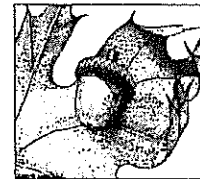




FOREST MANAGEMENT PLAN

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



CHECK-OFFS

CH61	CH61A	CH61B	STWSHP	C-S	Case No. (B) 029-10019	Orig. Case No. new
cert. <input type="checkbox"/>	cert. <input type="checkbox"/>	cert. <input type="checkbox"/>	new <input checked="" type="checkbox"/>	EEA <input checked="" type="checkbox"/>	Owner ID (G) 106-10018	Add. Case No.
recert. <input type="checkbox"/>	recert. <input type="checkbox"/>	recert. <input type="checkbox"/>	renew <input type="checkbox"/>	Other <input type="checkbox"/>	Date Rec'd 6-17-14	Ecoregion 221 AF
amend <input type="checkbox"/>	amend <input type="checkbox"/>	amend <input type="checkbox"/>	Green Cert <input checked="" type="checkbox"/>		Plan Period 2015-2024	Topo Name
Plan Change: _____ to _____			Conservation Rest. <input checked="" type="checkbox"/>		Rare Spp. Hab. No	River Basin CT
			CR Holder DCR			

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) The Town of Gill-c/o Administrative Assistant-Ray Purington

Mailing Address 325 Main Road - Gill, Massachusetts, 01354

Phone 413.863.9347

Property Location: Town(s) Gill and Bernardston
Road

Road(s) Hoeshop Road and Bascom Road

Plan Preparer Mary K. Wigmore

Mass. Forester License # 250

Mailing Address 1637 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
G-208	7	5750	129	98.219	NA	NA	0	98.219
G-208	1	5750	129	61.0	NA	NA	0	61.0
B-3	1	5750	129	3.3	NA	NA	0	3.3
Block 4								
TOTALS				162.519	NA	NA	0	162.519

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

HISTORY Year acquired 2009 Year management began 2009

Are boundaries blazed/painted? Yes ☐ No ☒ Partially ☐

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

stand no. NA treatment NA reason NA

(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Value	Acres	Date
NA						

Remarks: (if additional space needed, continue on separate page)

Local stewardship responsibility lies with the Town Forest Task Force with oversight by the Conservation Commission.

over-all

Name _____

STEWARDSHIP PLANNING WORKSHEET

These two sheets will help record your goals and visions for your property. Use the first page to start your thinking about issues to discuss or questions you may wish to ask your consulting forester prior to your plan's preparation. It is an optional worksheet for you to use as you wish. The second page will be included as part of the plan.

Ownership

1. How many years have you or your family owned this property? 54-5
2. How many more years do you expect to own it? 1 to 10 ☒ 11 or more
- n/a 3. Have you done any estate planning? yes no
4. What do you think you will eventually do with this property?
- Will it as is to heirs Divide among heirs Sell for development
- Protect some or all land from development Don't know Other
5. Are you interested in classifying the property under Chapter 61, 61A or 61B for tax purposes?
- Yes No Already is Don't know

The Land

1. Are you aware of any important natural or cultural features on your land? (Check all that apply)
- | | |
|--|---|
| <input checked="" type="checkbox"/> Abandoned Fields | <input checked="" type="checkbox"/> Apple Trees |
| <input checked="" type="checkbox"/> Beaver Pond | <input checked="" type="checkbox"/> Springs or Seeps <u>- each slips</u> |
| <input type="checkbox"/> Brooks or Streams | <input type="checkbox"/> Waterfalls |
| <input checked="" type="checkbox"/> Forested Wetlands | <input checked="" type="checkbox"/> Stone Walls <u>(small, infrequent)</u> |
| <input checked="" type="checkbox"/> Rock Outcrops or Ledges | <input type="checkbox"/> Old Foundations <u>(old well)</u> |
| <input checked="" type="checkbox"/> Very Large or Unique Trees | <input checked="" type="checkbox"/> Vernal Pools <u>(none catfished)</u> |
| <input type="checkbox"/> Mowed Fields | <input checked="" type="checkbox"/> eskers <u>Caluata brook: Fall River</u> |
2. Is your property posted against: Trespassing Yes Hunting Yes Fishing Yes Motorized vehic. Yes
3. Are your property boundaries well marked? Yes No
- surveyed, not completely marked pins not allowed CR

Accomplishing Goals

1. How much of the management work do you plan on doing yourself?
- None ☒ Some of it ☒ Most of it
2. How many days of free labor per year do you have (self, family, friends)?
- None 1 to 5 10 to 20 ☒ more than 20
3. What percent of earnings from woodland are you are willing to reinvest in the land?
- None 10% to 25% 33% to 50% ☒ more than 50% don't know
4. How much out-of-pocket money are you willing to invest to improve your property?
- None \$100 to \$500 \$1000 to \$2000 ☒ more than \$2000
5. Are you willing to work with your neighbors to accomplish mutual goals?
- ☒ Yes No Don't know

Landowner Goals

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

Goal	Importance to Me			
	High	Medium	Low	Don't Know
Enhance the Quality/Quantity of Timber Products*	X			
Generate Immediate Income			X	
Generate Long Term Income		X		
Produce Firewood			X	
Defer or Defray Taxes	N/A			
Promote Biological Diversity	X			
Enhance Habitat for Birds	X			
Enhance Habitat for Small Animals	X			
Enhance Habitat for Large Animals	X			
Improve Access for Walking/Skiing/Recreation	X			
Maintain or Enhance Privacy			X	
Improve Hunting or Fishing			X	
Preserve or Improve Scenic Beauty	X			
Protect Water Quality	X			
Protect Unique/Special/ Cultural Areas		X		
Attain Green Certification			X	
Other: education	No		X	

*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:

work w/ others in the community to preserve a quiet, semi-wild place for birds, animals, and passive recreation at minimal cost to the town.

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): Amy God

Date: June 9, 2014

Owner(s) (print) _____

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

Page 26 of 38

Section 1: PROPERTY OVERVIEW

History and Background: The 163-acre Gill Town Forest property was acquired in 2009 through a cooperative effort by the Franklin Land Trust, the MA Department of Conservation and Recreation, and the Town of Gill. The property had been owned by the Sandri family who actively managed their forestland, consistent with land use in the area and part of the local heritage of land ownership and working forests. The Town, Land Trust, and DCR worked together to conserve the 163-acre Town Forest, which was funded partially by selling off 4 house lots totaling 10 acres located on the eastern edge of the property. In addition, DCR purchased a Conservation Restriction (hereinafter called the "CR") to legally and permanently protect the land for conservation and public outdoor recreational use. Other funding sources were the Ruth Cook Trust and the Lesson Blake Trust with a large contribution. The result: the Gill Town Forest contains 162.519 acres in two compartments bisected by Hoeshop Road in Gill. The large parcel on the east side of Hoeshop Road contains 101.519 acres (including 3.3 acres over the town line in Bernardston), and the smaller one on the west side contains 61 acres. The Gill Town Forest is now a legally protected piece of the local natural heritage.

The Landscape/Regional Context: The local pattern of land use includes woodlands, working forests, and agricultural businesses inclusive of vegetable farming, dairy production, livestock, and hay production. An active gravel pit lies due north of this site, and a small campground operates to the west. Other uses of local properties include forest management, timber harvesting, horseback riding, bird watching, snowmobiling, hiking, and photography. The Town Forest is similar to its neighbors in its historic uses for agriculture, pastures, and timber production. Bernardston lies less than two miles north-west of the property.

Boundaries: Roberge Associates of Greenfield completed two surveys of the property in 2009, which are recorded in the Franklin County Registry of Deeds in Plan Book 128, Pages 21 and 28. The Forest Stand Location map in this document does not present the meets and bounds of the boundaries. The inclusion of a copy of the survey map accurately defines the bounds. Iron pipe monuments exist at corner positions. The inventory work for this report located many of these corner pins. The integrity of the boundaries is well maintained with no sign of encroachments.

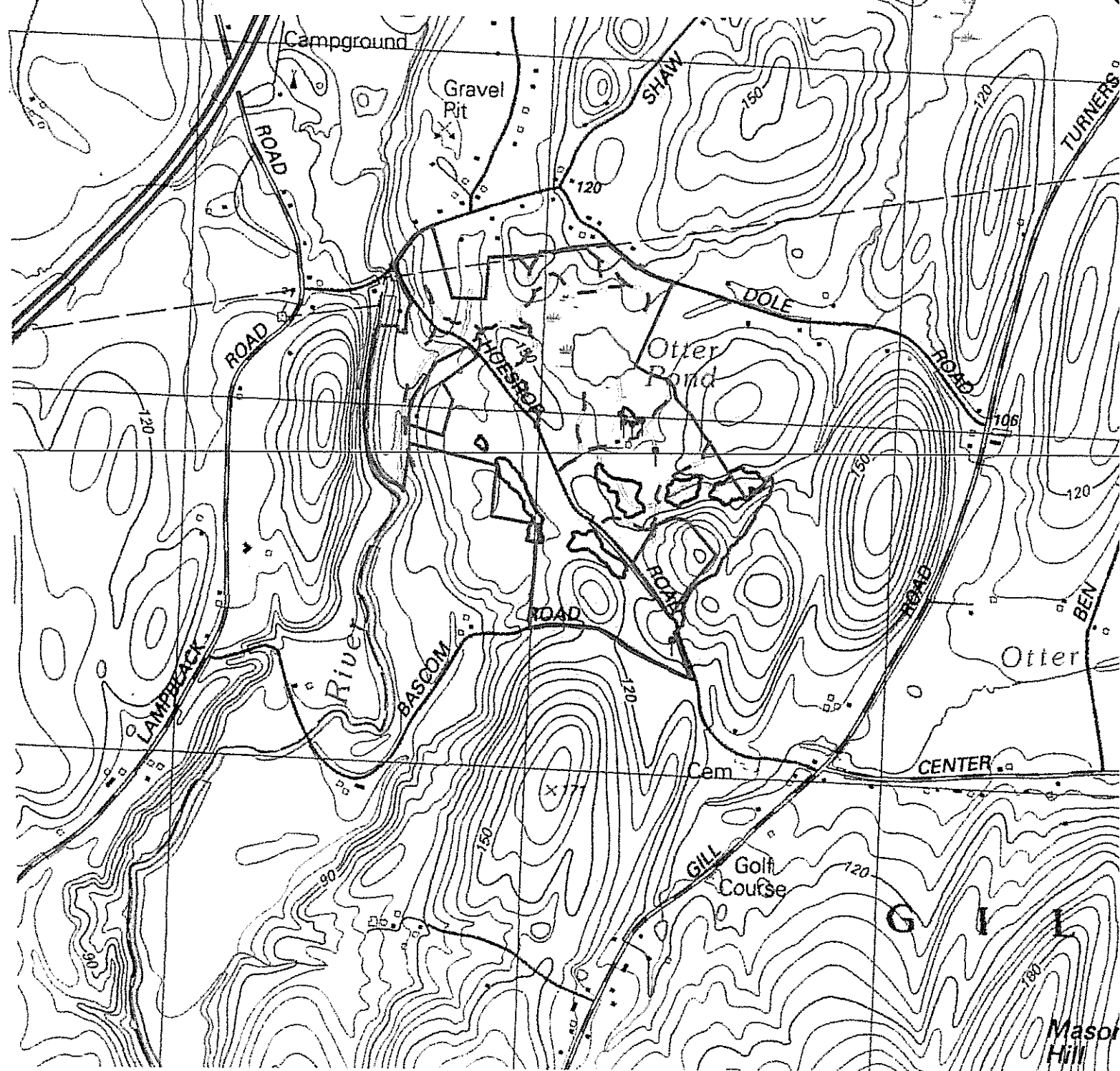
Topography: The general relief is characteristic of glacial outwash, eskers, and kettle pond topography. In the eastern portion, a series of five small hilltops ring a wide depression with the central focal point being Otter Pond. Kettle ponds formed from the calving of large ice chunks in the wake of the retreating glaciers. Once the ice melted, the kettle depressions remained. A wide glacial plain slopes westerly away from the Hoeshop Road into the micro-watershed basin of the Fall River. A soil medium known as the Hollis-Charlton Association lies beneath this terrain. These well-drained soils lie upon the sloping uplands of Franklin County. They formed in stony, sandy, glacial till, which derived mainly from schist and granite. They vary in depth, yet all contain a fine sandy loam composition. White pine dominates most of the forest structure, as this species is very well suited to these soils.






Unique Cultural and Physical Features: The Massachusetts Natural Heritage Endangered Species Program designates Otter Pond with its adjacent wetlands, the streams, Fall River, and its riverbanks as BioMap 2Core Aquatic Buffer Zone. These protective upland buffers support the broader wetland systems and its habitat functionality. NHESP designates the red maple and marsh wetlands, which surround Otter Pond, as BioMap 2 Core Wetland Habitat. These undisturbed wetland systems provide intact buffering capacity without any fragmentation along Otter Pond. They are likely to support critical wetland functions such as natural hydrological conditions, diverse plant, and animal habitats now and into the future. These core wetland habitats capture heavy rains, prevent downstream flooding, absorb greenhouse gases, and purify and store ground water.

Locus Map for the Gill Town Forest

Hoeshop Road Gill, Massachusetts

Total Area: 162.519 acres



-  Boundary
-  Swamps
-  Streams
-  Springseep
-  Retrail

1000 0 1000 2000 Feet




The Massachusetts Division of Fish and Wildlife Natural Heritage Endangered Species Program designates the property as a Supporting Natural Landscape and a Living Waters Critical Supporting watershed. These designations represent the areas with the highest potential to sustain or degrade Core Habitats and protect both freshwater and terrestrial biodiversity in Massachusetts. The United States Fish and Wildlife Service identified Fall River as habitat for Atlantic salmon populations.

