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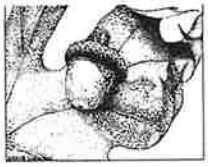
Forest Management Plan

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



CHECK-OFFS

CH61	CH61A	CH61B	STEWARDSHIP	Cost Share
cert ☐	cert ☐	cert ☐	new X	EEA X
recert ☐	recert ☐	recert ☐	renew ☐	Other ☐
amend ☐	amend ☐	amend ☐	Climate ☐	Birds X
			Conservation Rest. ☐	
Plan Change ☐	to		CR Holder	

Administrative Box

Case No. 215-12061 | Orig. Case No. new

Owner ID 201415 | Add. Case No. _____

Date Rec'd 6.23.22

Plan Period 2023-2032

Rare Spp. Hab. ND

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) Town of Northborough CO Greg Young

Mailing Address 63 Main Street, Northborough, MA 01532 Phone 508-393-5015

Email Address younggr@yahoo.com

Property Location Town(s) Edmunds Hill Conservation AreaNorthborough Road(s) See attached

Plan Preparer James DiMaio #350

Mailing Address 96 Hunt Road, West Brookfield, MA 01585 Phone 774-200-9726

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
see attached								
			TOTALS					

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

See attached

HISTORY

Year acquired see attached Year Management began 1935

Are boundaries marked: Yes ☐ blazed/painted/flagged/signs posted (circle all that apply) No X 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 is needed, continue on separate page)

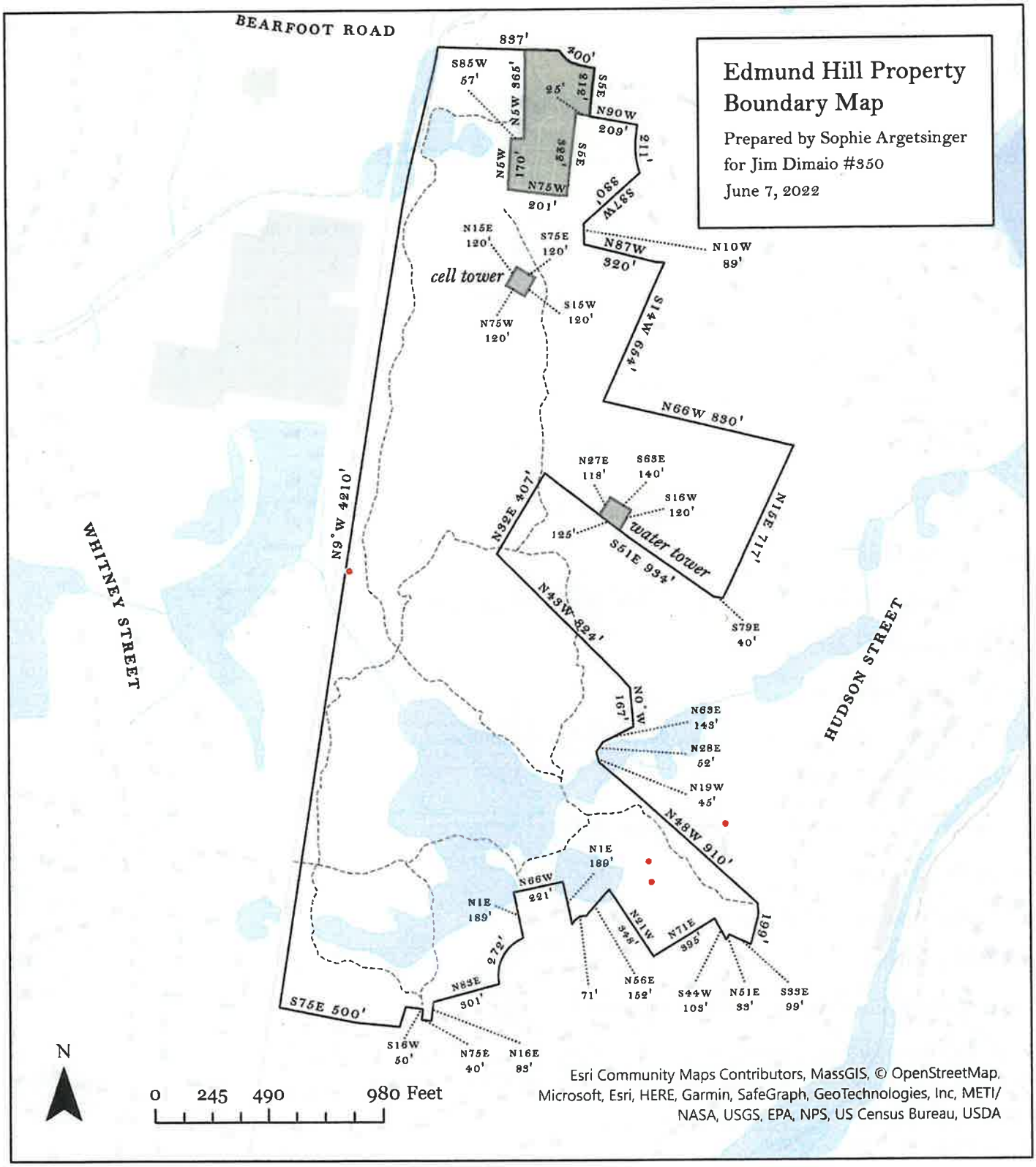
Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Acres	Date
NA					

Remarks: (if additional space is needed, continue on separate page): The town of Northborough began acquiring the 107.03 acre Edmunds Hill Conservation Area in 1935. There is an extensive well-maintained and used trail system throughout the property. Spongy moth has decimated a large number of oak trees throughout the property. In the winter of 2022, the Northborough Conservation Commission decided to prepare a Bird Habitat Assessment and Forest Stewardship Plan to better understand their resources, challenges, and opportunities.

Edmund Hill Conservation Area

Street	Map	Parcel	Book-Page	Year Purchased	Total Acres	Ch61 Excluded Acres	Ch 61 Acres	Stew Excluded Acres	Stew Acres
121 Rice Ave	46	76	5116/591	1971	8.00	0	0	0.00	8.00
23 Overlook Drive	46	55	45572/106	2010	2.42	0	0	0.00	2.42
0 Overlook Drive	46	52	7340/178	1981	4.80	0	0	0.00	4.80
0 Meadowbrook Rd	45	131	3500/162	1953	0.67	0	0	0.67	0
0 Whitney Street	36	31	2640/363	1935	52.80	0	0	0.00	52.80
0 Colburn Street	35	10	16857/122	1995	11.45	0	0	0.00	11.45
0 Colburn Street	35	11	NA	NA	0.38	0	0	0.00	0.38
0 Colburn Street	29	29	3500/162	1953	6.88	0	0	0.00	6.88
2 Edmunds Way	29	26	16857/122	1995	1.73	0	0	0.00	1.73
119 Bearfoot Road	29	30	26809/352	2002	17.90	0	0	5.90	12.00
Total					**107.03**	**0.00**	**0.00**	**6.57**	**100.46**



LEGEND Scale: 1:10,000

- PROPERTY BOUNDARY
- EXCLUDED AREA
- ROAD
- TRAIL
- WETLAND
- STREAM
- CERTIFIED VERNAL POOL

Landowner Goals

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

(goals may change over time and this table may be updated to reflect any changes)

Goal	Importance to Me			
	HIGH	MED	LOW	N/A, Don't Know
Improve access for walking/skiing/recreation	X			
Improve hunting or fishing			X	
Maintain or enhance privacy			X	
Preserve or improve scenic beauty	X			
Protect special features, including those of historical or person significance	X			
Enhance the quality and/or quantity of forest products*		X		
Practice agroforestry			X	
Produce income from timber products, or other products and services		X		
Produce firewood for personal use			X	
Enhance habitat for birds	X			
Enhance aquatic habitat in streams, ponds, and other wetlands	X			
Enhance habitat for wildlife	X			
Promote diversity of plant species and habitat types	X			
Increase forest resiliency	X			
Minimize damage from forest pests	X			
Protect water quality	X			
Sequester and/or store carbon to mitigate climate change	X			
Suppress or eradicate invasive plants	X			
Lower property taxes			X	
Protect land from development	X			

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

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

"Manage our town forest as a special place for our residences and guests to enjoy an outdoor recreational experience in a forest that is safe, aesthetically pleasing with large trees, composed of native species, an array of wildlife, high standards for water quality, and resilient over time to cope with climate events and insect and disease infestations"

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 for long-term forest health, productivity, diversity, and quality.
2. Conserving or enhancing water quality, wetlands, soil productivity, 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:** 6/21/22

Owner(s) (print) Town of Northborough

(This page will be included with the completed plan.)

