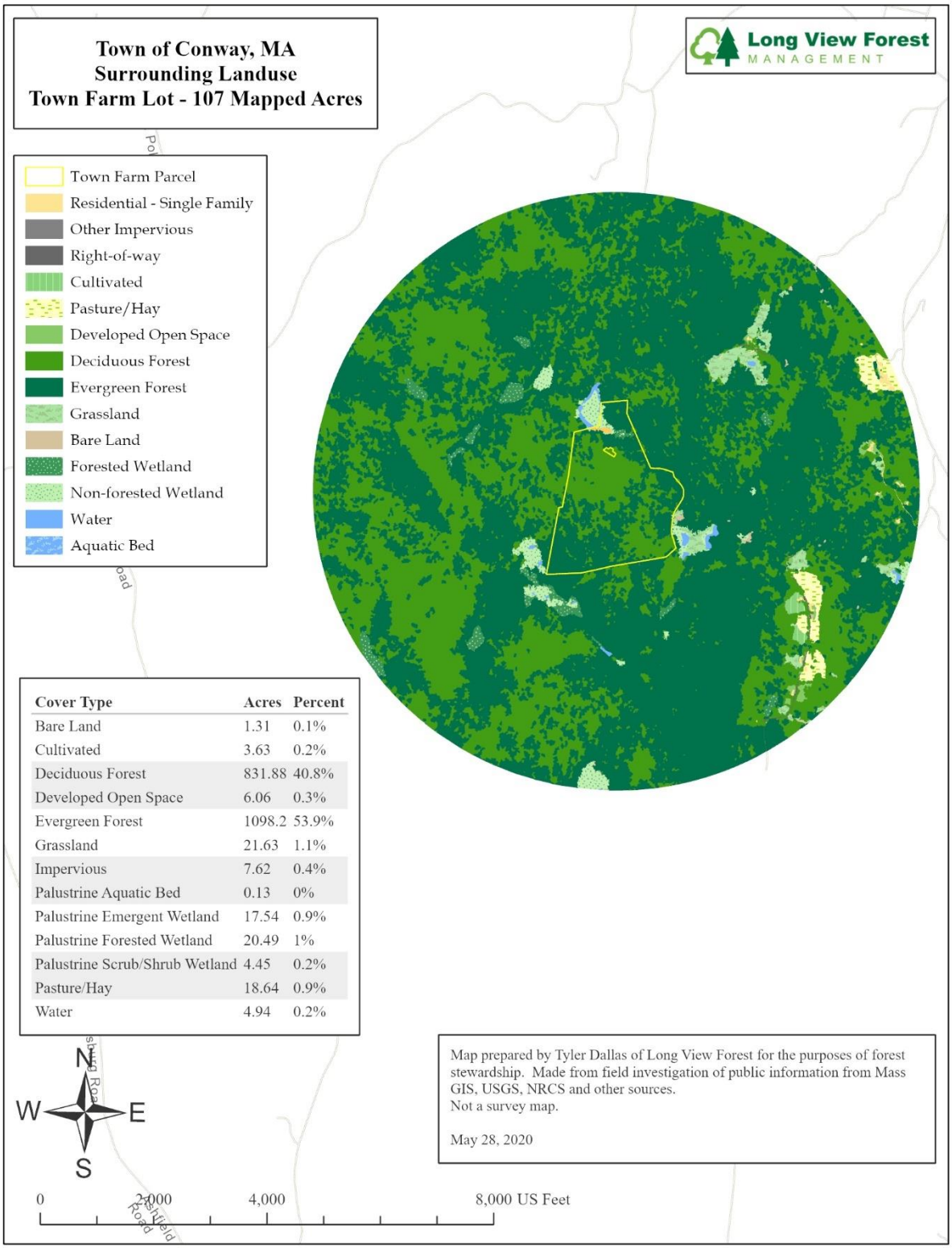


Figure 11: Land use types around the property

2.12 Property Impact of Proposed Forest Stewardship and Sustainable Forestry Practices

Throughout our Stakeholder Outreach and Listening Session Process that drove the creation of this plan, Conway residents articulated their vision of the future forests on the Town Farm woods. Beyond the boundaries of the property, the proposed stewardship of these lands will have a positive impact on the surrounding habitat reserves and the ecosystem services and goods that they provide. The proposed sustainable forestry practices detailed in this plan increase the vigor and health of the forest ecosystem and help mitigate anticipated climate changes. Forest condition and health improvement measures also enhance the quality of native habitat attributes.

2.13 How Management will impact the local and regional rural economy?

The local and regional economy may benefit from an increase in recreational use of the site and its positive influence on the health and well-being of the community. Folks from outside Conway enjoying these woods would be contributing to the local economy as they stop for lunch or spend an evening in a bed and breakfast. With its proximity to the State Forest and the beaver pond feature, this forest could easily be a wonderful additional stop on a birder's tour of the area. When forest goods are harvested in the future, local mills, contractors, and firewood processors could benefit from this local, sustainable resource growth and wealth creation.

2.14 Forest Resilience (FR)

As humans understand more about the importance of our forests to our health and our ability to mitigate the coming climate crisis, forest resilience (FR) becomes critical for forest ecosystems. FR means the capacity of a forest to respond to disturbances (natural and man-made) by resisting long term damage or stress and recovering quickly to full functionality and the provision of the goods and benefits that all life needs.

FR has historically been high on the Town Farm property, as indicated by its ability to withstand the 2008 ice storm with the only major loss in a planted non-native tree species (red pine). These woods have minimal insect and pest infestations, and even mitigatable invasive plant issues. We have determined FR is high on this forest because of a set of conditions that are summarized in the following chart. Conway residents rank the protection/enhancement of FR as one of their top stewardship goals.

Table 2: Forest Resilience Indicators on the Town Farm Lot

Forest Condition	Why and how this supports High FR
Long term legal protection	Town owned and preserved from change of use- will always support a forest.
Good soil structure and integrity	No recent excessive compaction or erosion so it cycles nutrients, holds water, provides stable banks to wetlands, and supports microorganism activity to build fertility
High biodiversity	Linear relationship to FR, tree species thriving here are well-suited to increasing temperatures of future. The black birch and oak components are particularly promising.
2007-2010 silviculture based harvest project	Increased individual tree and stand vigor and growth, established adequate tree regeneration, added coarse woody material on forest floor, and increased structural complexity
Connectivity	Town Farm Forest is a part of a large forest block where animal and plant species can move freely
High water quality	Trail system respectfully avoids vernal pools, spring seeps, water courses and wetlands, dense forest cover in all riparian filter strips
Community support	Vocal and engaged residents who care about the future of this forest and are willing to learn and advocate for its stewardship

2.15 The Town Farm Forest and Carbon

Scientists have known for a long time that trees suck CO2 out of the air to live and build their structural tissues. Even though scientific research is ongoing at a furious pace, there is still no solid fact base for how to treat forests for their use as optimal carbon sinks. Some of the science we know now is:

- Mature forests hold more carbon
- Young forests accumulate carbon fast
- Stable, well-structured soils hold a high percentage (~50%) of the carbon that is in the forest carbon pool
- Letting forests grow maximizes carbon storage as the forest grows older, but it opens a vulnerability to dramatic and rapid loss of carbon in the event a major natural catastrophe occurs and loses of some of the sequestration effects of younger forest growth
- A balance of different aged trees, growing at different rates, is good for a carbon sink's functionality
- The embodied carbon of long-term wood products has a positive replacement effect when they substitute for steel, plastics, or concrete
- There is much we do not know and keeping a resilient portfolio of trees of different species and sizes remains a very solid strategy

The Town Farm property is acting as a good carbon sink right now. but could be enhanced. Close monitoring and a thoughtful diversification of age classes over time will enhance this value. With the vulnerable red pine removed, a new cohort of young vigorous trees helps to balance the current portfolio of accumulators/storers of carbon. The Town's commitment to long periods between intentional forest disturbances and minimization of economics as a decision criterion for forest stewardship guarantee high functionality for both carbon accumulation and storage.

The Town is considering a feasibility study for the inclusion of these Town forests in a Climate Mitigation/Carbon Credit Program. Participation in an Improved Forest Management Carbon Program that use the forests for carbon sequestration and the offset of carbon dioxide emissions elsewhere, requires that forest owners demonstrate "additionality" within their forest stewardship programs and any proposed silvicultural harvests.

A carbon project is considered additional if one can show that the proposed forestry activity within the forest carbon sink removes more greenhouse gas emissions than other alternative forestry activities commonly undertaken locally. Your community would be required to show that a community-approved sustainable forestry practice sequesters more carbon than a "business as usual" approach. The silvicultural projects that would involve harvesting would easily demonstrate additionality**.**

Section 3: Forest Stewardship Overview

3.1 A New Paradigm for Community-based Forest Stewardship

Thanks to the financial and logistical support from the Massachusetts Executive Office of Energy and Environmental Affairs, this Forest Stewardship Plan and the community outreach, education, and listening processes that drove its creation are together creating a new paradigm for community-based forest stewardship in Massachusetts. This Plan, along with the Fournier Property Plan, is part of the pilot project here and has yielded many promising results for future work. Here, we summarize what is new and special about this work.

3.1.1 Community-based forestry is a participatory approach to forest management that strengthens communities' capacity to protect and enhance their local forest ecosystems. Although community forestry is difficult to define, the Forest Stewards Guild has identified some important characteristics:

- Community forestry begins with protecting and restoring the forest.
- Residents have access to the land and its resources and participate in land management decisions.

- Resource managers engage the knowledge of those living closest to the land in developing relationships with the forest.
- Forestry is used as a tool to benefit and strengthen community ties to the forest.
- Cultural values, historic use, resource health, and community needs are considered in management decisions.
- Decision-making is open, transparent, and inclusive.

The Mohawk Trail Woodlands Partnership funding for this Forest Stewardship Management Plan mandated community discussions for the identification of the goals for their forest ecosystems and their education about sustainable forestry practices upon them. Through these efforts we determined that public participation is a necessary component of sustainable forestry practices in Conway. Town residents have a wide range of knowledge, interests, and levels of involvement regarding forestry. Yet they all share a love, an appreciation, and a desire to protect the Town Farm Woods. They live here and depend on these forests for social, spiritual, recreational, and cultural sustenance. Who is better qualified to manage their futures?

Perhaps Conway might consider the formal recognition of a Forest Stewardship Committee or Community Forest Advisory Committee or a formalization of their Trails Committee that organizes representation to oversee the monitoring process of the forest ecosystems through time, addresses issues in the forest landscape as they arise (such as possible eligibility for Town forest land for solar installations), and holds future Select Boards accountable for the implementation of community-based sustainable forestry practices on these lands that reflect the Town values for and needs from the forest ecosystem today and in the future.

3.1.2 An Ecosystems Services Framework

Based upon the results of a community survey, this plan, and the community connectivity inherent to its creation, introduce and pilot a new paradigm for the decision-making process about forest stewardship. Similar processes have unfolded in other forests (For example, Deal, Smith and Gates: Ecosystem services to enhance sustainable forest management in the US: moving from forest service national programs to local projects in the Pacific Northwest, United State Forest Service, 2017) but our work here is new in our Massachusetts context. We think it is promising and worth expanding as more communities grapple with how to manage their forests.

When viewed from a landscape scale and in accordance with the wishes of the Forest Stewardship Planning Survey (Conway, May 2020) respondents, this document provides guidance for the stewardship of your "special place" under the framework of ecosystem services and ecological function. With this paradigm, your community can more effectively address the challenges facing forests and ensure a healthy, resilient forest ecosystem now and in future generations.

It is commonly recognized the healthy and resilient forest ecosystems deliver goods and benefits to people through their natural processes. **Your community voiced the desire to implement sustainable forestry practices only when they will support ecological function and the continual delivery of its essential services**. The Millennium Ecological Assessment (MEA 2005- www.milleniumassessment.org) defined these benefits and services with the following four categories:

- Provisioning - the "goods" such as timber products and fuelwood that humans rely on

- Regulating – the cycles that maintain our livable world with water purification, oxygen production, climate stabilization (CO2 uptake), and pollination

- Cultural- these make our world a place we want to live in -aesthetic and spiritual enjoyment of nature, recreational opportunities, solace, and educational opportunities

- Supporting- the underlying natural processes in a forest that maintain the conditions for life on earth such as soil formation, nutrient cycling, carbon uptake

The Forest Stewardship Planning Survey (Conway, May 2020, LV and WFRM) and the Conway Forest Stewardship Planning Workshops (Zoom Platform, May 26, 2020, and August 26, 2020) provided a clear, condensed set of goals and objectives for the stewardship of your Town forests. This plan proposes a set of sustainable forestry practices (SFPs) that are realistic given the Town's finite human resources, time, and financial resources. These SFP's were determined in terms of ecological outcomes such as improving forest ecosystem function, increasing forest resilience, and maintaining or enhancing goods and services provided to the community. Marketable timber goods consistently ranked as the lowest priority.

3.2 Management Goals 2020-2030

The community stated the following goals for the forest stewardship on the Town Farm forest for 2020 to 2030:

1. Sustain biological richness defined as all forms of life within the forest and their ecological roles and the different ecosystems, landscapes where they function, species, and genetic codes present here now.

2. Sustain the ecological services and benefits provided to humans from these forests defined as:
    a. Social and emotional goods- support well-being, relaxation, spiritual sustenance, study of nature, and recreational opportunities.
    b. Hydrologic cycle through which forests absorb water from soil and atmosphere and return it and filter it for its improved quality
    c. Soil quality and function as forests filter toxins before they enter the soils, anchor soils in place, support microbial and microorganism activity to build soils, which support all life.
    d. Climate Regulation - protect and promote the forests' use as a carbon sink that pulls CO2 out of the air via photosynthesis, accumulates and sequesters carbon, and stores it in boles, leaves, branches, and roots thereby mitigating the threats of climate change.
    e. Economic goods- timber products and fuelwood- lowest priority objective but still some members of the community value these goods and services.
    f. Cultural values-some important history of Conway is held on these lands and appreciated by Townspeople and historians.

3. Sustain forest resilience.

4. Promote the health and productive capacity of the forest trees and regenerate these forests to perpetuate their ecological benefits and functions.

