

FOREST STEWARDSHIP PLAN

DESERT NATURAL AREA CONCORD ROAD & OLD CONCORD RD. MARLBOROUGH, MA



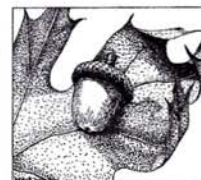
PREPARED FOR
THE CITY OF MARLBOROUGH
CONSERVATION COMMISSION

BY:
ROGER PLOURDE JR., C.F.
SHAVONNE SARGENT
BROAD ARROW FORESTRY
APRIL, 2010



FOREST MANAGEMENT PLAN

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



CHECK-OFFS					Administrative Box			
CH61	CH61A	CH61B	STWSHP	C-S	Case No.	Orig. Case No.		
cert. <input type="checkbox"/>	cert. <input type="checkbox"/>	cert. <input type="checkbox"/>	new <input checked="" type="checkbox"/>	EEA <input checked="" type="checkbox"/>	Owner ID	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	Ecoregion		
amend <input type="checkbox"/>	amend <input type="checkbox"/>	amend <input type="checkbox"/>	Green Cert	<input type="checkbox"/>	Plan Period	Topo Name	Framingham /Maynard	
Plan Change: _____ to _____			Conservation Rest.	<input type="checkbox"/>	Rare Spp. Hab. <u>yes</u>	River Basin	Sudbury	
			CR Holder	_____				

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) The City of Marlborough, attn. Priscilla Ryder, Conservation Officer

Mailing Address City Hall, 140 Main Street, Marlborough, MA 01752 Phone 508-460-3768

Property Location: Town(s) Marlborough Road(s) Concord Road, Old Concord Rd.

Plan Preparer Roger Plourde Jr., C.F. Mass. Forester License # 192

Mailing Address PO Box 20062, Worcester, MA 01602 Phone 508-792-2414

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
3	21A			35.00			0.0	35.00
4	1	14306	364	10.70			0.0	10.70
4	2	14306	364	14.50			0.0	14.50
4	3	14306	364	28.00			0.0	28.00
24	5A	25374	307	6.33				6.33
TOTALS				94.53			0.0	94.53

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

HISTORY Year acquired _____ Year management began 1995

Is subdivision plan on file with municipality? Yes ☐ No ☒

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

Have forest products been cut within past 2 years? Yes ☐ No ☒

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

stand no. _____ treatment _____ reason _____

(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Value	Acres	Date
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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*			✓	
Generate Immediate Income			✓	
Generate Long Term Income			✓	
Produce Firewood			✓	
Defer or Defray Taxes	✓			
Promote Biological Diversity	✓			
Enhance Habitat for Birds	✓			
Enhance Habitat for Small Animals	✓			
Enhance Habitat for Large Animals	✓			
Improve Access for Walking/Skiing/Recreation				
Maintain or Enhance Privacy		✓		
Improve Hunting or Fishing	✓			
Preserve or Improve Scenic Beauty	✓			
Protect Water Quality	✓			
Protect Unique/Special/ Cultural Areas	✓			
Attain Green Certification				
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:

To promote biological diversity by enhancing habitat for birds and wildlife and controlling invasive plants. Improve forest health to support habitat diversity and continue to provide recreational trails for passive recreational uses. Provide educational opportunities for public.

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): Priscilla Ryder

Date: 6-21-210

Owner(s) (print) Priscilla Ryder

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



Property Overview, Regional Significance, and Management Summary

Landscape Context

The 95-acre Desert Conservation Land owned by the City of Marlborough is a significant piece of open space lying in western Middlesex County along the eastern boundary of the city of Marlborough. The property, a scenic flat to rolling plain covered by pine and oak forests, with stream corridors shaped by the influence of beavers, is part of an open space matrix of protected lands located in a highly desirable suburb of Boston, near the intersection of Massachusetts' major highways. As a result of its location, Marlborough has undergone extensive commercial and residential development. While the Desert Natural Area and Memorial Forest is representative of the excellent land conservation work carried out in the Sudbury River valley, this property and the adjacent protected parcels exist within a highly fragmented landscape. There are no working farms in the immediate area though a few can be found in North Framingham as well as up towards Concord.

Property Overview

The Marlborough Desert Conservation Land includes two non-contiguous parcels made up of about 88 acres of forested land and 7 acres of open wetlands that are either active or recently abandoned beaver pond. The northern parcel is highly variable as it transitions from rolling hills and oak dominated forest cover in the west to a more level terrain, pine-dominated forest flanking Cranberry Brook in the middle of the property, and then rising somewhat in elevation to a pitch-pine scrub oak forest on a knoll along the eastern boundary. Cranberry Brook, which supports native brook trout populations, flows from the center of the northern boundary through a beaver pond and begins to meander at the southeastern portion of the property, nearly dividing this forest in two. The southern parcel is small, bounded to the east by the gas pipeline, and the west by Trout Brook. There is a small gravel pit reverting to forest at the center of the parcel, flanked on either side by white pine dominated forest. Ranging in elevation from 170-250 feet above sea level, this glacial lake bed area is characterized by very well drained sandy soils with rolling slopes and rock outcrop to near level topography. As a rule these excessively drained, glacial outwash soils have low timber growth potential but will grow better quality pine than oak. In this case, these soils are very well suited to growing white pine, pitch pine and scrub oak which are commonly found in a range of densities and ages across the Desert Conservation Land. Of the 455 thousand board feet (MBF) of timber inventoried, roughly 71% is white pine while pitch pine (11%), red maple (6%) and mixed oaks (red, black, white and scarlet, together 10%) make up most of the remaining timber volume. Main access to this property is from the Old Concord Road. The property also has frontage on Concord Road which could potentially be developed into a new access point to facilitate management prescribed in this plan and future recreation.

There is some evidence of fires and very minimal firewood cutting on the property. As a result, there is a significant amount of low grade material (about 780 cords of fuelwood and 1800 cords of softwood pulp) much of which is unacceptable growing stock. Advanced regeneration varies from stand to stand depending on canopy closure but overall is dominated by white pine and mixed oak. Pitch pine regeneration is noticeably absent. There are the numerous invasive species that have become established to different degrees and pose a significant threat to the biodiversity of this property. Of primary concern is glossy buckthorn which has become well established along trails and wetland edges and is poised to become a serious pest in the interior forest areas if it hasn't already. Though not economically valuable as a timber type, the pitch pine-scrub oak association is considered a threatened natural community that supports a number of threatened and endangered species, particularly birds and invertebrates. Principal threats to these habitats are human development and the exclusion of natural fire. There is relative lack of age class diversity (ages range from 50-100+ years old) on this property with a noticeable lack of early successional forest (with the exception of one small abandoned gravel pit, St-10) and the absence of late seral stage forest, both of which are important wildlife habitat features. The northeast corner of this property is listed as priority habitat for Box Turtle. Also, nearby along the powerline is a threatened plant species, the pale green orchid. Threatened species are native species which are likely to become endangered in the foreseeable future, or which are declining or rare as determined by biological research and inventory.

Owner(s) CITY OF MARLBOROUGH

Town(s)

MARLBOROUGH

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Overview (cont.)

Regional Significance

All runoff from this woodland drains directly into Cranberry and Trout Brooks, both of which flow into Hop Brook to the east on the property of the Sudbury Valley Trustees. Hop Brook flows northeasterly and then southeasterly before draining into the Sudbury River just south of Route 20 at the Sudbury/Wayland town line. This watershed is not part of a local water supply. This property is part of an extensive matrix of contiguous, protected open space parcels owned by various agencies totalling nearly 2600 acres. The bulk of this open space is one parcel (2230 acres) of land that was formerly an annex to the Fort Devens military base and is currently part of the Great Meadows National Wildlife Refuge. The other parcels include DCR state forest, Sudbury Valley Trustees Memorial Forest, and Sudbury conservation land. These properties are all heavily used by the public for hiking and an integrated trail system has been created and mapped. While this area is not classified as "core habitat" on the state's BioMap, it is clear that this property plays an important role in terms of watershed protection, enhancement of recreation resources, and as part of a larger open space matrix with significant wildlife habitat value. Healthy forest cover and careful logging practices will help safeguard the quality of these public resources.

