

dcr



FOREST MANAGEMENT PLAN

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



CHECK-OFFS

CH61 cert. <input type="checkbox"/> recert. <input type="checkbox"/> amend. <input type="checkbox"/>	CH61A cert. <input type="checkbox"/> recert. <input type="checkbox"/> amend. <input type="checkbox"/>	CH61B cert. <input type="checkbox"/> recert. <input type="checkbox"/> amend. <input type="checkbox"/>	STWSHP new <input checked="" type="checkbox"/> renew <input type="checkbox"/> FSC <input type="checkbox"/> Conservation Rest. <input checked="" type="checkbox"/> CR Holder _____	C-S EEA <input checked="" type="checkbox"/> Other <input type="checkbox"/> Birds <input type="checkbox"/>
Plan Change: _____ to _____				

Administrative Box

Case No. _____	Orig Case No. _____
Owner ID _____	Add. Case No. _____
Date Rec'd _____	Ecoregion _____
Plan Period _____	Topo Name _____
Rare Spp. Hab. _____	River Basin <u>Nashua</u>

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) Groton Conservation CommissionMailing Address Town of Groton; 173 Main Street; Groton, MA 01450Phone (978) 448-1106

Email Address _____

Property Location: Town(s) GrotonRoad(s) Shirley RoadPlan Preparer Michael Barry - Bay State Forestry ServiceMass Forester License # 11Mailing Address 468 South Mountain Road; Northfield, MA 01360Phone (774) 364-4192

RECORDS

Assessor's Map No.	Lot/Parcel No.	Deed Book	Deed Page	Total Acres	Ch 61/61A 61B Excluded Acres	Ch.61/61A 61B Certified Acres	Stewshp Excluded Acres	Stewshp Acres
219	8			136.25	0	0	30.3	105.95
220	35			25.4	0	0	0	25.4
210	8			10	0	0	0	10
TOTALS				171.650	0.000	0.000	30.300	141.350

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

Hay field areas are excluded from the stewardship acreage of this property, and are shown on the forest stand map within this management plan.

HISTORY Year acquired 2006 Year management began 2006

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

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

stand no. N/A treatment _____ reason _____

(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Acres	Date
N/A					

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

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			X	
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:				

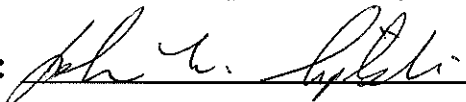
*This goal must be checked "HIGH" if you are interested in classifying your land under Chapter 61/61A.

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

Stewardship Purpose

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

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

Signature(s): 

Date: 3/28/17

Owner(s) (print) Groton Conservation Commission

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

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Active Forest Management Philosophy For Municipally Owned Conservation Land

Management of forest land has become a controversial issue in southern New England as open space becomes more scarce, and the impacts of conducting forestry practices becomes less familiar to the general public. This is especially true on public lands, where responsibility for the care and custody of the land often falls to appointed or elected commissions or committees, a diverse group of people with different backgrounds, interests, and areas of expertise. Any management conducted can have a direct impact on the existing recreational opportunities and the aesthetics of a property. This can result in the preference for a "hands off" philosophy when managing municipal lands. While this approach is appropriate in some places and for some reasons, there are many reasons that an active management philosophy is justified for the long term management of forests in this region.

Actively managing public open spaces for long term benefits including wildlife habitat, water quality protection, enhancing recreational opportunities and maintaining good aesthetics is the basis for conducting good forestry. While it is not always possible to meet every goal on every acre of land, it is usually possible to achieve a variety of goals on a single parcel. Planning out the details of activities ahead of time is critical to success. It is imperative to get all interested parties involved at the beginning of a project. This allows for everyone to have the same expectations of the results of a project, and to work toward meeting those expectations throughout the process. If good quality, well planned forest management activities are conducted more often, it could result in a reduction of the negative association with timber harvesting. This would make it easier to accomplish all of the goals associated with active forest management.

Wildlife habitat enhancement is often cited as a goal on public conservation lands. It would seem that allowing nature to take its course would be the best method for maintaining good wildlife habitat in the long run. While at the surface this sounds good, there are many reasons that it may not be the best approach for local wildlife habitat and populations.

Human activity creates a much different landscape than would otherwise occur without our developed lands. The areas we maintain without vegetation fragment the remaining natural places, and add a lot of edges, where pavement or manicured lawns meet forest habitat. This can result in great success for some species (white-tailed deer, raccoon, grey squirrel, cowbird), but can be a huge detriment to others (ruffed grouse, wood thrush, Cooper's hawk, flying squirrel).

Often, the species that thrive in our suburban habitats also create more impacts on the remaining natural areas. White-tailed deer populations can become too high in areas with a lot of forest edge. In these areas, the deer can prevent new tree and shrub growth in the forest when they browse and feed on this vegetation. This causes an immediate decrease to the quality of wildlife habitat, as many birds and small mammals need the low vegetation for cover and food sources. In the long term, it can be difficult to regenerate new trees in the forest to replace those that grow old or those that are uprooted in a natural disturbance event.

In addition to decreasing the total amount of habitat, humans also prevent a lot of natural disturbances that create more diverse habitat conditions across the landscape. Installing culverts, dismantling beaver dams, and generally preventing flooding helps our way of life, but also prevents forests from flooding and becoming marshes, shrub swamps, and eventually young forests again. Humans put a lot of effort into controlling wildfires. Without human interference, a wildfire caused by a lightning strike could create many acres of young forest after the larger trees die off. Larger disturbances are impacted by humans as well, even if they cannot be totally avoided. Clean-up efforts after tornados and hurricanes alter what would have occurred naturally, removing a lot of coarse woody material that is beneficial to insects, which then are fed on by birds and other wildlife species. While these activities seem normal and even required for our needs of the landscape, they have significant consequences for the natural world around us. The result can be a landscape dominated by areas where humans have taken over, and the remaining forest, consisting of a very uniform, maturing forest without a lot of benefit for many species of wildlife.