3.3 Sustainable Forestry Practices

A full set of useful objectives and sustainable forestry practices useful for their achievement can be reviewed in **Appendix A**. **Appendix A** is the distillation of our Forest Stewardship Planning Workshop, the Community Forest Stewardship Survey, and the many conversations related to this project that we have had with community members over the phone, in person, and on individual emails. It is inclusive and it is ambitious. The next sections of this document introduce a sub-set of Appendix A for the convenience of publishing. This full set could be revisited at any future date by the community.

Your implementation of these strategies depends upon the Town's commitment to Forest Stewardship, the availability of grants and funding, and your community's ability to reach consensus and work together in the future. Individual and unique Sustainable Forestry Practices that might achieve your stated goals within the Fournier Woods are presented in the chart below.

Your community stated the acceptance of the use of sustainable forestry practices inclusive of silvicultural harvesting, if an only if these practices promote the

achievement of the above stated goals and objectives. They do not support the use of SFP's exclusively for the goal of economic gain

Table 3: Sustainable Forestry Practices Recommendations

Stand	Forest Type	Forest Management Recommendation	Extent of Practice	Timing	Ecosystem function and management goal will these practices enhance or promote
1 2 3	WK, HH	**Invasive Plant Control Measures-**Manually remove some invasive plants and explore safe chemical control of others using community resources or grant funding. Adapt an annual monitoring process for early detection and control of future threats.	15-18 dispersed acres	2020-2022	Sustain biological richness and native plant diversity. Sustain Forest Resilience.
All	All	**Trail Mapping, Assessment, Construction, and Maintenance-** Develop a narrow trail across rock ledges to a vista site in Stand 1 (HH) and create a panoramic vista to the north at the hilltop if Town wide consensus. GIS mapping of Town trails. Publish new trail map. Develop a maintenance plan. Install directional and permitted use signage. Use a forest mulching machine to clear a subset of logging roads to be useable paths.	1,000 Linear feet of new trail in Stand 1 (HH) and all trail network property wide	2020-2030	Sustain ecological goods and services-social and emotional goods. Sustain ecological services-Soil quality and function.

1 2 5	HH OH WP	**Reserve Forest and Pro-forestation area-**Designate, map, and set aside ~43-acres of representative natural ecosystem across three forest types to serve as a reserve area. Complement active forest stewardship with reserve pro-forestation.	A to be determined swath across 3 Stands that would include dense hemlock and white pine cover, spring seep eco-niches, rock outcroppings and ledges.	2020-2021	Sustain ecological services- climate regulation. Sustain forest resilience. Sustain biodiversity.
1 2 3 4 5	HH OH WH ESH-BB WP	Develop and Archive **Town Best Management Practices** for use with trail work and silviculture.	Property Wide	2020-2024	Sustain Ecological Function and Ecosystem Goods and Services-Water and Soils Quality and Function.
2 3	OH WH	**Silvicultural Practice-** Focus Tree Release.	Appropriate portions of Stand 2 and 3: ~50 acres	2025+	Promote health and productive capacity of the forest trees. Sustain economic goods. Sustain biodiversity and forest structural complexity. Sustain Forest Resilience.
2 3	OH WH	**Red oak seedling planting in the understory of the oak and mixed hardwood grove.** Red oak is not germinating seed and develop seedlings here,	Scattered pockets through 35 acres	2025+	Sustain biological richness. Sustain Forest Resilience.

		and it is an essential and important component of the future forest ecosystem.			Increase Forest Productivity. Sustain ecological function-Climate Mitigation.
4	ESH-BB	**Cleaning or weeding amongst the youngest age class.** Thousands of saplings are growing in the salvaged red pine plantation site upon the most fertile soils on the property. Much like your garden, taking a few out helps the growth of the remaining. Leave cut material on site to rot.	10 acres	2020-2030	Sustain Biological Richness. Sustain Forest productivity. Sustain ecological benefits-climate mitigation and carbon accumulation.
1 2 3 4 5	HH OH WH ESH-BB WP	**Participation in a Carbon Program-** either through a marketing scheme with a carbon credit vendor or the possible Massachusetts EEA sponsored programs.	Property Wide	2020-2030	Sustain Ecological Function-Climate Adaptation, Carbon Storage and Accumulation.
1 2 3 4 5	HH OH WH ESH-BB WP	**Educational Outreach-** Install educational, historical, and demonstration signage for interpretive purposes along the trail system inclusive of detail about the natural and cultural history of the property in school curriculum. Schedule Community learning walks.	Signage along trail and at points of ecological and historic interest. Highlight cemetery, the Bates homesite cellar hole, and stonewall corrals. All season tours	2020-2030	Sustain ecological services- social and emotional goods.

			to build community appreciation.		
All	All	**Boundary delineation with discrete signage.**	Property Wide	2020-2022	Sustain ecosystem goods and services-social and cultural values.
All	All	**Collaboration with Massachusetts DCR Management Program, Cowls Lumber, and Town Highway Department.** Old Cricket Hill Road extension and Johnny Bean Road improvements and maintenance.		2020+	Sustain ecological goods and services-Water Quality protection and Hydrologic cycle and Soils Quality and Function.

3.4 Role of Silviculture

Ecosystem function and ecological dynamics do rely on intentional forest disturbance in the form of tree fellings and/or tree harvesting. If future community consensus supports the use of Sustainable Forestry Practices (SFP's), they would be conducted under the umbrella of ecological forestry (EF). EF enhances the growth of desirable species, protects native plant communities, and promotes regeneration through the application of silviculture. The harvest and non-harvest silvicultural techniques, which might be used if acceptable to the community under EF, are described in Appendix B, Silviculture Harvest and Non-Harvest Techniques.

3.5 Adaptive Management

Forests are living, dynamic systems trying to thrive in a complex environment subject to the stress of a changing climate. Forest stewardship planning efforts should accommodate this change. This document advocates the practice of Adaptive Forest Resource Management, which is a systematic approach for improving resource management by learning from management outcomes, changing climate and forest conditions, and evolving consciousness and knowledge at the individual and community scale.

If forestry is about planning, then planning should be adaptive to what happens in the forest when planned or unplanned. The diverse elements of this management plan document should be re-evaluated when new scientific information and community values change in time. This is particularly true as it relates to managing forests for carbon. Economic, ecological, climate, and social elements must also be adjusted as community dynamics change. The Townspeople of Conway in 1900 would have a quite different take on the woods than we do today, and as future generations will have in another 100 years.

An adaptive stewardship approach involves exploring alternative ways to meet management goals, implementing one or more of these alternatives, watching to learn about the impacts of an action, and then using the results to update knowledge and adjust future actions. There is no strict timeline suggested for this type of review, but some effort should be made each year. A Town Committee on Forestry could oversee this work with the ideas and strategies within this document as a guide for the development of a climate-adaptive, carbon-friendly, resilient forest ecosystem development approach.

Section 4: Field Methodology

4.1 Forest Inventory

Field method for tree data and volume per acre: In all stands, a nested point-sampling cruise was conducted using a BAF-10 prism for "count trees" and a BAF-10 prism for volume trees (diameter and height) Product volumes were calculated using Forest Metrix, a forestry software package. Results are reported in the Stand Overview table.

We installed 38 plots across the forest to collect our data. In addition to the tree data, we measured:

1. Regeneration via mil-acre plots,
2. Snags, coarse woody material, and forest structure,
3. Invasive plant densities, and
4. Birds via visual and aural identification

4.2 Site Index

Site index for each stand was estimated using data from the Natural Resources Conservation Service, U.S. Department of Agriculture, Web Soil Survey. This survey is available online at www.websoilsurvey.nrcs.usda.gov. Site index by species was figured out by weighted average based on the estimated percentage of the soil types within a stand.

4.3 Soils

Soils data were obtained from MassGIS, Office of Geographic Information, and Commonwealth of Massachusetts from the layer GISDATA_SOILS_POLY_SV_MUNAME. Stand maps were georeferenced to the soils layer to delineate soil types.

4.4 Mapping

GIS data was obtained from MassGIS, Office of Geographic Information, and Commonwealth of Massachusetts. Layers included the following and the proper aerial imagery from the same source.

Standardized "Level 3" Assessors' Parcels

GISDATA_SOILS_POLY_SV_MUNAME
USGS Color Orth imagery (2013/2014)
USGS Topographic Quadrangle Images

Protected and Recreational Open Space
BioMap2
Mass DOT Roads
Land Use (2005)
Contours (1:5,000)
MassDEP Wetlands
National Wetlands Inventory
USGS Hydrography

Stand maps, developed from aerial imagery, and further refined during field investigation using GPS, were geo-referenced to a base layer that covered the property and surrounding area.

Section 5: Forest Stand Descriptions

5.1 Stand 1: Hemlock and Mixed Hardwoods (HH)

Figure 12: The rocky knoll forms the western part of Stand 1 and could host a nice view.

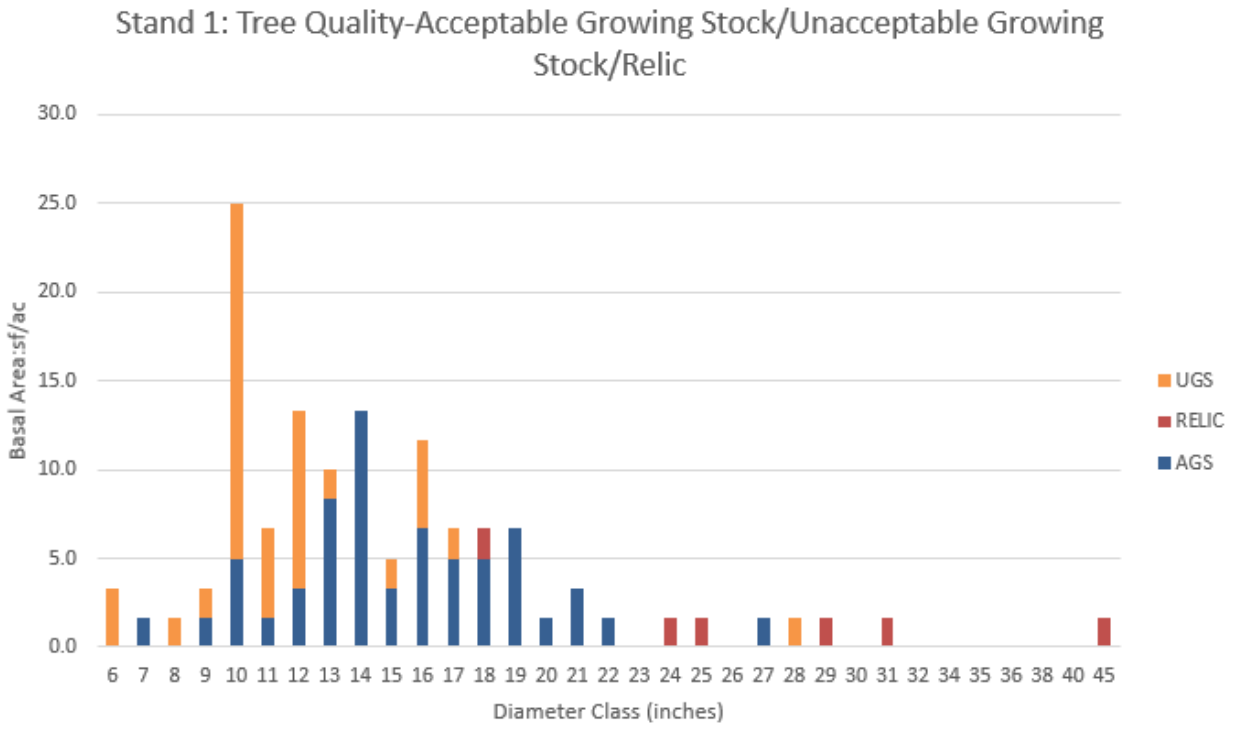
5.1.1 Overview

In two sections, this Stand presents a beautiful mixture of hemlock and hardwood across a range of topography. The eastern section features historic remnants from the Town Farm days and the western section feels like some of the most remote terrain on the property. Keeping an eye on the hemlock for signs of significant hemlock wooly adelgid stress will be key to make sure this Stand thrives and continues to supply maximum carbon storage benefits.

Table 4: Stand 1 Summary Data

Objective	Stand #	Forest Type	Stand Area (acres)	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	1	HH	16.47	12.5 inches	135 Sq. Ft.	6.423 MBF 8 cords 13 tons	55: WA

Table 5: Stand 1 Tree Quality Graph



5.1.2 Terrain and Topography

The terrain sweeps across two small hills (separated by a low saddle) with slopes that range in steepness from 8% to 25%. Exposed ledges and bedrock dot the ground.

5.1.3 Soils and Productivity

The physical diversity of this stand places it above two distinct soil regimes. The largest section, which lies along the southern bound, grows above Millsite-Westminster rock complex soils. The smaller section lies along Cricket Hill Road within a wide, narrow drainage channel above the moist Pillsbury Soils.

5.1.4 Forest Stewardship History

The 2008 ice storm did some minor damage to the crowns throughout this stand. Earlier hemlock wooly adelgid infestations forced many hemlock trees into decline. The application of a joint Salvage Harvest (2009) and Individual Tree and Group Selection Harvest in (2007) resulted in the introduction of a seedling and small sapling age class thereby increasing vertical stratification and size diversity within this stand. These young trees are thriving, as are the larger trees whose canopies continue to expand into available growing space.

5.1.5 Overstory Species and Condition

A well-stocked, two-aged stand supports larger hemlock (33% of the stocking), red maple (25%), red oak (9%), black cherry, and aspen, and yellow birch larger trees in the high canopy (diameter over 14 inches) and smaller sapling and pole-sized (diameter range of 9 to 12 inches) black birch, red maple, red maple, beech, and hemlock tree below. The quality of these trees is fair to good, with limited disease or pests, except for severe pocking by beech bark disease. Even the hemlock does not suffer from intensive adelgid attacks.

If one assessed them as timber crops, the hardwood has high value potential. Working with the ecosystem function paradigm, as these narratives shall do from here on, these trees are productive and vigorous, efficiently photosynthesizing, pulling in carbon, and filtering water across the stand. Recent storm activity, with its wind, ice-loading, and snow loading, causes limb breakage. Scattered super dominant white pine trees tower above the forest (average of 1 tree per are). Relic stems (over mature stems with >24 inches dimeters-remnants of the original post-agriculture forest) of hemlock, white pine, yellow birch, and sugar maple dot the landscape.