Eskers are long, winding ridges of stratified sand and gravel, which occur in formerly glaciated regions. Some fine examples of this land feature are found on this property near the Dole Road areas. A large foundation sits on a small stream channel near the western bound west of Hoeshop Road. It may have been the remains of a rudimentary fish hatchery system. The Fall River forms the western boundary of the Town Forest. A narrow outwash plain lies beside the river, and it offers a uniquely beautiful passive recreation spot. These designations and unique physical features make this area a high value conservation forest.

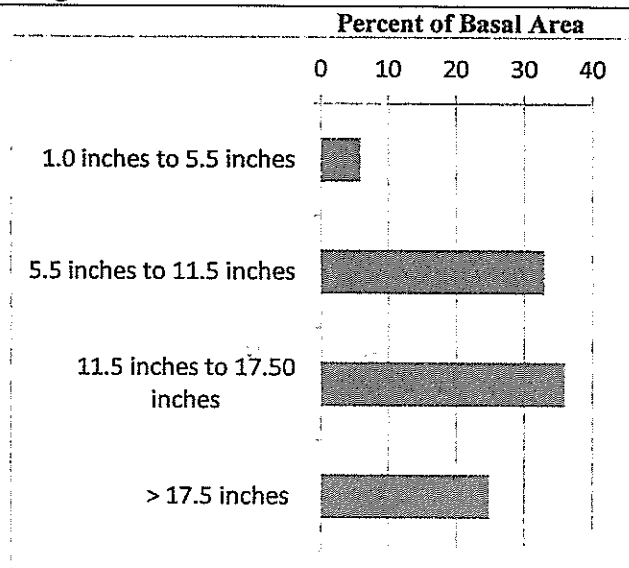
Impact on Nearby Protected Land: The Gill Town Forest provides wildlife connectivity across the neighboring conservation parcels (identified on the Mass GIS 2010 Protected land base Layer) of Remillard, Brechenser, and Bascom Hollow Farm. Habitat, recreation, or forest management work on the Town Forest would not have an adverse impact on these neighboring lands. Otter Pond forms the headwaters of one of the main tributaries of Otter Brook, which drains into the Connecticut River watershed basin. The forest ecosystem naturally maintains high water quality in the larger watershed.

Purpose of the Plan: The Gill Town Forest Task Force requested the completion of this plan as a guide for the stewardship and care of this property. Massachusetts Department of Conservation and Recreation mandates the completion of a Forest Stewardship Plan. This plan describes the natural resources, goals for their conservation, feasible projects to achieve these goals, and provisions and recommendations for monitoring projects.

The Forest Ecosystem, Forest Stands/Cover Types, and Condition:

General Summary: Most of the area is covered by an all-aged or un-even aged species-rich forest. An analysis of the distribution of the age-class and sizes of trees across the entire forested ecosystem indicates balance amongst the age and size classes with the exception a deficiency (only 6% of the stocking density) in the youngest age class of seedlings (trees less than five inches in diameter). The stocking distribution across the other age/size classes approximates balance as indicated in Figure 1: Percentage Basal Area Distribution across Diameter/Size Classes.

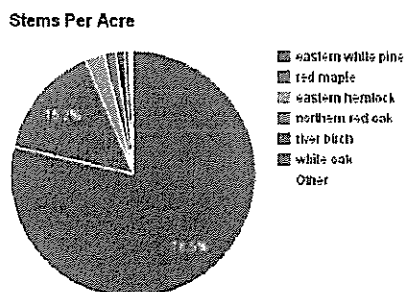
Figure 2: Basal Area Distribution across Diameter Classes in the Forest by Percent of Total Basal Area



Un-even aged, species-rich forests have trees and groups of trees of different ages and a wide mix of species with complex developmental dynamics. They have a natural capacity to withstand either anthropogenic or natural disturbance because of the younger age classes' replacement function. They provide inherent biodiversity protection and ecological resiliency. All layers of the forest are well stocked; even the forest floor supports a dense mat of herbaceous vegetation inclusive of wildflowers, ferns, moss, and shrubs. Maintenance of this all-aged condition and its further development later in the rotation allows compliance with the main biodiversity conservation provisions of the CR.

The species composition summary by proportion of the total stocking for the forest records as white pine (51%), hemlock (15%), red oak (15%), red maple (9%), white oak (5%), black birch (3%) with the remaining stocking in aspen, pitch pine, shagbark hickory, white ash, black oak, black cheery, paper birch, and pignut hickory. The weighted average of relative stocking density across the entire forest is 57%. Maximum stand growth occurs at this level, and enough trees occupy the growing site to discourage any detrimental effects on the growth of individual tree form. The general health of the forest is very good with some minor infestations of hemlock elongated scale, hemlock wooly adelgid, beech-bark disease, and bacterial cankers on the immature cheery. A healthy forest supports diverse and vibrant habitat, and it functions as a dynamic, living system.

Figure 3: Stocking Density by Species as Percent of Stems Per Acre

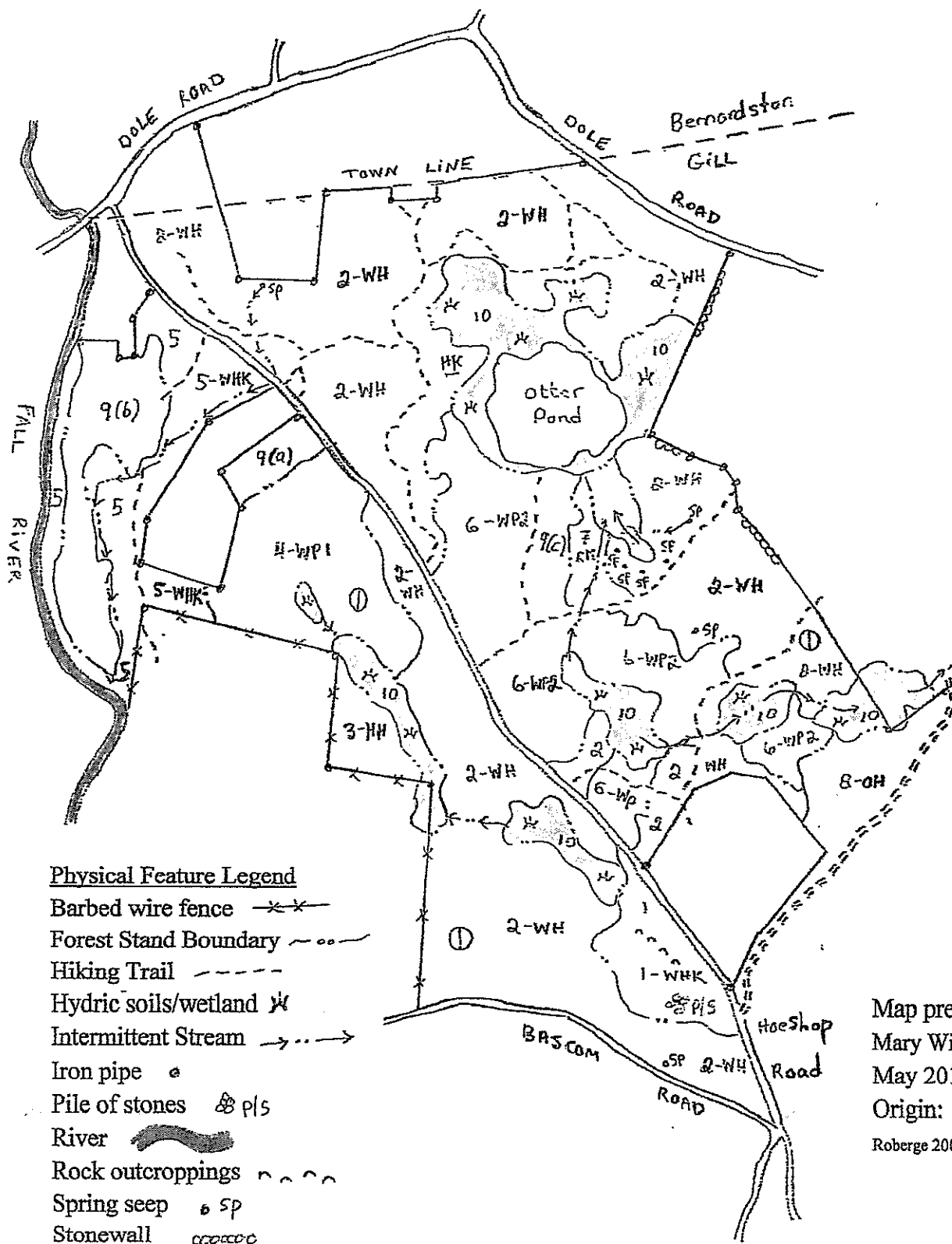


Stand Delineation: The forest was stratified into two sections, identified as the west and east side of Hoeshop Road. Stratification facilitates accurate statistical sampling. The compartments were further delineated into forest stands, which are the smallest unit of area useful for land management decisions. A forest stand represents a plant community with similar age, size, species composition, and overall condition. Each stand is given a general forest type code. These codes are described briefly in Table 1: Forest Stand/Cover Type List by Stand Number, Stand Name, and Area. The forest stands are described in detail in Section 2.2: Forest Stand Description Summary Forms. The forest stands are located on the property in Figure 3: The Forest Stand Locator Map.

Forest Stand Location Map for the Property of Town of Gill

Town Forest - Hoeshop Road

162.519 acres



Map Scale:
1 inch = 632 feet

True
North

Physical Feature Legend

- Barbed wire fence — x — x —
- Forest Stand Boundary — — — —
- Hiking Trail — — — —
- Hydric soils/wetland *
- Intermittent Stream — — — —
- Iron pipe •
- Pile of stones & p/s
- River
- Rock outcroppings ~ ~ ~ ~
- Spring seep • sp
- Stonewall ~ ~ ~ ~
- Town road — — — —
- Woods road = = = =
- Possible Vernal Pool/Water depression ①

Map prepared

Mary Wigmore

May 2014

Origin:

Roberge 2009 Survey.

Table 1: Forest Stand and Forest Cover Type Map and Description by Area

Stand Number	Cover Type/Stand	Stand Description	West Portion	East Portion	Total Areas
#1	WHK	White pine, hemlock, and limited hardwoods.	4 acres		4 acres
#2	WH	White pine and hardwoods with red oak dominance.	21 acres	54.519 acres	75.519 acres 3 acres in Bermudston
#3	HH	Hemlock with mixed hardwoods inclusive of oak, maple, and birch.	2 acres		2 acres
#4	WP1	Groves of white pine with minor hardwood component.	12 acres		12 acres
#5	WHK/RZ	Riparian white pine, hemlock, and hemlock maturing forest on a steep slope and stream and riverbank.	10 acres		10 acres
#6	WP2	Grove of all-aged white pine timber crops with small patches of immature hardwood.		23 acres	23 acres
#7	RM	Red maple shrub marshy stand.		2.5 acres	2.5 acres
#8	OH	Red oak timber with lower layer of other hardwoods and hemlock with mountain laurel on a steep slope.		5 acres	5 acres
#9	GF-ESH	The meadow on Bascom Road, the grass and shrub meadow along the Fall River and the herbaceous plant, grass, and fern meadow near the old house site.	7 acres	2.5 acres	9.5 acres
#10	RM-MS-SS	Red maple marsh, shrub swamp, and marshy swamp wetlands scattered throughout the property.	5 acres	9 acres	14 acres
#11	Pond	Otter Pond		5 acres	5 acres
			61 acres	101.519 acres	162.519 acres
		Total Property Area: 162.519+/- acres			

Non-Native Invasive Plants: Native, desirable plant communities thrive within this forest ecosystem. Non-native, invasive plants grow in scattered individual stems or small clumps throughout many of the stands. Overstory shade in the interior forest prevents their spread. These plants do not dominate the growing space even in more open sunlit areas. These plants pose no threat to the ecological function of the forest.

Wildlife Habitat Concepts and Conditions: The habitat conditions of the Gill Town Forest rate above average for diversity. Habitat management is done with the control of the ages, sizes, and densities of the vegetation. Food, water, cover, and space are elements essential to all wildlife. Techniques for the enhancement and protection of the habitat and its ability to conserve biodiversity are summarized by specific habitat feature and stand in Section 3 of this plan.

A description of the main habitat features recorded during the field inventory in April 2014 follows below. Specific plant names for the source of each habitat feature are referenced in Table 2. Please note that this is a

short list of the species observed during the field inventory in April 2014. A wildflower list by a member of the Town Forest Task Force is also included with this report. These tables imply a high degree of landscape biodiversity.