Enhancing recreational opportunities is another primary goal on many public forests. Recreation in the forest allows people to become connected with the natural environment around them, as well as to get away from the stress and challenges of our fast-paced society. Maintaining recreational opportunities can be costly, depending on the intensity of use and the current conditions of the land. Forest management activities that are conducted without consideration for recreational use can be a severe detriment to those uses. Planning out management activities can allow for multiple uses on the same property, including recreation, wildlife habitat and timber harvesting. In some cases, existing trails occur on woods roads that were originally created in timber harvesting operations. These roads can often be used in future projects with minimal or temporary impacts to recreational activities. Other situations sometimes require the avoidance of existing trails, but allow for active management for timber or wildlife in the vicinity of trails. If a project is planned properly, it can be completed in a way that enhances existing roads and trails on a property. This can reduce the cost over time of maintaining recreational trails in open space.

Active forest management can be conducted for the benefit of wildlife habitat, forest health, and enhancement of recreational opportunities. While it can be challenging to plan out and implement these projects, a successful result that improves the forest for the long term is well worth the effort.



Property Overview, Regional Significance, and Management Summary

Landscape Overview

Surrenden Farm West consists of 171.65 acres of land owned by the town of Groton, Massachusetts. 161.75 acres of this land is under the care and control of the Groton Conservation Commission. This portion of the land is also protected under a conservation restriction, held by the Massachusetts Department of Fisheries and Wildlife. The remaining 10 acres is administered by the Groton Water Department, and is held as a potential well site for town water. This land was purchased in 2006 through a collaborative effort including the Trust for Public Land, the Groton Conservation Trust, the Division of Conservation Services, and funds from the Community Preservation Act (implemented in Groton in 2004).

There is a significant component of protected open space adjacent to and in close proximity to this parcel. Properties that abut these parcels with permanent protection include the General Field, owned by the Groton Conservation Trust (purchased along with Surrenden Farm West), consisting of 143 acres; the Groton Town Forest, containing over 500 acres on the west side of the Nashua River; and the Ayer Game Farm with 60 acres under permanent protection. Other nearby protected lands include Sabine Woods, owned by New England Forestry Foundation, consisting of 140 acres; and the Squannacook River Wildlife Conservation Easement, with over 140 acres. Development pressure is certainly an issue in this region, but efforts such as those that protected this parcel will help this region to maintain a component of open space for the long term.

Current Forest Condition

This property consists of a total of 171.65 acres, including three contiguous parcels identified on the Groton Assessors Map. Within these three parcels, there is 43.4 acres of hayfield and grassland habitat, 47.65 acres of softwood forest, 40.4 acres of hardwood forest, 37.7 acres of mixed forest, and 1.5 acres of open water. Most of the forest on this property contain large diameter, maturing timber. About 6 acres contains younger, smaller trees. There are some small forested wetlands on the parcel, and at least two locations that hold standing water in the spring, potentially providing vernal pool function. Tree regeneration and dense shrubs are lacking in much of the forest on this property due to the dense overstory. These components provide vertical structure, greatly enhancing wildlife habitat conditions and overall forest health. Management activities can be planned to develop additional understory growth in order to increase this component.

Forest Health Concerns

There are two primary forest health concerns that will be addressed in this forest management plan. The first issue is due to the lack of forest understory. A mature forest without established tree regeneration can be at risk for long term forest health. If a natural disturbance occurs, such as a tornado or hurricane, there will be very little vegetation left in the area. If a forest has a well-established understory, it can recover from such a disturbance much quicker than a forest with open conditions. Management practices will be planned in order to establish understory growth to develop a more resilient forest.

The second forest health issue is the presence of non-native invasive plant species. Much of this property contains some component of invasive plants. Areas near the road and the open fields tend to have very dense



Property Overview, Regional Significance, and Management Summary

infestations of non-native plants. Locations further from these features have more minor occurrences. Invasive plants that exist here include Oriental bittersweet, common buckthorn, glossy buckthorn, honeysuckle, multiflora rose, burning bush, autumn olive, Japanese barberry and Japanese knotweed. These plants can reduce native plant populations in the forest understory, impacting the wildlife habitat and the long term productivity of the forest. Management of these plants is especially important when conducting harvesting, as this disturbance can allow the invasive plants to spread quite rapidly.

Wildlife Habitat

Habitat conditions are good on these parcels at this time. The combination of mature forest, hay field, open grassland habitat and water resources provide excellent variety of conditions. This diversity of habitat is directly reflected in the abundance of wildlife species that utilize the area. The abundance of oak trees provides a food resource for many animals in the form of hard mast (acorns). In addition, oaks attract many species of insects that feed on the foliage. These insects become food resources for many forest birds and mammals. There are many locations where dead standing trees occur (snags). These features create homes for wildlife species and attract other insects as well. The component of large trees creates an opportunity for large cavity trees that are a very important forest habitat component. All of these features will be considered when planning and implementing forest management activities. These features will be protected whenever possible and enhanced when the opportunity arises.

A significant portion of this property is located in area designated as Priority Habitat by the Massachusetts Natural Heritage and Endangered Species Program. Priority Habitat is mapped where there is a known occurrence of a rare or endangered species. The Priority Habitat covers land in the western region of the property. In the southern half of the property, over half of the acreage is within the mapped area. All of the floodplain forest (stand 5) and the white pine/hemlock forest (stand 7), and most of the grassland habitat (stand 12) is within Priority Habitat. In the northern portion of the property, the rare or endangered species habitat occurs in a more narrow strip along the Nashua River. Known species within this area include Blanding's turtle, wood turtle, Eastern box turtle, blue-spotted salamander, four-toed salamander, triangle floater mussel and 2 state-listed dragonflies. The BioMap 2 Core Habitat designation covers all of the Priority Habitat, and additional acreage, mostly in the grassland habitat on the property.

Recreation

There are multiple recreational opportunities on these parcels at this time. A main trail occurs along the Nashua River along the entire length of the property. A few paths exist to the north of the hayfield/grassland habitat, forming an enjoyable loop trail. An access point and logging road exist in the southern portion of the property as well. Over time, the goal is to focus trail use in the north, and to discourage trail use and development in the southern region. Hunting is allowed on this parcel during appropriate seasons according to Massachusetts regulations. No motorized vehicle use is allowed on the trails here.