5.1.6 Regeneration Species and Condition and Forest Floor Cover

These less fertile soils took a while to begin the regenerative process, yet now the site supports thousands of seedlings per acre. Species include all the overstory tree with dominance in beech, red maple (greatest number of seedings), black birch, and white pine. Herbivore pressure her is common and pronounced (moose and deer). Scattered patches of mountain laurel are present.

5.1.7 Invasive Plants

Invasive plant communities are absent.

5.1.8 Unique Stewardship Considerations and Inclusions and Habitat Thoughts

1. Pockets of dense hemlock trees were intentionally left undisturbed during the harvest project. These areas provide "deer yarding" niches in which the microclimate and wind shelter offer comfort from the winter temperature extremes. "Deer runs" traversed the stand.
2. The eastern knoll in the southern section offers a vista potential. If some trees were simply felled and a narrow trial laid out through the hemlock and over the rocks to the top, a view to the north would offer a peek at some un-named hills and the pleasant sensation of looking down on the tree tops.
3. The sighting of a raven over this stand confirms their return to the forests of western Massachusetts. The super dominant pine and hemlock trees (some reaching over 80 feet in height) supply nesting or roosting sites.
4. The over-mature sugar maple and yellow birch relic trees support cavities and crevices that supply nesting and denning opportunities.
5. The section nestled in the wetland area along Cricket Hill Road Extension supports a habitat niche with grasses, wetland ferns, and moss-covered rocks. The slow-moving spring seepage attracts songbird, who find the maple leaved viburnum fruit appealing. One could listen for the Canada Warbler or Red-eyed Vireo in such a moist niche.
6. A second spring seep fonts water that flows westerly into the adjoining lands of Cowls Lumber. These small eco-niches support a microclimate due to their dense cover of shrubs, trees, and herbaceous plants. They usually never freeze and return to open ground first in the spring. They supply ideal habitat for feeding and water.
7. A trail guides the interested hiker to the spring seep font in the eastern section of this stand along Cricket Hill Road Extension and through the heart of the larger stand. In this area, the trail follows an impressive stone wall.
8. Black-capped chickadee, brown thrasher, and wood thrush might be seen foraging on the ground beneath dense mixed hemlock and hardwood grove. The volume of coarse woody material from the past harvest and fallen limbs increases the invertebrate population for their feed.

5.1.9 Desired Future Condition

With time, the birch, maple, hemlock, and pine seedlings will rise to take their place in the main canopy. Some hemlock might succumb to adelgid damage and offer large snag trees for insect feeding by songbirds. The maturing overstory will continue to grow, adding more carbon with each season. One could climb to the knoll vista along the new path and enjoy the more remote sections of the stand.

5.1.10 Recommended Sustainable Management Practices:

1. Reserve Forest/Proforestation Area of this unique hemlock and mixed hardwood stand that one can visit via dense forest cover with minimal disturbance along a narrow trail.
2. Development of an interior forest vista and a trail accessing it.
3. Trail maintenance with mulching or brushing of the sapling growth along the trail network and installation of erosion control measures on the existing trail system through the stand.

5.2 Stand 2: Red oak and mixed hardwoods (OH)

Figure 13: Red oaks and a regenerating cohort of mostly birches and maples characterize Stand 2

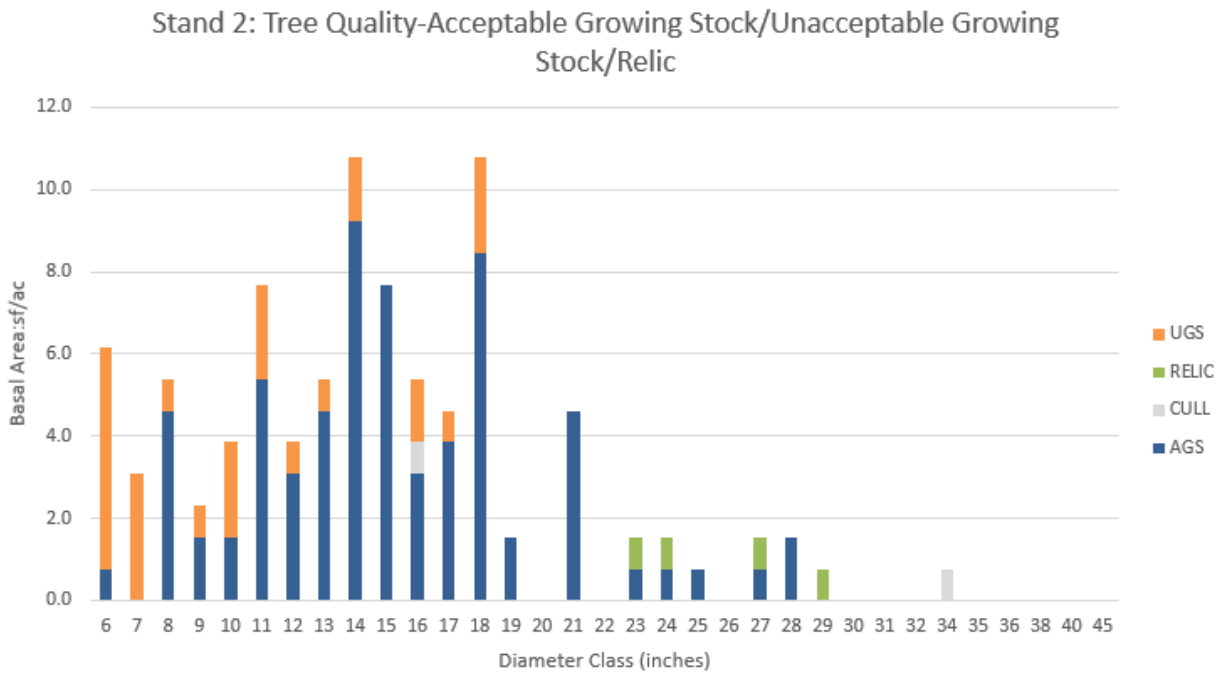
5.2.1 Overview

This is the largest and most representative Stand on the property. It features a vigorous oak component, well-designed logging roads that could be used as trails, a wetland feature, and a vigorous cohort of saplings.

Table 6: Stand 2 Summary Data

Objective	Stand #	Forest Type	Stand Area (acres)	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	2	OH	38.20	16 inches Overstory 7 inches lower	92 Sq. Ft.	5.472 MBF 8 cords 1.25 tons	65:RO

Table 7: Stand 2 Tree Quality Graph



5.2.2 Terrain and Topography: Entering the stand from the southern boundary, the relief sweeps around the eastern flank of the un-named hilltop in Stand 1, dropping into the drainage valley of a spring seep before rising upwards and crossing the broad eastern flank of another hill. The terrain is mostly gentle.

5.2.3 Soils and Productivity

The variably productive Millsite-Westminster soils lie beneath this stand. The more productive Millsite sites grow the more site demanding red oak trees here. The oak quality is quite high, and crowns continue their expansion post- release and post-ice storm.

5.2.4 Forest Stewardship History

The 2008 ice storm in Franklin County damaged the crowns in this stand. Black cherry, white ash, and birch stems were most severely impacted, the red oak resisted breakage. The application of a joint Salvage Harvest (2009) and the Individual Tree and Group Selection Harvest in (2007) resulted in the current sapling age class, thereby increasing vertical stratification and size diversity within this stand.

5.2.5 Overstory Species and Condition

This is another two-aged main canopy stand with red oak (27% of the total stocking), yellow birch, black cherry, sugar maple, and white ash trees in the high canopy and black birch (22%), red maple (22%), beech, cherry, yellow birch, red oak, sugar maple and hemlock sapling and small pole-sized trees (range from 4 to 7 inches) beneath it. These younger trees contribute the greatest number of stems per acre (80) giving the appearance of a "crowded" middle canopy. Productive, healthy trees with open crowns fill both upper layers. Each acre supports at least one over mature (>25 inches in size) sugar maple, red oak, or black birch relic. The increase in sunlight from the 2007+harvest sprouted side branches (epicormic) on the lower boles of the occasional suppressed red oak trees.

5.2.6 Regeneration Species, Lower canopy, and Condition and Forest Floor Cover

Openings from the Group Selection part of the past harvest filled with vigorous red maple, black birch, beech, black cherry, sugar maple, and striped maple seedlings. Red maple (stump sprout behavior) and beech (root system cloning behavior) supply a large starch store for vigorous growth and abundant numbers. The immature trees record diameters of 1-2 inches now. The sapling trees reach maximum heights of 35 feet.

True seedlings (young trees with heights less than 3 feet and diameters <=1 inch) are deficient across the stand due to the overstory shade. It is notable that given its success on this site, red oak seedlings and saplings are uncommon. Herbivore browsing was noted. The shrub layer is sparse and includes maple leaved viburnum, witch hazel, and pockets of mountain laurel.

5.2.7 Invasive Plants

Invasive plant communities are present throughout this stand, with the greatest concentration (pockets of up to 25% ground cover) along the western stand edge adjoining Stand 4 which is the early successional habitat zone. Species include Japanese barberry and honeysuckle.

5.2.8 Unique Stewardship Considerations and Inclusions and Habitat Thoughts

1. The red oak stocking provides nice habitat attributes- from the episodic acorn production but also as high forest nesting sites for birds like orioles. The leaves, twigs, and young shoots supply browse for deer and rabbits during times of food shortages. The large surface area of oak leaves also provide food to a diversity of invertebrates. Many species of insects feed on oak leaves, with several species of moth larvae feeding on nothing else. Many songbirds search the surface of branches and leaf clusters for insects.
2. Undoubtedly the most valuable resource oaks support vertebrate wildlife is acorns. More than 100 species of vertebrate animals are known to consume acorns in the US, including white-tailed deer, gray squirrels, flying squirrels, mice, raccoons, opossums, bear, and red foxes. Birds that feed on acorns include wild turkey, wood ducks, woodpeckers, crows, and jays. Acorns are on the ground in autumn and winter, when availability and nutritional quality of food resources are lowest, and animals need to consume extra food in preparation for the harsh weather conditions of winter.
3. A small native tree, hophornbeam, grows well in this upland stand and we record 3 hophornbeam trees per acre across the stand. The trees here have an average size of 6-7 inches, and they set ample seed each year. Their seed is a small, tight cluster of nutlets that are eaten by songbirds, wild turkey, and other small mammals. Witches broom that commonly occurs on this tree supplies a home to many invertebrates eaten by songbirds, especially during the winter.
4. Birds seen during the field inventory include Ruffed Grouse, Blue Jay, Chickadee, Black -throated Green Warbler, Ovenbird, and Woodcock. The soft mast source in black cherry trees, maple leave viburnum shrubs, and wild grapes provide high value nutrition prior to the fall migration.
5. The over-mature sugar maple and yellow birch relic trees support cavities and crevices that supply nesting and denning opportunities.
6. Wild grapes present some problems with tree productivity in this stand. They climb into high crowns and arc over immature tees to exploit photosynthetic area. Sometimes they strangle the trees. But their palatable fruit is enjoyed by most wildlife.

5.2.9 Desired Future Condition

Carbon friendly forests supports several canopy layers of healthy, productive trees of diverse species. The crowns of the oldest and largest trees are expanding across the skyline, collecting CO2 efficiently, and seeding each year onto the forest floor for perpetuation of this valuable ecological service. The healthiest of these maturing trees are kept if possible, for their lifespan, gaining girth and photosynthetic leaf surface each year. Younger trees struggle mid-canopy to capture more sunlight in this current forest condition. Seed germinates on the forest floor in sunlit small canopy gaps to sustain this species-rich valuable forest ecosystem.

5.2.10 Recommended Sustainable Management Practices

1. An application of a conservative Focus Tree Release silviculture project with the creation of small gaps between the crop trees.
2. Regeneration studies and if necessary, for the preservation of a red oak component in the stand, plant and protect red oak seedlings for biodiversity.
3. Trail maintenance with mulching or brushing of the sapling growth along the trail network and installation of erosion control measures on the existing trail system through the stand.

6.3 Stand 3: White pine and mixed hardwoods (WH)

Figure 14: White pine regeneration takes hold in an opening made by past harvesting. Note the high volume of woody material on the forest floor.

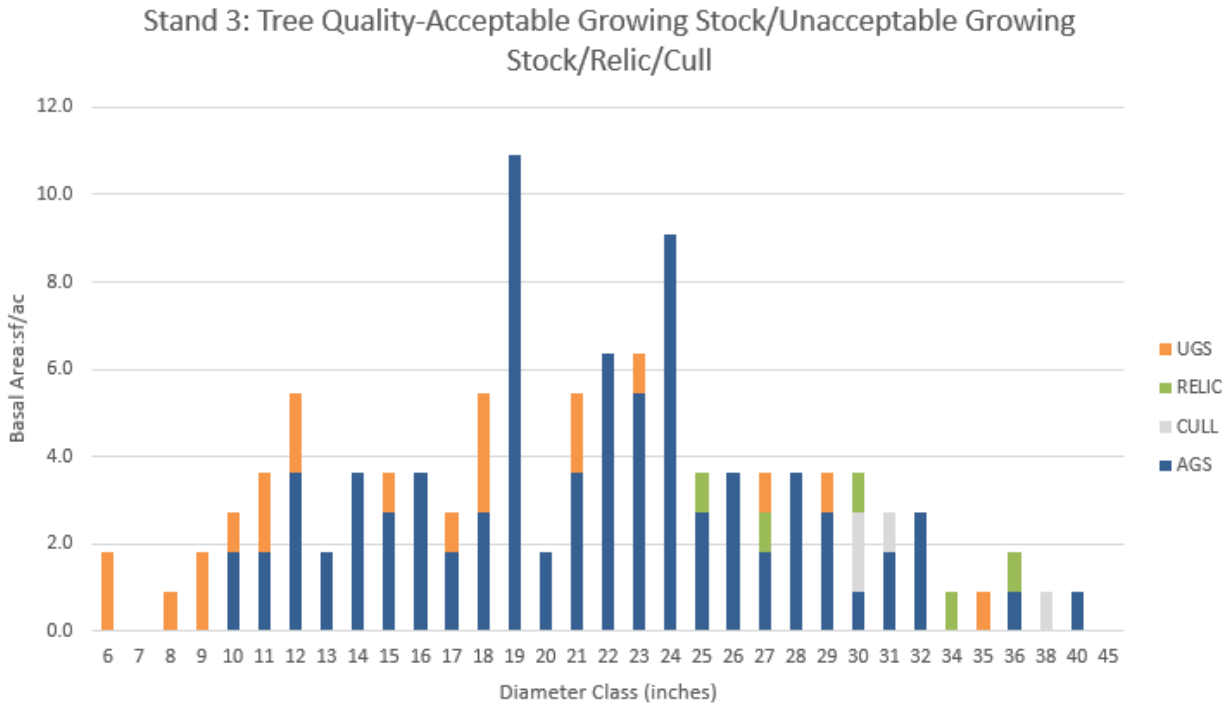
5.3.1 Overview

The pines in this Stand are soaring, remarkable, and quite large. Pockets of pine are regenerating here and will hopefully play a role in the future forest. Bears have regular routes through the Stand and the regenerating hardwoods are vigorous too. Logging roads provide nice access here and could be better kept allowing visitors to experience the pines here.