Management Summary

The city of Marlborough's management objectives are fairly broad in scope but with a focus on conserving and enhancing biological diversity. They include the following:

- Habitat restoration (pitch pine-scrub oak)
- Habitat protection (turtles, vernal pools)
- Water quality protection
- Passive recreation
- Protection of cultural and archeological resources
- Invasive species control
- Educational/interpretive use

The city wishes to be a good steward of the land and desires to accomplish this in an active manner, one that demonstrates active habitat management and restoration but also takes advantage of opportunities to intergrate sustainable forestry as a means of furthering their primary goals. The challenge of this plan is to weave all of these objectives together so that each management activity serves more than one purpose, maintain aesthetics, and integrate educational components. Though not specifically stated the goal of long-term periodic income production will provide an useful income to help fund ongoing land protection and stewardship efforts.

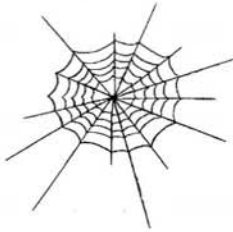
The management recommendations outlined in this plan are a reflection of the goal of promoting biological diversity and begin by underlining the importance of developing an aggressive and comprehensive invasive species control program as a prerequisite to any other management activities that result in forest disturbance. With some success achieved in this area, it will be possible to consider actively managing the forest in various ways. The first is to conduct timber harvesting to promote the growth and quality of the existing forest and establish new trees for the future. Careful management of the timber crop can produce periodic income that will help defray the significant expenses associated with invasive species control and habitat management. Timber harvests will incorporate managing for habitat targets including mast production (oak, hickory and cherry), age-class diversity, and late-seral forest conditions. Harvesting can also be a tool to promote increased access for recreation and aesthetic enjoyment of the forest. A final focus of management is to improve the pitch pine-scrub oak habitat that is so unique in New England and appears indigenous to this area. One publication which provides an excellent blueprint for managing for multiple objectives within the context of conserving biological diversity is a Mass Wildlife paper entitled Forest Management Guidelines for Wildlife Management Areas.

Overview (cont.)

The implementation of these recommendations may require that an access agreement be made with one or several abutters. The actual management activities will involve the use of non-restricted herbicides for the control of invasive species, the commercial and pre-commercial removal of trees and brush, and the use of prescribed fire. The configuration of management activity into two blocks is driven by the desire to carry out management that minimizes disturbance to recreation activities. This segmentation of the project may also serve to reduce the visual impact of the cutting by staggering the harvesting over time. The scheduling of the profitable forest management activities with the non-commercial habitat work will provide great reduction of cost of vegetation removal. All harvesting activities will be reviewed by NHESP to ensure protection of rare species. Any management activity on this forest is an opportunity to educate the public through educational signs that explain the purpose and nature of the work being done. Maintaining the aesthetics of the property is a concern and a challenge with any logging job. Proper siting of log landings, a well designed road network, hiring a conscientious logger, and maintaining age class diversity are some of the practices that will help to ensure that these value are protected. Finally, a true ecosystem-based approach to managing the Desert Conservation Lands will involve outreach to neighboring landowners. Possible goals for this type of collaboration would include 1) creating a combined inventory of acreages in different seral stages and determining the best opportunities for addressing deficiencies, 2) carrying out joint timber sales or other management operations (such as access roads) to obtain cost efficiencies, and 3) exchange of management knowledge.

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 background about issues specific to The Memorial Forest. **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. *The spring field work done in conjunction with this plan found relatively manageable densities of invasive species in the interior forests and driest sites. Along stream corridors and trails and in moist, enriched and lowland soils, invasive densities and species variety are much higher. Glossy buckthorn presents the greatest threat. In spite of the generally droughty soils, glossy buckthorn seems to be well established along the trail corridors and wetland edges and poses the most significant threat to species biodiversity on this property. Studies have shown that high density buckthorn populations greatly reduces the survival of most tree saplings under closed canopies which in turn will reduce the biological diversity of this forest. The primary management activity outlined in this plan is to develop a program for controlling these invaders.*

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.

Potential habitat for the box turtle—a species rare in Massachusetts— is present on the property covering about 35 acres along the easterly boundary of the stand. *The box turtle is a terrestrial species that spends its entire life cycle on land in hardwood and pine forests. It nests in open areas and overwinters in the soil. Management implications for the box turtle involve reducing risk of crushing them with motorized vehicles, including timber harvesting equipment during the terrestrial portion of their life cycle. The species requires a harvesting period of December 1 to March 31, while they are most likely buried in the soils while overwintering. Site scarification should be limited to hand tools. During harvesting, two snags per acre minimum should be retained, fallen logs should remain undisturbed and limbs and tops of cut trees should be left in the woods.*



where land and water meet.

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

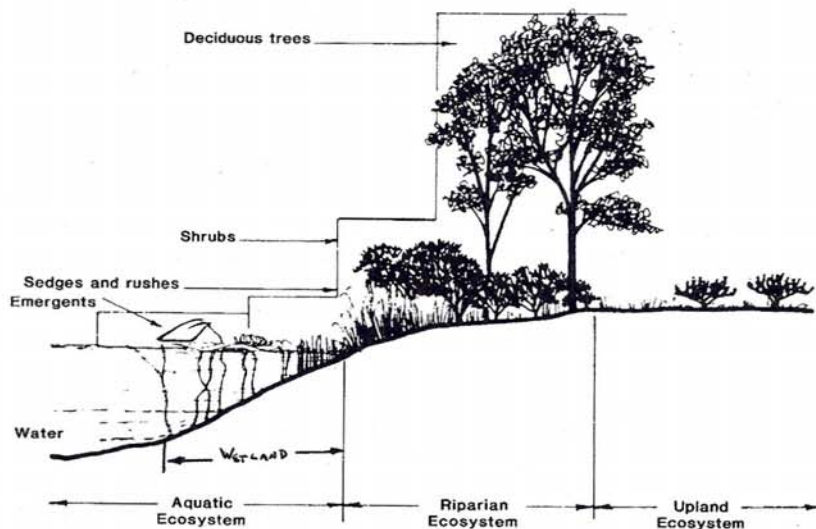


Figure 1: Example of a riparian zone.

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. DEM'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 DEM 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.

This property is dominated by loamy sand soil types that once were a glacial lake bed. Associations of pitch pine and scrub oak of different ages and densities are common in the eastern portion of the property and many areas have a known history of fire. There is a good deal of variation in the appearance of these stands as they compare to the classic open, shrubland pine barren. Currently pitch pine is fairly common as is often found on abandoned agricultural sites but the successional trend seems to be towards white pine. Over time and without the presence of fire, it is expected that tree oaks and white pine will take over. The loss of this rare habitat is of greatest consequence to the numerous species of butterflies and moths that depend on scrub oak/pitch pine habitats. In addition to the exclusion of fire, human development has greatly reduced the amount of pine barren habitat in Massachusetts and, in fact, the northeast. A management recommendation for this property is to utilize prescribed fire, if possible, to aid in the restoration of this declining habitat.



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

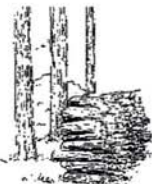
one of three broad strategies. These are **managing for diversity, protecting existing habitat, and enhancing existing habitat.**

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. *As mentioned in different ways above, a principal focus of this plan is to enhance the existing pitch pine/scrub oak habitat through exclusion of non-native species, timber harvesting, brush removal, and prescribed fire.*

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.

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.



STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	1a	WO	15.8 ac.	11.3"	129	4.5MBF	RO:47-70;WP:55
	1b		5.9 ac.			9.7cd(f)/13.4cd(p)	
	Total		21.7 ac.				