Property Overview, Regional Significance, and Management Summary

Cultural Resources

There is some evidence of past land use on this parcel. Fencing, man-made drainage channels, old apple trees, a small gravel pit and occasional stone walls/lines of stones occur, showing the agricultural past of this forest. Much of this land was likely cleared for animal pasture or crop fields at one time, as was most of the surrounding landscape. The planted trees are another indicator of land that was previously used as some sort of farmland. There are at least two likely cellar holes, located in the northern portion of the property, where residences once existed. These features are all a reminder of how the landscape changes over time, and how our current management choices can impact the future conditions of the land.

Management Recommendations

Several management activities have been recommended for these parcels in the next ten year timeframe. The first recommendation is to establish well-marked boundary lines. This will allow for more efficient implementation of management practices through the course of this management planning period. The second management recommendation is to implement an invasive plant control program to remove non-native plants and to restore these sites to native plant communities. Since there are some areas with a dense invasive plant component, this will be a difficult task, but it will allow for other objectives to be achieved more fully if accomplished. The third recommendation is to clear plantations and other areas adjacent to the open fields in order to diversify the habitat conditions on the property. The final recommendation consists of conducting timber harvesting activities with the goal of establishing a healthy component of tree regeneration, creating more vertical structure and species diversity for wildlife, and generating revenue for the landowner. Addressing these management recommendations will be a benefit to this land in both the short and long term. Being a good steward of open space allows the public to see what can be accomplished with active forest management, and the benefits that can be demonstrated as a result.

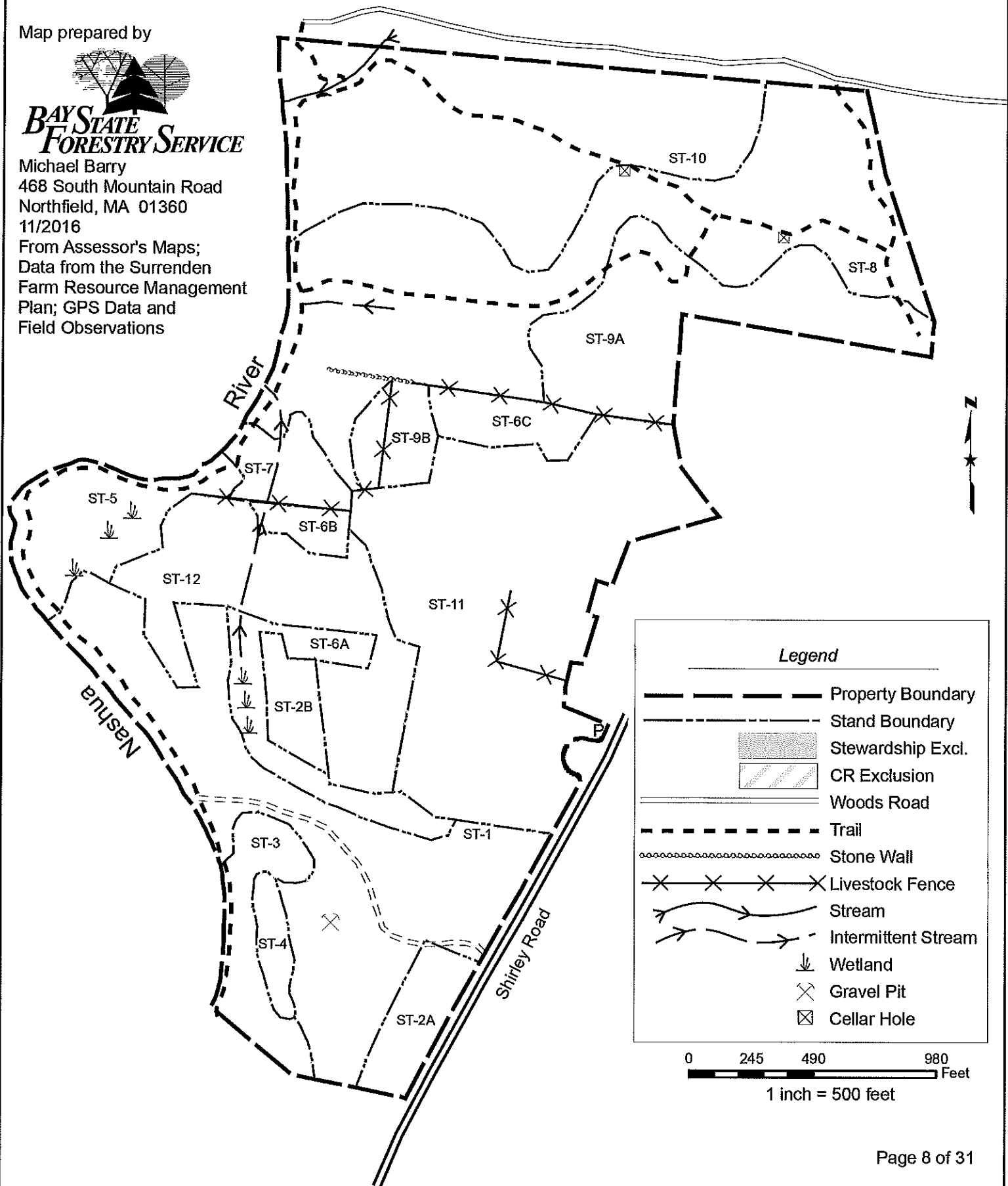
Property Boundary and Forest Stand Map

Surrenden Farm West, Owned by the Town of Groton
Located on Shirley Road, Groton, Massachusetts