Table 8: Stand 3 Summary Data

Objective	Stand #	Forest Type	Stand Area (acres)	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	3	WH	29.1	17 inches WP 23 inches Lower canopy: 7-11 inches	92 Sq. Ft.	12.656 MBF 3 cords 9 tons	68: WP

Table 9: Stand 3 Tree Quality Graph



5.3.2 Terrain and Topography

The southern section of this stand lies on the steeply pitched (slopes ranging from 25% to 50%) western flank of an un-named hilltop in the southwestern corner of the property. The northern section descends from the crest of a hill (highest point on the land) onto the broad, gently sloped to level lower flank along Johnny Bean Road and on down to the shores of the beaver meadow.

5.3.3 Soils and Productivity

The variably productive Millsite-Westminster soils lie beneath the southern section of this stand. The trees are more productive above the Millsite loams. Exposed bedrock,

some cliff-like formations and ledges are also common here. The northern section grows above the deep, well-drained, fertile Shelburne loams. Not surprisingly, this is where the cellar hole still denotes where people focused their farming efforts.

5.3.4 Forest Stewardship History

The 2008 ice storm minimally damaged the hardwood crowns throughout this stand. The applications of a combined Salvage Harvest (2009) and Individual Tree and Group Selection Harvest (2007) resulted in the current sapling age class thereby increasing vertical stratification and size diversity within this stand. Recent strong wind and high-volume precipitation events blew down several large white pine trees inclusive of a small pocket in the southern section of the stand.

5.3.5 Overstory Species and Condition

This stand supports a classic example of the transitioning successional forest from abandoned pastures, which usually evolve with high species diversity. The abundant white pine trees (54% of the stand stocking) are an artifact of human land use, seed ecology on bare soils, and shade tolerance of trees. Two distinct upper canopy layers developed from past disturbances. Larger red oak, white ash, aspen, red maple, black birch, sugar maple, and black cherry trees share the high canopy with the pine. A well-stocked layer of large sapling and pole-sized trees (size range from 6 to 12 inches) grows beneath this layer. The 2007+ harvest released the crowns of these trees for expansion and increased productivity. Traditional timber crop standards might suggest that the maturing white pine trees have trunk defects from excessive branching, but these trees hold tremendous amounts of carbon. Their vulnerability to windthrow, however, makes them a slightly riskier carbon portfolio asset.

5.3.6 Regeneration Species, Lower canopy, and Condition and Forest Floor Cover

This discussion focuses on trees less than 2-3 inches in diameter. The past harvest germinated seed and encouraged sapling development of all the overstory species. Simple seedling count show numbers well above a sufficient stand continuity count of 2,000 seedlings per acre. Black birch, black cherry, red maple, and white pine were successful. Dense thickets of white pine seedlings surround pockets of pine seed bearers. Once the canopy began to close over the last 11 to 12 years, beech seedlings dominated the forest floor given its cloning, prolific seed, and shade tolerance habits. The shrub layer is sparse, yet the needle layer on the ground is thick.

5.3.7 Invasive Plants

Invasive plant communities cover a small percentage of the ground throughout the northern section of this stand. The greatest concentration occurs along this northern edge of the stand adjoining Stand 4 (the early successional habitat zone) and along the north and south frontage to Johnny Bean Road. Species include Japanese barberry, Asiatic bittersweet, multiflora rose, and honeysuckle. Along the shoreline, the honeysuckle is particularly obvious.

5.3.8 Unique Stewardship Considerations and Inclusions and Habitat Thoughts

1. A small copse (some >20 inches) of aspen grows in the northern section close to Johnny Bean Road. This unique tree has two characteristics useful to high carbon accumulation. Its bark is photosynthetic, meaning that growth is still possible after the leaves have been dropped. The bark also has lenticels that serve as pores for gas exchange (like the stomata on leaves). Its bark is also base-rich, meaning aspens are important hosts for bryophytes and act as food plants for the larvae of butterfly species.
2. Remnants of the red pine plantation cling to the western edge of this stand. Multiple trees have evidence of repeated bear use.
3. Maturing white pine reach high into the air (some trees record heights of >90 feet). Given this tendency, forest structure is influenced by single large tree falls and occasional pockets of blowdown. Uprooting opens bare patches of mineral soil that can act as seed sinks and create higher biodiversity. Toppled trees have the potential of becoming nurse logs, nurturing habitats for other forest organisms.
4. Standing dead and declining large sized white pine trees across the stand provide potential and useful snag and cavity trees. Owls will roost in these tall trees. Black-cap chickadees sleep in the small cavities rotted from branches, as they excavate small roosting holes. Upturned root balls are preferred nesting sites for winter wren- many of whom heckled us repeatedly during the inventory process.
5. The northern section supports a thin strip of maturing mixed pine woods along the beaver wetland. The denser shrub covers here (inclusive of winterberry, dogwood, spice bush, and service berry) attract songbirds. Sightings were made of the Canada Warbler, Black and White Warbler, and the Red-winged Blackbird.
6. The soft mast species (black cherry, wild grape, and extensive rubus thickets) supply late fall feed for migrating songbirds and high nutrition feed for small mammals and overwintering birds such as chickadee, turkey, and grouse.

7. The inventory counted <=9 large dimeter relic trees and cull (>25 inches in diameter) across the stand with stems of white pine, cherry, red oak, and sugar maple. These remnants of the older forests hold high habitat value. In addition to the large mast and seed crops of the hardwood trees, they provide cavities and crevices for denning and nesting. The large pines attract cavity using birds and mammals as well as larger birds for perching and roosting.
8. Other songbirds noted during the field inventory include Winter Wren, Hermit Thrush, Ovenbird, Tree Swallow, and Turkey Vulture.

5.3.9 Desired Future Condition

The extreme weather predicted with the future changing climate could continue to force large white pine trees topple downs and uprooting. Retention of the pine trees in pockets and clusters supports their wind firmness. Dominance by beech in the lower canopy might limit the future species richness of these woods. Opening the canopy to more sunlight encourages seed germination and seedling development of cherry, ash, red oak, white pine, the birches, and maples, especially in the rich soils of the northern zone. The all-aged, resilient condition of this stand continues to evolve though the next few decades with a balance between carbon storage in the older trees and accumulation in the young.

5.3.10 Recommended Sustainable Management Practices

1. An application of an optional, conservative Focus Tree Release silviculture project.
2. Trail maintenance with mulching or brushing of the sapling growth along the trail network and installation of erosion control measures on the existing trail system through the stand.
3. Underplanting of red oak seedling with proper browse protection to increase the chances of its presence in the future forest ecosystem.
4. Corresponding cleaning out or weeding of the extensive beech sapling and seeding stocking to encourage biodiversity.

5.4 Stand 4: Early successional habitat dominance with northern hardwood species (ESH-BB)

Figure 15: The young forest of Stand 4 provides excellent early successional habitat

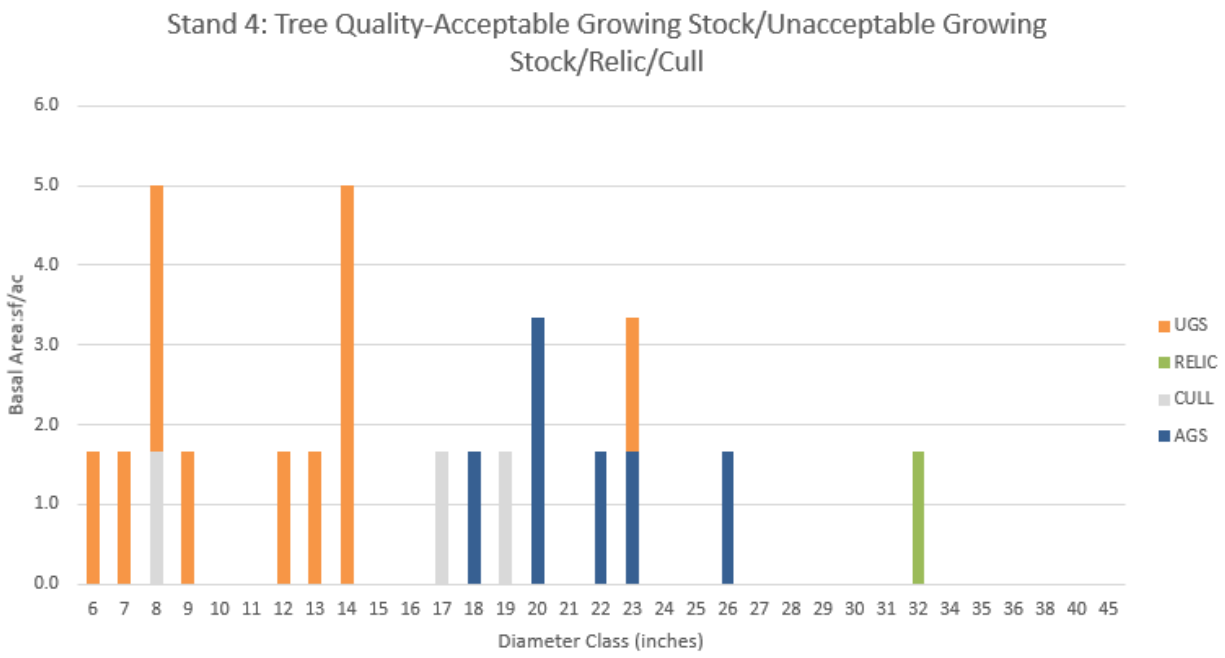
5.4.1 Overview

This stand is slowly aging out of its ability to provide this high value young forest songbird, game bird, and mammal habitat. In the meantime, it will continue to be excellent early successional habitat- a feature lacking across much of our forested land. The next decade here could focus on trail development, invasive plant control, and the tending of a wide array of desirable trees for wildlife, aesthetic, and carbon purposes.

Table 10: Stand 4 Summary Data

Objective	Stand #	Forest Type	Stand Area (acres)	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	4	ESH-BB	13.56	6.5 inches Overstory: 14-24 inches	Lower: >300 Sq.Ft. Overstory: 35 Sq. Ft.	1.935 MBF 2.4 cords	75: WP

Table 11: Stand 4 Tree Quality Graph



5.4.2 Terrain/Topography

The Civilian Conservation Corps planted softwood groves across the gently sloped, stone-free plains in western Massachusetts in the late 1920s. This land contributed the most productive agriculture sections of the Town Farm. The relief tips gently to the north across a broad plain.

5.4.3 Soils and Productivity

The Shelburne soils are very deep, well-drained loams that are well suited to productive tree growth.

5.4.4 Disturbance History on and Current Species Composition and Condition

The red pine plantation once growing here was infected with pathogens in the early 2000's and severely damaged by the 2008 ice storm. Red pine trees snapped, broke in half, and uprooted. Hardwood tree crowns (hardwood sprouted and grew up alongside the red pine through time) were battered, and many stems today still have diminished crowns. The first salvage harvest in this stand removed the pathogen infested, dying red pine trees and kept a healthy, well stocked mix of red pine and hardwood. After the ice storm in 2008, a second salvage operation removed all the damaged red pine stems salvaging any commercial value and reducing potential fuel loads and hence forest fire danger.

Any hardwood trees with a live crown intact were retained, even if severely damaged. They form the upper canopy layer of the stand today. Black cherry, black birch, red maple, and beech trees share this high space with the super-dominant white pine relics and remnants of the original old field forest. They continue to set seed each year and productively grow. Thousands of young trees less than 1 to 2 inches in diameter (<=11 to 13 years of age) grow beneath them. They seeded from any available seed-bearing trees in the vicinity. Species here include black birch (dominant), cherry, white ash, red maple, sugar maple, beech (dominant), paper birch, pin cherry, aspen, and white pine. These young trees accumulate carbon with their vigorous growth habits each season.

5.4.5 Native Shrub and Herbaceous Cover

Native shrub thickets grew into the open ground after the red pine removal. Witch hazel, striped maple (dominant in stocking), maple-leaved viburnum, elderberry, and rubus canes are present. One unique site in the southern edge of this stand supports dense herbaceous plants and grasses, which gives it giving it an open savannah-like appearance. Here, many saplings show signs of moose browse.

5.4.6 Herbivore Browsing

Moose and deer browse impact in this stand is high.

5.4.7 Invasive Plants

The full exposure to sunlight and high bird traffic after the last harvest introduced a moderate invasive plant community. A simple metric for its stocking density is B+ (on a A=high, C=low scale). Asiatic bittersweet, honeysuckle, Japanese barberry, and multiflora rose, grow here. The diffuse light through the immature trees could not prevent their spread. We recommend a concerted control effort to favor the growth of the native plants.

5.4.8 Unique Stewardship Considerations/Inclusions

1. Extensive volumes of coarse woody material were kept on site post-harvest. Sections of red pine logs and upper branch material and hardwood branches cover the ground in various stages of decay. This material decays and builds a healthy soil layer. American woodcock prefers stands less than 20 years of age with a lot of coarse woody material that supports their main food of invertebrates.
2. Rubus canes create thickets where birds, rabbits, and other animals hide. Game birds, songbirds, raccoons, chipmunks, and squirrels eat the fruits. The nectar

and pollen of the flowers attract many kinds of insects, especially butterflies and bees. This plant is moderately resistant to damage from deer. During the winter, birds and small mammals eat the seeds left from rotten fruit.