Forest Type: White Pine - Oak

Species Composition

Canopy: wh. pine, 40%; r. oak, 18%; bl. oak, 17%; wh. oak, 12%; hickory, 3%; pitch pine, 9%; aspen, 1%

Regeneration: white pine, white oak, red oak, red maple, chestnut, black birch, hickory

Invasive Species: very low density Norway maple, common buckthorn, Japanese barberry, crabapple

Description: This stand consists of two nearly contiguous sections that are dominated by pole to sawtimber-sized white pine and a variety of oaks (black, scarlet, white, red) with red maple, pitch pine and aspen as its chief associates. There are two age classes (55-65 & 75-85+ years old) present. The majority of the white pine and aspen appears of the younger age class while the oaks and pitch pine and a few individual large white pines comprise the older age class. The regeneration event for the younger trees could have been the 1938 hurricane or a fire (which may have been associated with the hurricane damage). Further investigation suggests an agricultural abandonment of nearly the entire acreage over 100 years ago, the land being reclaimed by a pioneer forest of pitch pine and white pine that, at its young age, could have partially blown over with limited ground evidence due to the small root balls. Evidence of recent disturbance in this stand is limited to a few small, highly weathered stumps and what appears to be about 20 year old fire scar on trees in the central section of stand 1b. The sections that comprise this stand generally have slope and soil qualities in common. The topography is rolling with variable aspect and slope (varying from 0-15%). The soils are classical Chatfield-Hollis-Rock outcrop glacial till soils which possess variable depths to bedrock and as a result have variable productivities for growing sawtimber. As a rule the shallow soils are better suited to growing pine while the deeper soils will grow very good quality oak. This site appears to be well suited to growing both of these species. The lower slopes are growing relatively good quality white pine and oak. Thin soils are evident along outcrops and ridgelines, as tree growth is stunted and quality is poor. There is good logging access to this stand from the Concord Road which is paved and maintained, and the abandoned Old Concord road which runs across the south end of 1a and northern portion of 1b. There is no hiking trail access to the scenic topographical features in the interior of stand 1a. 67% of the timber volume consists of fair to good quality white pine, though most of it is just merchantable. The oaks make up about 21% of the timber volume and are generally of low quality. The growth rates of the older dominant oaks over the last 20 years has been fairly slow (6-8 yr./in of diameter at dbh). White pine has the most apparent potential for production value, as most stems are straight, have vigorous crowns and better growth rates. The overall health of this stand is fair to good. Regeneration is mixed but largely composed of white pine, white oak and red oak. Chestnut sprouts are also scattered across the stand. The higher percentage of overstory oak makes this stand distinct from the rest of the property and is an important wildlife habitat element because of the oak mast it provides.

The desired future condition is an uneven-aged oak-pine stand comprised of vigorous mast-producing oaks and quality pine timber. Management will favor pine and oak and include removals of trees in groups to release desirable regeneration and thinning around oak and pine crop/mast trees.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

STEW= stands not classified under CH61/61A

STD= stand AC= acre MSD= mean stand diameter

MBF= thousand board feet

BA= basal area VOL= volume

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	2a	WP/PP	9.7 ac.	13.4"	187	9.0MBF	WP:57;RO:52
	2b		11.0 ac.			3.6cd(f)/40.4cd(p)	
	2c		11.7 ac.				
	Total		32.4 ac				

Forest Type: White Pine/Pitch Pine

Species Composition

Canopy: wh. pine, 70%; p. pine, 17%; wh. oak, 4%; bl. oak 4%; red oak, 3%; red maple & scarlet oak 2%

Regeneration: midstory white pine and red maple, often dense carpets of white pine, limited white oak, red maple seedlings

Invasive Species: low to high densities of common buckthorn and low densities of Japanese barberry

Description: This is a densely stocked, sawtimber-sized stand dominated by white pine with pitch pine as its main associate. A variety of oaks and red maple are minor associates. There are two age classes (65-75 & 100+ years old) present. The majority of the white pine is of the younger age class while the pitch pine and a few individual large white pines comprise the older age class. There is no evidence of harvesting since the initiation of the stand. There are gentle, 0-8% slopes found on this excessively well-drained glacial outwash site (Windsor loamy sand). The preferable timber species to grow on these droughty soils is white pine which tends to have a reduced occurrence of white pine weevil damage and limited competition from hardwoods. There is good logging access to stands 2a and 2b from Old Concord Road. Access to stand 2c will require improvements to Old Concord Rd at the Cranberry Brook stream crossing or obtaining access via the neighboring wildlife refuge parcel.

87% of the timber volume consists of fair to good quality white pine, with individual good-excellent stems. Pitch pine makes up 7% of the timber volume and is of fair quality. The growth rates of the dominant pines over the last 20 years has been fairly slow (7-10 yr./in of diameter at dbh) due to the very high stand density. The overall health of this stand is good with no major health problems noted. The exception is that pitch pine appears to be declining in vigor and dropping out of the stand. There is ample and in places dense stocking of white pine regeneration, though most of it is stunted and older. There are a number of invasive exotic species (see above) found here in low to severe populations. One of these species in particular, glossy buckthorn, poses a significant threat to the overall biodiversity of this forest. This problem is most severe along the stream corridors. Unless adequate control measures are taken, both of these species will become increasingly vigorous and begin displacing much of the native flora. There are some unusually large pines and groups of pine in this stand. One in particular in the southern section of stand 2b that was damaged by weevil at an early ages resulting in a very wide sprawling crown more typical of oak. In stand 2a and near the eastern edge of stand 3a, there is a small grove of approximately 30 very large white pines, averaging 28" in diameter.

The desired future condition is a scenic, even-aged softwood forest of similar species composition as currently exists but harvested in a manner that promotes improved growth of the best sawtimber while releasing areas where desirable oak and pine regeneration has become established. The desired future condition includes the control of invasive species such that the natural biodiversity of this area is preserved. Vigorous pitch pine and a percentage of the large mast producing hardwoods like white oak should be retained. Unusually large trees will be designated as "legacy trees" and retained for their scenic values. Judicial thinning of surrounding trees to accentuate their form and creation of access trails will provide great focal points for hikers.

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	3a	WH	1.1 ac.	10.6"	160	3.0MBF	RM: 50
	3b		3.7 ac.			21.2cd(f)/9.1cd(p)	
	3c		<u>0.7 ac.</u>				
	Total		5.5 ac.				

Forest Type: White Pine-Hardwood

Species Composition

Canopy: red maple, 81%; white pine, 19%

Regeneration: sparse and relatively low quality white pine, red maple, white oak

Invasive Species: low to high density glossy buckthorn, moderate Japanese barberry and honeysuckle

Description: This even-aged stand occurs in three sections spread across the property in lowland positions adjacent to streams. It is comprised mainly of red maple poles to small sawtimber and white pine sawtimber. Wetland and acid adapted plants such as highbush blueberry, spicebush, poison ivy and ferns make up the shrub and ground layer. There is no evidence of management or harvesting. The soils are at the transition of well-drained loamy sands (Deerfield and Windsor) to poorly drained Swansea and Freetown mucks. The site is generally flat to gently rolling, with varied aspect. There is good logging access to stand 3a from Old Concord Road. Access to stands 3b and 3c will require improvements to Old Concord Rd at the Cranberry Brook stream crossing or obtaining access via the neighboring wildlife refuge parcel.

71% of the sawtimber volume is in poor to fair quality red maple. Fair quality white pine comprises the remaining sawtimber volume. Stand health appears to be good with no major health issues noted. Invasive species such as glossy buckthorn are thriving on these moist floodplain soils especially (though not exclusively) along edges of openings and in areas where disturbance, such as trail creation or blowdown, has occurred.

The desired future condition is an even-aged, red maple and white pine stand allowed to mature and decline with limited management intervention. Management in the stand will focus on the control of invasive plants to prevent spread into adjacent stands where harvesting will occur. Any vehicular access should be limited to dry or frozen ground conditions.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

STEW= stands not classified under CH61/61A

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	4a	RZ/RM	2.7 ac.	14.4"	85	2.9MBF	RM:50
	4b		1.8 ac.			15.6cd(f)	
	4c		<u>1.3 ac.</u>				
	Total		5.8 ac.				