Map prepared by

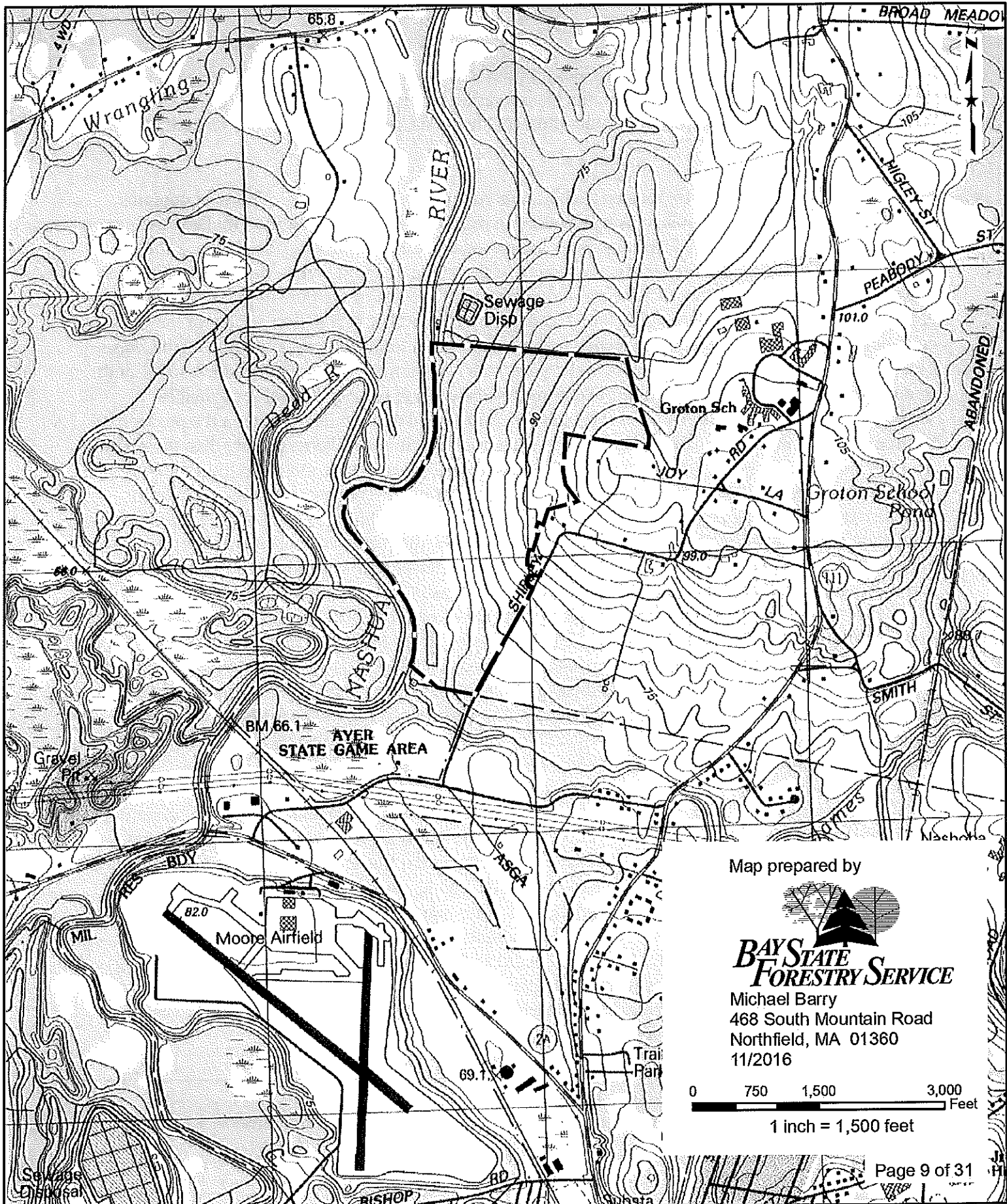


Michael Barry
468 South Mountain Road
Northfield, MA 01360
11/2016
From Assessor's Maps;
Data from the Surrenden
Farm Resource Management
Plan; GPS Data and
Field Observations



Property Location Map

Surrenden Farm West, Owned by the Town of Groton
Located on Shirley Road, Groton, Massachusetts



STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	01	WP	24	18.6	159	20.3 MBF 5.5 Cords	68-WP

21.2 acres of this stand occur within the Conservation Restriction held by MA DFW.

2.8 acres of this stand are excluded from the Conservation Restriction held by MA DFW. This land is under jurisdiction of the Town of Groton, protected under a Conservation Restriction held by the Conservation Commission.

Stand 1 is a white pine forest located in the southern region of the property. This area contains mostly white pine which originated as a plantation to reforest this area. In addition to the white pine, there is a minor composition of hardwoods including red oak, red maple, black birch, black locust, black cherry and black oak. Generally, the quality of the timber is good at this time. The white pine is large in diameter, averaging 19.5 inches in diameter (dbh). Most of the pine in the stand can be considered mature for the purposes of forest management for timber production. Some of the trees contain large dead limbs in the main stem which produce black knots in boards sawn from the logs. This greatly reduces the timber value of white pine trees. Other trees in the stand contain small limbs or no limbs in most of the lower stem. These trees contain much better potential for valuable sawtimber. The hardwood trees in this stand are of fair to good quality, depending on the position of the tree in the main canopy. Trees that have some direct sunlight are of better quality than those that are fully shaded out by taller trees (suppressed). Tree regeneration occurs mostly at low stocking levels, with some small patches of more dense young tree growth. Tree species in the understory include red maple, black birch, white pine, oak, elm, hickory and white ash. Although the understory vegetation is somewhat limited due to the dense tree canopy, there are several shrub and ground cover species that can be observed in this stand. American hornbeam, hop-hornbeam, winterberry, maple-leaved viburnum, sarsaparilla, high-bush and low-bush blueberry, rubus and several fern species occur with varying densities. Invasive plants are a very significant problem here, occurring at some level in almost all parts of the stand. The non-native plants tend to be more dense in areas close to the field and the road, where more sunlight reaches the forest floor. Invasive plants observed include Oriental bittersweet, glossy buckthorn, burning bush, Norway maple, black locust, Japanese barberry, honeysuckle, multiflora rose and privet. Any management in the near future will need to consider these undesired plants and the potential for making this issue worse through management activities that cause a disturbance or introduce sunlight to the forest floor.