3. Chestnut-sided Warblers forage by flitting between the branches of saplings, where they find insects among leaves and small twigs and dart out to catch flying insects in the midair.
4. The hopping, chirpy Veery might use the red pine stumps and residual log sections for nest building sites. The thick duff layer and coarse woody material volume supports high insect populations. Veery flips through this layer for its preferred foods of beetles, caterpillars, ants, and crickets.
5. The "peely" exfoliating bark of a couple of maturing red maple trees provide ideal bat habitat and small openings supply insect hunting areas.
6. Insects excavate the standing dead red pine snags, which provides more feed for insectivore songbirds and excavators.
7. Although damaged by ice, the maturing white ash trees are surviving the intense weather without any evidence yet of the emerald ash borer.
8. Songbird species sighted here include Ovenbird, Black and White Warbler, Black Throated Blue Warbler, Raven, Woodcock, and Ruffed Grouse. Witness was made of the mother grouse "injured act" for protection of her brood.
9. The grassy-brush site mentioned earlier is surrounded by an often-visited moose browse zone where ash, cherry, and red maple saplings show annual browse marks, and many larger saplings and pole trees have been rubbed by the moose.
10. Stone walls, corrals (livestock pens), and scattered field stone piles remind one of the hard-working families that needed respite from the community in the early 1800s.

5.4.9 Desired Future Condition

While slowly walking the improved trail network in the spring, one hears the songs of many songbirds or hear male grouse drumming on some of the larger down logs. Although the stand nears the end of its most useful period as migratory songbird habitat, the preservation of the dense, immature cover prevents full site exploitation by invasive plants. This young forest contributes to the Town Farm carbon pool with its rapid accumulation (high site productivity for hardwood trees, they are growing fast here). Some forest tending begins to favor the best formed and most vigorous stems across a range of species.

5.4.10 Recommended Management Practices

1. Trail maintenance with mulching or brushing of the sapling growth along the trail network and installation of erosion control measures on the existing trail system. Community decisions on the trail network extent and resource are necessary as an extensive network is possible.
2. Cleaning and weeding amongst the saplings to release the crowns of the climate adaptive species and increase their vigor.

5.5 Stand 5: Pure natural stand of white pine (WP)

Figure 16: Thickly stocked with white pine, stand 5 is a classic example of old fields that turned to pine after agricultural abandonment

5.5.1 Overview

After agricultural abandonment, much of New England looked like this Stand in the early 1900s when the boxwood industry thrived in an era before cardboard. Big, mostly poorer-formed white pines with multiple trunks dominate this area which supports the

highest stocking of anywhere on the forest. This area provides an unmanaged contrast to Stand 3, just across the water.

Table 12: Stand 5 Summary Data

Objective	Stand #	Forest Type	Stand Area (acres)	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	5	WP	4.99	17 inches	193 Sq. Ft.	16.898 MBF 2 cords 12 tons	75: WP

Table 13: Stand 5 Tree Quality Graph

5.5.2 Terrain and Topography

This stand grows at the northern tip of the Town Farm property upon a wide, low slope plain next to Roaring Brook and its beaver wetland. It was plowed in the past.

5.5.3 Soils and Productivity

The stand grows above the deep, fertile Shelburne loams that support productive white pine growth.

5.5.4 Ecosystem Narrative

Maturing white pine trees of variable condition (some heavily weevilled and some exceptional, branch-free boles) form the main stand. These trees reach over 90 feet in height. Past weevil damage presents as asymmetrical and declining crowns. A stage of decadence is setting into the oldest trees. The trees are vulnerable to extreme weather due to their height and rooting systems. Scattered robust large sapling, pole-sized, and small sawtimber black cherry, red maple, white ash, and black birch trees dot the canopy. Red maple sprouts and beech seeds into the shady lower strata. As the water level in the beaver pond fluctuates, mortality follows within the white pine at the edge of the wetland.

5.5.5 Regeneration Species and Condition

Regeneration is sparse (C level) due to shade. Beech seedlings contribute most of this stocking.

5.5.6 Native Shrub and Herbaceous Cover

A sparse carpet of shrubs and herbaceous plants cover the forest floor, with higher densities along the wetland edge (spicebush, elderberry, ilex, maple-leaved viburnum, and dogwood). Striped maple dominates this age class due to its shade tolerance and prolific seeding habits.

5.5.7 Herbivore Browsing

Moose and deer browsing affects the shrub layer. Past beaver impacts are also clear.

5.5.8 Invasive Plants

Given the stands remote position north of the wetland and its lack of disturbance, invasive plant activity is low. Scattered individual stems of Japanese barberry sprouted from bird droppings.

5.5.9 Unique Stewardship Considerations and Inclusions

1. This stand presents an example of the natural condition of a transitioning old farm pine forest before the disturbance common in the stands south of the beaver wetland. The white pine trees range in age from 85 to 115 years, and they are in decline. They offer a unique opportunity to see how this transition forest evolves with the changing climate.
2. Access gained from the Conway State Forest lands to the east provides the chance to walk the northern edge of the wetland. This trail could be improved in collaboration with the Commonwealth. Beaver dams supply connectivity from the south for the sure-footed.

3. Soft mast from black cherry and striped maple and hard mast from beech occur. They help a variety of species such as songbirds, wild turkey, blue jay, and white-tailed deer.
4. As a food source, white pine supplies seeds, needles and buds, bark, and the insects that can be gleaned from white pine substrates. White pine seed provides a food source for bird species such as red-breasted nuthatch, pine warbler, chipping sparrow, and common grackle.
5. Larger white pine stems, both live and dead, in and next to the wetland offer nesting sites to great horned owl and great blue heron. These tall trees (range in height from 80 to over 100 feet) attract birds that feed in the high canopy.

5.5.10 Desired Future Condition

The stand's inaccessibility for active management without use of the Commonwealth lands prevented its inclusion in the past harvest projects. The stand continues its development into a climax farm transition forest ecosystem. As the white pine trees mature, many will succumb to pests, disease, windthrow, and internal rot from overcrowding. The surviving overstory white pine might remain in clusters for wind firmness. Hardwoods will continue to seed into the slowly expanding gasp from attrition, and with many decades the site will convert to species rich, all-aged resilient forest. Although loosing carbon storage ability as the older white pine dies, the stand finds its balance with the vigorous younger hardwood trees.

5.5.11 Recommended Management Practices:

1. Reserve Forest and Proforestation Area of dense maturing white pine forest cover with minimal disturbance along a narrow trail.
2. One could consider a shoreline trail here along stonewalls and the beaver meadow- it would need to connect with State Lands trails nearby.

5.6 Stand 6: Riparian Zone (RZ)

Figure 17: The beaver meadow complex and riparian zone is a highlight on the property.

Table 14: Stand 6 Summary Data

Objective	Stand#	Forest Type	Stand Area acres	MSD or Size Class (inches)	Basal Area (sq.ft./ac)	Volume Per Acre	Site Index
Stewardship	6	RZ-Beaver Pond and Wetlands	4.67	NA	NA	NA	NA

5.6.1 Narrative

A large upland wetland rests at the height of the land to the west of the Town Farm property. This system drains both northerly (into the Johnny Bean Brook watershed) and easterly serving as the headwaters of Roaring Brook. The eastern edge of this

riparian area juts onto the Town Farm lands with a large pond and an extended tip of two smaller ponds connected by Roaring Brook. This ecosystem is a deep marsh complex, which is flooded with over three feet of water, though the depth fluctuates seasonally and with beaver activity. It stretches out in patches of integrated complexes of open water, dense marsh plants, and shrubs. The Pillsbury soils have a layer of well-decomposed organic muck on their surface.

Vegetation includes tall graminoids like cattail and phragmites in extensive dense stands. Other plants include goldenrod, arrow-leaf, and bulrush. Tall shrubs noted are speckled alder, spicebush, ilex, and dogwood. Invasive plants common here are purple loosestrife and phragmites. Many animals, vertebrates, and invertebrates use this wetland for feeding, nesting, roosting, cover, and movement corridors. Serial beaver habitation marks the landscape with dams, abandoned lodges, and chewing sign.

5.6.2 Water Quality Concerns

This wetland forms the headwaters of Roaring Brook. Local responsibility to the protection of wellheads downstream and the South Deerfield Water Supply District's public drinking water in the Roaring Brook Reservoir mandates prudent stewardship of this resource. No stewardship practices would be done within the riparian resource sites, except for non-intrusive trail use. These resources form the heart of the Roaring Brook riparian corridor and its unique habitat.

5.6.3 Desired Future Condition

Riparian resource areas and wetlands function as filtration and purification systems for the water that moves through them. These areas will be preserved in their pristine condition.

Section 6. Sustainable Forestry Practices Recommended for 2020-2030

The following sub-set of Sustainable Forestry Practices is based on the community-wide visioning process, the survey results, and the biophysical reality of what is going on in the forest right now. We recommend them as one alternative for the achievement of your stated goals and objectives. Implementation of these practices requires a sustained careful, community-based consensus building effort, Town and State-level funding, and a commitment of Town's human, time, and financial resources. We present the goals as named and prioritized by your Townspeople and consistent with the summary table, Table 3, we presented on pages 33-34 of this Plan. Each proposed practice is linked to a stated goal or objective as summarized on page and Appendix A.

6.1 Discussion: Your community said in survey results and during the Forest Stewardship Planning Workshops that **you are willing to implement sustainable forestry practices only when they will support ecological function and the continual delivery of the forest's essential services**. The proposals below support this premise. They are an expedient sub-set of the wide range of practices that were derived from our work together as presented in Appendix A. We strongly suggest that Conway devise a consensus building process or mechanism that prepares the community for the implementation of this sub-set or any future derivative to honor the spirit of this Community-based Forest Stewardship Planning Project.

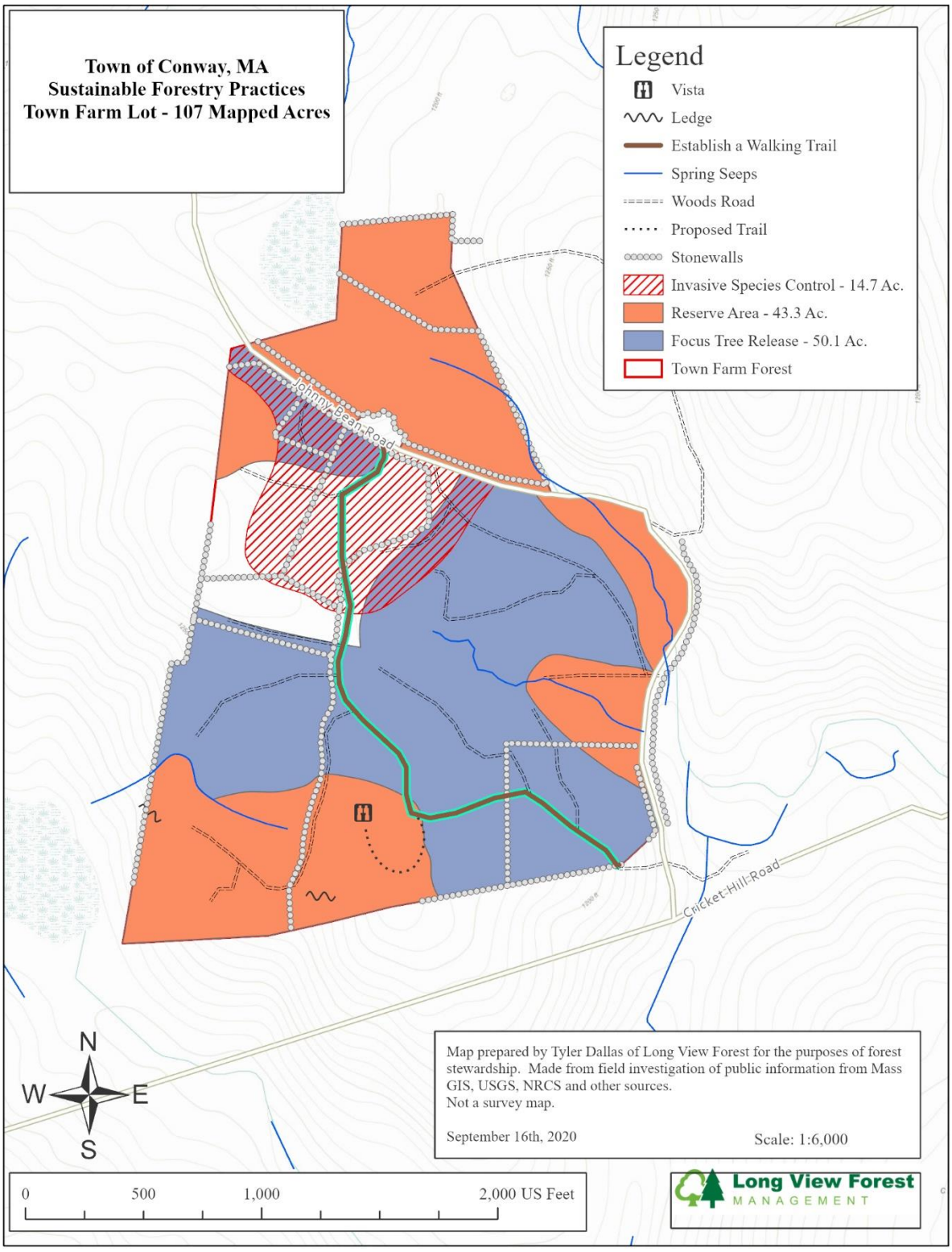


Figure 18: Proposed Forest Stewardship Activities

6.2 Sustainable Forestry Practices

Practice 1: Invasive Plant Control

Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Biodiversity. Forest Resilience. Forest Productive Capacity with Regeneration.	2 3 4	OH WH BB	Invasive Plant Control Measures	Density depends on stand location- highest stocking in Stands 3 and 4. Total of 15-18 acres lightly affected	2020-2025

Project Specifications: Integrative Vegetation Management (**IVM**) will be employed with review of each site will be reviewed and decisions made about the application of safe, cost-effective, and environmentally sound methods of control. The invasive plant communities are more extensive in Stand 4 (ESH-BB) due to the first red pine mortality and then salvage harvesting practices in 2009. Their stocking is less dense in Stand 3 with high stocking along Johnny Bean Road, and marginal in Stand 2.