Property Overview, Regional Significance, and Management Summary

Property Description:

The 107.03 acre Edmund Hill Conservation Area **("Edmund Hill")** is located on Bearfoot Road, Rice Avenue, Colburn Street, Edmunds Way, and Overlook Drive in the town of Northborough. The property is centered on Edmund Hill, a glacial drumlin 447 feet tall at its highest point that was formed in the bed of glacial Lake Assabet. The property is owned by the Town of Northborough. The town purchased its first parcel of land at Edmund Hill in 1935 (52.8 acres), subsequently adding on additional parcels in 1953, 1971, 1981, 1995, 2002, and 2010. Edmund Hill is now designated as conserved open space and is managed by the Town of Northborough Conservation Commission. Public access is allowed on the property, and the area is a popular local hiking, mountain biking, and snowshoeing destination, with well-maintained and well-marked trails. In the winter of 2022, the Town of Northborough decided to prepare a Bird Habitat Assessment and Forest Stewardship Plan to understand the resources, challenges, and opportunitiespresent on the property. The Town of Northborough remains committed to high-quality land stewardship and improving wildlife habitat values.

Regional Significance:

During the recent past (last 100 years),the Massachusetts landscape was dominated by abandoned dairy and sheep farms and young emerging forests. In Worcester County, many fields and pastures bordered by stone walls and later barbed wire were reverting to forest, primarily composed of white pine and oak. TheNorthboroughlandscape wasalso once dominated by farms and associated forests. The land use changed as many of these farms were abandoned and the land reverted to forest,resulting in a landscape dominated bysecond-growth forests with scattered farms. The Northborough landscape is fairly populated and developed—the town serves primarily as a suburban residential area, with many residents commuting to Worcester and Boston for work. With a population density of 850 inhabitants per square mile, Northborough is home to 15,741 residents (as of the 2010 census) in 18.5 square miles. It should be noted that the town ofNorthborough supportsand encourages forest as open and recreational space and works in cooperation with its Conservation Commission, residents, landowners, the Department of Fish and Game, and the Department of Conservation and Recreation to protect landfrom development. There are a number of working farms in the town, as well as an industrial park.

The town of Northborough is locatednortheast of Worcester along Interstate 290 and Massachusetts Route 20. It borders Boylston and Berlin to the north, Marlborough to the east, Westborough to the south, and Shrewsbury to the west. Northboroughas whole is approximately47% forest, 19% water and wetlands, 5% cultivated land, and about 29% of the land is developed with residences, businesses, and industrial development. Northborough has about 20% of its forest-based lands protected by MGL Chapter 61, conservation easements, or is state- or town-owned land.

Edmund Hill is surrounded largely by residential properties—it is an important island of protected forest in the developed landscape. The western edge of the property is bordered by a railroad line operated by CSX Transportation. Due to the residential nature of the surrounding landscape, BioMap2 indicates that the Edmund Hill property is not located within or adjacent to

any areas of Critical Natural Landscape, Core Habitat, or Forest Core, and no priority natural communities or rare species are located on or nearby the property (see attached BioMap2).

N

0 0.25 0.5 1 Miles

8 of 37

Edmund Hill Property
NHESP/TNC BioMap2

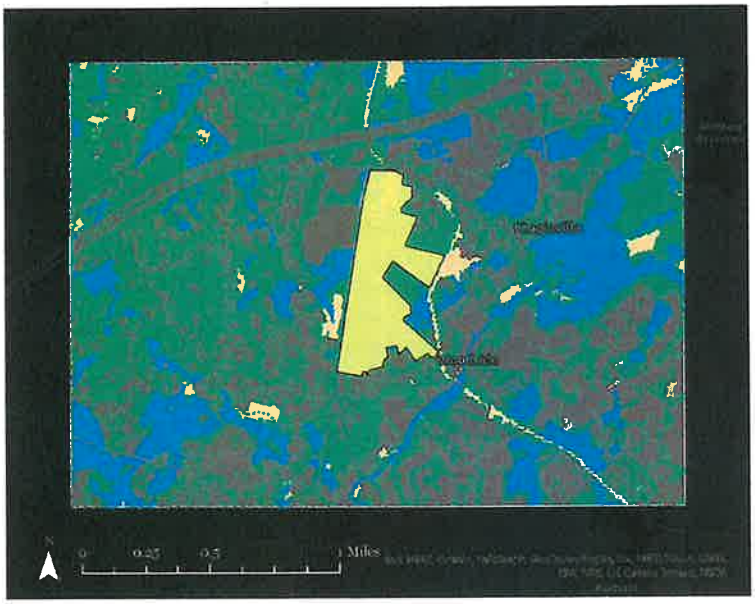
Prepared by Sophie Argetsinger
for Jim Dimaio #350
May 25, 2022

LEGEND

- PROPERTY
- OPEN SPACE
- WETLANDS
- CORE HABITAT
- CRITICAL LANDSCAPE
- PRIORITY COMMUNITIES
- AQUATIC CORE
- FOREST CORE
- VERNAL POOL CORE
- CERTIFIED VERNAL POOL
- POTENTIAL VERNAL POOL

The following land use information was calculatedin ArcGIS using Mass GIS landcover data for an approximately 2500-acre area surrounding the Edmund Hill property (see map below).

Land Use	**Estimated Amount**
Forest	43%
Residential, Commercial, and Industrial	35%
Water or wetland	19%
Cultivated	3%
Open Space (protected)	25%
Degree of Fragmentation	High
Mature Forest	99%
Early Successional Forest	1%



LAND COVER TYPE	% COVER
forest	43
wetland	19
cultivated	3
developed	35

History:

The Edmund Hill property is typical of Northborough forestland. Once farmland, it has reverted to forest composed primarily of white pine, red and white oak, and red maple in wetter areas. Numerous stone walls are an indication of its agrarian past—parts of the property are bordered by stone walls, and a number of interior stone walls are also presentwhere fields and pasturesonce dominated the landscape. There is evidence that a wildland fire took place some years ago in the oak forest. Management of this forest has not occurred for many years.

Cultural Resources:

None present.

Soils and Forest Health:

Soil information was derived from the Natural Resource Conservation Service Web Soil Survey. Soils are mostly composed of well-drained sandy loams, including Paxton fine sandy loam, Merrimac fine sandy loam, Windsor loamy sand, Canton fine sandy loam, and Whitman fine sandy loam. Chatfield-Hollis-Rock outcrop complex is also a dominant soil type, and soils in the wetland areas are composed of poorly drained Swansea muck. Soils are very stable with no evidence of surface erosion and are moderate in productivity. Topography isflat to moderate, increasing to about a 25% slope in the steepest areas.The landscape has lightto moderate amounts of exposed rock, lightly scattered amounts of down woody debris, and a light to moderate number of snags.Forest health in general is good and there appears to be low to moderate deer pressure on the forest, although high amounts of invasive plant species are present along the borders of the property, and there has been some oak mortality due to spongy moth (*Lymantria dispar*) outbreaks and there is some evidence of white pine weevil damage.Native vegetation such sassafras, maple-leaved viburnum, mountain laurel, hay-scented fern, low- and high-bush blueberry, princess pine, Canada mayflower, star flower, lily-of-the-valley, and skunk cabbagewere identified during inventory. In general, there was very good regeneration of seedings and sapling white pine, oaks, maple, birch, and ash. Having a good component of diversified regeneration species is important for the future of the forest and as habitat for wildlife.

Invasive Species:

Invasive plant species arecurrently dense along the property boundaries (particularly near residences), moderate in wet areas, and largely absent in the more interior, upland areas of the property. Invasive plant species on the property include oriental bittersweet, Japanese barberry, multi-flora rose, honeysuckle, autumn olive, and well-established populations of burning bush. It should be noted that invasive species can suppress the growth of native vegetation and can degrade wildlife habitat, including forage, as their foliage and fruits are often nota preferred food source for native wildlife (see for instance, Tallamy, Douglas W.,*Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*, Timber Press, 2007). It is recommended that the invasive species populations be treated with chemicals—at least 3 treatments may be necessary for effective control. Extra care should be taken to avoid the introduction of invasive plant

species to the interior of the property during all forestry operations.In the future, Edmund Hill should be regularly monitored for the presence of invasive species, which should be treated quickly if found. Prevention, monitoring, and treatment of invasive species populations is essential to ensure the persistence of native vegetation and quality habitat for wildlife.