This stand occurs on flat terrain with mainly moderately drained soils. Some areas hold more moisture, including small low areas and some of the terrain near the Nashua River, on the western side of the stand. The soils here are classified as Windsor loamy sand, Deerfield loamy fine sand, Birchwood fine sandy loam, and Winooski silt loam. Generally, this area contains conditions that are favorable for white pine growth. This stand can produce good growth in pine, as can be seen from the current forest type, size class and stocking level. The stand is currently at a very high stocking level with a single age class present. The desired condition for this stand in the future is a forest containing a strong component of white pine, but with additional hardwood stocking. Maintaining the forest with multiple age classes will also help to increase wildlife diversity, protect against natural disturbance, and maintain good forest health. Removing or reducing the composition of invasive plants is also a primary goal for this stand in the long term.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A)

STEW= Stewardship Program practices

STD= stand

Type= Forest type

AC= acre

MBF= thousand board feet

BA= basal area

VOL= volume

Owner(s) Groton Conservation Commission

Town(s) Groton

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	02	RP	5.25	13.6	95	13.3 MBF 1.7 Cords	60-RP

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 2 consists of two red pine plantations that occur along Shirley Road and the south edge of the large fields (stands 11 and 12). These areas consist of planted red pine with an occasional white pine, red oak or black oak included. The stocking level is moderate for a planted forest. Some small gaps in the canopy where blowdown or mortality has occurred. Most of the growing stock is of sawtimber quality at this time. Tree regeneration here consists of varying densities of tree saplings such as red oak, black oak, white pine, white oak, beech and red maple. Beneath the tree regeneration, the stand contains open ground conditions, with few native shrubs and limited ground cover. Non-native, invasive plants are quite abundant in both parts of this stand. Oriental bittersweet is extremely prevalent along the eastern edges of both parts of this stand, where full sunlight conditions occur. Other invasives that are present include common buckthorn, glossy buckthorn, honeysuckle and privet.

This area consists of flat terrain with moderate to moderately well drained soils. Soil classifications include Windsor loamy sand and Deerfield loamy fine sand. The conditions here are productive for tree growth, especially for white pine and oaks. The desired condition of this stand is a more diverse forest consisting of native tree species, including white pine, oak, red maple and hickory. A more substantial composition of native shrubs and ground cover species is also desired to enhance the overall forest health and wildlife habitat conditions.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume
Owner(s) Groton Conservation Commission Town(s) Groton

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	03	WH	4.7	18.5	125	13.1 MBF 5.5 Cords	62-WP

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 3 is a white pine/hardwood forest located in the southern part of the property, along the east bank of the Nashua River. This stand contains species such as white pine, red maple, black gum, black oak, chestnut oak, hickory and basswood. The quality of the timber is fair in this location. The white pines are large and somewhat rough, with large dead limbs and thick bark. Hardwood trees here have shorter sawlog height on average than in other parts of the property. Tree regeneration occurs in this stand at low to medium stocking levels, consisting of red maple, hemlock, black gum, white pine and oak. There is a moderate component of shrubs and ground cover species in the stand. Common species include American hornbeam, high-bush and low-bush blueberry, huckleberry, dewberry, partridgeberry, lycopodium's (club-mosses) and fern species. These plants are quite important for providing food resources to a variety of forest birds and other wildlife species. Invasive plants are a moderate concern in this stand. Medium densities of glossy buckthorn occur in most parts of the stand. While most of the buckthorn in this stand is of small to medium size (8 feet tall or shorter), there are some taller plants (over 10 feet in height). Without addressing this issue, the buckthorn will likely become a more dominant understory component, shading out native shrubs and tree regeneration.

This area consists of flat terrain with damp soil conditions. Since this stand is located between the Nashua River and the wetland/water of stand 4, the somewhat poorly drained conditions are not surprising. The soils here are classified as Winooski silt loam. Tree growth in these conditions is somewhat limited by soil moisture, but does remain in the moderately productive category. This stand will be managed to maintain the current forest type in order to provide good wildlife habitat and a riparian buffer for the Nashua River. Establishing an understory with only native plants will help to maintain long term forest health and good wildlife habitat conditions.

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	04	WA	1.5				N/A

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 4 is a small pond located in the southern part of the property, near the bank of the Nashua River. This water feature provides excellent habitat benefit, including access to water and a small edge condition where the forest meets the water. These areas generally contain more dense shrub growth, providing some cover habitat and diverse food resources. Management in the vicinity of the pond will take this resource into consideration to minimize soil disturbance that could cause a decrease in local water quality.

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	05	RZ	6.7	17.9	130	3.8MBF 14.4Cords	60-Sil Map

0.5 acres of this stand occur within the Conservation Restriction held by MA DFW.

6.2 acres of this stand are excluded from the Conservation Restriction held by MA DFW. This land is under jurisdiction of the Town of Groton, protected under a Conservation Restriction held by the Conservation Commission.

Stand 5 is a floodplain forest located in the western extent of the property, between the open fields and the Nashua River. This area contains large, broad silver maple trees, along with other hardwoods including red maple, elm, swamp white oak and hickory. Timber quality is limited due to trees with multiple stems and significant lean. These conditions create a lot of "reaction wood" which warps and splits when milled. Despite the low timber value in this stand, it is an aesthetically pleasing forest that is quite different than the rest of the property. Floodplain forests are also very important ecologically, as they contain rich plant diversity. Many floodplain forests were cleared in past centuries for use as farmland due the rich soils that they contain. Over time, these cleared, flat areas were the easiest places for more urban development. For this reason, it is very important that we protect the remaining areas that have been maintained with natural conditions.

Tree regeneration in this stand consists of low densities of saplings and seedlings. Species observed include white pine, elm, red maple, hickory, silver maple and swamp white oak. Other understory vegetation includes sensitive fern, winterberry, poison ivy and grasses. Invasive plant species occur in this stand, including glossy buckthorn, Oriental bittersweet, Japanese knotweed and honeysuckle.

This stand contains flat terrain with ground conditions that range from somewhat to very poorly drained. A wetland occurs in the middle portion of the stand, and may provide vernal pool habitat characteristics. Soils are classified as Winooski silt loam and Occum very fine sandy loam. Management in this stand will be limited to practices which enhance the wildlife habitat conditions or those intended to protect this important natural community. The desired future condition of this stand is a healthy floodplain forest containing mostly native vegetation.

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	06	BM	8.4	10.5	115	2.5MBF 11.2Cords	58-RM

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 6 consists of three areas that generally occur along the edges of the hayfield and grassland habitat. These areas are somewhat variable in species composition, but generally contain mostly hardwoods including red maple, grey birch, elm, red oak and silver maple. The southern portion of stand 6A contains some larger oaks and a component of apple trees. Stand 6B has a few pockets of planted trees such as Norway spruce and white pine, along with mixed hardwoods. Stand 6C consists of some larger white pines with sapling and pole red maple and black birch. Although these areas are somewhat differing at this time, it is likely that the conditions in each part of the stand will become more uniform over time, with management that will be recommended. A shrub component including alder and winterberry occurs in the damp parts of the stand, especially in the northeastern portion of area 6A. Invasive plants occur at medium to very high densities in most of this stand. The most prevalent non-native plants include Oriental bittersweet, common buckthorn, honeysuckle and multiflora rose. Glossy buckthorn, privet and autumn olive also occur in a more patchy distribution. The common buckthorn is quite large in the southern part of 6A, and is easy to confuse with the apple trees that are growing there.