Mechanics of Practice: Manual removal is expensive and time consuming but offers an environmentally safe method of invasive plant control. Hand pulling or grubbing is often the quickest and easiest way to halt invaders when first spotted. However, roots that break off during extraction will sometimes re-sprout. Manual removal can also cause unwanted soil disturbance which can result in conditions favorable to invasive plant reinvasion. Frequent visits over the course of several years are often necessary for success with manual control**.** This method will prove most effective in Stand 2 and the low stocking sites of Stand 3.

One form of manual removal uses digging tools. Digging tools rely on either operator weight or strength to uproot non-native plants from the ground. Some brand names include the Weed Wrench™ Honeysuckle Popper™, Root Talon™, and Extractigator™ or a Mattocks. Mattocks are the tool of choice when manual control is scheduled. A mattock with an ax on one end of the cutting tool and the digging tool on the other is preferred over a pickax when controlling invasive plant species. For species that readily

re-sprout from the roots, the entire root system should be removed. Sometimes it is only necessary to remove the crown and any rooted vine nodules.

Hand Clippers and Loppers Hand clippers and loppers are needed when mechanically controlling climbing vines or small multi-stemmed woody species. Always follow the vine or stem to the point where it appears from the ground. If you are unable to unearth the stem, cut as closely to the ground as possible and remove debris. To effectively control most non-native species, it is necessary to apply a proper herbicide to the wound. When this is not an option, it will be necessary to repeatedly cut when re-sprouts appear until there is no regrowth

Although chemical methods may be the most effective control method for the high-density zones, biological and mechanical methods applied serially should be explored. A local farmer could intensively graze animals to work with the Town to remove the plants. Or, the Town may decide to have these dense sites with shade retention on their margins and repeated manual and mechanical control the margin plants preventing their further spread.

For the invasive plant communities in Stand 4, due to their higher stocking and the overall thick density of the stand, we recommend exploring both manual control and chemical control via a judicious cut-stump application. Any chemical control work should be discussed fully in Town and should be buffered around hydrologic features as Roaring Brook springs from the nearby wetland. Licensed and insured professionals would execute this practice to effectively accelerate the ecological restoration work needed here to assure a mix of native plants moving forward.

Target Species and Stocking Densities: Densities are low, but growing, and include honeysuckle, Asiatic bittersweet, Japanese barberry, and multiflora rose.

Stewardship Discussions: Small Towns run on a tight budgets and shortfalls to revenues are expected for western Massachusetts in the coming years. Conway might commit financial resources to the provision of ecosystem services. Further public outreach initiatives can discuss the invasive species problem. Residents will motivate and take part in a volunteer program for simple manual removals of some of the plants. Grant funding from both Federal and State programs will be looked for help with this effort. Either way, the focus of ecological restoration should be paramount here where the Town weighs the environmental and community impacts of different control measures and choses the one base suited to the task.

Community Outreach: An educational outreach process would inform the community about the invasive species projects. A brochure could be published and available through the Town offices, educational bulletins could be posted on the Town website, and field tours could show the plant species, removal techniques, and native plant communities. Education might inspire community members to volunteer at an ecological restoration day or contributions to any fund-raising campaigns for this work. Community education also prevents misunderstandings about the plant removal activities.

Practice 2: Trail Development and Enhancement

Ecological Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Ecological goods and benefits-solace, education, enjoyment, recreation. Ecological function-Soil quality and function. Cultural values.	1 2 3 4 5	HH OH WH ESH-BB WP	Trail development and maintenance and general access development	<1,000 linear feet of new trail Mulching/opening of 2,000-3,000 feet	2020-2022+ Annual Monitoring and Maintenance Scheduling

Trail Development and Maintenance Discussion:

1. Mapping of the existing trial system. Publication of a revised Town Farm Forest trails map with its connections to broader Conway State Forest and Herron Gulch trail networks.
2. The lay out and development of a narrow trail to the crest of a small hilltop within Stand 1 in its southern section and the creation of a small vista here with a northward outlook over the interior forest and some distant hilltops is suggested. The trail should be kept narrow for minimal intrusion to this forest ecosystem. It would cross over some of the rock outcrops and ledges.
3. The trail system wanders along the exquisite stone wall work indicative of the historic field edges, stock pens, and the cellar hole on Cricket Hill Road Extension and the interior old farm lanes (bordered by stone wall). Thousands of young trees seeded onto the trail ways. Mulching and brushing the trail network (removal of the dense sapling and seedlings trees along the trail surface) will

delineate the trail locations and draw the walker's attention to the beauty of these stone structures. Mulching and brush cutting will open these trails.

4. The trails follow many of the roads used for the past harvest. The surface of these trails held up over the last 11 years due to the installation of adequate erosion control measures post-harvest. An assessment and documentation of the current trail condition with the follow-up of the development of a maintenance plan and protocol is recommended. The Conway Trails Committee and community members could foster the energy for the care of these woods for seasonal community trail work on volunteer days.
5. With the guidance of the community or the Conway Trails Committee, construct trailhead kiosks or simple box-slot for maps and install color-coded, directional signs on the trail network. Some noticeable educational signs near the stock pens, corrals, cemetery, and unique habitat and ecosystem features would increase the community's awareness and appreciation of this resource.
6. Parking along Cricket Hill Road Extension at the corner of the Cricket Hill Road and the State Forest access point invites the hiker into this forest. Signage here would help visitors understand the location and access to the Town Farm trail system as well as the differences between the different ownerships and management styles here

Practice 3: Reserve and Proforestation Area

Ecological Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Biodiversity. Climate Mitigation. Carbon Storage. Ecological goods and services- solace, nature study. Forest Resilience.	1 2 3 5 6	HH OH WH WP RZ	Designate and Map a Refugia/Reference Forest/Pro-forestation Zone within this property	~43 acres	2020-2021

Definition: Proforestation is the practice of purposefully growing an existing forest intact toward its full ecological potential. It is a nature-based solution whereby existing forests are protected as intact ecosystems to foster continuous growth for maximal carbon storage and ecological and structural complexity. In suitable forested areas it has the potential to be a powerful forest-based strategy that can address the global crises in climate and biodiversity.

Discussion:

1. A part of the community would like to see both Town forests un-disturbed by future timber harvesting and management activities. This voice is important and presents a valid position given the forest's ability to mitigate climate change by accumulating and storing carbon.
2. The hemlock-hardwood groves (Stand 2) support the spring seep fonts and their drainage systems and adelgid-free hemlock trees. The remote white pine stand (Stand 5) offers an ideal reference forest for the natural evolution of the transitioning old farm white pine forest. One of the larger stone wall enclosures near the southern bound eclipses area in Stand 1 (OH: Oak and mixed hardwood trees) and Stand 3 (WH: white pine and mixed hardwood trees) and creates a clear bound for the preservation zone. All lands north of Cricket Hill Road extension which surround the Maynard cemetery support the beaver meadow complex and the aesthetic appeal of the cemetery structures. A riparian zone paralleling Cricket Hill Road extension (south of road) contributes the last section of reserve sites for the protection of water quality.
3. If the Town takes part in any climate mitigation or carbon storage programs in the future, these protected areas will provide carbon reserves with high carbon stocks.
4. Long term protection as a reference forest in undisturbed conditions would provide a useful comparison to other managed areas while at the same time recognizing and celebrating the values that some community members hold. Afterall, this is everyone's forest.
5. However, the Town would also need to set up guidelines for what types of emergency interventions would be permitted in this zone.
6. This proposed reference forest would be a place where natural processes such as carbon sequestration and storage, would develop without human intervention from the moment of designation forward- fully recognizing that the complex anthropogenic land-use history from native peoples up to the present time obviously changes this trajectory.
7. Given the uncertainties and unknowns around above-and below ground forest carbon dynamics, having a reference forest paired next to a more managed forest would allow both layperson observation of differences as well as scientific study of change over time.

Optional Passive Approach for the Property: Two letters were received through the community outreach component of this document preparation phase that requested that the Town consider the designation of all the Conway forest lands as reserve zones without any harvest related disturbance. Support for trial building and maintenance

and invasive plant control shows a reluctance by these parties to promote true non-disturbance zones.

It is beyond the mandate of this document to resolve this philosophical debate within Conway. A total passive approach to this entire property is certainly a choice for review and debate in the future. This discussion should include the concepts of the increase in forest structure vulnerability and the decrease in forest resilience within a forest ecosystem that supports an overstocking of maturing trees as they face disease, insects, climate changes, and severe storm damage.

Practice 4: Develop Conway-Specific BMPs

Ecological Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Ecological function-Hydrologic cycle and Soil Quality and Function.	1 2 3 4 5	HH OH WH ESH-BB WP HH	Develop either Town-specific Best Management Practices (BMPs) or codify as policy for the Town a set of BMPs	Property-wide	2020-2023

Discussion:

1. Survey results and public comments show that the community shares a concern for the protection of water resources and soil integrity during the implementation of any sustainable forestry practices on the Town forests.
2. The Massachusetts Department of Conservation and Recreation has a set of BMPs for use when a silviculture project occurs. The Massachusetts 2014 BMP Manual lists some minimal requirements for statutory compliance, and another set of suggested practices for the protection of water and soil. If silviculture is started on the Fournier Lot, both the minimal and the added precautionary suggested practices will be followed.
3. Written guidelines or at least a discussion of appropriate BMPs for the protection of water quality, soil integrity, rare, endangered, and protected species zones, the aesthetic appeal of the land, or unique cultural sites (ice pond) are advisable for use during any future sustainable forestry practice inclusive of trail development or maintenance projects, invasive plant control projects, storm damage clean-up projects, and silviculture harvesting projects.

4. Concern was presented about machinery use for any sustainable forestry practice in these woods. Heavy equipment used on sensitive ground or under inappropriate conditions can change the landscape and soil function for a long time. This community process of standards documentation could consider a mandate for types of harvesting equipment permitted on the Town forests, scheduling constraints, and harvest protocol that supports minimal impact.
5. This work might also address a policy for the oversight of equipment use on Town forest lands for the completion of any sustainable forestry practices. Weather it is carried out via a detailed contract with any contractors that are privileged to work these lands or through a private consultant or Town official, language that conveys the needs of the community and the rigor of the Town-wide BMP's must be used.
6. This process could be undertaken by a Town Forestry Committee or Advisory Board. It would require some research into existing BMP's and education of the Select Board, and Forest Advisory Board or Committee about standards, equipment familiarity, and general forest engineering ideas.
7. Discussions included the possibility of a forestry by-law for Conway. No clear resolution was made about the process for the establishment of a set of BMP's for the community. Our recommendations include the completion of this work by some community-wide mechanism. Its priority in discussions, survey, and the workshops merits the consideration of the application for grant funding for the support of this work.
8. This process should also consider standards for the protection of culverts and commonly used roadways during any sustainable forestry practice that involves the use of equipment across these structures.

Practice 5: Optional- Focus Tree Release

*Presented as an Optional Active Forest Management Project for the support of forest health, individual tree vigor, and the establishment of additionality for any participation in a carbon sequestration program by Conway.

Objective	Stand No.	Forest Type	Sustainable Forestry Practice: Silvicultural Practice	Stand Area (acres)	Basal Area Removal (sq.ft.)	Volume Removal (MBF)	Fire-wood Removal (Cords)	Pulp-wood Removal (Tons)	Timing
Biodiversity Forest Resilience. Carbon pooling. Climate Mitigation. Forest and	2 3	OH WH	Legacy or Focus Tree Release	~50 acres	<30 Sq. Ft. 15% - 20% of stocking.	100 MBF	115 cords	125 tons	2025-2030

Tree Productivity Regenera-tion.									

Sustainable Forestry Practice Objectives:

1. Increase structural complexity amongst age classes, species composition, and tree heights.
2. Improve the general health and vigor of the crop trees.
3. Enhance and protect songbird habitat attributes in the small openings while keeping functional stand dynamics and natural resilient structure in over 80% of the stand.
4. Preserve dense forest cover for maximum carbon storage in maturing trees.

Mechanics of the Harvest for Focus Tree Release:

1. Legacy or Focus tree release mechanics aim to open the crowns on two to three sides of the broadly defined legacy or focus trees in the stand. A minimum of 25-30 trees will be selected per acre. Many trees with no influence on focus tree crowns or growth would still grow. It would be a conservative harvest.
2. Scheduling of this proposed project should reflect commitment to carbon friendly and ecological forestry in which disturbances are spaced out over a 20-year window for sufficient recovery of the forest ecosystem between these disturbances. The conservative removals (remember the total stocking and volume records for this site are extremely high due to the tree size and heights) adhere to the maximization of carbon storage premises of retention of high stocking post-harvest.
3. The proposed silviculture project would follow the Ecological Forestry precepts as summarized in Appendix B of this document.
4. The trail network would be protected with the strategic retention of aesthetic pleasing trees, a buffer strip along the trails, the removal of any brush from this trail surface at the end of operations.

Trees to Be Removed: Sawtimber-sized oak, maple, birch, white pine and hemlock stems and large sapling and pole-sized red maple, beech, hemlock, and paper birch stems, trees with poor form, low vigor, and a juxtaposition that interferes with crown expansion of the chosen focus trees. Some of the high value red oak trees could be harvested. An estimated 10-15% of the site stocking will be harvested. Hardwood trees with crown damage, obvious decline due to insects and disease, or toppling over-uprooting storm damage. White pine trees for removal include those with root heaving,

asymmetrical crowns, and extensive needle dropping caused by fungi. Hemlock trees that shed over ~75 % of their needles over the next five years would be included.

Legacy or Focus Trees: Expansion of the definition of crop/focus trees from the traditional use of the term crop trees reflects the Town's concern that no emphasis on economic gain or timber crop management be pursued. Focus trees include soft mast producing trees, aspen, the relic trees (large trees over 25 inches in diameter that have been a part of the forest for a long time) and black cherry (soft mast), any species with well-formed cavities, trees with large, expansive, healthy crowns for perching, large-diameter snag trees, uncommon species such as white oak, black oak, or hickory, or aesthetically appealing trees. And it can include vigorous trees that diversify or enhance the carbon portfolio in the forest here.

Invasive Plant Control: The invasive plant communities within these two stands should be treated for stocking reductions prior to the implementation of any sustainable forestry practices to protect the seedbed conditions. Appropriate control measures as outlined above can be scheduled prior to any silviculture disturbance.