Forest Type: Riparian Zone/Red Maple

Species Composition

Canopy: red maple, 94%; elm, 6%

Regeneration: white pine, red maple

Invasive Species: moderate to severe density glossy buckthorn; moderate to high density barberry, honeysuckle, oriental bittersweet

Description: An even-aged stand (approximately 70-90 years old) dominated by medium sized red maple firewood and elm lies along the watercourses on the property. Few white pines, oaks and ash are minor associates. There is no evidence of recent harvesting. These are riparian corridors associated with perennial (Cranberry Brook) and intermittent streams on floodplain sites with 0-3% slopes. The soils are poorly drained Swansea and Freetown mucks. Erosion and compaction are major concerns in these soils, and equipment access will be very limited. Stand 4a is crossed by Old Concord Road via a large culvert.

92% of the timber volume in the stand consists of good quality red maple with the remaining 6% in elm. Given the proximity of the stand to sensitive wetlands and the presence of large trees that could eventually serve as cavities, this stand has more potential as habitat. The overall health and vigor of the stand is good. Several invasive species are present throughout the stand, with severe invasions found along Old Concord Road and in stand 4b. The density of invasive exotic plants is among the highest of all stands on the property.

The desired future condition is an uneven-aged, red maple dominated stand with components of elm, white pine, ash and oak. The stand will be allowed to mature and decline naturally with the primary objective being to maintain the integrity of this stand as a riparian corridor and wildlife habitat that is free of invasive species. Any future logging will be limited to the margins and restricted to extremely dry or frozen ground conditions.

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	5	BL/SM	2.7	11.9"	120	2.0MBF 25cd(f)/2.5cd(p)	SM:65

Forest Type: Black Locust/Sugar Maple

Species Composition

Canopy: white ash, 42%; black locust, 33%; sugar maple, 17%; white pine, 8%

Regeneration: sugar maple seed and midstory, white ash

Invasive Species: moderate to high density Japanese barberry, bush honeysuckle, common and glossy buckthorn

Description: This is an enriched site dominated by small sawtimber sized white ash and black locust with sugar maple as a consistent midstory species. Aerial photographs from 1952 show this area as still fairly open so it is likely that the age of this forest is about 50-60 years old. Many of the trees originated from plantings around Carter homestead site, which is now just a series of three foundations at the center of the stand and a fairly complex network of stone walls. The Chatfield glacial till soils here have excellent productivity ranking for growing hardwood sawtimber. The shrub and herb layer include spice bush, jack-in-the-pulpit, poison ivy and sedge. Several invasive species are also present in high densities as a result of the enriched soil and historic use. This stand is easily accessed by the Old Concord Road, which runs along the southern boundary of the stand.

51% of the sawtimber volume is in good quality sugar maple, with white pine and white ash comprising the remaining percentage. The dominant overstory species, black locust and white ash, are showing signs of decline due to age while the sugar maple appears vigorous and well suited to this site. Invasive species are a major concern in this stand because of their high density, and the risk of spread to adjacent stands.

The desired future condition is an even-aged stand of similar species composition as currently exists, free from invasive species and harvested in a manner that promotes improved growth of the best sugar maple and white ash while maintaining cultural features. Invasive species control should be carried out prior to any management in this or the adjacent stands.

STEW	6	BP	6.2ac	N/A	N/A	N/A
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Forest Type: Beaver Pond

Species Composition

Canopy: white pine and pitch pine along margins

Regeneration: white pine, white ash, red maple

Invasive Species: Glossy buckthorn, multiflora rose

Description: This area is an abandoned beaver dam and pond formed along Cranberry Stream with standing dead trees in and surrounding it. The underlying soils are Swansea muck. Water enters the pond from three directions near the northern boundary of the property, and flows out of the pond to the southeast. The shrub layer includes speckled alder, blueberry and beaked hazelnut. In areas where beavers have left and the waters receded, invasive species, such as glossy buckthorn and multiflora rose are thriving.

The desired future condition of this area is as productive riparian corridor that is free of invasive species and serves as wildlife habitat, allowed to mature and decline naturally.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	7	PS	5.7ac	9.9"	90	0MBF 6.4cd(p)/3.5cd(f)	RO:47-70;WP:55-57

Forest Type: Pitch Pine – Scrub Oak

Species Composition

Canopy: pitch pine, 28%; white oak, 28%; white pine, 28%; scarlet oak, 16%

Regeneration: suppressed under scrub oak, white oak, black oak, red maple, white pine, black cherry, scarlet oak

Invasive Species: none noted

Description: This is a two-aged stand (50 & 75+) consisting of scattered residual small sawtimber trees of white pine, pitch pine, scarlet oak and white oak. The cover type extends across the gas pipeline to the east to the Sudbury Valley Trustees property. There is a dense understory dominated by scrub oak, which appears to be mature and in decline, as many dead standing stems are present. There is evidence of a fire that occurred roughly 20 years ago. Overstory trees are survivors of this and likely several other fire events and some have char on the bark or basal damage. The effect of the fire was to damage and kill some overstory trees and create conditions beneficial to scrub oak dominance. Limited pitch pine regenerated as a result of the fire. The site is a knoll with slight slopes to the west and steeper slopes to the south and east. The soils are an intersection of three types, including very well-drained glacial till (Charlton-Hollis) and rock outcrop, loamy sands (Windsor) and loamy coarse sand (Carver) some sandy loams. The soils tend to be droughty and have areas of exposed rock, but are best suited to trees. No invasive species were found in this stand, likely due to the droughtiness of the soils. The Old Concord Road extends across the northern portion of this stand. Logging access to this stand is similarly constrained as Stand 2c.

Overstory trees are generally of poor timber quality, and no timber volume was recorded in the cruise. Given the small average diameter of the trees in this stand, the timber value is very low. Conversely, however, it has impressive biological value. Pitch pine-scrub oak barrens are globally limited and support a number of threatened and endangered species, particularly birds and invertebrates. Some species of concern found in these habitats include rufous-sided towhees, brown thrashers, whippoorwills, common nighthawks, barrens buck moth, and Edwards' hairstreak. Stands frequented by fire or routinely mowed are young and vigorous, and the most valuable as habitat.

The desired future condition is a young, vigorous, even-aged shrubland composed of a scattered pitch pine overstory with scrub oak understory. Management will involve mechanical and fire treatments to maintain shrubland character.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

STEW= stands not classified under CH61/61A

STD= stand AC= acre MSD= mean stand diameter

MBF= thousand board feet

BA= basal area VOL= volume

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	8	PP/WP	9.5ac	11.4"	98	3.2MBF 2.4cd(f)/16.5cd(p)	RO:49-52;WP:57-60

Forest Type: Pitch Pine/White Pine

Species Composition

Canopy: pitch pine, 54%; white oak, 18%; white pine, 23%; black oak, 5%

Regeneration: white oak, white pine, black cherry, red maple, black oak

Invasive Species: none noted

Description: This stand is dominated by a mix of pitch pine and white pine small sawtimber as in Stand 2 but here individual trees are more widely spaced and there is a vigorous shrub and sapling understory. The shrub layer includes scrub oak, blueberry, and huckleberry, while sapling regeneration is made up of white pine, white, black and scarlet oak. White pine predominates where there is a midstory. No evidence of past harvesting was noted but char on trees indicates some fire history. The site is rolling with varied aspects. The soils are dominated by well-drained loamy sands (Hinckley and Windsor) with a small section in the south of loamy coarse sand (Carver). The northern reach of this stand is at the intersection of the Old Concord Road and a hiking trail, which appears to be frequented by ATVs. Logging access to this stand is similarly constrained as Stand 2c.

48% of this timber volume consists of fair to good quality white pine. Fair quality pitch pine makes up the majority of the remaining timber volume. Given the overall low timber potential and the presence of pitch pine and scrub oak, this area is a good candidate for management that would encourage a barrens quality. The overall health and vigor of the stand is good with no significant pest issues. While there is uneven but fairly good oak and white pine regeneration distributed throughout this stand along with some pitch pine, the focus will be to encourage scrub oak and pitch pine. White pine will be the major competitor as it is currently present in seedling, sapling and poles and intermediate light conditions in the stand are favorable to its growth.

The desired future condition is a pitch pine-scrub oak barren. Management will involve removing competing species, particularly white pine, and treat the site mechanically and with fire to encourage development of the scrub oak component.