These areas occur on flat terrain and some gentle slopes with a western aspect. The soils range from moderately drained to very poorly drained soils in and near wetlands. The soil types found here include Deerfield loamy fine sand, Scituate fine sandy loam, Windsor loamy sand and Winooski silt loam. Most areas are fairly productive for tree growth. Areas that hold a lot of soil moisture are prone to erosion when conducting management activities. These areas will be managed in the long term to develop good field edge habitat characteristics. The desired condition will be thick, brushy native vegetation with a low stocking of trees. These conditions can be expected to enhance the hayfield and grassland habitats that they are adjacent to.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume
Owner(s) Groton Conservation Commission Town(s) Groton

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	07	WK	2.8	16.8	160	15.2 MBF 10.5 Cords	62-WP

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 7 is a white pine/hemlock forest located to the northwest of the open fields on the property, along the Nashua River. This stand contains a dense softwood component including white pine and hemlock, and some small patches of planted red pine and white pine. The planted trees occur in the southern part of the stand, near the open fields. Some hardwoods occur as a minor part of the overstory, including red maple, white ash and poplar. The softwood overstory is very dense here, creating an open understory with little vegetation. Where tree regeneration occurs, it consists of white ash, silver maple, hickory and elm. Areas such as this are often used by wildlife during the winter to stay warm. The softwood trees hold in some heat when compared to hardwood trees that have no foliage in the dormant season. Invasive plants are present in this stand, including honeysuckle, privet, bittersweet, glossy buckthorn and burning bush. The density of invasives tends to be higher in the eastern and southern parts of the stand, where the overstory is slightly more open.

This area occurs on mostly flat terrain with moderately drained soils. A man-made drainage ditch occurs within this stand that may impact the soil moisture after heavy rain events. Soils here are classified as Deerfield loamy fine sand and Winooski silt loam. Tree growth in this stand is moderate to good, and the current forest type is appropriate for the site conditions. This stand will be managed to maintain a dense forest overstory with the current species distribution.

OBJECTIVE CODE: CH61 = Forest Products (for Ch. 61/61A) STEW= Stewardship Program practices
STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume
Owner(s) Groton Conservation Commission Town(s) Groton

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	08	WO	33	18.4	126	13.9MBF 2.7Cords	68-WP

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 8 is an extensive white pine/oak forest located in the northern region of the property. This area contains large diameter trees with good growth form and timber potential. Red oak, white pine and red maple make up about 80% of the stocking in this stand. Species occurring as a minor component include white oak, black oak, hickory, black birch, poplar, sugar maple and white ash. The stocking level is moderately high, and the timber volume per acre is quite high due to the large diameters of the trees. Tree regeneration occurs at low densities, consisting of beech, red maple, black birch, white pine, oak and occasional chestnut sprouts. Additional tree regeneration would benefit this stand for both wildlife habitat conditions and for ensuring long term forest health. This stand contains a moderate shrub component, consisting of witch-hazel, hop-hornbeam, maple-leaved viburnum, hazelnut, winterberry, American hornbeam and high-bush blueberry. Common ground cover species include low-bush blueberry, partridgeberry and club-moss. This variety of vegetation is very beneficial for maintaining good wildlife habitat conditions plant diversity. In some cases, witch-hazel can create difficulty when trying to regenerate pine and oak in the forest, but it is a native shrub with wildlife benefits. Invasive plants are present in this stand, occurring with patchy distribution rather than throughout the stand. Invasive plants range from medium densities to not present in some areas. Species observed include glossy buckthorn, burning bush, bittersweet, barberry, common buckthorn and honeysuckle. There is a small area of Japanese knotweed near the northeast corner of the property, on the side of the gravel access road.

This stand contains flat terrain and some gentle north and west-facing slopes. Growth is good for both oak and pine, as can be seen from the tall heights of the codominant trees. The soils area classified as Montauk and Scituate fine sandy loams, and are moderately to moderately well drained. This stand will be managed for good timber productivity in the long term, and to develop additional age classes. Timber harvesting to establish oak and pine regeneration will help to meet this objective.

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	09	WP	15.6	18.5	177	28.5MBF 2.0Cords	65-WP

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 9 consists of two distinct areas that contain mostly white pine sawtimber, of medium to large size. The white pine here is generally of good quality, although there are some trees with medium to large dead limbs in the main stem. Associated species in this stand include black oak, hemlock, red oak and white ash. The basal area stocking and the volume per acre are very high, even for a white pine forest type. Due to the dense tree canopy, the understory is rather open. Some tree regeneration occurs, including beech, red maple, sugar maple, black birch, hickory and white ash. Shrubs exist with a patchy distribution at low densities. Species observed include maple-leaved viburnum, hop-hornbeam, hazelnut, low-bush blueberry and Virginia creeper. Invasive plants are present, generally occurring at moderate densities. Oriental bittersweet and Norway maple are the most common, with some presence of burning bush, common buckthorn, glossy buckthorn, barberry and honeysuckle. The invasives are especially dense near the field edges on the south sides of these areas.

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STD= stand Type= Forest type AC= acre MBF= thousand board feet BA= basal area VOL= volume
Owner(s) Groton Conservation Commission Town(s) Groton

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	10	OM	25.3	18.0	114	11.4MBF 1.6Cords	63-RO

All of this stand occurs in the area protected by the Conservation Restriction held by MA DFW.