Wildlife Habitat:

The Edmund Hill property currently provides some valuable wildlife habitat due to the relative maturity of forest, the presence of hard and soft mast (oaks, hickory, cherry, blueberry), and the presence of wetland areas. Wetlands are valuable to a wide variety of wildlife, including birds, mammals, amphibians, reptiles, and insects. There are a number of large diameter dead oak trees (snags) within the oak forest and a small amount within the pine forest. However, the forest as a whole is very over-stocked, and is lacking in wildlife habitat trees (trees with significant cavities, broken tops and limbs) and downed woody debris, structural and age class diversity, early successional habitat, and significant amounts of soft mast.

Bird Habitat Characteristics:

The ideal optimum bird habitat includes a complex ecosystem with grasslands and young shrub-forests in various stages surrounded by mature forests. Within the forest, a complex structure is ideal, including large-diameter trees, trees with cavities and dens, snags (standing dead trees), mid-story (pole size) layers (vertical diversity), canopy gaps with dense brush (horizontal diversity), soft- and hard-mast-producing trees and vegetation, and downed woody debris of various size classes including large logs.

The Edmund Hill property habitat strengths include a diversity of tree species,goodoverall forest health, the presence of both hard and soft mast-producing species, large and varied wetland areas (forested swamps, vernal pools, and open water),and a low number of invasive plant species in the interior forest. The following bird species were inventoried on the property by Wildlife Biologist Christopher Sturgeon on April 28, 2022: American robin, crow, white-breasted nuthatch, red-winged blackbird, blue jay, northern cardinal, chipping sparrow, black-capped chickadee.

To enhancebird and other wildlife benefits and improve forest health, it is suggested that the majority of the forest be thinned, that some of the dead oaks be salvaged, and that the invasive plant species be treated. Thinning willimprove forest health and concentrate growth on desirable trees and speed up the development of old-growth characteristics for the benefit of species that are dependent on mature, late-successional forest. The retention of wildlife snags, trees with cavities, and downed woody debris will increase these characteristics. Treating the invasive plant species will promote the growth of native vegetation, which will support native wildlife and overall forest health.

The following birds might benefit from this management:

Thinning / Late Successional Forest
Black-and-white warbler
Black-throated green warbler
Black-throated blue warbler
Veery
Wood thrush
Eastern wood-pewee
Canada warbler

Salvage Large Groups of Dead Oaks-Early Successional Forest
Canada warbler
Ruffed grouse
White-throated sparrow
Chestnut-sided warbler
Eastern towhee.

Natural Heritage and Endangered Species:

State rare species information was gathered from the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program Priority Habitats of Rare Species and Natural Communities GIS layers. There are no known federal or state-listed rare species or habitats of special concern on the property according to this resource.

Boundaries:

The boundaries have not been located, flagged, and painted.

Forest Products:

In the spring of 2022, the property was inventoried using systematic variable plot sample and 20 basal area factor prism. The property was categorized into four (4) forest stands that had fourteen (14) plots established and measured. Stand were delineated based on site conditions and species composition, including tree size class and number of trees. The data obtained from the field inventory was entered into a "Two-Dog" computer software program that used International ¼" Board Foot Volume by Number of Merchantable 16-foot Logs (Form Class 78) volume tables

and cubic foot volume and trees per acre. Calculations were made on a plot and individual tree basis.

In addition, site index trees (most dominate trees) were specifically measured for height, age, diameter, and last ten years growth. The average site tree age and height were calculated for each stand and applied to the Site Index Curves found in the USDA Forest Service Timber Management Field Book. The Mean Annual Incremental Growth was calculated in board feet using the 1.26 Calculation for Growth Formula contained in the USDA Forest Service Timber Management Field Book.

A walk-through examination also took place documenting mid-story vegetation, impact from spongy moth infestation, regeneration success and growth, duff and leaf litter layers, and other information to prepare the 2022 Bird Assessment and Stewardship Plan.

Stand information includes growth as well as forest commodity projections. Local, sustainably produced forest products have a beneficial effect on rural communities and to the landowner who desires to keep their land as forest and open space. Sawlogs and firewood are the primary forest products harvested by skilled labor. Firewood is very beneficial to landowners and others who desire to reduce their carbon footprint by reducing use of fossil fuels and either generate modest sources of income or reduce their heating bills. A well-managed, sustainable forest captures future mortality, increases growth on high quality trees, produces ecosystem and economic values and can be more resilient to climate (wind, snow, ice, drought) and forest health (insects and disease) potential threats.

Access:

The property is accessible fromBearfoot Road in Northborough via the main entrance, where a large parking area is located.There are well-established, marked, and well-used trails throughout the property. Two cell towers are located in the northern half of the property.

Forest Threats:

The following forest threats should be monitored:

Spongy moth oak damage and mortality
White pine weevil damage to pines
Wind, heavy snow, and ice events
Drought and excess rain
Deer browse of regeneration
Invasive plant species
Wildland fires (There is a history of fire within the oak forest)

Management Summary:

The Edmund Hill propertyprovides multiple forest values, including wildlife habitat, forest productivity, recreational opportunities, and scenic beauty. The management of the forest for

many or all of these values simultaneously is referred to in various circles as eco-forestry, ecosystem management, "green" forestry or, more traditionally, multiple use management. The significance is that cutting or harvesting on such a property will not be done for the ultimate goal of selling timber without consideration of other forest values. Rather, opportunities will be taken to manipulate the forest to enhance any of the above forest values where a significant benefit would result and the change would not adversely impact the other values.

One noticeable difference from timber management is that some of the trees may be retained far longer than from a timber growing perspective. Trees may be allowed to decline or die in the woods, as many wildlife species depend on declining trees that form cavities for denning sites. For the most part, large-diameter cavity trees are more desirable than smaller trees. Under multiple value management, a tree with a particular wildlife value may be retained even if its retention has a negative impact on timber growth. In general, blanket prescriptions such as a maximum diameter at which all trees should be harvested are not used in multiple-value forestry.

Aesthetics deserve mention because the tidiness of a harvesting job does more to influence most observers' opinion of that job than any other factor. While the aesthetic impact of multiple-value forestry harvests will vary from job to job, a forester will weigh the effect of different aesthetic treatment options on other forest values in order to determine management strategy. For instance, chipping slash for aesthetics is rarely used as an option since it usually consumes more revenue than most timber sales would generate. In addition, chipping would negatively impact wildlife habitat by eliminating coarse woody debris on the forest floor, an important element of habitat for many species. An option that is often considered in order to reduce the negative aesthetic of harvesting is restricting the equipment used to a forwarder. A forwarder is a machine that carries, rather than drags logs out of the woods. Requiring a forwarder may result in a lower stumpage price to the landowner, since fewer operators have forwarders than have skidders. However, under the right conditions, it can result in less disruption to the forest floor and less damage to the residual trees. Requiring that slash be lopped low may also be a worthwhile investment in aesthetics by the landowner.

The management practices reflected in this document attempt to balance landowners' goals with both cost-share and revenue producing practices while enhancing wildlife and aesthetic values.

The following landowner objectives were developed:

- Keep the land protected from development
- Maintain a diversity of native wildlife and enhance native species habitat
- Sustain a well-managed forest
- Improve scenic beauty and recreational access
- Increase forest resiliency and minimize damage from pests
- Sequester and/or store carbon
- Suppress or eradicate invasive plants

These objectives should be achieved by implementing the following strategies to improve the forest, wildlife, and biodiversity conditions in a sustainable manner following Forest Stewardship Council Forest Certification and MGL 61 standards:

1. Conduct forestry practices to improve forest health and encourage the development of old growth characteristics, including selective salvage harvesting of oaks killed by spongy moth and periodic thinning. The salvaging of large groups of dead oak trees will results in small gaps (openings) within the forest for species that utilize early successional wildlife habitat.

2. Reserve selected wildlife snags, trees with cavities, and downed woody debris.

3. Treat the invasive species along the borders of the property, if socially acceptable.

4. Protect, maintain, and enhance the current trail system.

5. Forest and wildlife management should follow MA Forestry Best Management Practices and Forest Cutting Practices Act, as well as associated Massachusetts' environmental laws such as Endangered Species Act, Wetland Protection Act, and Slash Law.

6. Monitor every 5 years for increases in invasive species population, treatment effectiveness, regeneration, and health of the forest and wildlife conditions.

Forest Stands

For the purposes of this report a forest stand is an easily defined area that is relatively uniform in composition, and structure, *and supports a particular suite of birds*.