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	9	WO/WP	3.7ac.	12.6"	185 sf/ac	6.5 MBF 17.0cd(f)/20.8cd(p)	RO:49;WP:60

Forest Type: White Pine-Oak/White Pine

Species Composition

Canopy: wh. pine, 48%; wh. oak, 32%; r. maple, 16%; pitch pine, 3%

Regeneration: white pine, white oak, black oak, red maple, chestnut, black cherry

Invasive Species: crabapple

Description: This stand consists of 2 small non-contiguous sections dominated by sawtimber-sized stand white pine with white oak as its chief associate. The composition varies somewhat from a white pine-oak mixture (St-9a) to a more white pine dominated stand (St.-9b). Red maple and pitch pine are minor associates in both areas. Within each area there appear to be two distinct age classes (65-75 & 100-110 years old). The majority of the white pine is of the younger age class while the pitch pine and white oak comprise the older age class. The hurricane of 1938 may have been the regeneration event for the white pine. There was no evidence noted of recent cutting. The site is rolling to level with well-drained glacial outwash soils running along the southerly bank of Trout Brook. The preferable timber species to grow on these moderately productive, loamy sand soils (Hinckley) is white pine due to a reduced occurrence of white pine weevil damage and limited competition from hardwoods. Access to this stand is very limited due to its remoteness and beaver activity along Trout Brook. Access would require crossing the adjacent DCR and/or Federated Women's Club parcels.

72% of the timber volume consists of fair-good quality white pine. White oak makes up about 22% of the timber volume and is generally of fair quality. The growth rates of the dominant pines appear decent and may still be able to show some growth response to thinning while the older pitch pine are showing extremely slow growth (16-17 yr./in of diameter at dbh). The overall health of this stand is good. There is a fair stocking of white pine and oak regeneration. There were few invasive species noted on this site. Stand 9b is fairly scenic with an open, park-like understory and well-spaced stems.

The desired future condition is an even-aged stand of similar species composition as currently exists but harvested in a manner that promotes improved growth of the best white pine sawtimber while maintaining the a park-like feel. Large mast producing hardwoods like white oak should be retained. Due to access constraints and valuable riparian habitat, this area could be designated as a reserve area with limited management focusing on creating late-seral forest conditions and controlling invasive species.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

STEW= stands not classified under CH61/61A

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	10	BM	1.3ac	2.6"	130 sf/ac	N/A	

Forest Type: Gray Birch-Red Maple/Gravel Pit

Species Composition

Canopy: Gray birch, 38%; pitch pine, 46%; white pine, 8%; red maple, 8%

Regeneration:

Invasive Species: glossy buckthorn, multiflora rose.

Description: This is an abandoned gravel pit that is slowly revegetating. Early successional trees are beginning to become established around the margins. Meadowsweet, blueberry and sweet fern are common shrubs. The soils are excessively drained glacial outwash (Hinckley) that are well suited to growing pitch pine.

The desired future condition is a young, vigorous, even-aged shrubland composed of a scattered pitch pine overstory with scrub oak understory and with invasive species controlled. Future management could involve mechanical and fire treatments to maintain shrubland character and retain pitch pine component.

Glossary

advanced regeneration - young trees that have become established in a stand before any special measures are undertaken to establish new growth.

midstory - vegetation that is shorter than the main tree canopy, but taller than 10'

basal area - a measure of stand density based on the cross sectional area of a tree at breast height.

d.b.h. - diameter at breast height (4.5' from the ground)

MBF - 1000 board feet

site index (SI) - the height of the dominant portion of a forest stand at 50 years of age (in eastern US). This is one of many indices used to measure site quality.

release cutting - freeing a young stand of desirable trees from the competition of undesirable trees that threaten to suppress them.

epicormic branches - branches that develop from dormant buds along the bole of a tree when bark is exposed to direct solar radiation.

rotation the period of years required to grow a crop of timber to a specified condition of economic or natural maturity

early-seral forest seedling growth stage

late-seral forest forest that has achieved greater than 50% of its maximum expected age (generally over 150 years for trees in Massachusetts)

high-grading - the process of harvesting of the healthiest and most valuable trees on a site while leaving inferior growing stock. Also know as "taking the best and leaving the rest".

pre-commercial harvest - when the cost of layout and removal of trees in a stand exceeds the stumpage value.

Stumpage - the price paid for standing timber whereby the buyer incurs of the cost of harvesting the trees.

legacy trees - select trees left during a harvest for the purpose of leaving a genetic, historical and species legacy on the landscape after the establishment of a new cohort of trees.

OBJECTIVE CODE: CH61 = stands classified under CH61/61A

STEW= stands not classified under CH61/61A

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

Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

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 Stands	Invasive Species Control	10ac/yr	N/A	N/A	Ongoing

Description: The control of glossy buckthorn, common buckthorn, Japanese barberry, oriental bittersweet, multiflora rose, garlic mustard, black locust, honeysuckle and Japanese knotweed, all upland invasive exotic species, is of primary concern across the property. Purple loosestrife is a wetland invasive that is also of concern but is not necessarily impacted by the management activities described in this plan. With the exception of glossy buckthorn, the field work done in conjunction with this plan found relatively manageable densities of invasive species. In spite of droughty soils, glossy buckthorn is well established in both open and dense shade conditions and is particularly vigorous along the trail corridors and wetland edges. This species poses the most significant threat to species biodiversity on this property. Regardless of individual species populations, costs for controlling these species will quickly trend upward with declining efficacy if no action is taken. Invasive species issues should be addressed in some fashion prior to any harvesting activity as any harvesting activity at any time of the year will tend to promote further seed dispersal of these species due to soil disturbance and opening of the canopy. Winter harvests will minimize ground disturbance and reduce this negative effect.

Control measures include hand weeding for some species though any serious effort to control these species must include some type of herbicide treatment (foliar, basal bark, and cut stump applications). Follow-up treatments and minimizing impact on non-target native species are important concerns while undertaking this project. Application of herbicides should be carried out by a licensed professional. Consider developing an annual program to control these species that includes a follow-up monitoring protocol. This project will require a long-term commitment and ongoing funding for it to be successful. Outreach and collaboration with abutting landowners is highly recommended and will help insure the long-term success of control efforts. Future timber harvests can be used as a source of income for funding ongoing invasive control projects.

The general recommendation of this Stewardship Plan is to establish an invasive plant control program that will break up the property into a more manageable set of tasks. What follows are some general recommendations regarding invasive species control.

1. Think of the "minor" invasive species in the same way that you think about the light infestation areas of the property. These are easy battles to fight now and will likely development into costly, heavy infestations if not treated.
2. Hand pulling is a suspect technique for most species with the possible exception of honeysuckle and japanese barberry due to the high likelihood of resprouts and increased soil disturbance.
3. Carefully study current literature on treatment recommendations for all invasive species and look for opportunities to treat several species simultaneously. For instance, a foliar spray using triclopyr is effective for barberry, multiflora rose, and bittersweet and as such may make sense to treat all three species at once, especially if all are still leafed out in late fall after the natives have dropped their leaves.
4. Consider the use of the Sproutless™ brush saw attachment for cut stump applications as an efficient way of treating individual stems in high densities.