Stand 10 is a mixed oak forest located along the northern property boundary. Over 70% of the stocking of this stand is made up of red oak, white oak and black oak. Other species found here include white pine, red maple, hemlock and hickory. A few pitch pine trees also occur near the northwestern property corner. The timber quality in this stand is very good, and the stocking level is high for this forest type and size class. The best crop trees in this stand would do even better with additional growing space. Tree regeneration exists in most parts of the stand, but is somewhat sparse. Species include beech, red maple, black birch, white pine, chestnut sprouts and some oak seedlings. Shrubs and ground cover species in this region include witch-hazel, wintergreen, hazelnut, maple-leaved viburnum, lycopodium and low-bush blueberry.

This area contains easy terrain with moderately well drained soils. The soils are classified as Montauk, Scituate and Ridgebury fine sandy loams. The site conditions here are optimal for growth of red oak and white oak. Management activities will be conducted in this stand with multiple goals in mind. Long term development of good quality timber, maintaining and enhancing wildlife habitat conditions, and protecting recreational opportunities are all factors to consider when planning management. This stand will be managed to maintain the current forest type and to establish additional age classes in the understory in the next several management planning periods.

OTH	11	GF	30.3	N/A
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Stand 11 is an actively managed hayfield located in the central/eastern part of the property. This area contains good quality forage for livestock, and occurs at higher elevations than stand 12, allowing for better drainage. There is a minor component of spotted knapweed in some patches in this field. Knapweed is an invasive plant that can spread aggressively in open field conditions, reducing the quality of hay for animal feed. In addition to the knapweed, other invasives including common buckthorn, honeysuckle and multiflora rose occur along interior fencelines and near trees in the field.

STEW	12	GF	13.1	N/A
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Stand 12 is an open grassland habitat, maintained with annual mowing. Mowing is conducted late in the growing season or early in the spring in order to allow for nesting birds to use the area successfully. This field provides excellent habitat for migratory birds whose numbers are in decline, as well as for some small mammals and turtle species. Invasive plants occur within this stand, mainly along the forest edges. Invasive plant species include common buckthorn, multiflora rose, bittersweet, glossy buckthorn and honeysuckle.

This area will be maintained in its current condition throughout this management planning period. Implementing a control program for the invasive plants can help to enhance the habitat conditions here, as well as prevent further infestation of these species into the adjacent forest.

MANAGEMENT PRACTICES
to be done within next 10 years

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

STEW ALL Boundary Maintenance 2017,2026

Maintaining well-marked property boundaries helps to prevent trespass issues and allows for more efficient implementation of forest management activities. The boundaries on this property have not been designated in the recent past. A significant portion of the boundaries of this parcel is along the Nashua River, and does not need marking. The northern and southern boundaries should be marked, prior to conducting management activities in these areas. The status of the boundaries will be re-examined at the end of this management planning period to determine additional maintenance necessary.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

STEW 11,12 GF Field Maintenance 43.4 2017-26

Stands 11 and 12 will be maintained with mowing each year according to the Surrenden Farm Resource Management Plan. This mowing will be conducted for production of hay and for maintaining wildlife habitat conditions beneficial for songbirds, turtles, and other animals that will utilize the field and field edge.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	

STEW ALL Invasive Plant Management 100 2017-26

The majority of this property contains some component of invasive plants. In order to maintain good forest health, and to prevent the further spread of invasive plants after commercial timber harvesting activities, it is recommended that a property-wide invasive plant management program be implemented. This program will include mechanical treatments such as cutting and mowing; herbicide control including cut-surface treatments and foliar applications; and natural control through filling in gaps with native vegetation. Two approaches are described below, depending on the intensity of the current infestation. After completion of the work described below, it is important that a monitoring program be implemented to maintain good control of invasive plants. Without monitoring and further control, invasive plants will slowly become re-established on the landscape. Monitoring includes patrolling the property and removing any invasive plants found by either hand-pulling or with selective herbicide applications.

Treatment method 1 - Heavy infestations with tall vines or thick, dense shrubs

Stands 2 and 6, portions of stands 1,5,9

Estimated area - 35 acres

This treatment includes areas where there are tall vines growing into the trees, or the plants are over 10 feet tall or more than 15 feet wide. In the first growing season, two treatments will be conducted. The first treatment will include cutting the tall/large plants, and treating the cut stump with concentrated herbicide. As a part of this treatment, cutting lanes maybe necessary to create access for the second treatment. The second treatment will include a foliar herbicide application to control the smaller invasive plants in these areas. If commercial cutting or mowing work will be completed soon after the foliar application, it may be advisable to delay the spraying until the following growing season. Two follow-up foliar herbicide applications should be conducted in the next two growing seasons to control and re-sprouts and new individuals becoming established from the seed bank.

Treatment 2 - Low to medium infestations without plants over 10 feet in height

Portions of stands 1,3,5,7,8 and 9

Estimated area - 65 acres

In areas with minor to moderate components of invasive plants, foliar herbicide applications can be very effective in obtaining good control. It is important to patrol all areas that have some invasive plants as well as a buffer around the infestation. This helps to prevent future re-invasions from a few missed individual plants. A foliar application will be conducted in years 1 and 2 to control the existing plants and re-sprouts and new seed germination. After year 2, the site should be assessed to determine if a third treatment is necessary. This can be conducted in year 3 or year 4, depending on how much new growth comes back.

For both treatment types described above, all herbicide applications should be completed by MA Licensed Pesticide Applicators. All herbicides used should be listed on the Massachusetts Sensitive Area Materials List for Rights of Way Treatments, unless there is a justified reason to use another material, and it can be demonstrated that there will not be a significant environmental impact from the use of such material.