Summary of the Forest Stands on your property

Stand	Forest/Habitat Type	Approx. Size (acres)	Notes
1	White Pine-Oak	35.1	Even-aged, over-stocked stand dominated by white pine, with oaks, cherry, and pitch pine. Vernal pools, small streams, and seeps present. Dense invasive species along boundaries.
2	Mixed Oak	51.7	Even-aged mixed oak stand, with hickory, ash, and white pine. Vernal pools, small streams, and seeps present. Dense invasive species along boundaries.
3	White Pine-Hardwoods (forested swamp)	10.0	Even-aged forested wetlands complex dominated by red maple and white pine. Dense invasive species along boundaries.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified under CH61/61A/61B
STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

4	Open Water	0.75	

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Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	1	WO	35.1	16.4	257	37.2mbf/ 13.2 cords	WP 65

Stand 1: White Pine-Oak: Edmund Hill property Stand 1 had 6 plots measured in the spring of 2022 with a variable-plot 20 basal area factor prism. Dominant white pine site trees had age, height, and growth measured to determine site index.

Species	BA	DBH	TPA	BF/AC	Cords/AC
Dead Oak	7	20.9	3	719	0
R Oak	7	14.4	5	564	0
B Oak	3	14.0	3	207	0
B Cherry	3	15.0	3	337	0
W Pine	233	16.7	136	35,393	12.0
P Pine	3	12.0	42	0	1.2
TOTAL	**257**	**16.4**	**155**	**37,219**	**13.2**

Species Composition: Predominately white pine, with scattered red and black oak, black cherry, pitch pine, and significant spongy moth (*Lymantria dispar*) oak mortality.

Size: 16.4 average dbh

Regeneration: White pine, oak, red maple, black birch

Height: Overstory 90 feet

Distribution: Over-stocked and well-distributed

Midstory: predominately white pine, ranging from a height of ~15-30 feet, with a 25-45% occupancy. Some portions of the stand have a hardwood midstory component~30 feet high with 20% occupancy.

Understory: Lily-of-the-valley, maple-leaved viburnum, hay-scented fern, blueberry, and grasses

Soft Mast: present (black cherry and blueberry)

Non-Native Species: Dense along property boundary, moderate in wetlands and wet areas, very light to none within upland forest.

Leaf Litter: 1/4 to1/2 inch

Coarse Woody Debris: light

Fine Woody Debris: light

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Stew	1	WO	35.1	16.4	257	37.2mbf/ 13.2 cords	WP 65

Desired Stand Conditions

Condition	**Actions**	**Responsibility birds that may benefit**
Maintain a mature, large-diameter forest with old-growth characteristics	Thinning from below	Black-and-white warbler, black-throated green warbler, black-throated blue warbler, veery, wood thrush, eastern wood-pewee, yellow-bellied sapsucker

Stand #1 is an even-age forest consisting of an 80- to 100-year-oldoverstory composed predominately of mature white pine. It should be noted that there is also a small pocket of planted 15- to 20-year-old white pine. The stand has not been managed for years and is very over-stocked. The regeneration is predominately white pine and is sparse in some places due to the density of the overstory.

The stand topography ranges from flat to about 20% in slope, with generally very light amounts of exposed rock. The stand contains several vernal pools, small streams, drainages, wetlands, and forested wet areas (isolated seeps). There are lightly scattered snags and trees with cavities throughout the stand, and light amounts of downed woody debris. The ground cover consists primarily of low-bush blueberry, lily-of-the-valley, maple-leaved viburnum, hay-scented fern, and grasses. There are dense amounts of invasive species along the perimeter of the stand (adjacent to residential areas), and moderate amounts within wetland, riparian, and forested seep areas. Invasive species consist of Japanese barberry, multi-flora rose, oriental bittersweet, burning bush, honeysuckle, and autumn olive. There were very few invasive plant species observed in the interior of the stand. Recently, spongy moth caused minor amounts of mortality and top damage in oak trees and strong multiple wind events resulted in a few trees being blown down or having tree damage (broken tops and limbs). There is also evidence of white pine weevil damage in the stand. There are no known federal or state listed threatened or endangered species.

The soils in the stand are mostly well drained, dominated by Chatfield-Hollis-Rock outcrop complex, a well-drained soil composed of friable, moderately deep, coarse loamy basal till derived from gneiss over gneiss; and Merrimac fine sandy loam, a somewhat excessively drained soil composed of loamy glaciofluvial deposits derived from granite, schist, and gneiss. Other soils include Whitman sandy loam, extremely stony, a very poorly drained soil composed of friable coarse-loamy eolian deposits over dense

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OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	1	WO	35.1	16.4	257	37.2mbf/ 13.2 cords	WP 65

coarse-loamy lodgment till derived from metamorphic rock; Windsor loamy sand, an excessively drained soil composed of loose sandy glaciofluvial deposits derived from granite, schist, or gneiss; and Canton fine sandy loam, very stony, a well-drained soil composed of friable coarse-loamy eolian deposits over friable sandy basal till derived from granite and gneiss. The soil (site) productivity is moderate as indicated by the White Pine site index 65. There is no evidence of natural soil erosion.

There are stone walls along the boundary of the property and within the stand. There is an extensive, well-maintained, and well-used trail system.

The short term desired future condition (next ten years) is to treat the invasive species chemically at least three (3) times (if socially and politically acceptable), and to thin 20 acres of the stand from below and by spacing. Maintain oak snags and trees with cavities unless they pose a hazard to the public; live oak and hardwood trees should be maintained to provide a diversity of tree species. The trail must be protected from damage and maintained at a very high level. The goal is to provide a forest that is mature, diverse, composed of native species, and aesthetically pleasing.

The long-term desired future condition (50 years from now) is to treat the invasive species when needed (if socially and politically acceptable), protect and maintain the trail system, and periodically thin the mature white pine stand by spacing about every 20 years (2044 and 2064) to maintain tree and forest health and good growing conditions. Snags and trees with cavities should continue to be maintained unless they pose a threat to public safety and live oak and hardwood should be maintained to provide a diversity of species. This meets the long-term goal of providing a forest that is mature, composed of native species, and aesthetically pleasing.

Monitoring focused on the regeneration, health, and growth of the forest, and the presence of invasive species populations should be conducted every 5 years.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	2	OM	54.61	14.2	149	15.2mbf/ 6.4 cords	RO 60

Stand 2: Mixed Oak: Edmund Hill property Stand 2 had 7 plots measured in the spring of 2022 with a variable-plot 20 basal area factor prism. Dominant red oak site trees had age, height, and growth measured to determine site index.

Species	**BA**	**DBH**	**TPA**	**BF/AC**	**Cords/AC**
Dead Oak	31	18.1	17	4,150	0
R Oak	74	15.0	59	7,815	2.8
B Oak	9	15.7	6	1,041	0
W Oak	11	14.8	9	1,121	0
S Oak	9	14.1	8	632	0.7
Hickory	9	10.7	13	424	1.8
W Ash	3	9.0	7	0	0.6
W Pine	3	8.0	8	0	0.5
TOTAL (live trees)	**118**	**14.2**	**110**	**11,033**	**6.4**
Dead Oak	31	18.1	17	4,150	0

Species Composition: Predominately mature oak (red, white, black, and scarlet), with scattered hickory, black cherry, white ash, and white pine, and significant spongy moth (*Lymantria dispar*) oak mortality.

Size: 14.2 average dbh

Regeneration: White pine, oak, red maple, black birch, American chestnut

Height: Overstory 85 feet

Distribution: Over-stocked and well-distributed

Midstory: predominately white pine, ranging from a height of ~15-30 feet, with a 35-65% occupancy. Some portions of the stand have a hardwood midstory component~30 feet high with 30% occupancy.

Understory: Lily-of-the-valley, sassafras, maple-leaved viburnum, mountain laurel, hay-scented fern, low- and high-bush blueberry, princess pine, Canada mayflower, star flower.

Soft Mast: present (blueberry)

Non-Native Species: Dense along property boundary, moderate in wetlands and wet areas, very light to none within upland forest.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	2	OM	54.61	14.2	149	15.2mbf/ 6.4 cords	RO 60

Leaf Litter: 1/4 to1/2 inch

Coarse Woody Debris: light

Fine Woody Debris: light

Desired Stand Conditions

Condition	**Actions**	**Responsibility birds that may benefit**
Openings where groups of dead oak is salvaged Maintain a mature, large-diameter forest with old-growth characteristics	Salvage Dead Oak Thinning from below	Black-and-white warbler, black-throated green warbler, black-throated blue warbler, veery, wood thrush, eastern wood-pewee, yellow-bellied sapsucker Early successional bird species where groups of dead oak are salvaged

Stand #2 is an even-age forest consisting of an 80- to 100-year-oldoverstory composed predominately of mature red, black, and white oak with small amounts of scarlet oak in the higher elevation. The stand has not been managed for years and is over-stocked. The regeneration consists of oaks, red maple, American chestnut, and white pine. There is evidence that a ground fire occurred in the past in the upper portions of the stand, causing tree bole damage to the oaks.