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) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

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 Stands	Invasive Species Control	10ac/yr	N/A	N/A	Ongoing

(continued from previous page):

5. Do not underestimate Japanese barberry. The insidious characteristic of this plant is that it is known to invade both disturbed and undisturbed forests and possesses a wide range of soil and moisture tolerances. Even when eliminated, few plants are able to reestablish the site. The seed is dispersed by both deer and birds. It also tends to be avoided as browse by deer which might imply that it is not easily controlled by livestock.
6. The present clean zones tend to coincide with soil type characteristics in that the most well drained glacial till sites having the fewest invasives. Based on this, it would stand to reason that these types of sites would be the easiest sites to reclaim.
7. Wet soils, stream banks, field edges and old settlement sites tend to be the areas of highest infestation.
8. When it comes time to begin tackling the heavier infestation areas, consider going after areas of high seed production such as field edges, roadside areas and areas of past disturbance due to logging or ash mortality (locations). In areas where there is desirable advanced regeneration amidst the invasive species, it may be desirable to herbicide treat prior to harvesting in order to minimize impact on non-target native trees.
9. In areas of dense infestation, control efforts may require some type of small clearcut that removes all vegetation combined with a foliar herbicide treatment of resprouting invasives the following season. It is unclear whether or not the size of the clearing plays a role in the response of the invasive species. The larger openings are, however, more favorable for regenerating oak, a valuable wildlife species. In wetland areas where harvesting is not practical, a combination of foliar and cut stem will be necessary.
10. Generally, in areas of low density, individual plants can be treated using through a foliar spray using a hand pump backpack sprayer, while dense, larger infestations should be treated with a motorized backpack mist blower. A general cost estimate for treatment is \$200-400 per acre, varying dependent on the density of invasive plants.
11. Bittersweet is best treated in the winter, when thick, tree climbing stems can be cut and treated with herbicide. Smaller ground level plants may need to be treated in the summer.
12. Prioritizing control effort should recognize the importance of addressing dense infestations due to their seed production capacity and lighter infestations which are easily controlled with minimal cost.
13. Invasives should be treated with species specific herbicides where possible. These mixtures target the plant's weakest areas and set back its ability to recover most thoroughly. In areas of diverse and dense infestation, treatment on a species by species basis becomes cost-prohibitive. Cocktails of herbicides are often used in this case as a blanket treatment. These are effective, but less thorough in their kill than a mix created for a specific species.

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) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

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	1a,b	WO	Crop Tree Release/Group Shelterwood	20ac	43 sf	80 cd(f) 120 cd(p)	Fall 2014-2018
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Description: This stand has two distinct age classes, with the majority of oaks in the older age class, and white pine and aspen in the younger age class. The overall quality of the oak on the site is relatively low for timber production, but the oak-dominated forest has aesthetic value and oaks, especially white oak, are an important source of mast (i.e. acorn) production for wildlife. White pine is also present on the site, and, compared to oak, shows more timber potential in these soils.

The management recommendation is to retain the aesthetic and habitat characteristics of the oak dominated ridges while also taking advantage of opportunities to regenerate some of the low vigor portions of this stand to a mixture of oak and pine. This initial harvest will involve releasing oak and white pine crop trees on at least three sides by removing adjacent competing crowns. The desired rotation age for the crop trees is extended out 20-40 years to a total age of 100-120+ years. This type of thinning may promote the establishment and development of pine and oak regeneration by allowing more sunlight to reach the forest floor. Additionally, small groups (< ¼ acre) of trees will be removed in valleys and along slopes where there is desirable advanced white pine and oak regeneration and existing oak quality is low. Overall this harvest will remove 25-80% of the basal area, taking poorly formed oak and pine firewood, pulpwood and some sawtimber while retaining trees with unique habitat values such as large mast trees (particularly white oak) or cavity trees. Time harvest to occur in the fall and coincide with a good pine seed year to ensure regeneration success.

Special attention will be paid along trails and the Concord Road to maintain pleasing aesthetics. Over the long term, white pine regeneration groups will be expanded to variable sizes of 1-3 acres, representing a total of 7-10 acres regenerated to pine across the stand. Sections of oak, particularly along scenic ridges will be retained and thinned for aesthetic and wildlife purposes. This scenic stand holds opportunities for expanding the trail network.

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

STEW	2a-c	WP/PP	Crop Tree Release/ Commercial Thinning	32 ac	60sf	48MBF	Winter
						32cd(f)/480cd(p)	2014-2016

Description: The desired future condition is an even-aged softwood forest dominated by white pine with components of pitch pine and oak. Harvesting will occur in a manner that promotes improved growth of the best formed stems with healthy crowns. Approximately 30% of the basal area will be removed focusing on stems competing with crop trees, poorly formed stems and some of the larger mature sawtimber. Over 2/3 of the trees removed will be softwood pulpwood with the remaining volume consisting of sawtimber quality trees as well as some hardwood firewood. In addition to white pine crop trees, vigorous pitch pine and a percentage of the large mast producing hardwoods like white oak should be retained. Thinnings of this nature generally enhance the aesthetics of a stand.

In areas of the stand where poor quality, low vigor stems dominate and advanced white pine regeneration is present, the overstory will be removed in small groups with the objective of regenerating the area to quality white pine. No harvesting will occur in the grove of large, old white pines in the northeast portion of 2a and the unique multi-stemmed pine in southern part of Stand 2b will be retained as a legacy tree.

Any harvesting activity should be preceded by initial and follow up treatments of invasive species. It is recommended that this harvest be scheduled for winter months. The eastern section of 2c is included in the habitat polygon for the box turtle. There is a seasonal equipment restriction in this area which is imposed by NHESP and described in the Conservation Management Practices (CMP) for Box Turtle (see the "Stewardship Issues" section of this plan for CMP detail). In addition to protecting the box turtle, a winter harvest will reduce soil compaction and ground scarification which in turn will help minimize the dispersal of invasive plant seed.

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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	5	BL/SM	Crop Tree Thinning	3.2ac	30sf	1.5MBF 20cd(f)/2cd(p)	Winter 2016-2018
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Description: The desired future condition is an even-aged hardwood stand with a strong sugar maple component, free from invasive species. Invasive species control is the first priority due to the high densities of invasive plants in this stand. Timber harvesting should not be conducted until a control program has been enacted. For the timber harvest, vigorous, well-formed trees of sugar maple and white ash will be selected as crop trees and released on three to four sides. This thinning is expected to remove 1/4 of the basal area, mostly black locust firewood but also including some sawtimber and pulp. Special care should be taken when operating in this stand due to the presence of old foundations which pose an equipment hazard and are cultural artifacts that should be undisturbed.

STEW	7	PS	Cutting/Mowing/Prescribed Fire	5.7 ac	40sf	19 cd(p)/7 cd(f)	Mar-Oct 2014-2016
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Description: The desired future condition is a young, vigorous, two-aged shrub land composed of a scattered pitch pine and oak overstory with scrub oak understory. Management will involve mechanical and fire treatments to maintain shrub land character. Given the overstory stocking in this stand of 90 square feet of basal area per acre, some cutting in the overstory is required, with a focus on removing white pine and oak trees. The residual stand should have 50 square feet per acre, with stems widely spaced or in small groups so that fire that may reach the crowns is unlikely to spread under normal conditions. Special attention should be given to nurturing and protecting individual pitch pine stems, with the overall goal of increasing the overstory stocking in pitch pine.

The dense understory of scrub oak is maturing and thus becoming less valuable to the endangered or threatened species that use the habitat. Treatments will involve mowing followed by burning, and should take place as soon as possible. Management that only involves mowing can be effective, but takes more time to return the stand to the desired condition. Researchers at the Montague Plain in western Massachusetts found that 1) Mechanical treatments followed by prescribed fire reduce the time required to restore vigorous, young scrub oak stands from 6 years to less than 2 years. 2) Prescribed fire alone in mature, untreated scrub oak fuels is accompanied by increased risk of escape and/or smoke management problems. 3) Mechanical treatments cost \$300.00-600.00/acre using a Davco mower depending on the density of the vegetation.

Mowing can take place during the growing season (March-October) in order to maximize the effect on scrub oak. In keeping with the probable effects of a fire, individual pitch pines should be retained. A controlled burn should be carried out during the growing season within one year of mowing. It is important to phase treatments so that not all age and structure classes are treated in the same year. This will provide refugia for species dependent on variable structures. The natural fire return interval to this forest type is documented as 15-25 years. A shorter burn cycle of 10 years will help ensure that scrub oak is vigorous and dominant. Cost share money and assistance from groups with expertise in barrens management and prescribed fire may be available for these treatments because of the ecological value in pitch pine-scrub oak barrens. Due to the complex nature of prescribed burns, investment of time and money can be high and uncertain. Consultation with organizations like The Nature Conservancy that have carried out controlled burns in the region may assist in overcoming some hurdles in the planning and enactment phases of barrens management.