- ❖ **Food:** A variety of native plants provides food for wildlife species, which in turn provide food for other species further along the food chain. The food sources are adequate for the sustenance of the local populations using the Town Forest.
 - **Browse:** Buds, twigs, and leaves: High stocking of native woody shrubs and vines, buds, twigs, and leaves of native tree seedlings and saplings, and herbaceous plants- palatable to most mammals.
 - **Herbaceous Vegetation: Herbage:** Dense mats of herbage cover even the shady areas: Leaves, stems, rhizomes, and roots of non-woody plants-generally rich in nutrients and palatable to herbivores.
 - **Mast:** Fruits and seeds of trees and shrubs: hard mast (nuts and seeds) and soft mast (berries and fleshy fruits)-These are among the most important high energy foods of many animals and birds.
 - **Shelter/Cover:** Wildlife need places to hide, rest, sleep, and take cover from environmental stress. Cover is species specific. Birds and small mammals take cover in bushes, thickets, and brush piles. Aquatic animals take cover in woody debris in water or rock piles.
 - **Winter Deer Yards:** Isolated patches of dense immature sapling and pole trees beneath an overstory cover of hemlock grows along one small section of the western edge of Otter Pond and due south of a wetland site along the southern bound. The groves of dense mixed-age white pine offer the winter cover. These thick softwood stands provide cover that intercepts snow, reduces snow depth making travel less energy intensive to the deer. They also support a slightly warmer microclimate with less wind. Evidence of deer browse and bedding were noted in all of these areas.
 - **Edge Zones:** These are the transition sites where different plant communities or different habitats meet. Here wildlife species realize the benefits of two or more adjoining habitats without traveling great distances. Examples of the edge habitat are
 - Extensive transition between the forest ecosystem and the meadowlands (Stand 9(a), 9 (b), and 9(c)) as well as forest and the home sites around the property. These areas provide adequate sunlight, abrupt edges between trees, grassland and woody shrubs and sprouts that include commonly preferred forages of deer and rabbits. Songbirds gather in high-densities at the meadow/shrub and forest edge. These brushy areas also make excellent hiding cover for deer and rabbits and nesting cover for turkeys. Some raptors may spend considerable time along these types of high-contrast edges because of high visibility, the presence of suitable perches for hunting, and the presence of prey.
 - Another high-profile edge zone exists with the transition between the wetland/shrub, aquatic plant areas, and the maturing forest canopy. The mosaic pattern of their dispersion amongst the forest on both sides of Hoeshop Road juxtaposes two valuable habitats. These narrow, irregular strands of wetland provide an additional 5,000 linear feet of edge to the forest.
 - The edge effect offered by the red maple sapling/pole and shrub swamps that surround Otter Pond and the maturing forest canopy adjacent to it is good. A different host of birds and animals that depend on aquatic food chain for their life cycles benefit from this edge.
 - As briefly noted above, the irregular geometric shapes of each edge magnify their benefit and linear surface footage.
 - **Cavities:** These are dead trees and trees, which contain dead wood. They provide one quarter of the New England wildlife species with shelter from weather, escape from predators, forage, food storage, perching stations, and sites for breeding and raising young. Excavator birds such as the woodpeckers and sapsuckers enlarge and deepen cavities. Species that use cavity trees include woodpeckers, yellow-bellied sapsuckers, black-capped chickadee, eastern bluebird, and kestrel. The inventory data recorded an average of 2 to 3 cavity or potential cavity trees per acre. Live, declining white pine timber sized trees, dead pine, and hardwood stems, found extensively on the edge of Otter Pond and scattered throughout the riparian

zones and the interior forest contribute to this abundance. The following two types of cavity trees exist here.

- ◆ **Den trees:** Living trees with cavities which are used for mammal dens

- ◆ **Snags:** Standing dead trees with cavities which are used by birds

- **Dead Wood/Coarse Woody Debris:** This refers to the fallen dead trees and the remains of large branches on the ground in forests and in rivers or wetlands. Cavities may form in large fallen logs, which provide shelter for non-flying species. Branch sized debris offers escape cover for animals. Dead wood of all sizes provides the main food source for fungi, insects, and other decomposers organisms. This habitat feature covers about 20% on average of the forest floor.

- ❖ **Water:** Water is needed by wildlife for drinking, bathing, and reproducing. Water habitat and specific riparian habitat features are discussed below:

- **Stream and Riparian Habitat:** These are ecosystem structures, which surround rivers, streams, wetlands, marshes, vernal pools, and spring seeps. Each compartment supports these unique habitat features. Aquatic food webs evolve in these areas, which support species farther along the terrestrial food web. The Fall River bank (also the western bound of the Town Forest) supports a mixed height/age community of hemlock, pine, red maple, aspen, black birch, and red oak trees, which offer perching and denning opportunities. These trees shade the banks, which keeps water temperature cool and increases oxygen absorption.
- The wetland areas with their longer sunlit periods and its accompanying photosynthesis support algae and aquatic plants, which are an important food source.
- This riparian stocking forms a filter strip along the banks, prevents particulate matter, and dissolved nutrients from entering the river and streams.
- The maturing streamside and riverside vegetation provides large woody debris into the water, which creates deep pools with slower currents for predator escape and resting sites for fish.
- The existence of such an extensive riparian and streamside habitat structure provides additional benefit for terrestrial wildlife. Any of the habitat elements discussed above has greater value near water. For example, a cavity tree with many perching stations is more useful to a kingfisher on the stream bank.

- ❖ **Diverse Tree Species Composition:** Many of the best native mast producing trees and shrubs grow within here.

- ❖ **Vertical Structure Diversity:** Wildlife species are dependent upon different vegetative layers in the forest known as the forest floor (including roots and soil), the herb/ground layer, understory, midstory, and canopy layers. Each layer offers a unique set of habitat features. A large variety of sizes and types of plant matter, including some large maturing pine and oak trees, grow on the Town Forest giving it a multi-layered or vertically stratified condition. Taken as one large 162-acre mosaic of plant communities, the vertical stratification becomes obvious. The maturing forest ecosystem surrounds pockets of marsh, shrub swamp, open water, meadows, streams, the Fall River, and spring seeps. Embedded within this model is the stand level vertical stratification dependent upon the different age classes.

- ❖ **Early Successional Habitats:** These areas are a matrix of grassland, herbaceous plants, and meadows (along the Fall River bank and due south of Otter Pond), mowing (Stand 9(b)), and wetland/marshes (Sections of Stand 10). They are sometimes referred to as early-successional habitat. They have structural diversity that provides nesting sites, escape cover, and food for wildlife. Cottontails and other small mammals benefit from shrub cover, which they use to escape detection from hawks and owls. Turkeys, quail, kingbirds, and others benefit from the abundance of insects found in herbaceous openings.

Table 2: Plant Community List for the Gill Town Forest as Observed in May 2014

<u>FERNS</u>	<u>TREES</u>
<p>Dennstaedtia punctilbula (hay-scented fern) Polystrichum arostichoides (Christmas fern) Thelypteris noveboracensis (New York fern) Dryopteris fragrans (woodfern) Dryopteris spinulose (spinulose fern) Onoclea sensibilis (sensitive fern) Osmunda cinnamomea (cinnamon fern) Osmunda regalis (royal fern) Pteridium aquilinum (bracken fern) Osmunda claytoniana (interrupted fern) Athyrum filix-femina (lady fern)</p>	<p>Acer pensylvanicum (striped maple) Acer rubrum (red maple) Acer saccharum (sugar maple) Amelanchier canadensis (shadblow) Betula lenta (river birch) Betula papyrifera (paper birch) Carpinus caroliniana (blue beech, musclewood) Carya cordiformis (bitternut hickory) Carya ovata (shagbark hickory) Castanea mollissima (Chinese chestnut) Catalpa speciosa (northern catalpa) Fagus grandifolia var. grandifolia (beech) Fraxinus americana (white ash) Hamamelis virginiana (witch hazel) Ostrya virginiana (ironwood, hophornbeam) Platanus occidentalis (sycamore, plane-tree) Populus grandidentata (large-toothed aspen) Prunus pensylvanica (fire or pin cherry) Prunus serotina (black cherry) Quercus alba (white oak) Quercus rubra (red oak) Pinus strobus (eastern white pine) Quercus velutina (black oak) Tsuga Canadensis (Eastern hemlock) Salix nigra (black willow) Malus domestica (Apple) Sassafras albidum (sassafras) Malus sylvestris (Flowering crabapple)</p>
<u>SHRUBS</u>	<u>VINES</u>
<p>Alnus incana (speckled alder) Alnus serrulata (smooth alder) Amelanchier arborea (downy serviceberry) Aronia melanocarpa (black chokeberry) Cornus amomum ssp. obliqua (silky dogwood) Cornus racemosa (gray dogwood) Ilex verticillata (winterberry) Lindera benzoin (spicebush) Viburnum acerifolium (maple leaf viburnum) Prunus virginiana (chokecherry) Rhus glabra (smooth sumac) Cornus florida (flowering dogwood) Rhododendron viscosum (swamp azalea) Rhus hirta (staghorn sumac) Rubus occidentalis (black raspberry) Rubus odoratus (thimbleberry) Salix discolor (pussy willow) Sambucus canadensis (elderberry) Spiraea tomentosa (steeplesbush, hardhack) Vaccinium angustifolium (low-bush blueberry) Vaccinium corymbosum (highbush blueberry) Viburnum lentago (nannyberry) Kalmia angustifolia (sheep laurel)</p>	<p>Parthenocissus quinquefolia (Virginia creeper) Vitis aestivalis (summer grape) Toxicodendron radicans (poison ivy)</p> <p><u>Non-native, Invasive Plants</u></p> <p>Alliaria petiolata (Garlic mustard) Berberis vulgaris (Common Barberry) Berberis thunbergii (Japanese barberry) Frangula alnus (Glossy Buckthorn) Ligustrum obtusifolium (Border Privet) Lythrum salicaria (Purple loosestrife) Rosa Multiflora (Multiflora Rose) Phragmites australis (Common reed) Fallopia japonica (Japanese knotweed)</p>

Table 3: Gill Town Forest Wildflower List by Gill Town Forest Task Force-2009

Common Name	Scientific Name	Common Name	Scientific Name
Yarrow	Achillia millefolium	White Avens	Geum canadense
Red Baneberry	Actaea rubra	Purple Avens	Geum rivale
Bugle	Ajuga reptans	Gill-Over-The-Ground	Glechoma hederacea
Garlic Mustard	Alliaria officinalis	Thin-Leaved Sunflower	Helianthus decapetalus
Common Ragweed	Ambrosia artemisiifolia	Day-Lily	Hemerocallis fulva
Hog-Peanut	Amphicarpa bracteata	Cow-Parsnip	Heracleum maximum
Wood Anemone	Anemone quinquefolia	Dame's Rocket	Hesperis matronalis
Thimbleweed	Anemone virginiana	Orange Hawkweed	Hieracium aurantiacum
Groundnut	Apios americana	King Devil	Hieracium pratense
Spreading Dogbane	Apocynum	Rough Hawkweed	Hieracium scabrum
Wild Sarsaparilla	androsaemifolium	Bluets	Houstonia caerulea
Spikenard	Aralia nudicaulis	Water-Pennywort	Hydrocotyle americana
Jack-In-The-Pulpit	Aralia racemosa	Common St. Johnswort	Hypericum perforatum
Common Burdock	Arisaema	Marsh St. Johnswort	Hypericum virginicum
Swamp Milkweed	Articum minus	Stargrass	Hypoxis hirsuta
Common Milkweed	Asclepias incarnata	Spotted Touch-Me-Not	Impatiens capensis
White Milkweed	Asclepias syriaca	Common Morning-Glory	Ipomoea purpurea
Large-Leaved Aster	Asclepias variegata	Larger Blue Flag	Iris versicolor
New England Aster	Aster macrophyllus	Sheep Laurel	Kalmia angustifolia
Purple-Stemmed Aster	Aster novae-angliae	Mountain Laurel	Kalmia latifolia
Panicked Aster	Aster puniceus	Blue Lettuce	Lactuca biennis
Flat-Topped White Aster	Aster simplex	Motherwort	Leonurus cardiaca
Small White Aster	Aster umbellatus	Poor-Man's-Pepper	Lepidium virginicum
Winter Cress	Aster vimineus	Round-Headed Bush-Clover	Lespedeza capitata
Beggar-Ticks	Barbarea vulgaris	Canada Lily	Lilium canadense
European Beggar-Ticks	Bidens frondosa	Butter-And-Eggs	Linaria vulgaris
Field Mustard	Bidens tripartita	Indian-Tobacco	Lobelia inflata
Marsh-Marigold / Cowslip	Brassica rapa	Downy Lobelia	Lobelia puberula
Mouse-Ear Chickweed	Caltha palustris	Birdfoot Trefoil	Lotus corniculatus
Turtlehead	Cerastium vulgatum	Ragged-Robin	Lychnis flos-cuculi
Lamb's-Quarters / Pigweed	Chelone glabra	Bugleweed	Lycopus virginicus
Spotted Wintergreen	Chenopodium album	Fringed Loosestrife	Lysimachia ciliata
Ox-Eye Daisy	Chimaphila maculata	Whorled Loosestrife	Lysimachia quadrifolia
Enchanter's Nightshade	Chrysanthemum	Yellow Loosestrife	Lysimachia terrestris
Pasture Thistle	leucanthemum	Purple Loosestrife	Lythrum salicaria
Bull Thistle	Circaea quadrisulcata	Wild Lily-Of-The-Valley	Malanthemum canadense
Virgin's Bower	Cirsium pumilum	Indian Cucumber Root	Medeola virginiana
Goldthread	Cirsium vulgare	White Sweet Clover	Melilotus alba
Bunchberry	Clematis virginiana	Sharp-Winged Monkey-Flower	Mimulus alatus
Pink Lady's Slipper	Coptis groenlandica	Square-Stemmed Monkey-Flower	Mimulus ringens
Queen Anne's Lace	Cornus canadensis	Partridgeberry	Mitchella repens
Small-Leaved Tick-Trefoil	Cypripedium acaule	Indian-Pipe	Monotropa uniflora
Deptford Pink	Daucus carota	True Forget-Me-Not	Myosotis scorpioides
Mayflower	Desmodium ciliare	Bullhead Lily	Nuphar variegatum
Purple-Leaved Willow-Herb	Dianthus armeria	Fragrant Water Lily	Nymphaea odorata
Narrow-Leaved Willow-Herb	Epigaea repens	Common Evening-Primrose	Oenothera biennis
Helleborine	Epilobium coloratum	Sundrops	Oenothera fruticosa
Daisy Fleabane	Epilobium leptophyllum	Star-of-Bethlehem	Ornithogalum umbellatum
	Epipactis helleborine		