The stand ranges from flat to about 25% in slope and has light to moderate amounts of exposed rock. The stand contains small streams, drainages, wetlands, and forested wet areas (isolated seeps), and at least four (4) vernal pools. There are numerous snags, light amounts of trees with cavities, and light amounts of downed woody debris throughout the stand. Understory growth includes lily-of-the-valley, sassafras, maple-leaved viburnum, mountain laurel, hay-scented ferns, low- and high-bush blueberry, princess pine, mayflower, and star flower. There are dense amounts of invasive species along the perimeter of the stand (adjacent to residential areas), and moderate amounts within wetland, riparian,and forested seep areas.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	2	OM	54.61	14.2	149	15.2mbf/ 6.4 cords	RO 60

Invasive species consist of Japanese barberry, multi-flora rose, oriental bittersweet, burning bush, honeysuckle, and autumn olive. There were no to very few invasive plant species observed in the interior of the stand. There are no known federal or state listed threatened or endangered species. Recently, spongy moth caused significant amounts of mortality and top damage in oak trees and strong multiplewind events resulted in a few trees being blown down or having tree damage (broken tops and limbs). Down trees and tops that crossed trails have been cut up to allow for safe passage by the public.

The soils are dominated by Paxton fine sandy loam, extremely stony, a well-drained soil composed of friable coarse-loamy eolian deposits over dense coarse loamy lodgment till derived from schist. Other soils include Chatfield- Hollis-Rock outcrop complex, a well-drained soil composed of friable, moderately deep coarse loamy basal till derived from gneiss over gneiss; and Merrimac fine sandy loam, a somewhat excessively drained soil composed of loamy glaciofluvial deposits derived from granite, schist, and gneiss. The soil (site) productivity is moderate as indicated by the Red Oak site index 60.There is no evidence of natural soil erosion.

There are stone walls along the boundary of the property and within the stand. There is an extensive, well-maintained, and well-used trail system.

The short term desired future condition (next ten years) is to treat the invasive species chemically at least three (3) times (if socially and politically acceptable), to salvage the dead and severely damaged oak trees, and to thin the oaks in the stand from below and by spacing where over-stocked. Some oak snags and trees with cavities should be retained unless they pose a hazard to the public. The trail must be protected from damage and maintained at a very high level. The goal is to provide a forest that is mature, diverse, composed of native species, and aesthetically pleasing.

The long-term desired future condition (50 years from now) is to treat the invasive species when needed (if socially and politically acceptable), protect and maintain the trail system, and periodically thin the mature oak stand by spacing about every 20 years (2044 and 2064) to maintain tree and forest health and growing conditions. Snags and trees with cavities should be maintained unless they pose a threat to public safety. This meets the long-term goal of providing a forest that is mature, composed of native species, and aesthetically pleasing.

Monitoring focused on the regeneration, health, and growth of the forest, and the presence of invasive species populations should be conducted every 5 years.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	3	WH	10.0	12.9	277	19.6mbf/ 28.7 cords	WP 60

Stand 3: White Pine-Hardwoods (wetlands complex): Edmund Hill property Stand 3 had 1 plot measured in the spring of 2022 with a variable-plot 20 basal area factor prism. Dominant white pine site trees had age, height, and growth measured to determine site index.

Species	BA	DBH	TPA	BF/AC	Cords/AC
Red Maple	140	14.0	127	4,131	24.6
A Beech	20	6.0	23	0	4.1
White Pine	100	18.9	48	15,494	0
TOTAL	277	12.9	198	19,625	28.7

Species Composition: Predominately mature red maple and white pine, with scattered amounts of beech.

Size: 12.9 average dbh

Regeneration: White pine, spruce, red maple, black birch, beech

Height: Overstory 80 feet

Distribution: Over-stocked and well-distributed

Midstory: predominately red maple and black birch, ranging from a height of ~30-35 feet, with a 35-45% occupancy.

Understory: Skunk cabbage, lily-of-the-valley, maple-leaved viburnum, hay-scented fern, low- and high-bush blueberry, poison ivy.

Soft Mast: present (blueberry)

Non-Native Species: Dense along property boundary, moderate in wetlands and wet areas.

Leaf Litter: 1/4 to1/2 inch

Coarse Woody Debris: light

Fine Woody Debris: light

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	3	WH	10.0	12.9	277	19.6mbf/ 28.7 cords	WP 60

Desired Stand Conditions

Condition	**Actions**	**Responsibility birds that my benefit**
Maintain a healthy forested wetland community	Natural processes; removal of invasive plant species	Black and White Warbler, Wood Thrush, Black-throated Green Warbler, Black-throated Blue Warbler, Veery, Eastern Wood-pewee, Canadian Warbler

Stand #3 is an 80-year-old forested wetlands complex (wooded swamp) with an overstory composed predominately of mature red maple and white pine, with small amounts of beech. The stand is over-stocked. Regeneration consists of red maple, white pine, black birch, and beech.

The stand is flat in slope and has light to high amounts of exposed rock. The stand contains small streams, drainages, and wetlands. There are light amounts of snags and trees with cavities scattered throughout the stand and light amounts of coarse woody debris. The understory growth consists primarily of skunk cabbage, lily-of-the-valley, maple-leaved viburnum, hay-scented ferns, low- and high-bush blueberry, and poison ivy. There are dense amounts of invasive species along the perimeter of the stand (adjacent to residential areas), and moderate amounts within wetland, riparian, and forested seep areas. Invasive species consist of Japanese barberry, multi-flora rose, oriental bittersweet, burning bush, honeysuckle, and autumn olive. There are no known federal or state listed threatened or endangered species present in the stand. Recently, strong multiple wind events resulted in a few trees being blown down or having tree damage (broken tops and limbs). Down trees and tops that crossed the trails have been cut up to allow for safe passage on the trails by the public.

The soils consist of Swansea muck a very poorly drained soil composed of highly decomposed herbaceous organic material over loose sandy glaciofluvial deposits. The soil (site) productivity is moderate as indicated by the White Pine site index 60. There is no evidence of natural soil erosion.

There are stone walls along the boundary of the property and within the stand. There is an extensive, well-maintained, and well-used trail system.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	3	WH	10.0	12.9	277	19.6mbf/ 28.7 cords	WP 60

The short term desired future condition (next ten years) is to treat the invasive species chemically at least three (3) times (if socially and politically acceptable), and to maintain the trail system. The goal is to provide a forested wetland area that is mature, diverse, and composed of native species through management via natural processes. No active management is recommended for the wetland areas beyond invasive species control.

The long-term desired future condition (50 years from now) is to treat the invasive species when needed (if socially and politically acceptable) and maintain the trail system. This meets the long-term goals of enhancing aquatic habitat, enhancing habitat for birds and wildlife, and promoting a diversity of plant species and habitat types.

Monitoring focused on the regeneration, health, and growth of the forest, and the presence of invasive species populations should be conducted every 5 years.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B

STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

STAND DESCRIPTIONS

OBJ	STDNO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
Stew	4	OW	0.75	NA	NA	NA	NA

Stand 4: Open Water: Edmund Hill property Stand 4consists of open water resources and had no plots measured.

Species Composition: NA

Size: NA

Regeneration: NA

Height: NA

Distribution: NA

Midstory: NA

Understory: NA

Soft Mast: NA

Non-Native Species: NA

Leaf Litter: NA

Coarse Woody Debris: NA

Fine Woody Debris: NA

Stand #4 is open water. No management is proposed at this time. Natural processes should adequately provide for these important natural resources. Monitoring should occur every 5 years to inspect water quality and wildlife habitat.

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STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

Management Recommendations

For the purposes of this report management practices with an object code of *CH61* are required to be accomplished as a commitment to the Massachusetts Current Use Program. Practices with object codes of *STEW* are voluntary and are provided as suggestions of activities that can help you achieve your woodland objectives.