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Town(s) MARLBOROUGH

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	8	PP	Seed Cut-Shelterwood Brush Mowing/Prescribed Fire	9.5	50 sf	14MBF 11cd(f)/50cd(p)	Winter 2014-2018

Description: The desired future condition is a pitch pine-scrub oak barren. Management will involve removing competing species, particularly white pine and midstory hardwoods followed up by treating the site mechanically and with fire to encourage development of the scrub oak component. The objective is to reduce the basal area by 50% and create more open understory conditions. Pitch pine may also be thinned in areas where it is densely stocked. Sections of the stand that occur along riparian corridors will have less heavy treatment for both aesthetic and conservation reasons. Residual overstory will include widely spaced pitch pine and mature oaks with thick bark. If pitch pine regeneration is a desired habitat element, then it is recommended that some form of soil scarification be carried out to expose a suitable seedbed (mineral soil) for this species. This would, however, conflict with the seasonal equipment restriction imposed by NHESP and described in the Conservation Management Practices (CMP) for Box Turtle (see the "Stewardship Issues" section of this plan for CMP detail). Alternative practices for establishing pitch pine could include hand-tilling or planting trees after the prescribed fire. The practice of controlled burning may also expose sufficient mineral soil for pitch pine regeneration.

Some mowing will be necessary to reduce the existing shrub layer, as described in the management practices for stand 7, but this may also be accomplished during the harvesting process if a feller-buncher & whole tree chip harvesting operation is utilized. Once the height of the understory is reduced, it is recommended that a prescribed fire be carried out in the following year in order to create favorable site characteristics for the increased dominance of the desired scrub oak shrub layer as well as to promote increased overall diversity of native plants. A cruise on the neighboring Sudbury Valley Trustees property to the east showed that a similar stand occurs there, and similar management has been prescribed. Management across boundary lines would be especially favorable in the restoration of pitch pine-scrub oak barrens.

This management could feasibly be carried out in conjunction with management in stand 7, and ideally in cooperation with neighboring SVT across boundary lines to similar stands. Given the large acreage of the Marlborough and SVT properties in pitch-pine scrub oak management, partial sections of 5-10 acres may need to be treated each year for several years. In years where burning is not possible, mowing can be considered as a low cost alternative to burning, but this practice is also complicated by the NHESP restriction on the use of heavy equipment during the non-winter months due to potential impact on box turtles.

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MANAGEMENT PRACTICES
to be done within next 10 years

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

MANAGEMENT SUMMARY

As mentioned, much of the harvesting recommended in this plan should be postponed until an invasive control program is in place. Once there has been a reasonable degree of success in maintaining and expanding clean zones, the planned harvesting can be considered.

While with some coordination it may be possible to carry out harvesting recommendations on the entire property at once, several constraints make it more feasible to separate management activities into two sales, with the dividing line being Cranberry Brook. This separation of sales will reduce recreation interruption and allow time to address invasive species issues and access constraints present in the western section. The eastern side has doughtier soils and lower incidence of invasive species, making it possible to cut sooner. The adjacent property of Sudbury Valley Trustees has similar management recommendations and it would be cost-effective to carry out these practices simultaneously. Additionally the economics of a larger sale would be beneficial to the town and land trust. A second harvest on the western portion of the property would follow invasive control measures and creation of sound access across Cranberry Brook or from Concord Road via Old Concord Road. The following are the combined estimated volumes for this sale:

1. Eastern Sale on Stands 2c, 7, 8 (27 acres):
Est. Volumes: 32 mbf sawtimber, 30 cd. firewood, and 250 cd. softwood pulp
2. Western Sale on Stands 1a, 1b, 2a, 2b, 5 (45 acres):
Est. Volumes: 32 mbf sawtimber, 140 cd. firewood, and 440 cd. of pulp

GENERAL MANAGEMENT ACTIVITIES

Boundaries: All boundaries should be blazed and painted within the first 2 years of this plan. Repaint in 7-10 years. Town property tags can also be installed every 150-200' along these lines. If there are access restrictions (e.g. for ORV use) then these should be clearly posted at all access points.

Roads/Access: Vehicular access across the property is currently limited by an unsuitable crossing along the Old Concord Road at Cranberry Brook. This crossing may not be necessary to achieve harvesting objectives in the east if access can be gained though the abutting Federal Refuge land. If it is not possible to move wood off the property to the west, this crossing repair will be necessary to move wood across to the east and out through the Refuge. Layout main skid trails prior to logging with consideration given to minimizing grade change as well as their future use as hiking trails. Consider the benefits of permanent crossing utilized for recreational purposes. Recreational trails should be well marked with bright flagging to make them obvious to harvesters. No slash should be left within 50' of trails, and thinning along trails should consider aesthetic impacts.

Tree Farm: Consider applying to become a certified Tree Farm as away of demonstrating that high standards of forest stewardship are being practiced. In addition, an educational board explaining the goals and objectives of the harvest should accompany all harvesting operations.

Education/Trails: Any new trails should follow grade fairly closely in order to minimize erosion. Avoid wetlands except where crossing is necessary.

Habitat: Silviculturally, the timing of this harvest should take place during the fall of a good pitch pine seed year. Seek advice from NHESP in determining if there are ways to carry out a fall harvest without negatively impacting box turtle populations. During harvesting practices, leave approximately 6-10 cavity trees or potential cavity trees per acre.

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Owner(s) MARLBOROUGH CONSERVATION COMMISSION

Town(s) MARLBOROUGH

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.

Signed under the pains of perjury:

Owner(s) Priscilla Ryder Date 6-21-2010
Conservation Officer Date _____

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

Plan Preparer Roger Dandley C.F. Date June 28, 2010
Broad Arrow Forestry

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) CITY OF MARLBOROUGH

Town(s) MARLBOROUGH

USGS TOPOGRAPHIC BASE MAP
Property of the Marlborough
Conservation Commission
Concord Road Marlborough, MA