Common Fleabane Hollow Joe-Pye-Weed Boneset White Snakeroot Cypress Spurge Common Strawberry Galinsoga Wild Madder Fragrant Bedstraw Wintergreen / Checkerberry Wild Geranium	Erigeron annuus Erigeron philadelphicus Eupatorium fistulosum Eupatorium perfoliatum Eupatorium rugosum Euphorbia cyparissias Fragaria virginiana Galinsoga ciliata Galium mollugo Galium triflorum Gaultheria procumbens Geranium maculatum Polygonum sagittatum Polygonum scandens Potentilla argentea Potentilla norvegica Potentilla recta Potentilla simplex Prenanthes altissima Prunella vulgaris Pyrola elliptica Pyrola rotundifolia Ranunculus acris Rhus radicans Rosa multiflora Rosa palustris Rubus Rubus Rubus	One-Flowered Cancer Root Yellow Wood Sorrel Wood Betony Pokeweed Clearweed English Plantain Common Plantain Fringed Polygala / Gaywings Solomon's Seal Halberd-Leaved Tearthumb Long-Bristled Smartweed Swamp Smartweed Tall Goldenrod Silver-Rod Zig Zag Goldenrod Lance-Leaved Goldenrod Early Goldenrod Rough-Leaved Goldenrod Spiny-Leaved Sow-Thistle Meadowsweet Steeplebush / Hardhack Nodding Ladies'-Tresses Long-Leaved Chickweed Common Chickweed Star Chickweed Skunk Cabbage Common Dandelion Tall Meadow-Rue Foamflower Starflower Hop Clover Red Clover White Clover Nodding Trillium Coltsfoot Common Cattail Slender Nettle Indian Poke Common Mullein American Brooklime Sweet White Violet Dog Violet Wild Grape (vine) Golden Alexanders	Orobanche uniflora Oxalis ? Pedicularis canadensis Phytolacca americana Pilea pumila Plantago lanceolata Plantago major Polygala paucifolia Polygonatum biflorum Polygonum arifolium Polygonum cespitosum Polygonum coccineum Solidago altissima Solidago bicolor Solidago flexicaulis Solidago graminifolia Solidago juncea Solidago patula Sonchus asper Spiraea latifolia Spiraea tomentosa Spiranthes cernua Stellaria longifolia Stellaria media Stellaria pubera Symplocarpus foetidus Taraxacum officinale Thalictrum polygamum Tiarella cordifolia Trientalis borealis Trifolium agrarium Trifolium pratense Trifolium repens Trillium cernuum Tussilago farfara Typha latifolia Urtica gracilis Veratrum viride Verbascum thapsus Veronica americana Viola blanda Viola conspersa Vitis (many varieties) Zizia aurea
Arrow-Leaved Tearthumb Climbing False Buckwheat Silvery Cinquefoil Rough Cinquefoil Rough-Fruited Cinquefoil Common Cinquefoil Tall White Lettuce Heal-All Shinleaf Round-Leaved Pyrola Common Buttercup Poison Ivy Multiflora Rose Swamp Rose Brambles (blackberry) Brambles (raspberry) Dewberry	Rudbeckia hirta Rumex acetosella Rumex crispus Rumex obtusifolius Sambucus canadensis Sanicula marilandica Saponaria officinalis Scutellaria lateriflora Senecio aureus Silene cucubalus Sisyrinchium montanum Smilacina racemosa Smilax herbacea		
Black-Eyed Susan Sheep Sorrel Curled Dock Broad/Bitter Dock Common Elderberry Black Snakeroot Bouncing Bet Mad-Dog Skullcap Golden Ragwort Bladder Campion Blue-Eyed Grass False Solomon's Seal Carrion-Flower			

Habitat Management Techniques and Recommendations:

The enhancement and protection of the greatest number of habitats achieves the goal of conservation of local biodiversity. A full set of guidelines and techniques for each of the important habitat elements is summarized in Section 3 of this plan. Sometimes the best approach will be to simply preserve or leave things alone.

Silviculture:

The Role of Silviculture: Silviculture is the practice of controlling the establishment, growth, composition, health, and quality of forest and forest ecosystems to meet the diverse needs and values of the owner and society. The use of silviculture upon a high value conservation forest with a large degree of biodiversity requires clear vision and a thoughtful approach. Its application to these lands is an allowable and encouraged

management technique within the CR provisions. The valuable conservation lands have been designated into two broad categories of suitable for silviculture or unsuitable for silviculture.

An inner core zone of 90.519 acres functions as an area of protection for the most fragile ecological systems. This area includes all of Stands 3, 5, 7, 8, 9, 10, and 11 and a filter strip of 75 feet along the edges of these areas within the other forest stands. Tree cutting is only permitted in these areas for the protection of the property or human safety. Other vegetation could be managed for the preservation of the existing habitat conditions (i.e. invasive plant removal or mowing). An outer zone of 72-forested acres functions as a transition area into more ecologically resilient landscape able to sustain silvicultural work. Access routes into this zone must be well planned and monitored extensively during any management treatment. Prescriptions will focus on selection treatments of a conservative nature.

Silviculture Approach: The age, condition, and structure of the forest ecosystems within the 72 acre outer zone would benefit from the application of Thinnings. The rotation age (period of years to grow a stand to its specified condition) is set at the biological age for these trees. White pine reaches maturity between 175 and 225 years of age. Most of the hardwood species reach their maturity between of 175 to 300 years. At a weighted average age range of 85 to 140 years, these trees are immature. Concerns for their replacement with seedlings and saplings due to their advanced decline are not warranted yet.

This choice of thinnings as a silvicultural tool is suitable because of the existing all-aged or un-even aged condition of the stands and the need for preservation of the forest's beauty, the protection of the site ecology, and the protection of habitat. Thinnings remove a conservative number of trees from the upper or lower canopy layers to open the most promising trees. These removals retain a high degree of crown closure in the upper canopy and the bulk of the lower layer stems or simply the best of the lower canopy. The full crown closure without disturbance above or the dense lower canopy shade either restricts branching and retains continuous distribution of foliage thereby maintaining a more diverse feeding and nesting habitat.

A potential harvest would increase growing space in the canopy for the superior crop and legacy tree crowns, thereby concentrating production on the best trees. The removals would not vacate enough growing space below to encourage reproductive growth, although some seedlings develop from any canopy opening. Application of the thinning technique favors the trees of best potential quality and discriminates against poor quality and high-risk stems. The increase in tree vigor protects against abiotic agents. Legacy trees (trees of all species greater than 24 inches in diameter) would be chosen for retention through their biological lifespan if either the Crown or Low Thinning were applied.

The field application of the Crown Thinning involves the choice of superior crop, legacy, and mast trees and the removal of their main competitors in the upper canopy. Low thinning applications also retain the best-formed, most vigorous immature hardwood stems. At some point down the road (perhaps in 20 years in this forest), a bunch of subordinate trees in the lower strata will have to come out to encourage seedling growth. For now, treatment would be confined to the space around the crop trees. Light, conservative removals will retain the growth of the shrub layer, retard the growth of any undesirable vegetation, and maintain the desirable vertical stratification across the forest.

Execution of the thinnings across the forest stands in one operation makes the project most profitable and manageable. Thinnings generate revenue. These funds should be re-invested into the property for the completion of the management work. Silviculture is applied on forest stand at set intervals known as the cutting cycle. Cutting cycle lengths depends upon site productivity, access routes, and the owner's use of the site. The cutting cycle for these lands would be set at fifteen years. Therefore, one would expect to enter the land for timber harvest projects and produce revenues very fifteen years.

Non-native, Invasive Plant Treatment: The non-native species, which were observed during the field inventory, are listed in Table 2 of this report. Their threat to the native plant community is low, with the exception of the Common Reed in Otter Pond and the Japanese knotweed along the Fall River banks. Mechanical methods of control will prove adequate for the land plants. If a combination of mechanical and chemical methods is considered, the assistance of a certified and licensed invasive plant control specialist will be used. If Option 1 (No disturbance) is chosen as a long-term strategy, the canopy shade may prevent the spread of the shrubs.

Mechanical controls are one of the most common control techniques. Hand pulling ensures that, with proper identification, only target plants are removed. Depending upon the species and the size of the plant, it may be helpful to use a weeder, trowel, or spade. Plants are easiest to remove after a rain, when the ground is soft. Grasp plants at the base near the soil and pull slowly to ensure that you remove the entire plant and root stem—many woody and herbaceous plants can re-sprout from underground roots, so getting the entire root is crucial. Even in the meadow sites (Stand 9), the invasive plants are not found in large monocultures with extensive root systems.

If a combination method is considered, the best approach maybe single stem cutting. Stems should be cut close to the ground in the fall. For woody stemmed species, apply herbicide directly to the cut surface immediately after cutting, before the stem starts to dry out. For larger stumps, you only need to apply the herbicide to the living tissue in the outer layer. The herbicide can be applied with a sponge, pain brush, or spray bottle. It is worthy of note that mechanical means of treatment for Japanese knotweed may be counterproductive and cause further spread of the plant.

The commitment to a treatment program for invasive plants requires persistence and patience. One application of either mechanical or chemical methods will not guarantee removal. Successive treatments over a two to three year period with each treatment reducing the amount of necessary resource for effectiveness usually work best. A continual monitoring program ensures identification of their advancement to earlier threatening levels or the success of treatment. A good documentation system with record of treatment dates, acres, and GIS data facilitates efficient management of the protocol. The use of a volunteer staff, student interns, or the aid of the Franklin Land Trust seasonal AmeriCorps presents cost-effective treatment options.

Recreation and Aesthetics: The Gill Town Forest is a beautiful property. Trails wind their way through a variety of landscapes and habitats. There is a special solace and peace in the natural wonder of these lands. The provisions of the CR specify passive recreational use of these lands by the public. Further development of the trail system will proceed with care and consideration for the protection of the ecosystem values. Proposed routes include:

Application of the proposed silvicultural work will change the appearance of the Town Forest. Conservative application minimizes this visual impact. Tree removals will occur alongside the main hiking trails. Efforts are recommended for the clean up all harvest debris trailside through removal from the trail surface and some brush piling into useful habitat dens.

The success of silviculture on this site depends upon the cooperation of your patrons. Educational forums and field tours should be conducted prior to the commencement of any activity in which the objectives and the techniques of silviculture could be clearly expressed. Field tours during the active phase of the work are recommended for further engagement with patrons. Their feedback, visions, and comments inform the adaptive management approach to the stewardship of the Gill Town Forest. Care with the application of the silviculture is essential. Working with a reliable timber harvester who will listen to your goals and aesthetic concerns is also

essential. Silviculture could be one more useful tool to the Town of Gill in your execution of the Stewardship duties as outlined in your CR.

Forest Stewardship Goals/Objectives: The CR document directly informs the Forest Stewardship Management Goals for the Gill Town Forest. The goals in a descending order of priority are as follows:

1. To protect the natural watercourses and wetlands including Otter Pond and Fall River;
2. To protect the glacial features such as eskers and kettle ponds;
3. To protect and maintain native habitat and biodiversity;
4. To protect BioMap2 Supporting Natural Landscapes and Living Waters Critical Supporting Watershed as designated by Massachusetts Natural Heritage and Endangered Species program;
5. To protect the aesthetic appeal of these lands;
6. To promote and encourage passive recreational use on the lands by the general public in full accordance with Clause III, Section B1 to B5 of the CR.
7. To maintain the all-aged, species rich forested ecosystem growing here now with attention to the growth of the timber crops and its replacement crop when biologically necessary near the rotation's end.
8. To promote sustainable forest management activities within appropriate zones of the property which are consistent with all the provisions of the CR through the choice of three possible alternative approaches each suitable for the condition of the forested ecosystem.

Town Forest Ability to meet These Goals: This property offers a good example of a fully functioning ecosystem with natural ecological resilience to environmental changes, a high degree of biodiversity, and the potential for success of any conservation efforts. Challenges to the implementation of the management plan ideas would be the intelligent engineering of a harvest road system if silviculture work were considered. This road network could serve future recreational trail needs if done well without disturbance to the inner core zones of the property.

Summary of The Management Recommendations:

1. Designation of an inner core zone for the protection of the BioMap 2 designations, biodiversity, water resources, riparian areas, and the valuable native habitat. A GIS shape file of this area would be documented for future reference. Human disturbance within the riparian areas would be prohibited with the exception of erosion control measure installation (the possibility of planting of shrubs, native herbage and grasses, or mulch if necessary at high-use sites along the main trails) and recreational trail/s use.
2. Maintenance of the meadow habitat with a periodic schedule of mowing and cutting.
3. Trail/s maintenance projects, which provide safety for Town Forest patrons.
4. Maintenance of the valuable edge habitat within the open/low vegetation areas with possible native plantings, mowing, cutting, invasive plant control, apple tree release and pruning, and bird box installation.
5. Maintenance of the valuable edge habitat within the forest side of the edge with the creation of brush piles from any potential harvest debris or downed material.
6. The maintenance of an all-aged, species-rich forest stand structure and a vigorous timber crop through the application of Crown Thinnings with Retention of Legacy Trees upon 72 acres. The habitat enhancement techniques, which are summarized in Section 3, will be integrated into any silvicultural work. All silvicultural work will be conducted in strict compliance with the provisions of the CR, the Massachusetts Harvest Cutting Practice Act, and both the required and suggested BMPs in the Massachusetts Forestry Best Management Practices Manual (2013).

Funding Sources: The recreational trail, habitat enhancement, and invasive plant control programs require investment. The Town should seek any form of assistance available to municipalities for these projects.

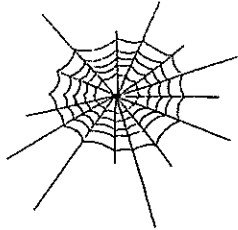
- The Partners for Wildlife Program through the US Fish and Wildlife Service
- The Community Preservation Act (Massachusetts)
- The Massachusetts Department of Conservation and Recreation Recreational Trails Program
- The Massachusetts Forest Stewardship Community Forest program

Creative marketing of the needs for this work to the Town Forest patrons might elicit special fund drives. The recruitment of student researchers or special internships for the implementation of some of this work to the Northfield Mount Hermon School, the Four Rivers Charter School, and the University Of Massachusetts School Of Conservation Resource Management may help to reduce the costs of the management on these lands.