Summary of the Management Recommendations for your property

Stand	Object Code	Forest type	Recommendation	CPS Code	Value/Cost/ Cost Sharing opportunities	Acres	Timing
1	STEW	WO	Treat invasive species	314	~$250 per treatment per acre	35.1	2023-24
			Thinning	666	Gross Revenue ~$19,594 Cost share		
			Retain snags and cavity trees; retain and improve down woody debris	-	No cost or revenue involved		
			Maintain trails	655	No cost or revenue involved		
2	STEW	OM	Thinning / Salvage harvest	666	Gross Revenue ~$17,174 Cost share	51.7	2023-24
			Treat invasive species	314	~$250 per treatment per acre		
			Retain snags and cavity trees; retain and improve downed woody debris	-	No cost or revenue involved		
			Maintain trails	655	No cost or revenue involved		

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified under CH61/61A/61B
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Owner(s) Town of Northborough Towns(s) Northborough

Stand	Object Code	Forest type	Recommendation	CPS Code	Value/Cost/ Cost Sharing opportunities	Acres	Timing
3	STEW	WH	Treat invasive species	314	~$250 per treatment per acre	10.0	2023-24
			Retain snags and cavity trees; retain and improve down woody debris	-	No cost or revenue involved		
			Maintain trails	655	No cost or revenue involved		
4	STEW	OW	NA	NA	NA	0.75	NA

Total approximate costs:	Approximately $
Total approximate revenue:	Approximately $ plus grant cost share revenue

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Owner(s) Town of Northborough Towns(s) Northborough

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	1	WO	Thinning from Below	20.0	90	290MBF/0cords	2023-24

The forest growth is estimated at approximately 508 board feet per acre per year.

The stand description discusses this relatively mature white pine-oak stand. Although the stand is currently lacking sufficient coarse woody debris and wildlife habitat trees (snags and trees with significant cavities, broken tops and limbs, etc.) to benefit the responsibility (key) bird species, the stand is heading toward the desired future condition though natural processes. Currently, a low number of snags and wildlife trees are present in the stand, as well as a light amount of downed woody debris. These elements will continue to accumulate over time through natural disturbances and tree senescence. The stand is currently very over-stocked, which is suppressing healthy growth and regeneration. Thinning the stand from below would free up space, concentrate growth on the highest-quality trees in the stand, and add additional woody debris to the stand. The guide *Silviculture with Birds in Mind: Options for Integrating Timber and Songbird Habitat Management* was designed to guide foresters and landowners in improving breeding habitat for responsibility species. The following options are compatible with the landowners' use of this property and provide some guidance on how to maximize positive benefits for breeding birds and general forest health.

Option 0: Let it grow
Option 1T: Low intensity thinning
Option 1E: Retain snags, cavity trees and downed woody debris

Bird species that are dependent on mature, late-successional forest that might benefit specifically from these treatments include: Black-and-white warbler, black-throated green warbler, black-throated blue warbler, veery, wood thrush, eastern wood-pewee, and yellow-bellied sapsucker.

Landowner Goals and Management Description:

Based on the landowner goals of managing the forest for bird and wildlife habitat, managing for native species, increasing forest resiliency, and minimizing damage from forest pests, a thinning from below is recommended, combined with chemical treatment of the invasive species in the stand. The invasive species along the border of the property and in the wet areas should be treated at least three times, if socially and politically acceptable. Thinning should be conducted on 20 acres of the stand, which will free up growing and regeneration space, concentrate growth on the most desirable trees (particularly the largest and most valuable white pines and white oaks), and increase the resiliency of the forest. Small diameter and low-quality trees should be removed, and the highest quality crop trees should be identified, retained, and protected during the thinning operation. Live oak and other hardwood trees should be maintained to promote a diversity of tree species in this pine-dominated stand. Snags and trees with valuable wildlife feature such as cavities or broken tops should be identified and protected. 90 square feet of basal area per acre should be removed, including all pulp and firewood, for a total volume of 290 mbf/ 0 cords. This will result in a high-quality large diameter pine and oak stand. The trail must be protected from damage and maintained at a very high level.

The long-term goal (next 50 years) for the stand is to periodically thin the forest by spacing and from below by removing the lowest-quality trees about every 20 years (in 2044 and 2064). This periodic thinning will help to promote a mature, large-diameter forest with high quality trees that will have ample space to grow and thrive. The

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	1	WO	Thinning from Below	20.0	90	290MBF/0cords	2023-24

eventual result should be a mature forest with large trees emulating an old-growth forest. Based on the landowner goals of managing for native forest species and wildlife habitat that will benefit responsibility species, it is recommended that the stand be regularly monitored for the presence of invasive plant species. If found, invasive plants should be treated as quickly as possible, as early treatment is the most efficient and economical method of control. The trail system should be maintained.

Monitoring focused on the quality of the regeneration, health, and growth of the forest, and increases in invasive species populations should be conducted every 5 years.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified under CH61/61A/61B
STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	2	OM	Salvage and Thinning from Below	30.0	44	166MBF/299cords	2023-24

The forest growth is estimated at approximately 345 board feet per acre per year.

The stand description discusses this relatively mature mixed oak stand with a large number of large diameter dead oak trees. Currently, a good number of snags are present, with a light amount of wildlife trees and downed woody debris. These elements will continue to accumulate over time through natural disturbances and tree senescence. The stand is currently over-stocked, which is suppressing healthy growth and regeneration and has a large number of large diameter dead oak trees. Salvaging the dead oak trees will create gaps (openings) for early successional wildlife habitat dependant species. Thinning the stand from below would free up space, concentrate growth on the highest-quality trees in the stand, and add additional woody debris to the stand. The guide *Silviculture with Birds in Mind: Options for Integrating Timber and Songbird Habitat Management* was designed to guide foresters and landowners in improving breeding habitat for responsibility species. The following options are compatible with the landowners' use of this property and provide some guidance on how to maximize positive benefits for breeding birds and general forest health.

Option 0: Let it grow
Option 1T: Low intensity thinning
Option 3C. Salvage dead oak areas (mimicking a stand-replacing natural disturbance)
Option 1E. Retain snags, cavity trees and downed woody debris

Salvage dead oak: Some bird species that might benefit specifically from these treatments include: Canada warbler, ruffed grouse, white-throated sparrow, chestnut-sided warbler, and eastern towhee.

Thinning: Bird species that are dependent on mature, late-successional forest that might benefit specifically from these treatments include: Black-and-white warbler, black-throated green warbler, black-throated blue warbler, veery, wood thrush, eastern wood-pewee, and yellow-bellied sapsucker.

Landowner Goals and Management Description:

Based on the landowner goals of managing the forest for bird and wildlife habitat, managing for native species, increasing forest resiliency, and minimizing damage from forest pests, a selective group and individual dead trees salvage harvest and thinning from below is recommended, combined with chemical treatment of the invasive species in the stand. The invasive species should be treated at least three times, if socially and politically acceptable, particularly along the border of the property and in wet areas. Thinning throughout the stand will free up growing and regeneration space, concentrate growth on the most desirable trees (particularly the largest and most valuable white oaks), and increase the resiliency of the forest. Small diameter and low-quality trees should be removed, and the highest quality crop trees should be identified, retained, and protected during the thinning operation. Much of the dead and severely damaged oak trees should be salvaged (individual trees and pockets of dead oak trees over about 30 acres of the stand), but high-quality snags and trees with valuable wildlife feature such as cavities or broken tops should be identified and retained. Overall, about 44 square feet of basal area per acre should be removed, including all pulp and firewood, for a total volume of 166mbf/299cords). This will result in a high-quality large diameter oak stand

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	2	OM	Salvage and Thinning from Below	30.0	44	166MBF/299cords	2023-24

with gaps of early successional wildlife habitat. The trail must be protected from damage and maintained at a very high level.

The long-term goal (next 50 years) for the stand is to periodically thin the forest by spacing and from below by removing the lowest-quality trees about every 20 years (in 2044 and 2064). This periodic thinning will help to promote a mature, large-diameter forest with high quality trees that will have ample space to grow and thrive. The eventual result should be a mature forest with large trees emulating an old-growth forest. Based on the landowner goals of managing for native forest species and wildlife habitat that will benefit responsibility species, it is recommended that the stand be regularly monitored for the presence of invasive plant species. If found, invasive plants should be treated as quickly as possible, as early treatment is the most efficient and economical method of control. The trail system should be maintained.

Monitoring focused on the quality of the regeneration, health, and growth of the forest, and increases in invasive species populations should be conducted every 5 years.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified under CH61/61A/61B
STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

Owner(s) Town of Northborough Towns(s) Northborough

MANAGEMENT PRACTICES *to be done within next 10 years*

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	3	WH	Treat invasive species	10.0	0	0	2023-24

The forest growth is estimated at approximately 353 board feet per acre per year.