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Owner(s) Groton Conservation Commission

Town(s) Groton

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	2	RP	Clearcut	5.25	95	65 MBF 10.0 CDS	2017-19

It is recommended that the red pine plantations on this property be cleared, early in this management planning period. Planted forests do not provide the wildlife habitat benefit that a naturally grown forest does, and they are susceptible to disease, mortality and windthrow. In addition, there is a serious problem with invasive plants in these two stands. An invasive plant management program should be implemented in these areas, prior to and/or soon after the cutting takes place (see the invasive plant management practice below). This harvest will remove all of the standing red pine trees in these two stands. Once the invasive plant control program brings the areas back to a native plant community, the area will be allowed to re-grow into a forest through natural succession. Seeds from trees and shrubs in adjacent stands will naturally re-vegetate this stand over the course of this management planning period. It can be expected that these stands will develop into dense, young forests that will provide exceptional wildlife benefits in the form of early successional habitat for the next decade or more.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	6	BM	Clearing/Mowing	8.4	90	10 MBF 65.0 CDS	2019-21

The three areas designated as stand 6 contain somewhat varying conditions, but all of these areas contain limited timber value and a dense component of invasive plant species. In order to control the invasive plants in these areas and to establish good wildlife habitat conditions, it is recommended that these areas be cleared of most tall vegetation and brush. Apple trees and specimen trees such as oaks and hickories may be retained. This management practice will include the cutting and removal of all trees greater than 2 inches in diameter (except for designated trees to retain), and mowing/mulching of lower brush and all trees up to 2 inches in diameter. An invasive plant management program will be implemented along with the clearing work (see below). After this area is cleared and the invasive plants are in check, the areas will be allowed to re-vegetate naturally, creating early successional forest habitat by the end of this management planning period. This type of habitat will be especially beneficial adjacent to the hayfield and grassland habitats on the property.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	1	WP	Group selection	22	40	100 MBF 45.0 CDS	2017-19

Harvesting in stand 1 will focus on removal of mature trees and those that have poor growth form, defects, or characteristics which reduce the potential timber quality. Trees selected for removal will be in groups ranging from 0.1 to 0.5 acres in size. Gaps will be variable in size throughout the stand, but more small gaps will be created than larger ones. Some thinning of lower quality trees will occur between the open patches, to facilitate access to the patches, and to lower the residual basal area to meet the goals for this treatment. The objective of this harvest is to begin to establish good quality tree regeneration beneath the main canopy in the gaps created. This will provide good vertical structure for wildlife habitat, as well as a young forest component that will eventually replace the existing overstory canopy. Access for this harvest can be from the existing landing along Shirley Road, or from the edge of the hayfield to the north.

Since there are invasive plants in this stand, it is recommended that a management program be implemented to control the undesired plants, prior to, and/or soon after this harvest is completed. See the Invasive Plant Management Practice below for more information.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	8	WO	Shelterwood - Prep cut	33	38	135 MBF 40.0 CDS	2019-21

The following narrative is for the harvesting recommended in stands 8, 9 and 10. While these areas are different in forest type, the management objectives will be the same across these three stands.

Harvesting in stands 8, 9 and 10 will focus on removal of trees that have defects, those with poor crown position, mature trees and those not expected to survive for at least 10 years. Trees to retain will be white pines with healthy crowns and clean stems, white and red oaks with tall sawlog height that are free of defects, and specimens of other species that are in good health. Some better quality trees will be selected for removal in order to create access for skidding or to meet residual stocking goals. Access to this stand will likely be through the existing hayfield. For this reason, it may be preferred to complete this work with frozen ground conditions (preferably with snow cover). Recreational trails should be well marked and crossed the minimum number of times necessary. Debris will be cleaned from these trails upon completion of the harvesting to maintain a usable trail network. The objective of this harvest is to provide more growing space for the best quality crop trees retained in the harvest, and to begin the process of establishing tree regeneration in the understory after the cutting is completed. By retaining good quality oak and pine, it can be expected that these trees will provide the seed source for establishing the desired regeneration.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	9	WP	Shelterwood - Prep cut	50	50	130 MBF 15.0 CDS	2019-21

See narrative for stand 8.

OBJ	STD NO	TYPE	SILVICULTURAL PRESCRIPTION	AC	TO BE REMOVED		TIMING
					BA/AC	TOT VOL	
STEW	10	OM	Shelterwood - Prep cut	24	35	80 MBF 20.0 CDS	2019-21

See narrative for stand 8.

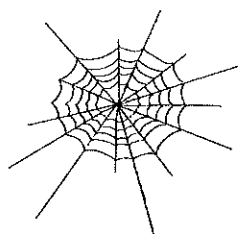
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Owner(s) Groton Conservation Commission Town(s) Groton

Note: The following 7 pages are educational materials supplied by the MA Forest Stewardship Program

Stewardship Issues

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.

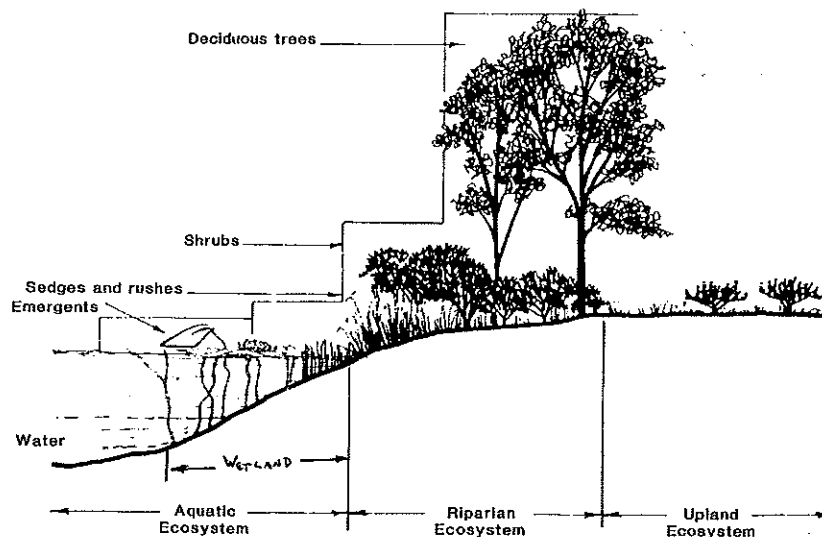


Figure 1: Example of a riparian zone.

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.

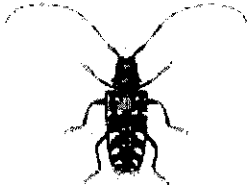
If aesthetics is a concern and you are planning a timber harvest, obtain a copy of this excellent booklet: *A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters & Landowners*, by Geoffrey T. Jones, 1993. (Available from the Northeast Regional Agricultural Engineering Service, (607) 255-7654, 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.



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.

☐ **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) *John T. Smith* Date 3/28/17
 Owner(s) *Jane L. Black* Date 3/28/17

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

Plan Preparer _____ Date _____

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

Approved, Service Forester _____ Date _____

Approved, Regional Supervisor _____ Date _____

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

Owner(s) Groton Conservation Commission Town(s) Groton