Stewardship Issues Specific to Gill Town Forest: #1: The timber harvest project would require the construction of rudimentary woods access roads and the installation of small areas for log decking. The roads will not exceed twelve feet in width, will not cross any riparian area inclusive of stream, spring seeps, or wetlands, and will minimize impact on the ecological functionality of the forest. These roads and landing areas are necessary for the removal of timber products in order to maintain the desirable all-aged forest stand condition. It is not feasible to utilize the narrow recreational trails for harvest access. The road construction will fully comply with all provisions of the CR and the Massachusetts 2013 Best Management Practices Manual guidelines for access road construction. After the proposed harvest work, the road system would be graded to a level condition, treated with the installation of erosion prevention measures along any sloping sections, and seeded well with native grasses for both aesthetics and erosion control. #2. A rudimentary road accesses the Fall River from Bascom Road. This road will be improved for emergency vehicular use only. Grading work and the placement of gravel is recommended for the improvement of this road. A gate will be placed at the access point on Bascom Road to this area.

Section 2.1: Mandatory DCR Stewardship Issues Template

Massachusetts is a small state, but it contains a tremendous variety of ecosystems, plant and animal species, management challenges, and opportunities. This section of your plan will provide background information about the Massachusetts forest landscape as well as issues that might affect your land. **The Stand Descriptions and Management Practices sections of your plan will give more detailed property specific information** on these subjects tailored to your management goals.



Biodiversity: Biological diversity is, in part, a measure of the variety of plants and animals, the communities they form, and the ecological processes (such as water and nutrient cycling) that sustain them. With the recognition that each species has value, individually and as part of its natural community, maintaining biodiversity has become an important resource management goal.

While the biggest threat to biodiversity in Massachusetts is the loss of habitat to development, another threat is the introduction and spread of invasive non-native plants. Non-native invasives like European Buckthorn, Asiatic Bittersweet, and Japanese Honeysuckle spread quickly, crowding out or smothering native species and upsetting and dramatically altering ecosystem structure and function. Once established, invasives are difficult to control and even harder to eradicate. Therefore, vigilance and early intervention are paramount.

Another factor influencing biodiversity in Massachusetts concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that, for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1" in diameter). Yet we currently have no more than 2-3% early successional stage seedling forest across the state. There is also a shortage of forest with large diameter trees (greater than 20"). See more about how you can manage your land with biodiversity in mind in the "Wildlife" section below. (Also refer to *Managing Forests to Enhance Wildlife Diversity in Massachusetts* and *A Guide to Invasive Plants in Massachusetts* in the binder pockets.)



Rare Species: Rare species include those that are **threatened** (abundant in parts of its range but declining in total numbers, those of **special concern** (any species that has suffered a decline that could threaten the species if left unchecked), and **endangered** (at immediate risk of extinction and probably cannot survive without direct human intervention). Some species are threatened or endangered globally, while others are common globally but rare in Massachusetts.

Of the 2,040 plant and animal species (not including insects) in Massachusetts, 424 are considered rare. About 100 of these rare species are known to occur in woodlands. Most of these are found in wooded wetlands, especially vernal pools. These temporary shallow pools dry up by late summer, but provide crucial breeding habitat for rare salamanders and a host of other unusual forest dwelling invertebrates. Although many species in Massachusetts are adapted to and thrive in recently disturbed forests, rare species are often very sensitive to any changes in their habitat

Indispensable to rare species protection is a set of maps maintained by the Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) that show current and historic locations of rare species and their habitats. The maps of your property will be compared to these rare species maps and the result indicated on the upper right corner of the front page of the plan. Prior to any regulated timber harvest, if an occurrence does show on the map, the NHESP will recommend protective measures. Possible measures include restricting logging operations to frozen periods of the year, or keeping logging equipment out of sensitive areas. You might also use information from NHESP to consider implementing management activities to improve the habitat for these special species.



Riparian and Wetlands Areas: Riparian and wetland areas are transition areas between open water features (lakes, ponds, streams, and rivers) and the drier terrestrial ecosystems. More specifically, a **wetland** is an area that has hydric (wet) soils and a unique community of plants that are adapted to live in these wet soils. Wetlands may be adjacent to streams or ponds, or a wetland may be found isolated in an otherwise drier landscape. A **riparian area** is the transition zone between an open water feature and the uplands (see Figure 1). A riparian zone may contain wetlands, but also includes areas with somewhat better drained soils. It is easiest to think of riparian areas as the places where land and water meet.

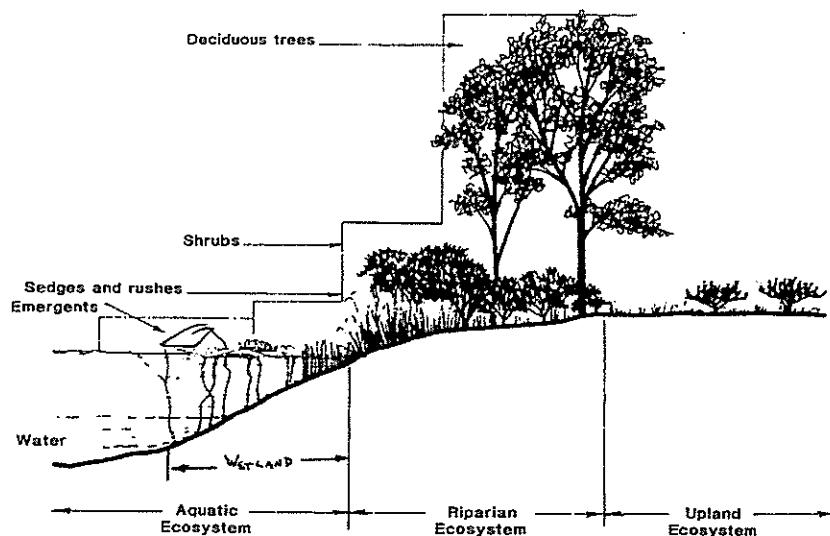


Figure 1: Example of a riparian zone.

The presence of water in riparian and wetland areas make these special places very important. Some of the functions and values that these areas provide are described below:

Filtration: Riparian zones capture and filter out sediment, chemicals and debris before they reach streams, rivers, lakes and drinking water supplies. This helps to keep our drinking water cleaner, and saves communities money by making the need for costly filtration much less likely.

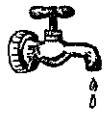
Flood control: By storing water after rainstorms, these areas reduce downstream flooding. Like a sponge, wetland and riparian areas absorb stormwater, then release it slowly over time instead of in one flush.

Critical wildlife habitat: Many birds and mammals need riparian and wetland areas for all or part of their life cycles. These areas provide food and water, cover, and travel corridors. They are often the most important habitat feature in Massachusetts' forests.

Recreational opportunities: Our lakes, rivers, streams, and ponds are often focal points for recreation. We enjoy them when we boat, fish, swim, or just sit and enjoy the view.

In order to protect wetlands and riparian areas and to prevent soil erosion during timber harvesting activities, Massachusetts promotes the use of "Best Management Practices" or BMPs. Maintaining or reestablishing the protective vegetative layer and protecting critical areas are the two rules that underlie these common sense measures. DCR's Massachusetts Forestry Best Practices Manual (included with this plan) details both the legally required and voluntary specifications for log landings, skid trails, water bars, buffer strips, filter strips, harvest timing, and much more.

The two Massachusetts laws that regulate timber harvesting in and around wetlands and riparian areas are the Massachusetts Wetlands Protection Act (CH 131), and the Forest Cutting Practices Act (CH132). Among other things, CH132 requires the filing of a cutting plan and on-site inspection of a harvest operation by a DCR Service Forester to ensure that required BMPs are being followed when a commercial harvest exceeds 25,000 board feet or 50 cords (or combination thereof).



Soil and Water Quality: Forests provide a very effective natural buffer that holds soil in place and protects the purity of our water. The trees, understory vegetation, and the organic material on the forest floor reduce the impact of falling rain, and help to insure that soil will not be carried into our streams and waterways.

To maintain a supply of clean water, forests must be kept as healthy as possible. Forests with a diverse mixture of vigorous trees of different ages and species can better cope with periodic and unpredictable stress such as insect attacks or windstorms.

Timber harvesting must be conducted with the utmost care to ensure that erosion is minimized and that sediment does not enter streams or wetlands. Sediment causes turbidity which degrades water quality and can harm fish and other aquatic life. As long as Best Management Practices (BMPs) are implemented correctly, it is possible to undertake active forest management without harming water quality.



Forest Health: Like individual organisms, forests vary in their overall health. The health of a forest is affected by many factors including weather, soil, insects, diseases, air quality, and human activity. Forest owners do not usually focus on the health of a single tree, but are

concerned about catastrophic events such as insect or disease outbreaks that affect so many individual trees that the whole forest community is impacted.

Like our own health, it is easier to prevent forest health problems than to cure them. This preventative approach usually involves two steps. First, it is desirable to maintain or encourage a wide diversity of tree species and age classes within the forest. This diversity makes a forest less susceptible to a single devastating health threat. Second, by thinning out weaker and less desirable trees, well-spaced healthy individual trees are assured enough water and light to thrive. These two steps will result in a forest of vigorously growing trees that is more resistant to environmental stress.



Fire: Most forests in Massachusetts are relatively resistant to catastrophic fire. Historically, Native Americans commonly burned certain forests to improve hunting grounds. In modern times, fires most often result from careless human actions. The risk of an unintentional and damaging fire in your woods could increase as a result of logging activity if the slash (tree tops, branches, and debris) is not treated correctly.

Adherence to the Massachusetts slash law minimizes this risk. Under the law, slash is to be removed from buffer areas near roads, boundaries, and critical areas and lopped close to the ground to speed decay. Well-maintained woods roads are always desirable to provide access should a fire occur.

Depending on the type of fire and the goals of the landowner, fire can also be considered as a management tool to favor certain species of plants and animals. Today the use of prescribed burning is largely restricted to the coast and islands, where it is used to maintain unique natural communities such as sandplain grasslands and pitch pine/scrub oak barrens. However, state land managers are also attempting to bring fire back to many of the fire-adapted communities found elsewhere around the state.



Wildlife Management: Enhancing the wildlife potential of a forested property is a common and important goal for many woodland owners. Sometimes actions can be taken to benefit a particular species of interest (e.g., put up Wood Duck nest boxes). In most cases, recommended management practices can benefit many species, and fall into

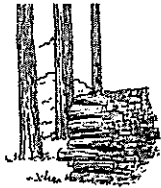
one of three broad strategies. These are **managing for diversity, protecting existing habitat, and enhancing existing habitat.**

Managing for Diversity – Many species of wildlife need a variety of plant communities to meet their lifecycle requirements. In general, a property that contains a diversity of habitats will support a more varied wildlife population. A thick area of brush and young trees might provide food and cover for grouse and cedar waxwing; a mature stand of oaks provides acorns for foraging deer and turkey; while an open field provides the right food and cover for cottontail rabbits and red fox. It is often possible to create these different habitats on your property through active management. The appropriate mix of habitat types will primarily depend on the composition of the surrounding landscape and your objectives. It may be a good idea to create a brushy area where early successional habitats are rare, but the same practice may be inappropriate in the area's last block of mature forest.

Protecting Existing Habitat – This strategy is commonly associated with managing for rare species or those species that require unique habitat features. These habitat features include vernal pools, springs and seeps, forested wetlands, rock outcrops, snags, den trees, and large blocks of unbroken forest. Some of these features are rare, and they provide the right mix of food, water, and shelter for a particular species or specialized community of wildlife. It is important to recognize their value and protect their function. This usually means not altering the feature and buffering the resource area from potential impacts.

Enhancing Existing Habitat – This strategy falls somewhere between the previous two. One way the wildlife value of a forest can be enhanced is by modifying its structure (number of canopy layers, average tree size, density). Thinning out undesirable trees from around large crowned mast (nut and fruit) trees will allow these trees to grow faster and produce more food. The faster growth will also accelerate the development of a more mature forest structure, which is important for some species. Creating small gaps or forest openings generates groups of seedlings and saplings that provide an additional layer of cover, food, and perch sites.

Each of these three strategies can be applied on a single property. For example, a landowner might want to increase the habitat diversity by reclaiming an old abandoned field. Elsewhere on the property, a stand of young hardwoods might be thinned to reduce competition, while a “no cut” buffer is set up around a vernal pool or other habitat feature. The overview, stand description and management practice sections of this plan will help you understand your woodland within the context of the surrounding landscape and the potential to diversify, protect or enhance wildlife habitat.



Wood Products: If managed wisely, forests can produce a periodic flow of wood products on a sustained basis. Stewardship encompasses finding ways to meet your current needs while protecting the forest’s ecological integrity. In this way, you can harvest timber and generate income without compromising the opportunities of future generations.

Massachusetts forests grow many highly valued species (white pine, red oak, sugar maple, white ash, and black cherry) whose lumber is sold throughout the world. Other lower valued species (hemlock, birch, beech, red maple) are marketed locally or regionally, and become products like pallets, pulpwood, firewood, and lumber. These products and their associated value-added industries contribute between 200 and 300 million dollars annually to the Massachusetts economy.

By growing and selling wood products in a responsible way you are helping to our society’s demand for these goods. Harvesting from sustainably managed woodlands – rather than from unmanaged or poorly managed forest – benefits the public in a multitude of ways. The sale of timber, pulpwood, and firewood also provides periodic income that you can reinvest in the property, increasing its value and helping you meet your long-term goals. Producing wood products helps defray the costs of owning woodland, and helps private landowners keep their forestland undeveloped.



Cultural Resources: Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago, or the remains of a farmstead from the 1800's, these features all tell important and interesting stories about the landscape, and should be protected from damage or loss.

Massachusetts has a long and diverse history of human habitation and use. Native American tribes first took advantage of the natural bounty of this area over 10,000 years ago. Many of these villages were located along the coasts and rivers of the state. The interior woodlands were also used for hunting, traveling, and temporary camps. Signs of these activities are difficult to find in today's forests. They were obscured by the dramatic landscape impacts brought by European settlers as they swept over the area in the 17th and 18th centuries.