Scale 1"=528 feet

Parcel Size: 88.2 acres

MARLBOROUGH

SUDBURY
STATE FOREST

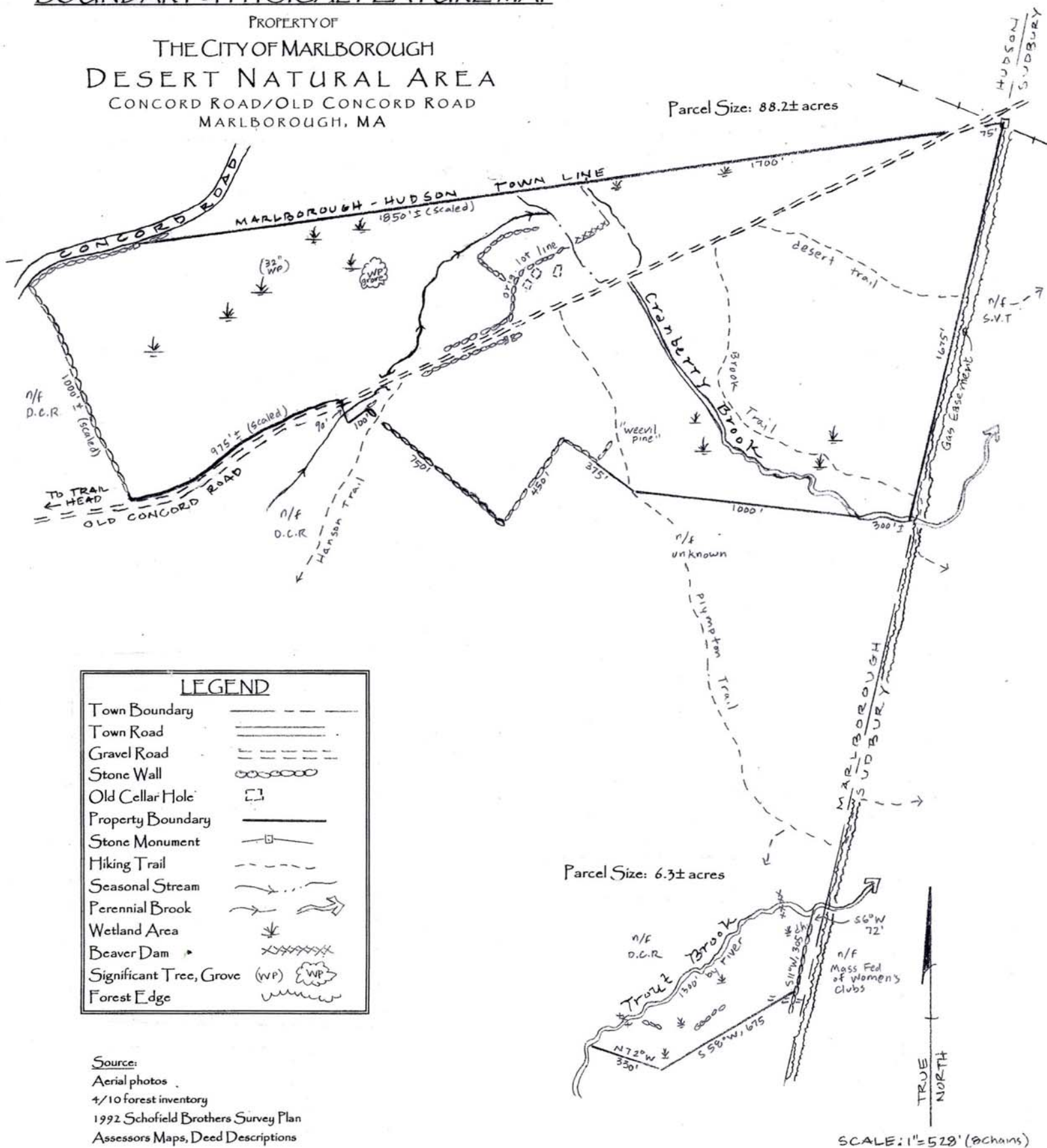
SUDBURY
STATE FOREST

Parcel Size: 6.3 acres

Source: 2008 MassGIS Aerial Photography

PROPERTY OF
THE CITY OF MARLBOROUGH
DESERT NATURAL AREA
CONCORD ROAD/OLD CONCORD ROAD
MARLBOROUGH, MA

Parcel Size: 88.2± acres



Aerial photos
4/10 forest inventory
1992 Schofield Brothers Survey Plan
Assessors Maps, Deed Descriptions

Roger Plourde Jr., C.F., MA Lic. #192
Shavonne Sargent, ME Lic. # F13543
April, 2010



BROAD ARROW FORESTRY
Post Office Box 20062
Worcester, MA 01602
508.792.2414

COLOR ORTHOPHOTO BASE MAP
Property of the Marlborough
Conservation Commission
Concord Road Marlborough, MA

Scale 1"=528 feet

Parcel Size: 88.2 acres



Parcel Size: 6.3 acres

Source: 2008 MassGIS Aerial Photography



FOREST STAND MAP

PROPERTY OF

THE CITY OF MARLBOROUGH

DESERT NATURAL AREA

CONCORD ROAD/OLD CONCORD ROAD
MARLBOROUGH, MA

Parcel Size: 88.2± acres



Stand Types			
WO	White Pine-Oak	PS	Pitch Pine-Scrub Oak
WP	White Pine	BL	Black Locust
PP	Pitch Pine	SM	Sugar Maple
WH	White Pine-Hardwood	BM	Gray Birch-Red Maple
RM	Red Maple-Swamp Hardwoods	RZ	Riparian Zone

LEGEND	
Town Boundary	---
Town Road	=====
Gravel Road	-----
Stone Wall	xxxxxx
Property Boundary	=====
Stand Boundary	~~~~~
Stand Number	①
Seasonal Stream	~>~>~
Perennial Brook	~>~>~
Wetland Area	~>~>~
Beaver Dam	xxxxxx
Significant Tree, Grove	(WP) (WP)
Forest Edge	~~~~~

Source:

Aerial photos
4/10 forest inventory
1992 Schofield Brothers Survey Plan
Assessors Maps, Deed Descriptions

Prepared by:

Roger Plourde Jr., C.F., MA Lic. #192
Shavonne Sargent, ME Lic. # F13543
April, 2010



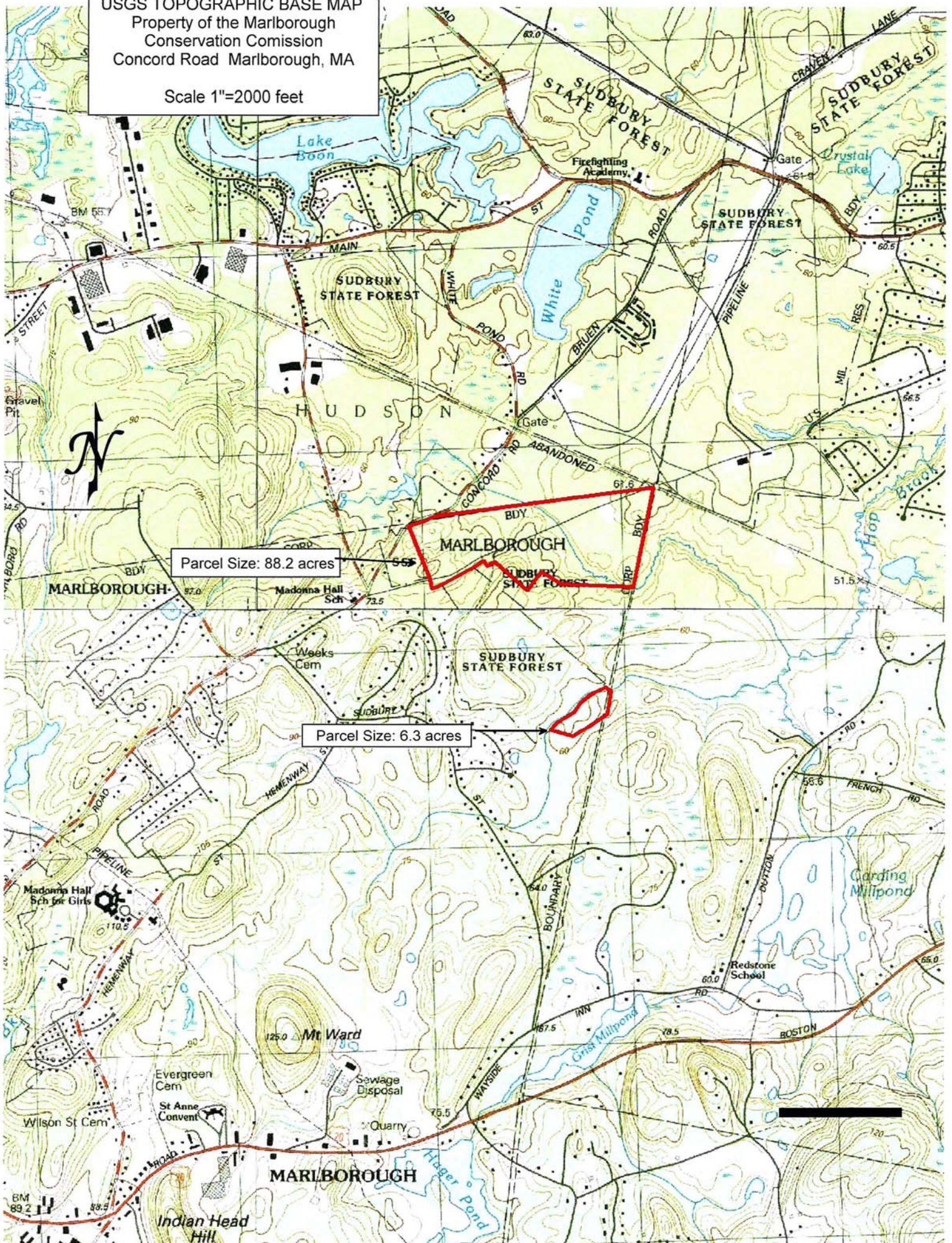
SCALE: 1"=528' (8 Chains)



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USGS TOPOGRAPHIC BASE MAP
Property of the Marlborough
Conservation Commission
Concord Road Marlborough, MA

Scale 1"=2000 feet



COLOR ORTHOPHOTO BASE MAP
Property of the Marlborough
Conservation Commission
Concord Road Marlborough, MA



Scale 1"=2000 feet