Landscape Considerations: Forest management approaches on neighboring private, industrial, and State-owned forest lands differ from this proposed silviculture project. This is a conservative technique which removes a minimal number of trees per acre, keeps maturing, large sized trees for their life cycle, minimizes disturbance to ecosystem function, and supports a quick return to pre-disturbance condition and structure.

In contrast, other forestry projects, which are driven by a different set of goals and objectives than your communities, remove higher levels of stocking, harvest more and keep less mature trees, and create large openings in the forest landscape for habitat values. If the community support this proposed practice, it will not detract from the use of the Town forests as a carbon sink and the Town's participation in any carbon credit offset project.

Practice 6: Red oak underplanting

Ecological Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Biodiversity. Forest Resilience. Social and economic goods. Forest Productivity. Carbon Accumulation. Climate Mitigation.	2 3	OH WH	Plant red oak seedlings (large size) within the stand to increase the stocking levels of this species for habitat, biodiversity, and economics (carbon or timber).	Dispersed planting out over the 50 treated acres.	2025+ Post disturbance

Discussion:

1. United States Department of Agriculture Soil Conservation Districts can often help with plant procurement and the State of New Hampshire Nursey also has a great selection of seedlings available each spring. Community donations could also be looked for from Franklin County nurseries or businesses.
2. The planting could be privatized or conducted as a community forest outreach program with aid from local eagle scout candidates, high school environmental sciences classes, or interested Conway residents.
3. Prior to the actual seedling planting exercise, it is advisable to open the seedbed to added sunlight with the removal of thick duff layer around the plant site. Seedlings could be planted within the small gap openings from the tree removals.
4. Given the herbivore populations locally, protection of the seedlings is recommended with plastic tubing or fencing.
5. Red oak will survive a warming world well, and any resource invested in its perpetuation will enhance the climate mitigation ability of this forest.

Practice 7: Cleaning and Weeding in Sapling Area

Ecological Objective	Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
Biodiversity. Forest Resilience. Forest Productivity. Carbon Accumulation.	4	ESH-BB	Cleanings and Weeding amongst the sapling and seedling class. Wild grape control	9 acres	2025+ Post disturbance

Climate Mitigation.					

Discussion:

1.Release operations such as cleanings and weeding free young trees not past the sapling stage, from the competition of surrounding trees that threaten to suppress them. The basic goal is to give young trees enough light and growing space to grow vigorously and develop into mature trees in the main canopy at a more accelerated rate than might otherwise occur. Another purpose of this practice is regulation of species composition so that trees adapted to a changing climate will form the future forest ecosystem.

2. Immature trees for removal include the short lived species such as striped maple, gray birch, and pin cherry in favor of the long lived trees best suited for warmer soils and air such as black birch, red maple, red oak, white ash, cherry, and white pine.

3. The scattered older trees provide carbon storage trees and although they are over topping some of the vigorous young trees. They should be kept for a simple balance in ecosystem function and seed- bearing ability.

4. The cutting of some of the wild grapes that climb into some of the most productive overstory trees and smother the younger trees would increase site productivity.

Practice 8: Forest Carbon

Objective	**Stand Number**	**Forest Type**	**Sustainable Forestry Practice**	**Extent**	**Timing**
Climate Mitigation. Carbon storage and accumulation. Forest Resilience. Ecological goods- economic goods.	1 2 3 4 5	HH OH WH ESH-BB WP	Participation in Carbon Offset Project-Completion of a Carbon Inventory Process and Verification of the Carbon Credit Equivalents within the organic components of this forest ecosystem and The Development of a long-range, detailed Climate Mitigation Strategy	Property - wide	2020-2030

Discussion:

1. Accurate estimates of carbon in forests are crucial for forest carbon management, carbon credit trading, national reporting of greenhouse gas inventories to the

United Nations Framework Convention for Climate Change, calculating estimates for the Montreal Process criteria and indicators for sustainable forest management and registering forest-related activities for state and regional greenhouse gas registries and programs. While the inventory we performed to write this plan is rigorous and useful as a baseline, it does not meet the standards of a carbon inventory.

2. The Commonwealth and its Executive Office of Energy and Environment are exploring the use of carbon marketing program for incentivizing the use of our valuable forests in western Massachusetts as a climate mitigation tool. When this program is launched, the Town might consider the development of a carbon program within their Town forests.
3. The United States Forest Service offers technical help with the establishment of carbon friendly forestry practices (much like the ideas presented in this document) on municipal and community forest land. It may be helpful if the Town considered participating in a study or project with the United States Forest Service Northern Institute of Applied Climate Sciences case study on the Town forests. This process would provide detail about the condition of the Town forests with respect to surviving and thriving under different climate change scenarios into the future.

4. The Town has applied for grant funding from the FRCOG-Mohawk Trail Woodlands Partnership for the completion of a feasibility study for the initiation of a carbon sequestration and credit generation project for the Town forests in aggregation with surrounding municipal and private forest lands. The ideas, golas and objectives sustainable forestry practices presented in this document integrate well with participation in such a program.

Practice 9: Adaptive Management

Stand Number	Forest Type	Sustainable Forestry Practice	Extent	Timing
1 2 3 4 5	HH OH WH ESH-BB WP	Practice Adaptive Management Development of a Monitoring Program and Documentation or Archive System	Property -wide	2020-2030

Discussion:

1. As discussed throughout this Plan, change is an inevitable part of natural processes. The forest will evolve through the next ten years no matter what and climate change will undoubtedly scramble this process too. One can wisely guess, but not completely understand today what threats or challenges this forest ecosystem will face though this period. The establishment of a record keeping system to archive the forests' current condition (this document could serve as your baseline description of the forest and its functionality in 2020) and the changes that occur with each growing season provides the Town with the flexibility necessary to work on solutions if problems arise.
2. This responsibility could be hired out to a forester, a botanist, an environmental consultant or taken on by a community-derived Town Forest Committee (keeping in mind the experience and wisdom of the Conway participants in the Forest Stewardship Planning process) or some derivative of these methods.
3. Good record keeping and documentation will also position the Town to take advantage of any carbon sequestration, climate mitigation, or carbon credit marketing programs that arise during the coming years. Your Town invested the first resources to complete this Forest Stewardship Management Plan, and you can easily use the data, ideas, and stewardship issues presented here for future program development.
4. Monitoring hemlock will be an important task over the course of this Plan. Keeping an eye out for thin crowns, dying trees, and regionwide reporting on winter Hemlock Wooly Adelgid mortality rates will help inform this effort.

6.3 Boundary Maintenance and Delineation

The placement of small identification signs along the perimeter of the property would help visitors understand the bounds of the Town Farm Forest. Community feedback shows that many recreators are unsure when they enter the Town farm given the vastness of the State Forest and Cowls Lumber Company holdings. And tasteful signage could help differentiate the management approach and style of the Town.

6.4 Access Negotiation, Road Improvements, and Maintenance

Cricket Hill Road Extension is technically the access for the Maynard cemetery and the Town holds some responsibility for access to the graves by the families. The road has been kept through the years for this purpose. Recent harvesting activity upon the State Forest and Cowls Lumber Company lands have changed the condition of this road. The predicted weather pattern changes in the future and its accompanying high-volume storm events will bring higher flow rates than the existing culverts might mange well (under-sizing in the past).

Some pre-planning about the care and upgrade of this access could assure continual use of the road for cemetery access and forest management purposes. Collaboration with the Massachusetts DCR Management Program and Cowls Lumber could share the costs of these projects. The documentation of Best Management Practices and a road use policy (as it is still a continued Town road) would provide the Town with the means to secures its upkeep as the Town and your neighbors use of it for forestry practices in the future.

6.5 Community-based Forest Stewardship and Budgeting Planning

The Town of Conway wishes to be directly involved with any decision relating to the stewardship of their forests and the use of any sustainable forestry practices upon them. The Townspeople would like is to be fully informed in a prompt fashion whenever forest management work is proposed or planned. As mentioned earlier in this document, one way to assure full disclosure or any discussions relating to the Town forests would be the creation of a formal political body within the auspices of Town government and committees to conduct due diligence when necessary.

Such a body could meet when the implementation of any of the recommendations in this document are proposed. The Committee's responsibility would include the protection of the collective voice heard during this project. Small Towns face financial dilemmas in their annual budget season. Our current pandemic might enforce austerity measures for years. This body could stay current on grant funding opportunities (Federal and State as well as private foundations), complete applications, and supervise the direct supervision of the grant itself and all work on the Town forests or keep a third-party for such supervision and implementation. A Town Forestry Committee could also liaison with your neighbors as future harvesting projects are planned and educate them about Town mandates or future by-laws so that respectful treatment of your road surfaces and wetlands occurs.

Section 8: Signature Page

Check each box that applies

☐ CH. 61/61A Management Plan I attest that I am familiar with and will be bound by all applicable Federal, State, and Local environmental laws and /or rules and regulations of the Department of Conservation and Recreation. I further understand that if I convey all or any part of this land during the period of classification, I am under obligation to notify the grantee(s) of all obligations of this plan which become his/hers to perform and will notify the Department of Conservation and Recreation of said change of ownership.

☒ Forest Stewardship Plan. When undertaking management activities, I pledge to abide by the management provisions of this Stewardship Management Plan during the ten-year period following approval. I understand that if I convey all or a part of the land described in this plan during the period of the plan, I will notify the Department of Conservation and Recreation of this change in ownership.

☐ Green Certification. I pledge to abide by the FSC Northeast Regional Standards and MA private lands group certification for a period of five years. To be eligible for Green Certification you must also check the box below.

☐ Tax considerations. I attest that I am the registered owner of this property and have paid all applicable taxes, including outstanding balances, on this property.

Signed under the pains of perjury:

Owner(s)_____ Date_____

Owner(s)_____ Date_____

I attest that I have prepared this plan in good faith to reflect the landowner's interest.
Plan Preparer: Mary K. Wigmore MFL #250 Date

I attest that the plan satisfactorily meets the requirements of CH61/61A and/or the Forest Stewardship Program.

Approved, Service Forester_____ Date_____

Approved, Regional Supervisor_____ Date_____

In the event of a change of ownership of all or part of the property, the new owner must file an amended Ch. 61/61A **plan within 90 days from the transfer of title to insure continuation of** Ch. 61/61A **classification.**

Appendix A- Forest Stewardship Goals

The full set of forest stewardship goals, objectives and strategies using sustainable forestry practices for the Conway town forests, which were derived from the On-line Community Forest Stewardship Planning Survey and the Forest Stewardship Planning Workshop.

These are all the things that we heard the community say they wanted to do. It embarks from position of community engagement- knowing full well that the voices in the decision-making process may change at different times and in response to different values.

There were two general approaches that coalesced- one which tends towards a passive, hands-off approach to stewardship, and the other which tends toward a more active, hands-on approach. Here, we strive to present two tracks, which will undoubtedly often overlap, of stewardship practices.

The more passive approach is highlighted with grey in the central column where applicable.

COMMUNITY-BASED FOREST STEWARDSHIP GOALS	OBJECTIVES	SUSTAINABLE FORESTRY PRACTICES	Fiscal Year accomplished	Example of Ecosystem Service or Ecological/Social Function Outcome
1. Sustain biological richness defined as all forms of life within the forest and their ecological roles and the different ecosystems, landscapes, species, and genetic codes present here now.	**1.Preserve Habitat for rare and endangered species and species of conservation priority in natural condition.** **2.Support a full range of habitat conditions for the support of wildlife diversity.** **3.Protect native plant communities.**	**A: Passive with Minimal Disturbance** **1.Find priority habitat through GIS mapping** **2.Set policy for these areas of non-disturbance-BMP guidelines set up for visiting and trail use in Conway Community Forests.**	**2021-2030**	**Sustain wildlife habitat in its natural condition** **Mapped and reserved refugia sites or long-term minimal management zones**

		3. Interpretative signs constructed and installed on the properties with a simple message of treading lightly and sharing the forest. **4. Identify unique habitat refugia and legacy sites for protection, use GIS mapping for their designation, and establish a Town policy about the establishment of these micro-refuges upon the two Town forests with non-disturbance/forever wild zones understanding.** **5. Develop a long-term protection plan for the Town forests such as the sale of a conservation restriction or a Town initiative for no future development.** **6. Educate the neighborhood and Town about strategies to protect and enhance habitat.** **7. Protect Rare, Threatened and Endangered (RTEs) Species by strategically focusing recreational and educational access away from special areas.**		

		B. <u>Active and Conservative Stewardship</u> **1.Identify full scope of the invasive plant threats on both Town forests. Use GPS and GIS mapping technologies to figure out and map their extent on both forests.** **2.Develop an Integrated Vegetation Management Plan for the control of these invasive plants. The current stocking allows for manual and mechanical control measures with hand pulling, brush cutting, or mowing on the Fournier Woods, but Town Farm Forest may need other control measures.** **3. Promote Old Growth Stand Characteristics through the felling of large trees to create large sized downed woody material to support invertebrates and girdle large sized trees for snags and cavity nesting sites.** **4. Create added wildlife habitat by installing a 1-2-acre openings in the remote uplands of the properties without the extraction of forest products.** **5. Plant native shrubs within forest areas that are deficient in this valuable plan layer for cover and feed.**	**1.2020-2021** **2. 2020-2021** **3.2020-2030** **4. 2020-through 2030** **5. Ongoing**	**Protect native habitat and plant communities and their ecological function**