By the middle 1800's, more than 70% of the forests of Massachusetts had been cleared for crops and pastureland. Houses, barns, wells, fences, mills, and roads were all constructed as woodlands were converted for agricultural production. But when the Erie Canal connected the Midwest with the eastern cities, New England farms were abandoned for the more productive land in the Ohio River valley, and the landscape began to revert to forest. Many of the abandoned buildings were disassembled and moved, but the supporting stonework and other changes to the landscape can be easily seen today.

One particularly ubiquitous legacy of this period is stone walls. Most were constructed between 1810 and 1840 as stone fences (wooden fence rails had become scarce) to enclose sheep within pastures, or to exclude them from croplands and hayfields. Clues to their purpose are found in their construction. Walls that surrounded pasture areas were comprised mostly of large stones, while walls abutting former cropland accumulated many small stones as farmers cleared rocks turned up by their plows. Other cultural features to look for include cellar holes, wells, old roads and even old trash dumps.



Recreation and Aesthetic Considerations: Recreational opportunities and aesthetic quality are the most important values for many forest landowners, and represent valid goals in and of themselves. Removing interfering vegetation can open a vista or highlight a beautiful tree, for example. When a landowner's goals include timber, thoughtful forest management can be used to accomplish silvicultural objectives while also reaching recreational and/or aesthetic objectives. For example, logging trails might be designed to provide a network of cross-country ski trails that lead through a variety of habitats and reveal points of interest.

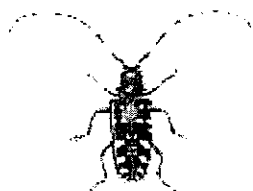
If aesthetics is a concern and you are planning a timber harvest, obtain a copy of this excellent booklet: *A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters & Landowners*, by Geoffrey T. Jones, 1993. (Available from the Northeast Regional Agricultural Engineering Service, (607) 255-7654, for \$7). Work closely with your consultant to make sure the aesthetic standards you want are included in the contract and that the logger selected to do the job executes it properly. The time you take to plan ahead of the job will reward you and your family many times over with a fuller enjoyment of your forest, now and well into the future.



Invasive Species Management: Invasive species pose immediate and long-term threats to the woodlands of MA. Defined as a non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human, animal, or plant health, invasives are well-adapted to a variety of environmental conditions, out-compete more desirable native species, and often create monocultures devoid of biological diversity. The websites of the Invasive Plant Atlas of New England, www.nbii-nin.ciesin.columbia.edu/ipane, and the New England Wildflower Society, www.newfs.org are excellent sources of information regarding the identification and management of invasive plants. Some of the common invasive plants found in MA are listed below.

- Oriental Bittersweet (*Celastrus orbiculata*)
- Glossy Buckthorn (*Frangula alnus*)
- Multiflora Rose (*Rosa multiflora*)
- Japanese Barberry (*Berberis thunbergii*)
- Japanese Knotweed (*Fallopia japonica*)
- Autumn Olive (*Eleaagnus umbellata*)

Early detection and the initiation of control methods soon after detection are critical to suppressing the spread of invasive species. Selective application of the proper herbicide is often the most effective control method. See the next section for information on the use of chemicals in forest management activities.



Pesticide Use

Pesticides such as herbicides, insecticides, fungicides, and rodenticides are used to control "pests". A pest is any mammal, bird, invertebrate, plant, fungi, bacteria or virus deemed injurious to humans and/or other mammals, birds, plants, etc. The most common forest management use of a pesticide by woodland owners is the application of herbicide to combat invasive species. MA DCR suggests using a management system(s) that promotes the development and adoption of environmentally friendly no-chemical methods of pest management that strives to avoid the use of chemical pesticides. If chemicals are used, proper equipment and training should be utilized to minimize health and environmental risks. In Massachusetts, the application of pesticides is regulated by the MA Pesticide Control Board. For more information, contact MA Department of Agricultural Resources (MDAR), Pesticide Bureau at (617) 626-1776

On MA Private Lands Group Certification member properties, no chemicals listed in CHEMICAL PESTICIDES IN CERTIFIED FORESTS: INTERPRETATION OF THE FSC PRINCIPLES AND CRITERIA, Forest Stewardship Council, Revised and Approved, July 2002, may be used.

This is your Stewardship Plan. It is based on the goals that you have identified. The final success of your Stewardship Plan will be determined first, by how well you are able to identify and define your goals, and second, by the support you find and the resources you commit to implement each step.

It can be helpful and enjoyable to visit other properties to sample the range of management activities and see the accomplishments of others. This may help you visualize the outcome of alternative management

decisions and can either stimulate new ideas or confirm your own personal philosophies. Don't hesitate to express your thoughts, concerns, and ideas. Keep asking questions! Please be involved and enjoy the fact that you are the steward of a very special place.



Section 2.2: STAND DESCRIPTIONS

These descriptions can be best interpreted with the aid of the **Forest Stand Location Map**. The stand numbers in the discussions are identical to the stand numbers within each region on the map.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#1	WK	4 ac	12 inches	213 SF	11.500 MBF and 10 cords	60: WP	

Narrative: Maturing white pine and hemlock grow above a densely stocked lower stratum of hemlock, pine, oak, birch, and maple. Quality of the pine is variable with both high value stems and defective, black knotted ones. The hemlock crop retained branches along the main trunks of all sizes and ages. Overstory shade prevents reproductive growth; patches of shade tolerant hemlock and beech seedlings dot the forest floor. Field inventory recorded minor infestations of hemlock elongated scale and hemlock wooly adelgid on the hilltop areas.

The terrain sweeps down slope from a small hilltop on Hoeshop Road to the southwest into a wetland and westerly across a distinctive rock outcropping before rising to another hilltop. The stand grows above a mix of the Hollis and Scituate soils. These are shallow, well-drained soils, which produce fair yields of timber. Decaying stumps indicate a harvest here over 30 years ago. A verdant spring seep effuses water towards Bascom Road across a small a patch of alder, ilex, and yellow birch and red maple saplings. One narrow trail climbs the western hilltop, and another sweeps along the lower slope of this hill through the rocky outcroppings with their covering of lichen, moss, and ferns. Some unusual herbs include dragons tooth, lambkill, and princess pine. The dense lower strata hemlock provides winter protection for deer.

During the next ten years, this stand will continue its role as an ecological resilient mixed age and species forest, providing valuable habitat and biodiversity. The stand will also fill a stewardship role providing recreational and aesthetic opportunities with the addition of some new trail to the western peak and across the rock outcroppings and improvements on old trail. Retention of the crown closure protects the deeryard.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#2	WH	75.519 acres	12 inches	133 SF	7.772 MBF and 5 cords	65:WP	
Overstory white pine: 18 inches								

Narrative: Natural dynamics and past disturbance created a matrix-like blend of many age and size classes across this stand. White pine dominates a composition inclusive of red oak, hemlock, black birch, white oak, aspen, red maple, cherry, ash, and hickory. The quality of the timber crop is variable. Many pine stems have good quality, but just as many have large black knot defects and past weevil damage. A root heaving phenomena occurs from high winds on the tall pine tops (Some pine stems reach up near 80 feet.). The root collar thrusts upward out of the soil creating instability.

The oldest red oak timber has good form and high value, yet the middle-aged crop has epicormic branch defects and crown decline. Immature pine pole stems have excellent form with small crowns. Inclusions of very dense pockets of sapling and pole hemlock, birch, red maple, oak, and pine dot the lower canopy. The reproductive stocking density is also variable with dense thickets in sunlit areas. All overstory species were observed. The size and quality of the white pine, red oak, and red maple increases closet to Otter Pond and its surrounding wetlands.

The general terrain is a level outwash plain of sand and gravels with undulations across gentle slopes. Unique esker formations rise from this plain in the northern sections of the stand. The Warwick, Gloucester, and Charlton soils lie beneath this terrain. All three are fine, sandy loams with surface stone and high amounts of available water. Trees grow well on these soils, and they develop deep root systems.

The rich soils support a dense herbage and shrub layer. Invasive plants (most notably Japanese barberry and multiflora rose) contribute an estimated 12% of this vegetation; they are scattered throughout the stand. Some stems of privet grow in this stand near the old home site in the eastern portion. Some valuable native shrubs include high and low bush blueberry, witchazel, and shadbush; all set ample fruit each season. A lot of standing dead pine snags was noted near the riparian areas with cavities. An old well is located in this stand near the old home site on the east side of Hoeshop Road

The development of the complex all aged, species-rich matrix structure will progress in this stand naturally with time or in a more expedited fashion with silvicultural application. The application of either Crown Thinnings or Low Thinnings will improve the vigor of the best timber crops in the applicable age class, encourage seed production, promote further vertical stratification, and provide opportunity for habitat enhancement. The stand will also fill a stewardship role by providing recreational and aesthetic opportunity with the addition of some new trail/s through the stand to Otter Pond and around the wetlands.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX
STEW	#3	HH	2 acres	12 inches	133 SF	7.772 MBF and 5 cords	65:WP
Overstory white pine: 18 inches							

Narrative: This small stand sits due west of a wetland along the western boundary. The trees grow in the well-drained fine, sandy Charlton loams, which produce good timber yields. The stand supports an all-aged hemlock grove with scattered red oak pole and timber trees and overstory, high quality white pine. Overstory shade prevents reproductive growth, except in naturally sunlit areas. The sandy, moist soils grows lycopodium well. Shade tolerant species dominate this age class (hemlock, beech, and black birch). The stand is healthy with minor amounts of hemlock wooly adelgid infestation. The juxtaposition of this dense hemlock deer yard near the open water and wetlands appreciates the value of the denning and snag trees in the area. This grove provides an excellent winter deer habitat and wolf tree opportunity. Retention of the current stocking levels and species composition maintains this habitat value. Compliance with any of the economically feasible techniques from Section 3 of this report enhances the habitat condition.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX
STEW	#4	WP1	12 acres	18 inches	87 SF	12.253 MBF and 4 cords	65:WP
Overstory white pine							
Pole Hardwood: 5 inches							

Narrative: This stand spreads across a gently sloping plain above the productive fine, sandy Warwick loams. Mature white pine timber crops tower (average height 80 feet) above a moderately stocked seedling, sapling, pole, and layers in this rudimentary all-aged stand. The quality of the white pine is mixed; the youngest trees have the best form and defect-free boles. All of the timber crops are healthy with vigorous crowns. A timber harvest 25 to 30 years ago opened the pine canopy for the younger age classes' development. Species cited in this layer are black birch, hemlock, red maple, white oak, and white pine. The immature black birch trees dominate this age class; they are outgrowing all other species.

An extensive edge effect manifests from the juxtaposition of this stand to a meadow. Several large white pine wolf trees (diameter greater than 30 inches) and large standing dead pine trees provide denning, nesting, and perching sites and cavities in the overstory. The harvest operation left high volumes of large sized coarse woody debris on the forest floor. The vertical stratification in the canopy allows a dense mat of herbaceous plants and ferns growing space. Some unique species here are low bush and high bush blueberry and false Solomon seal.

The immature hardwood crop will develop beneath consistent shade of mature, statuesque white pine trees. Thinnings from either canopy height (Crown or Low) would improve the vigor of the stand, maintain the

desirable all-aged, species-rich structure, and enhance habitat diversity. The overstory shade protects the form and quality of the best of the young birch, oak, and cherry stems. If a silviculture option is exercised, retention of all wolf and snag trees along the meadow edge will enhance habitat.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX
STEW	#5	RZ-WK	10 acres	20 inches	65 SF	7.247 MBF and 4 cords	60:WP
Overstory white pine							

Narrative: This complex stand descends a moderate slope into the Fall River flood plain area. Its length extends across the well-drained Warwick sandy loams onto the moister, fine Whitman sands. It has a complex structure, which changes along a continuum of habitat and vegetation. Upslope and along a sharp ridgeline above the river, mature pine and hemlock shade immature hardwoods and shrubs. As the terrain drops into the floodplain, scattered red maple pole and timber trees shade dogwood, elderberry, skunk cabbage, marsh marigold, ilex, and ferns. The invasive plants Japanese barberry and multiflora rose grow densely along the shallow channel of a spring-fed stream, which parallels the Fall River. The towering pine and hemlock provide excellent denning, nesting, and perching opportunities near the river site. Songbirds particularly enjoy the drastic edge effect of the forest/floodplain meadow and vertical stratification of the tall softwoods and the shrub layer.

Riparian forests protect the ecological integrity, promote ecosystem resilience, maintain high water quality, and soil and bank stability. Native plant communities are an essential component of these green infrastructures. Although the forest ecosystem will not be disturbed, a control program for the non-native, invasive plants will protect the local biodiversity. The strip of land along the Fall River and the spring-fed stream supports the highest density of Japanese barberry and glossy buckthorn. A combination of mechanical and chemical methods might prove most effective here. A trail runs along the ridgeline above the Fall River, and one passes through the section of the stand near the old foundation in the stream (speculation of an old hatchery site).

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX
STEW	#6	WP1	12 acres	13 inches	168 SF	11.668 MBF and 6.5 cords	70:WP
Overstory white pine: 19 inches							

Narrative: This stand undulates across a small knoll as it gently rises from Hoeshop Road before a descent into the wetlands, which surround Otter Pond. The entire stand grows above the stony, sandy Gloucester loam soils. Trees develop deep roots in these soils, tend towards wind firmness, and grow good yields of timber crops. White pine is especially well adapted to these soils. A densely stocked white pine grove with two distinct ages and a mix of hardwood sapling, pole, and timber trees covers this raised knoll and wide sandy plain. This fast growing, immature (age range of 45 to 110 years of age) white pine has good quality. The nicest stocking and highest value pine grows in this grove north of the old driveway access road. The wind catches the tops of these tall trees (some heights exceed 90 feet) and "heaves" their root systems upward.