Stand 3 consists of a wetlands complex of wooded swamps dominated by mature red maple, with white pine and scattered American beech. Wooded swamps, including red maple swamps, are a common wetland type in Massachusetts. They may be fed through surface runoff, groundwater seepage, or stream or lake overflow. Red maple is strongly dominant in the overstory, and blueberry and skunk cabbage are common in the understory. Forested swamp areas provide nesting locations for thicket-dwelling birds, and the availability of dense understory coverwater make them attractive to many small mammal species.Reptiles, amphibians, and insects use forested swamps for feeding and breeding.

The presence of thesewetland areason the property likely currently provides a great deal of benefit to many species, including the responsibility (key) bird species. Wetland areas contribute habitat variation to the landscape, and the responsibility bird species would likely utilize and greatly benefit from the presence of these wetland area within the matrix of the surrounding forest. Additional target species that prefer less dense cover may also benefit from these areas. Benefits will likely continue to be present in the stand without any active management interventions beyond the removal of invasive species. The guide *Silviculture with Birds in Mind: Options for Integrating Timber and Songbird Habitat Management* was designed to guide foresters and landowners in improving breeding habitat for responsibility species. The following options are compatible with the landowners' use of this property and provide some guidance on how to maximize positive benefits for breeding birds and general forest health.

Option 0: Let it grow
Option 1E: Retain snags, cavity trees and down woody debris

Bird species that might benefit specifically from these treatments include: Black-and-White Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Canadian Warbler, Wood Thrush, Veery, and Eastern Wood-pewee.

Landowner Goals and Management Description:

Based on the landowner goals of managing for native forest species, maintaining wildlife habitat that will benefit responsibility species, and protecting water quality, no management is currently recommended for this stand, beyond the treatment of invasive species.It is recommended that the invasive species in the stand be treated with chemicals to promote the growth of native vegetation at least three times (if socially and politically acceptable). Otherwise, the desired conditions will likely be maintained over time through natural processes.The trail must be protected from damage and maintained at a very high level.

The long-term desired future condition (50 years from now) is to maintain a healthy, mature, forested wetland area through natural processes. This meets the landowner's objectives of enhancing habitat for birds and small and large animals and protecting water quality.

Monitoring focused on the regeneration, health, and growth of the forest, and the presence of invasive species populations should be conducted every 5 years.

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Owner(s) Town of Northborough Towns(s) Northborough

MANAGEMENT PRACTICES*to be done within next 10 years*

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
Stew	4	OW	NA	0.75	0	0	NA

Stand 4 consists of an area of open water. Managing the surrounding forest well will help protect the water quality of this pond. Open water is utilized by a wide variety of species, including birds, fish, mammals (including beavers), reptiles, amphibians, and insects.

The presence of this open water area on the property likely currently provides a great deal of benefit to many species, including the responsibility (key) bird species. Wetland areas contribute habitat variation to the landscape, and the responsibility bird species would likely utilize and greatly benefit from the presence of these wetland area within the matrix of the surrounding forest. Benefits will likely continue to be present in the stand without any active management interventions.

Bird species that might benefit specifically from these treatments include: Black-and-White Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Canadian Warbler, Wood Thrush, Veery, and Eastern Wood-pewee.

Landowner Goals and Management Description:

Based on the landowner goals of maintaining wildlife habitat that will benefit responsibility species and protecting water quality, no management recommended for Stand 4, now or in the future.This open water areawill likely maintain the desired conditions over time through natural processes.

Monitoring should occur every 5 years to inspect water quality and wildlife habitat.

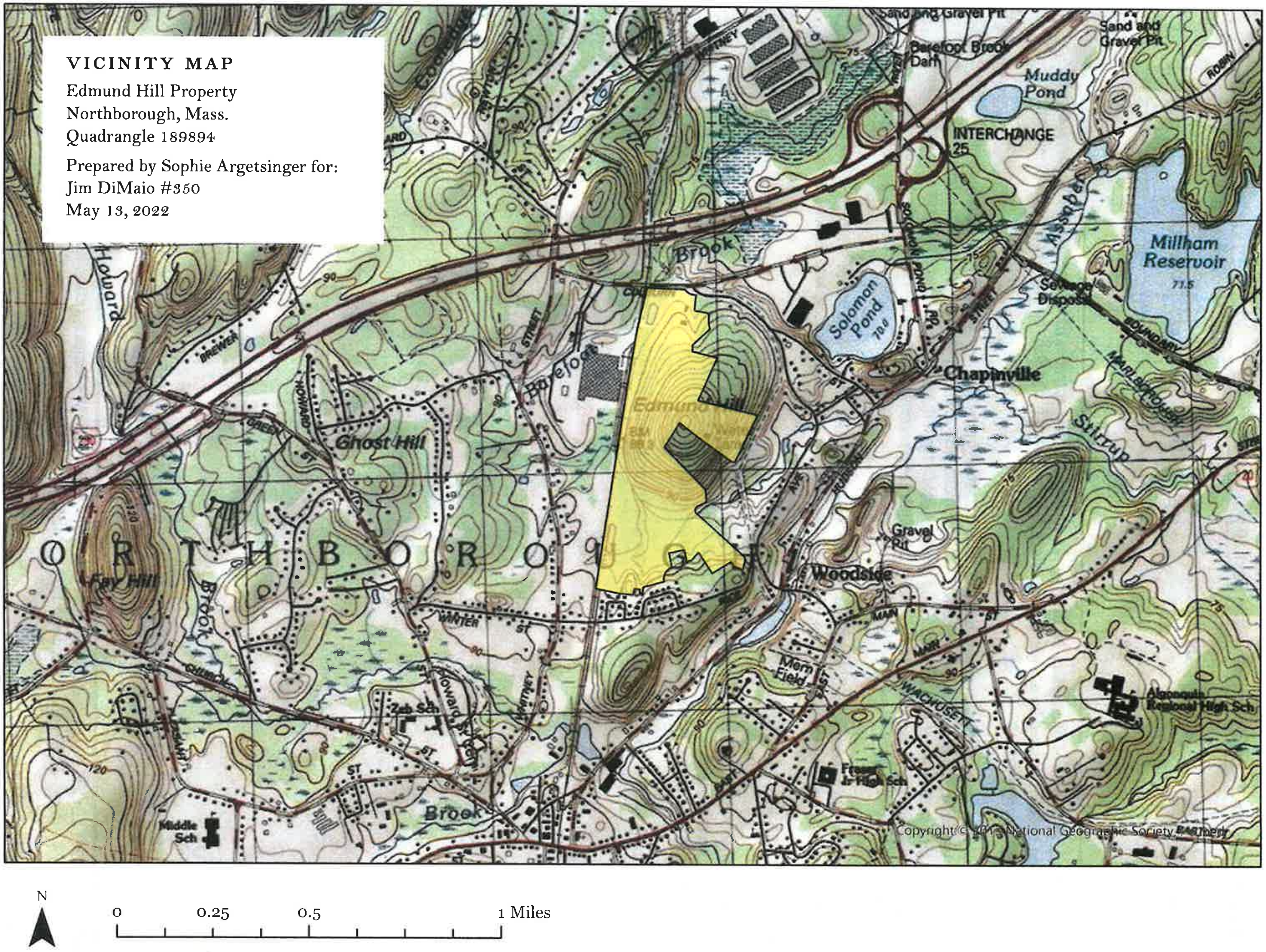
OBJECTIVE CODE: CH61 = stands classified under CH61/61A/61B STEW= stands not classified underCH61/61A/61B
STD= stand AC= acre MSD= mean stand diameter MBF= thousand board feet BA= basal area VOL= volume