		6. (a) Explore full government grants, private foundation grants, forest goods based, and community resource for human power (volunteer programs) funding for the completion of these sustainable forestry practices. **(b) Secure funding sources.** **(c)Implement these Sustainable Forestry Practices on the two Town forests.** **7. Protect RTEs by planning and timing SFP's around the requirements of known RTEs on the property.**	**6. Continual** **7. Ongoing**	
2. Sustain the ecological services and benefits provided to humans from these forests defined as:				
a. Social and emotional goods- support well-being, relaxation, spiritual sustenance, study of nature, and recreational opportunities	**1.Maintain and enhance the recreational experience of both forests.** **2. Develop and expand the educational use of the Fournier Woods by the Conway Grammar School**	**Cannot be too passive here- if you do not do anything, trails deteriorate, and erosion occurs-community spoke and wants to use the land.** **1.Trail inventory of current trail locations and condition on the Town Forests.** **2.Identify needs for trail restoration and maintenance such as brushing out, erosion prevention measure installations, closing trails if deteriorating beyond sustainable condition, and signage needs**	**2020 through 2030**	**-Protect and enhance emotional and spiritual well-being of community** **-Sustain and protect water quality with erosion prevention**

		inclusive of best locations, minimal effective number, educational/interpretive, directional, and designation of trail use as some should be just for walking. **3. Develop a 10-year working plan for trail maintenance and upgrade when necessary.** **-Secure funding sources.** **4. Implement the recreational plan for the trail system** **-erosion control measures installed** **-proper signage installed** **-map of the system made and presented at a kiosk with rules of use** **-kiosk built with local wood and installed** **- designate locations of good viewsheds.** **5. Install educational signage to enhance peoples' experience of the place with a special focus on children's engagement with the woods here.** **(a) Assist local teachers in attendance to a Project Learning Tree seminar** **(b) Apply for special grants if an interest teacher appears for the inclusion of forest ecosystem material in the curriculum.**		**-Sustain and Protect soil integrity** **-Promote Recreational Opportunities**

		(c) Revision of the Ruth Parnell Forest Treasure map for display at the forest and availability in a kiosk for family use. **6. (a) Explore full government grants, private foundation grants, forest goods based, and community resource for human power (volunteer programs) funding for the recreational trail development and maintenance.** **(b) Secure funding.**		
b. Hydrologic cycle through which forests absorb water from soil and atmosphere and return it and filter it for its improved quality	**1. Protect and maintain the water quality in vernal pools, streams, spring seeps, riparian zones, and wetlands**	**If passive- then no forestry and no use in riparian zones but that only stops the respectful, civil folks from damaging these sensitive sites.** **Active Management:** **1.Draft and document a set of best management practices that use an acceptable set of standard practices for water quality protection during trail work, forest stewardship projects, or silvicultural activity.**		**-Protects and supports high water quality within the wetland resources on these lands and downstream** **-Sustains ecological function of the forests**

		2.Map and find riparian resources on both properties and display map on interpretive signage with directions to tread lightly. **3.Follow all CMP's from Mass NHES Program for Vernal pools during any Sustainable Forestry Practices.**		**-Sustains biological richness with preservation of water sources**
c. Soil quality and function as forest filter toxins before they enter the soils, anchor soils in place, support microbial and microorganism activity to build soils, which support all life	**1.Protect and restore soil integrity and structure**	**Passive- then no forestry and other disturbance in the riparian zones or on highly erodible sites, but that only stops the respectful folks from damaging these sites and protecting soil integrity** **Active Stewardship-one can argue recreational use of the trails on site falls within Active Stewardship parameters:** **1.Identify areas with soil degradation due to past harvesting or current welcome and unwelcome recreational use, map field locations of current and possible sensitive zones where site degradation could occur from use, and establish a GIS database on both properties inclusive of minor issues (ruts in woods, overuse trails, or sheet erosion on trails and major issues (failed or undersized culverts or massive sedimentation and erosion zones).**		**-Protects and sustains long term soil integrity, fertility, and function on both forests** **-Sustains ecological function of the forests** **-Sustains biological richness with preservation of water sources**

		2.Draft or accept an already proven set of best management practices with community input that decides how to us the trail system or implement SFP's and protect soils integrity. **3. (a) Explore full government grants, private foundation grants, forest goods based, and community resource for human power (volunteer programs) funding for the completion of the above tasks when necessary.** **(b) Secure funding sources.** **4. During any future silvicultural SFP's for forest health, productivity, or resilience, make use of the Massachusetts 2014 BMP Manual and the added Town policy and minimize road surfaces for work and restore disturbed soils surfaces.**		
d. Climate Regulation - protect and promote the forests' use as a Carbon sink that pulls CO2 out of the air in photosynthesis, accumulates and sequesters carbon and stores it in boles, leaves, branches, and roots	**1. Promote forest conditions that support their use as a mitigation strategy for climate change through Carbon sinking/pooling and promoting forest conditions that allow for climate adaptation by the forest**	**1.Social/cultural- Before any active management starts- hold a community forum to accept the proper sustainable forestry practices necessary for the accomplishment of this goal. At the forum present science to date and decide what the Town can accept.**		**-Maintain forest condition for its use as mitigation strategy for climate change** **-Protects and sustains biological richness**

thereby mitigating the threats of climate change		**2. Active management- science has some guidelines on how to grow a forest for the best accumulation and storage of carbon and the adaptation of forest conditions for climate mitigation.** **(a) Identify the current forest conditions and characteristics useful to carbon pooling and supportive of future adaptation to a changing climate.** **(b) Set up a long-term SFP in a long rotation (time you grow trees on a property) and grow site and climate changing suitable trees older-closer to their lifespans.** **(c) Require long recovery periods between disturbance from forest stewardship/harvest with a required 20-year window. Both forests are in the recovery phase for another 5 to 8 years+/-** **(d) Establish a monitoring system on both forests so that you can see how the forest is doing as change occurs annually/biannually?** **(f) At end of recovery period use silvicultural practices to introduce a new young age class, improve forest stand and individual tree vigor, increase forest ecosystems productive ability, and remove any threatened trees**		**-protects and sustains the delivery of ecological services** **-Increase forest productivity and its ability to sequester carbon**

e. Economic goods- timber products and fuelwood are important to some community members, but overall, these are the lowest priority objectives	**1. Maintain and improve timber stocking where appropriate and where co-benefits of forest health and productivity gain.** **2.Regenerate the forest when necessary**	**Pro-forestation – is a passive management approach whereby the Town lets the forests develop naturally from this point forward through time.** **1. Implementation of a low intensity harvest that meets all the ecosystem services and benefits goals- Crop Tree Release with small gaps creation between crop trees or Combination of Single Tree and Small Group Selection.** **2. Draft an aesthetic values protection land for use during implementation of SFPs** **3. Ask for community input and involvement in all the decisions about best use of silviculture on the Town forests.** **4.Hold educational field tours about the project goals and mechanics.**	**2028+**	**-Maintain and enhance forest health and vigor** **-Maintain forest condition for its use as mitigation strategy for climate change** **-Protects and sustains biological richness** **-protects and sustains the delivery of ecological services** **-Increase forest productivity and its ability to sequester carbon**
f. Cultural values-some of the history of Conway is held on these lands.	**1.Protect all historic and cultural resources across both forests**	**Combination of Active and Passive <u>required</u>** **1.Map the cultural resources.** **2. Create and follow a community policy for their protection.**		**-Protects and supports the historic and cultural values inherent on the Town forests**

		3. Seek any funding for special protection measures- such as restoration of gravestones. **4. Secure funding** **5. Implement any practical measures.**		**-Protects and sustains the delivery of ecological services and benefits to humans**
Sustain Forest Resiliency	**1.Conserve and Protect the Forest Ecosystem itself against conversion of use** **2.Use SFP to increase and maintain forest resiliency**	**1.Set up a monitoring program that can assess future vulnerabilities to disturbance across both forests, change sin resilient characteristics, and threats to the forest ecosystem.** **2. Implement SFP's that promote long term forest resiliency** **(a) Passive-Let the forest grow and naturally develop resiliency. Depends on the premise that forests have the genetic history and adaptiveness to survive.** **(b) Implement many of the above stated SFP's which are scientifically accepted, and community accepted and will increase forest resilience:** **b.1. Similar SFP's for climate mitigation.** **b.2. Create balance in age classes across the forest.** **b.3.improve the health and vigor of the trees in both forests.**		**-Sustain Forest Resilience** **-Maintain and enhance forest health and vigor** **-Maintain forest condition for its use as mitigation strategy for climate change** **-Protects and sustains biological richness** **-protects and sustains the delivery of ecological services** **-Increase forest productivity and its ability to sequester C**

		b.4. Use an adaptive management program for frequent review of resilient conditions and adaptation of necessary measures to protect FR. **6.Educate the community about forest resilience.**		

Appendix B: Ecological Forestry

The use of Ecological Forestry (EF) principles strivers to maintain the ecological processes of water filtration, carbon storage and biodiversity protection within a forest ecosystem. Ecological Forestry is a silvicultural philosophy that perpetuates forest ecosystem integrity at a landscape spatial scale while continuing to provide the full suite of ecological goods and services as discussed previously in the Forest Stewardship Management Plan. It is a suitable silvicultural tool to meet the integrated goals of management on the Conway Town Forests. Ecological Forestry depends upon the continuity of the forest structure, function, and biotic communities before and after any harvest disturbance to the ecosystem. If your community accepts a silvicultural harvest, it is planned and executed to mimic natural disturbances. Therefore, these projects follow a wide gradient of size/shape from the individual tree to small patches/gaps to entire stands.

Each disturbance frees up growing space in the forest yet keeps many of the elements of the original forest such as standing dead cull trees and legacy mature stems. Structural and compositional complexity is preserved or created during any disturbance. On the Fournier Forest, there is already a complex mosaic of species, size classes, and natural features. However, it is a young, to middle aged forest and management here can look to guide portions of the woods toward and older forest condition replete with the structural complexity and messiness that this generally entails. The proposed reserve area (See Practices Map) will grow undisturbed towards biological maturity, some individual trees within stands will mature, and some sites will mimic larger scale disturbance for the creation of young forest. This process blends the preservation of refugia sites and mature forests, regeneration harvests, variable density thinnings, and crown thinnings for the improvement of individual tree and stand vigor, habitat, carbon reserves, and biodiversity.

Longer rotation ages (more than 200 to 250 years) for the best site-suited tree species and longer periods between harvest disturbances (cutting cycles set to 20 to 25 years) allow for the development of the desired structural complexity within an area post disturbance. The community plans and executes a disturbance regime schedule after a thorough identification and mapping of all the environmentally or culturally sensitive zones upon the watershed. With this approach critical resource sites such as functional riparian zones or seep collection fonts or culturally important structures such as stone walls and cellar holes are found and protected. Longer rotations also accommodate species specific adaptations amongst the forest to climate change.

The following seven elements guide the field application of ecological forestry practices:

1) forests have intrinsic value,
2) humans need to extract products from the forest,
3) silviculture should follow natural processes as much as possible,
4) foresters should plan for the long term,
5) forestry is implemented at the stand scale but must be in balance with the larger ecosystem,
6) the social and economic context matters, and
7) science and place-based experience should guide silviculture.

These guidelines would form, if necessary, the silvicultural tenets that guide prescriptions for the stewardship of the Town forests.

The next discussion tells the harvest standards and guidelines necessary for the protection of the ecological function

Forest Management Standards for the Silvicultural Application of Ecological Forestry on Conway Town forests

Goal: Use of silvicultural-based timber harvesting within the EF context for the maintenance and development of an all-aged, species rich, structurally complex, biodiverse, natural filtration watershed forest.

Standards or Practice:
1. Apply current and accepted scientific principles from the 2014 Massachusetts Best Management Practices manual to conserve soil and water quality across the managed sections of the watershed forest.

2. Apply current and accepted Ecological Forestry silviculture principles for native biodiversity protection as a standard for the managed sections of the watershed forest.

3. Establish long term (200 to 250 year) rotations (time necessary to produce the desirable management crop on the watershed) and establish 15 to 20 year intervals between harvest disturbances within any give management unit on the watershed forest unless more frequent entries are necessary for salvage due to pathogen damage or regeneration purposes.

4. Prevent the movement of sediments into the riparian zones and its riparian corridor of seeps, streams, wetlands, and swamps during any silvicultural harvest work. Conduct all silviculture harvests under an approved Massachusetts Chapter 132 Harvest Cutting plan and in full compliance with Massachusetts Chapter 131 The Wetlands Protection Act.

5. Establish and maintain all access/truck roads, skid roads, and landings areas in compliance with both the required and recommended best management practice guideline in the 2014 BMP Manual.

6. Avoid wetland area crossings during any harvest operation, establish and maintain proper stream crossings for logging machinery and work the machinery within these crossing areas in strict compliance with both the required and recommended best management practice guidelines in the 2014 BMP Manual.

7. Find and map all vernal pools within designated harvest areas and plan the harvest with strict compliance with all the required and recommended best management practices guidelines in the 2014 BMP Manual for vernal pools.

8. Establish ~50-foot filter strips around all designated and mapped riparian zones across the Forests, which are zones essential to the collection and movement of groundwater across the forest ecosystem and into the riparian zones. Restriction of any harvest or entrance into the riparian zones or their 50-foot filter strips.

9. Conduct annual interior service road inspections and conduct annual maintenance of the culvert system and periodic erosion control measure installations along this road system to prevent roadbed degradation and the potential for increased erosion and runoff along these road networks.

10. Survey the property (ideally in early spring) and identify in finer detail the Important hydrologic features of a proposed harvest site and mitigate for water quality. Protect surface waters and wetlands by appropriately locating roads before harvesting begins and applying other all BMPs.

11. When logging in and near the forested wetlands, avoid rutting and other damage by cutting when the ground is frozen or sufficiently dry to support the type of equipment used.

12. Before harvesting within or near rare or sensitive wetlands, consult with the Massachusetts NHESP for their most recent Conservation Management Practices for site protection during harvest work and these CMP's would be implemented.

13. Comply with all Conservation Management Practices if necessary, from the Massachusetts Natural Heritage and Endangered Species Program for the protection of any state listed and priority natural communities identified within the managed sections of the watershed forest.

14. Designate a wetland buffer adjacent to forested and non-forested wetlands. A buffer's effectiveness increases with its width. Sensitive wetlands require larger areas of upland to reduce the risk of disturbance.

15. Designate no-disturbance zones inclusive of steep slopes, highly erodible soils, known threatened and endangered species habitat, rare plants and exemplary natural communities, or nests.

16. Leave the area closest to the stream, pond, or wetland un-harvested to provide increased protection to aquatic habitats and allow a reliable long-term supply of cavity trees, snags, and downed woody material. Larger zones will increase the protection of non-timber values; however, no-harvest zones may not always align with ecological or silvicultural objectives.

17. Retain trees with cavities, standing dead trees, downed logs, and large superior canopy trees.

18. Maintain the boundaries of the Forests for protection against trespass and illegal uses of the site.

19. Implement strategies for invasive plant control across the Town Forests.

20. Everywhere, apply appropriate methodologies matched to site specific conditions for the protection of biodiversity.