The overstory shade limits seedling growth to natural openings or the small openings from a conservative past harvest. 25% of the forest floor supports reproductive growth. Species found here are white pine, hemlock, black birch, red oak, and red maple. The shade also limits the herbage layer. Some unique plants thriving in the cool shade include lady slipper, princess pine, New York fern, cinnamon fern, and sensitive fern (the latter two near the pond and wetlands). Non-native, invasive plants grow amongst this grove. Their density was highest near the wetland sites, along the connecting streams, and near the edge of the stand along the wet meadow at the old home site. Species cited were Japanese barberry, glossy buckthorn, and multiflora rose.

Two large raptor nests were observed in tall pines near Otter Pond, which grow on a uniquely beautiful peninsula with grasses and ferns beneath them. Large diameter living white oak and hickory trees dot the upper canopy. They both set ample annul mast crops. A fair stocking of younger white oak and hickory were also noted. Beaver activity raises the water table into this stand, causing decline and mortality in the older pines. These offer excellent denning, nesting, and perching sites on the water's edge. The largest pine trees grow near the wetlands and on the edge of Otter Pond.

Walking amongst this aging pine grove offers a quiet solace. Natural dynamics will play out slowly in this immature stand. Decline and mortality will eventually open more growing space for hardwood and pine seed germination, and slowly vertical stratification with its addition of a third age class will increase across the stand. Thinnings would accelerate this progress, therefore enhancing the habitat value of the area, improving the quality and vigor of the white pine crop, and promoting the desirable all-aged, species diverse stand structure. Protection of the biodiversity in this grove requires the initiation of some invasive plant control prior to any thinning operations.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#7	RM	2.5 acre	4 to 6 inches	40 SF	2 cords	55: RM	

Narrative: This small stand lies upon a level plain due south of Otter Pond and adjacent to the shrub swamps on its edge. The red maple grows above the poorly drained, fine, sandy Whitman loams. These soils are saturated most of the year, and trees grow very slowly upon them. Red maple sapling and pole stems grow upon hummocky soils with standing water between them. They grow to a certain size, decline, die-off, and new trees sprout from the stumps. The quality is poor to fair with water defects. The moist, wet loams support scattered, dense growth of highbush blueberry, grasses, skunk cabbage, cinnamon fern, and ilex. Japanese barberry infiltrates these herbaceous zones. Water from wetland stream flow and spring seep effusions move through this small stand towards Otter Pond. Forested wetlands act as a final barrier of defense for the catchment of toxins and sediment before entry into the pond. Maintenance of this stand in its current structure and condition promotes biodiversity and the maintenance of water quality in the Otter Brook watershed system.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#8	OH	5 ac	11.5 inches	130 SF	5.009 MBF and three cords	60: RO	

Narrative: In this small stand along the eastern bound, a mixed age grove of overstory red oak shades immature hemlock sapling, pole, and small timber crops upon a steep slope. The terrain rises sharply from the wetland site and levels near the old access road to the Scott place. The stand grows above the rocky and stony Hollis sandy loams. Trees grow slow upon these soils. The red oak timber quality is fair. The thick, acidic oak duff allows only limited hemlock, beech, and red maple seedling growth. A dense carpet of mountain laurel dominates the lower forest layer. Evidence of woolly hemlock adelgid was recorded here. This stand anchors a small corner of the woodlot and prevents sediment loss into the wetlands below. Maintenance of this all-aged oak grove in its current structure and condition promotes biodiversity, maintains water quality, and protects a winter deer yard.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#9	GF-ESH	9.5 ac	NA	NA	NA	Fair to Good	

Narrative: This stand is a collection of grasslands, old fields, meadowlands, and some shrub habitat. These areas provide a low vegetation layer adjacent to a high forest canopy across the landscape. They hold high value as habitat due to their insect breeding capacity, nesting, and cover opportunities, and high biodiversity. Maintenance of this habitat niches is recommended through bi-annual mowing or brush hogging. Control of the

marginal stocking of non-native, invasive plant communities scattered through these open areas will promote biodiversity and protect the native habitat benefits.

9 (a): A narrow plain on the banks of the Fall River above sandy, rich Warwick soils supports an old field with a mixture of grasses, goldenrod, sweet meadow and steplebush. On the edges of the meadow, black birch seedlings, sumac, and blueberry have become established. Very few Japanese barberry, glossy buckthorn, and multiflora rose plants dot this site.

9 (b): This small rectangular meadow adjoins a home site along Bascom Road above the productive, sandy Warwick loams. A true grassland habitat dominates this area with minor non-native plants along the southern edge. Mowing maintains this grassy habitat.

9 (c): This strip of shrubs, grasses, and ferns parallels the stream flow near the old home site east of Hoeshop Road. The southern edge of the meadow rest upon the dry, sandy Gloucester soils, and the northern tip lies above the poorly drained Whitman soils. Dense herbaceous plants and ferns prevent the infiltration of the area by trees seedlings and invasive plants. The land slopes northward to Otter Pond, and walking through this stand offers a unique aesthetic appeal.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX	
STEW	#10	RZ/RM/MS/SS	14 acres		NA	NA	Poor to Fair	

Narrative: These sites rest above a hardpan layer, which holds water in sandy, gravel soils, or deep, rich muck soils. Wetlands, marsh shrubland, red maple sapling/pole marshes, and riparian zones in general serve a vital water quality protection function with their ability to draw toxins and sediments out of water as it slowly moves through them. They also provide water for all wildlife populations and essential habitat for aquatic-dependent birds and animals, fish, amphibians, and invertebrates. Maintenance of their condition promotes local biodiversity.

Two serial extensions of wetland stretch through the sections east and west side of Hoeshop Road. Stream flow connects these isolated wetlands. They are deep in the forested ecosystem. The system on the east side of Hoeshop Road has one large central marsh, which drains both into Otter Pond and directly into the Otter Brook watershed. Common plants in both of these systems include winterberry, elderberry, gray dogwood, highbush blueberry, bracken fern, cattail, steplebush, and red maple.

The marsh which surrounds Otter Pond exists in a continuum of vegetation from Common reed, sedges, cattails closet to the pond and outward to hydric loving shrubs, red maple saplings, and pole stems. Common reed is a non-native, invasive plant, which threatens the native wetland plant community. A beaver greeted me during each visit to the Otter pond during the field inventory. Other wildlife citing in these stands included a great blue heron, frogs, geese, ducks, and white tailed deer.

Section 2.3: MANAGEMENT PRACTICES To be done within next 10 years

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#1	WK	1. Optional Habitat Enhancement Work –See Section #3 for specifics 2. Optional Invasive Plant removal near the spring seep on Bascom Road and the roadsides through the stand.			

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#2	WH	1. Possible Thinnings	42 acres	35 SF basal area removed	
Estimated Timber Products: <u>Option 2:</u> 70 MBF White pine timber, 10 MBF Hemlock timber, 80 cords pine pulp in standing trees and top wood, 50 cords of firewood in standing trees. <u>Option 3:</u> 60 cords of firewood and 35 cords of white pine and hemlock pulpwood. 2. Optional Trail Development and Improvement 3. Optional Invasive Plant Control prior to Crown Thinnings 4. Optional Habitat Enhancement Work –See Section #3 for specifics						

Narrative: Healthy forest stands provide good habitat, support healthy wildlife populations, and increase ecological resiliency of a forest. Intermediate harvests in an all-aged stand structure improve the overall stand condition and individual tree growth. Option 2 would remove pine trees within a diameter range of 15 to 23 inches. These stems have both crown and bole defects, root heaving evidence, and juxtaposition next to superior trees. The mechanics of harvesting mandates the removal of smaller trees in the way of felling larger ones. Option 3 would remove red maple, hemlock, and black birch pole trees (diameter range six to 15 inches).

The designation of a 75-foot filter strip around all riparian zones promotes the conservation of biodiversity throughout the harvest. Implementation of the techniques outlined in Section 3 of this plan guarantees protection of both biodiversity and habitat. Open ground harvesting during the late summer or early fall promotes mineral soils scarification and the preparation of an ideal seedbed. The installation of five small log-landing sites avoids interaction with the inner core zone of fragile ecosystem. Conversion of these small openings to native grass and wildflower meadows post-harvest enhances habitat value. Thoughtful harvest road design and layout assures compliance with all of the CR provisions. Some of these roads could be incorporated into future trail networks.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#3	HH	1. Optional Habitat Enhancement Work –See Section #3 for specifics			

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#4	WP	1. Possible Thinnings	12 acres	25 SF basal area removed from specific canopy layer	
Estimated Timber Products: <u>Option 2:</u> 30 MBF White pine timber and 60 cords pine pulp in standing trees and top wood. <u>Option 3:</u> 20 cords of firewood and 30 cords of pine and hemlock pulpwood. 2. Optional Trail Development and Improvement 3. Optional Invasive Plant Control prior to Thinnings 4. Optional Habitat Enhancement Work –See Section #3 for specifics						

Narrative: The mature white pine timber in this stand is an excellent seed source. The younger age classes are developing beneath their shade. Silvicultural application of thinnings in either the upper or the lower canopy would further the development of the all-aged condition and improve the vigor and high quality condition of the stand. Healthy forest stands provide good habitat, support healthy wildlife populations, and increase ecological resiliency of a forest. This stand eclipses two small sections of swamp. A 75-foot filter strip zone would be

established around these fragile eco-niches for the protection of site biodiversity. Pre-harvest control of the invasive plant community within this stand will further protect the site's biodiversity, prevent their spread throughout the stand, and promote native seedling development. One small log landing could be installed along Bascom Road for truck access on level, dry sandy soils. Two landings would be required on Hoeshop Road in this stand near trailhead areas. Post-harvest grading and seeding of these sites provides excellent browse and insect breeding areas.

Trees for removal in either choice of thinning include three different sizes and ages of white pine timber crops. Some younger trees with a diameter range of 15 to 19 inches would be targeted, and another group of older, larger trees that range in diameter from 25 to 29 inches. All trees chosen would be high-risk stems, which may not survive another 15 years on site. Their crowns are small and asymmetrical, and their root systems heave upward from winds. They are trees, which compete with the crowns of the best pine genotypes in the stand. The immature pine for harvest are poorly formed, not vigorous, and in competition with the better immature hardwood crowns. Sapling and pole hardwoods would also be removed in the mechanics of the felling of larger pine stems. Low thinnings would remove the black birch pole stems with nectria infections and the inferior red maple stump sprout and suppressed poles and saplings.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#5	RZ-WK	1. Optional Invasive Plant Control 2. Optional Trail maintenance and improvement 3. Optional Habitat Enhancement Work –See Section #3 for specifics			

Narrative: The trail near the old stream foundation features a couple of old apple trees and a wide spreading maple on a small knoll. This area with its view of the spring-fed stream the spring wildflowers offer a pleasing short hike. This trail could connect down to the meadow site with a little work.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#6	WP	1. Possible Thinnings 23 acres 40 SF basal area removed from specific canopy layer			
Estimated Timber Products:						
<u>Option 2:</u> 55 MBF White pine timber and 45 cords pine pulp in standing trees and top wood.						
<u>Option 3:</u> 40 cords of pine and pulpwood.						
2. Trail Development and Improvement						
3. Invasive Plant Control prior to Thinnings						
4. Habitat Enhancement Work –See Section #3 for specifics						
5. Pruning of the immature white pine trees.						

Narrative: Thinnings in either the upper or the lower canopy will open the growing space for an increase in tree vigor of the appropriate age class trees. Although reproduction is not the objective, these small, conservative removals also open forest floor space for seedling development and encourage the desirable all-aged stand condition. Healthy forest stands provide good habitat, support healthy wildlife populations, and increase ecological resiliency of a forest. This stand eclipses three small sections of swamp. A 75-foot filter strip zone would be established around these fragile eco-niches for the protection of site biodiversity. Pre-harvest control of the invasive plant community within this stand will further protect the site's biodiversity, prevent their spread throughout the stand, and promote native seedling development. Two landings would be required on Hoeshop Road in this stand near trailhead areas, and one could be located along the old driveway access road. Post harvests the grading and seeding of these sites provides excellent browse and insect breeding areas. The narrow hauling roads might be useful for future trails.

Trees for removal in either choice of thinning include two different sizes and ages of white pine timber crops. Crown thinning would remove younger trees with a diameter range of 11 to 13 inches and another group of older, larger trees greater than 24 inches in diameter. All trees chosen would be high-risk stems, which may not survive another 15 years on site. Their crowns are small and asymmetrical, and their root systems heave upward from winds. They are trees, which compete with the crowns of the best pine genotypes in the stand. Low thinning would remove the immature pine with poor forms, low vigor, and position next to the better immature pine crowns. Sapling and pole hardwoods would also be removed in the mechanics of the felling of larger pine stems. Either thinning operation would release the sprawling white oak or hickory crowns for increased mast production. The immature pine pole trees with excellent growth rates, good form, in addition, tiny branches could be pruned for quality improvement.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
STEW	#9	GF-ESH	1. Optional Invasive Plant Control 2. Optional Trail maintenance and improvement along the Fall River 3. Optional Habitat Enhancement Work –See Section #3 for specifics 4. Optional Improvement of access road into the meadow along the Fall River			

Narrative: 9 (a): The meadow along the Fall River offers a peaceful solitude for hikers or fisher persons. An existing aces road needs improvement for the eventual necessity of emergency vehicle access. Simple grading and some gravel placement will open the area to use by emergency-wheeled vehicles. A fabricated metal gate and signage will be placed at the entrance to the road. Bi-annual mowing or brush hogging will maintain this valuable habitat vegetation and remove the infiltration of tree seedlings.

9 (b): Annual mowing of this grassy and herbaceous meadow maintains its habitat value.

9 (c): Timing of the mowing of this moist site for late summer or early fall will protect the soil integrity.

All mowing work should respect the breeding and nesting season from mid-April to late August.