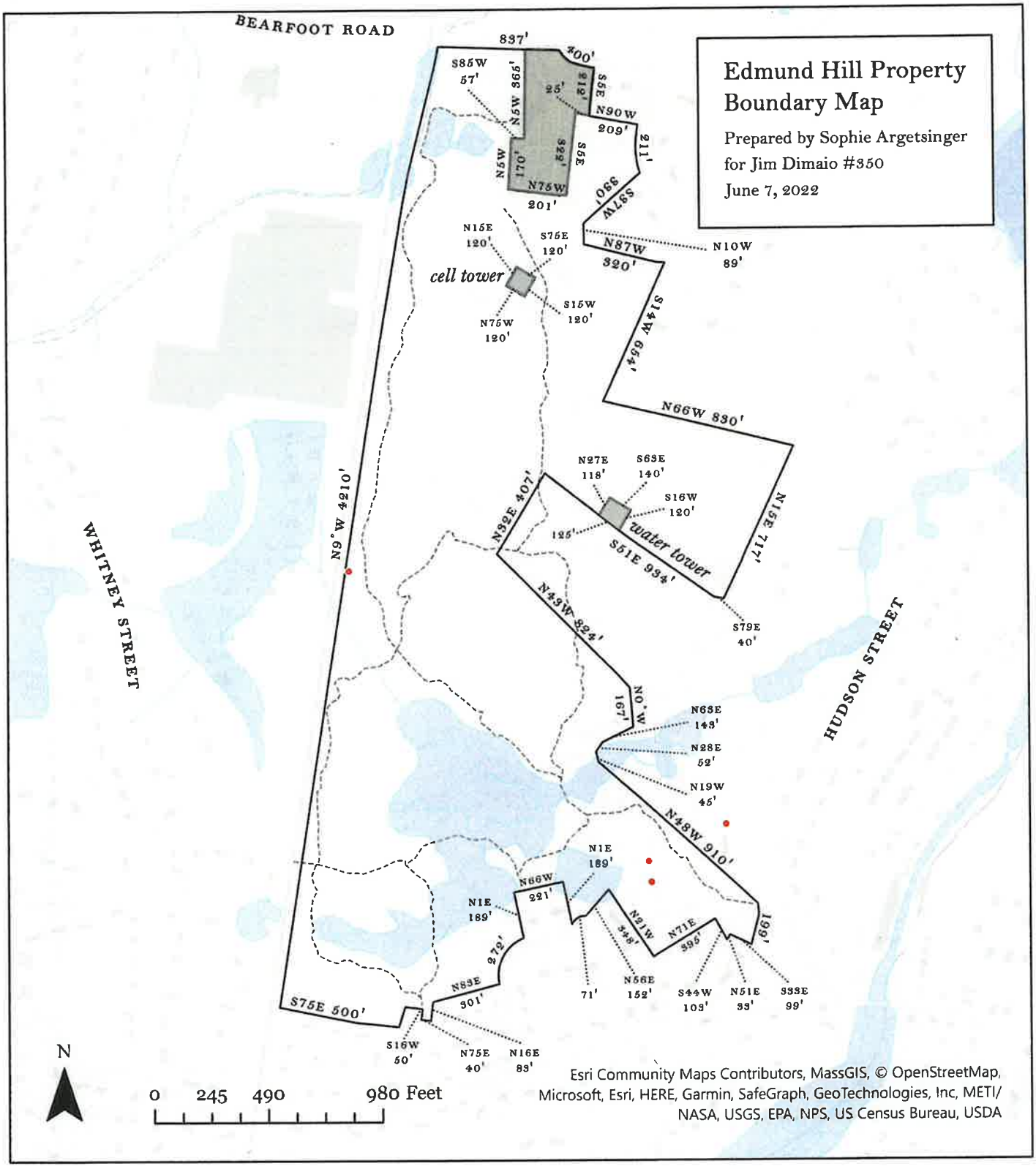
Owner(s) Town of Northborough Towns(s) Northborough

VICINITY MAP

Edmund Hill Property
Northborough, Mass.
Quadrangle 189894

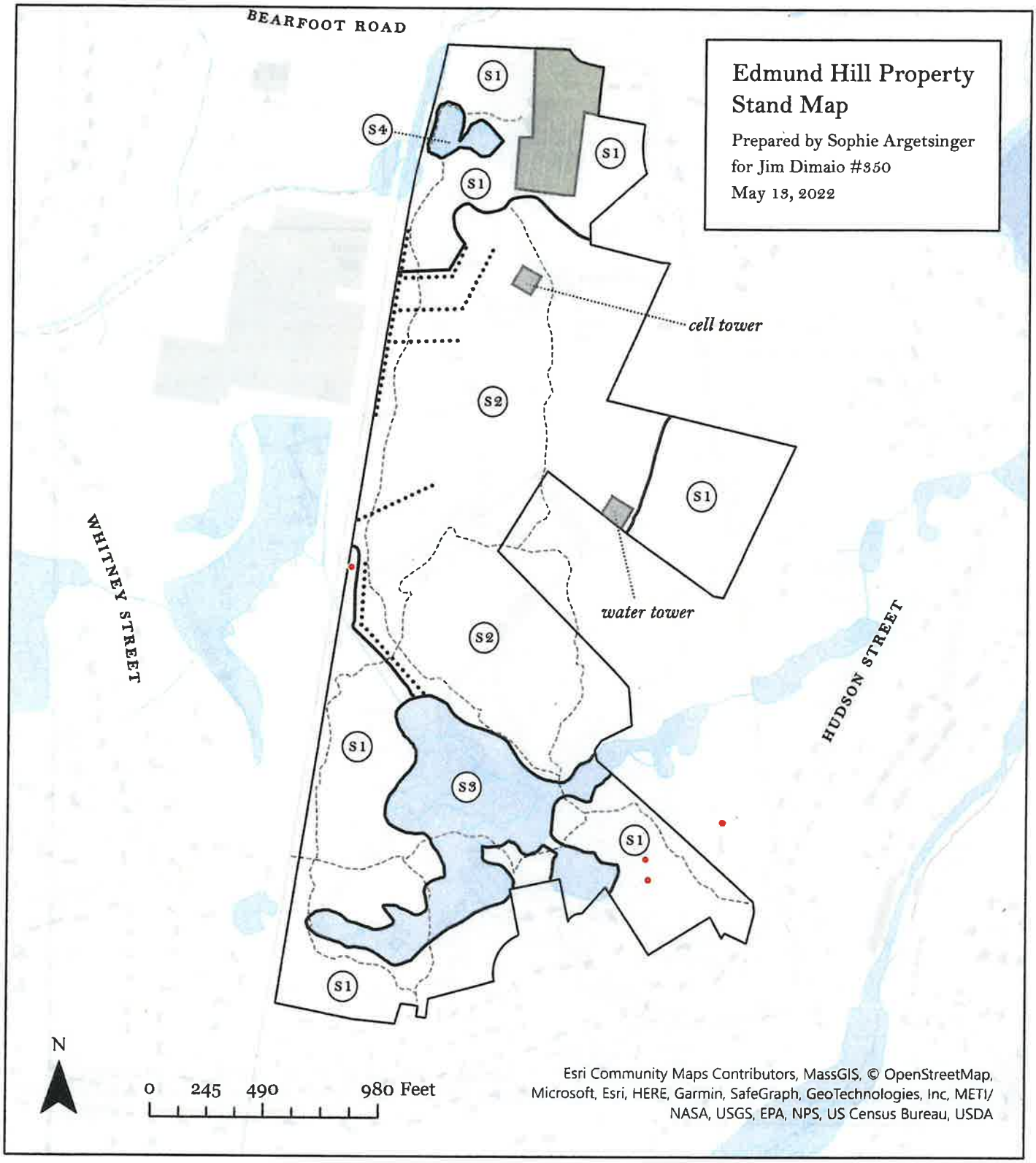
Prepared by Sophie Argetsinger for:
Jim DiMaio #350
May 13, 2022





LEGEND Scale: 1:10,000

- PROPERTY BOUNDARY
- EXCLUDED AREA
- ROAD
- TRAIL
- WETLAND
- STREAM
- CERTIFIED VERNAL POOL



LEGEND Scale: 1:10,000

- PROPERTY BOUNDARY
- STANDS 1–4 (S1)
- EXCLUDED AREA
- ROAD
- TRAIL
- STONE WALL
- WETLAND
- STREAM
- CERTIFIED VERNAL POOL

Signature Page Please check each box that applies.

☐ **CH. 61/61A/61B 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 in the event that I convey all or any portion 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.

X **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 in the event that I convey all or a portion 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.

Signed under the pains of perjury:

Owner(s) _____ **Date** 6/21/22

Owner(s) _____ **Date** _____

I attest that I have prepared this plan in good faith to reflect the landowner's interest.

Plan Preparer _____ **Date** 6/9/22

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

Approved, Service Forester Laura Dooley **Date** 7/20/22

Approved, Regional Supervisor _____ **Date** 8.8.22

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/61B**plan within 90 days from the transfer of title to insure continuation of** Ch. 61/61A/61B**classification.**

☐ Amendment

Signed under the pains of perjury:

Owner(s) _____ **Date** _____

Plan Preparer _____ **Date** _____

Description of Amendment: _____

_____

_____

Approved, Service Forester _____ **Date** _____

Owner(s) Town of Northborough **Town(s)** Northborough