	STD NO	TYPE	AC	SIZE-CLASS MSD	BA/AC	VOL/AC	SITE INDEX
STEW	#10	RZ/RM/MS/SS	4 acres		NA	NA	

Narrative: A program of invasive plant control will remove the Common reed plants from the Otter Pond.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
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STEW ALL ALL BOUNDARY DELINEATION 2014 to 2015

The boundaries of the property will be defined through painting. The Roberge survey map will be used for delineation purposes. As Frost stated, "Good fences make good neighbors." The establishment of the boundary of any woodlot indicates a commitment to its stewardship.

OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
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STEW ALL ALL Monitoring and Site Assessments

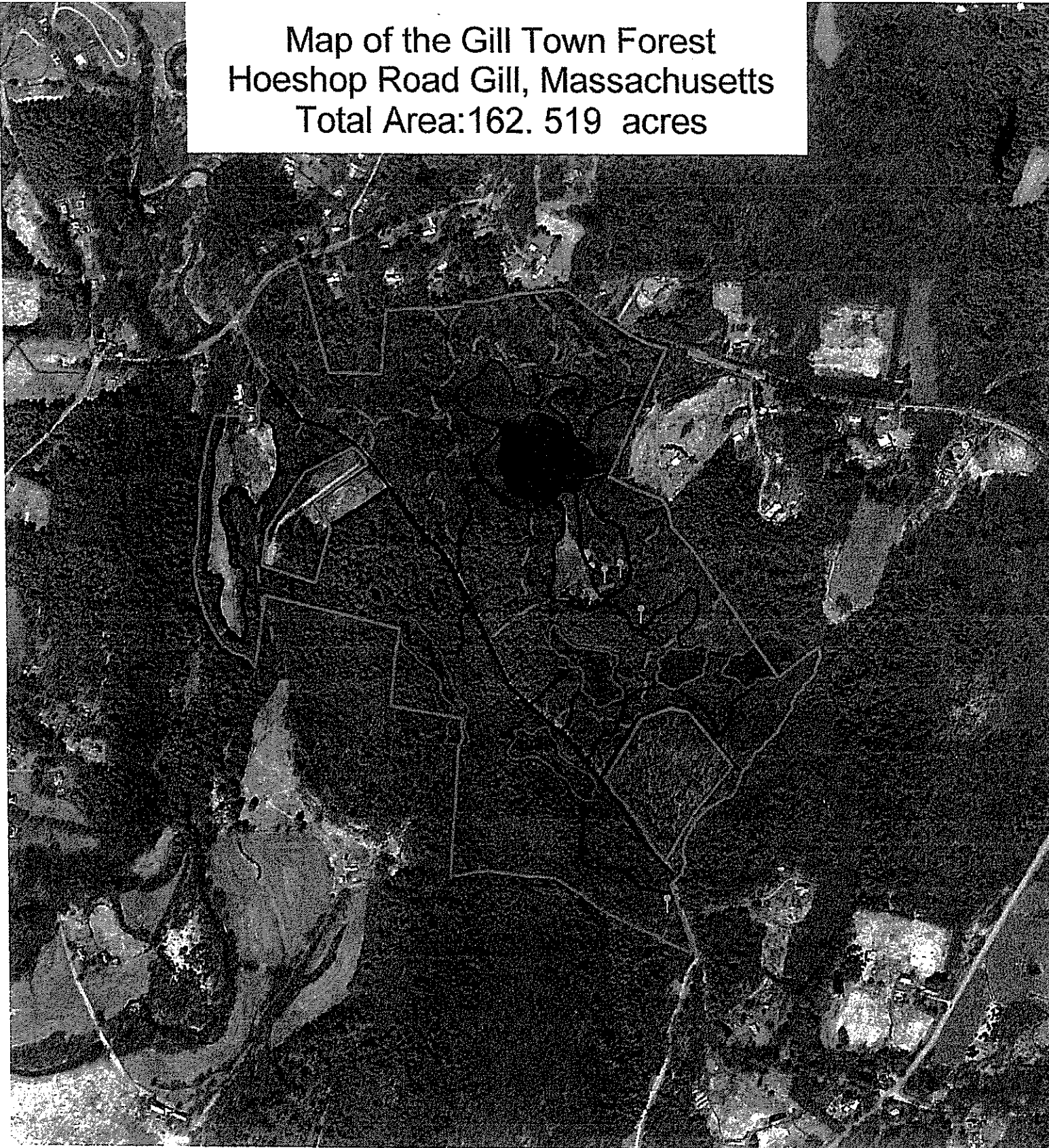
Narrative: Annual reviews of the property for the status of invasive plant control, the development of the desirable forest stand conditions inclusive of forest health, seedling development, or environmental damages.







OBJ	STD NO	TYPE	TREATMENT	AC	TO BE REMOVED BA/AC TOT VOL	TIMING
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STEWALL ALL FOREST STAND REVIEW FOR 2024
MANAGEMENT PLAN REVISION


As mandated by the CR, a full review of the site will be conducted at the end of a ten-year period. A revised management plan must be submitted to the Department of Conservation and Recreation at this time.

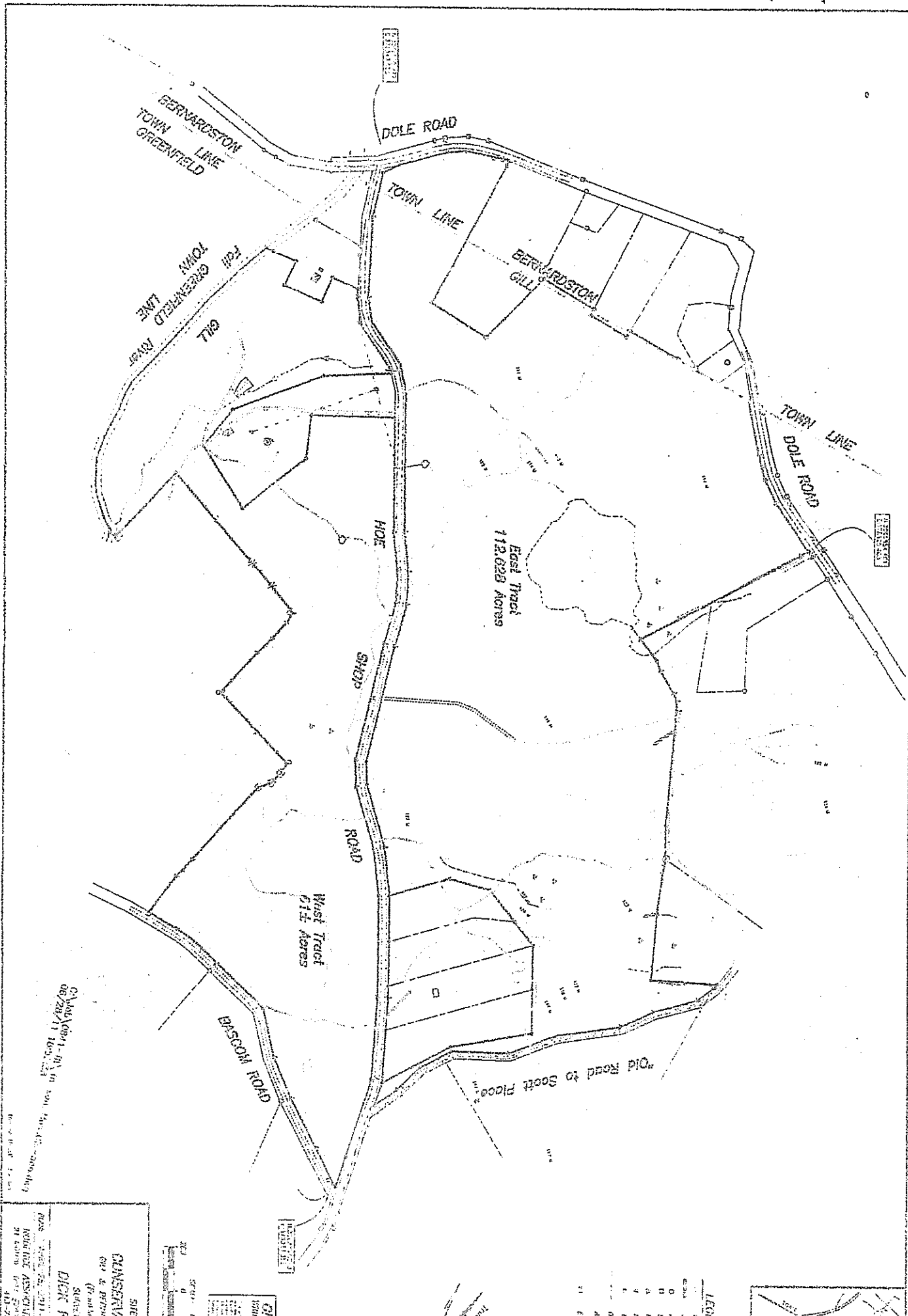
Map of the Gill Town Forest
Hoeshop Road Gill, Massachusetts
Total Area: 162.519 acres



-  Boundary
-  Swamps
-  Forest Cover Types
-  Streams
-  Springseep
-  Rectrail

1000 0 1000 2000 Feet





SECTION #3: WILDLIFE HABITAT MANAGEMENT TECHNIQUES SUMMARY SPECIFIC TO THE STANDS ON THE GILL

TOWN FOREST

Habitat Element and Value Found In The Town Forest	Location Within The Town Forest by Compartment and Stand Number	Suitable Enhancement or Preservation Technique Applicable to Stand	Specific Guidelines for Implementation
Browse layer-food source and cover for wildlife	Stands #2, #4, and #6 -72 acres of land suitable for silviculture.	1. Establish new native seedlings, saplings, and shrubs and encourage the growth of existing vegetation.	1. Create openings in the main canopy during the application of Crown or Low Thinnings. 3. Invasive plant control executed before any harvest work. 3. Remove hazard trees along the main trail system.
	Stand #9 and #10	1. Release stocking of native seedling, sapling, and shrub layer	1. A program of invasive plant control and stocking reduction will release the native seedlings and shrubs.
Herbage Layer	All stand where applicable. Native herbage has high stocking levels now and little threat of suppression.	1. Allow native herbage to thrive with through increasing sunlight.	1. A program of invasive plant control and stocking reduction will release the native herbage.
Mast Trees/Shrubs	Stands #2, #4, and #6 where applicable- mast trees are sparse in the pine groves.	1. Retain and release when applicable red oak, white oak, shagbark hickory, pignut hickory, black birch, yellow birch, sugar maple, and ash large diameter, maturing stems. 2. Retain or release native soft mast shrubs or small trees such as raspberry, striped maple elderberry, blueberry, hazelnut, or dogwood.	1. Retain at the minimum 20 stems per acre of large mast producing trees with diameter greater than 18 inches in the mixed pine and hardwood stands. 2. Retain all mast trees in the white pine groves. 3. Release the crown of of superior mast producing trees on 2 or 3 sides.
	Stand #9		5. Release through manual clippings or thinnings native small trees such as elderberry, striped maple, or dogwood from overtopping competition. 6. Release of the apple trees which dot each section of Stand #9.
Edge Zones and Early Successional Habitat	Stands #7, #9, and #10	1. Maintain high quality condition of the native grass, forbs, herbaceous plants, and shrubs in the open sites and along the edges.	1. Plant native shrubs and fruiting trees to diversify the species composition within the edge habitat for the development of cover and food. 2. Mow or cut tall shrubs every 7 to 10 years. 3. Avoid edge and meadow maintenance from April to August during nesting season.

Edge Zones within Forest Stands			<p>4. Establish a program of grassland bird management with 2 bluebird or kestrel boxes per 300 feet.</p> <p>5. Initiate a program of invasive plant control to promote native plant communities within the edge and mowing sites. Follow all treatment with the initiation of a monitoring and evaluation program for future planning.</p> <p>6. Release apple trees within the open areas for overtopping competition on all sides.</p>
	Stand #2, #4, and #6		<p>1. Create brush piles with the windfalls or any tree removal debris at the edges for cover within Stands #2, #4, and #6.</p> <p>2. Retain scattered large trees throughout Stands #2, #4, and #6 for denning and perching near the edges.</p>
Cavity Trees	Stands #2, #4, and #6-during silviculture work.	1. Retain cavity trees in various locations for use by different species.	<p>1. Retain cavity trees and potential cavity trees at woodland edges, in deep interior of the forests, and along stream and riverbanks.</p> <p>2. A general rule-of-thumb is to retain at least 2 trees greater than 18 inches per acre.</p>
Den Trees and Snag Trees	Stands #2, #4, and #6-during silviculture work.	1. Retain existing and recruit potential new den and snag trees within the forest stands.	<p>1. Retain all den trees greater than or equal to 25 inches in diameter in the riparian zones.</p> <p>2. Retain a minimum of 2 or more den trees per acre greater than or equal to 25 inches in diameter in the upland habitat sites.</p> <p>3. Retain 3 to 5 potential den trees greater than or equal to 18 inches in diameter per acre with existing cavities throughout all stands.</p> <p>4. Retain all snag trees or stumps greater than 6 inches in diameter throughout all stands unless the stem is a hazard to the Town Forest patrons.</p>
Coarse Woody Debris (CWD)	All stands Technique #4 is specific to Stands #2, #4, and #6 during silviculture work.	1. Retain and recruit higher volumes of CWD across the forest stands in the Sanctuary.	<p>1. Larger pieces of CWD are more valuable than smaller pieces—they last longer, hold more moisture, are useable structures for a greater number of organisms, and cannot be easily replaced.</p> <p>2. Ecologically, it is advantageous to maintain the full range of decay and diameter classes of CWD in all stands—different functions and ecosystem processes require CWD in different stages of decay.</p> <p>3. The composition and arrangement of CWD should be managed within acceptable levels of</p>

Signature Page Please 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 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.

☒ **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.

^{adg}
No ☒ **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 any and all applicable taxes, including outstanding balances, on this property.

Signed under the pains of perjury:

Owner(s) Amy A Gordon Date June 9, 2014

Owner(s) _____ Date _____

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

Plan Preparer Mary H. Wagoner Date 6/9/2014

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

Approved, Service Forester [Signature] Date 9/3/14

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.

