

# FOREST STEWARDSHIP PLAN

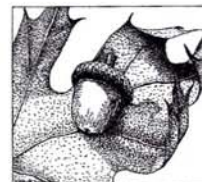
## MEMORIAL FOREST DUTTON ROAD & OLD CONCORD RD. SUDBURY & MARLBOROUGH, MA



PREPARED FOR  
THE SUDBURY VALLEY TRUSTEES

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





## Landowner Goals

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

Goal	Importance to Me			
	High	Medium	Low	Don't Know
Enhance the Quality/Quantity of Timber Products*		X		
Generate Immediate Income			X	
Generate Long Term Income			X	
Produce Firewood			X	
Defer or Defray Taxes				N/A
Promote Biological Diversity	X			
Enhance Habitat for Birds	X			
Enhance Habitat for Small Animals	X			Insects!
Enhance Habitat for Large Animals			X	
Improve Access for Walking/Skiing/Recreation		X		
Maintain or Enhance Privacy				N/A
Improve Hunting or Fishing			X	
Preserve or Improve Scenic Beauty	X			
Protect Water Quality	X			
Protect Unique/Special/ Cultural Areas	X			
Other:				

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

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

**Goal 1. Conserve and enhance biological diversity and environmental health.**

Objectives:

- a) Restore pitch pine-scrub oak barrens
- b) Control invasive species
- c) Enhance habitats for migratory bird species that are declining in population (such as whip-poor-will, Eastern towhee – see ARNWR plan for other species) *need to specify which birds and what habitat(s) they use.*
- d) Maintain and enhance water quality.
- e) Maintain rare turtle habitat (Eastern box turtle and wood turtle)
- f) Maintain cold water streams (Cranberry Brook and Trout Brook)
- g) Maintain vernal pools and associated upland habitat.

**Goal 2. Provide passive recreational opportunities.**

**Goal 3. Preserve cultural and archeological resources.**

Objectives/strategies:

- a) Conduct archeological survey (Tom can inquire with their regional archeologist)
- b) Review historic information in France Clark's 1995 Management Plan

**Goal 4. Educate the public about the biodiversity and cultural resources and management of the Desert Natural Area**

- Emphasize creation, restoration and management of habitat (not "harvesting")
- Install interpretive signage

## Stewardship Purpose

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

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

**Signature(s):**

**Date:**

Owner(s) (print) **Sudbury Valley Trustees**

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





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## Property Overview, Regional Significance, and Management Summary

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### Landscape Context

The 220-acre Memorial Forest woodland owned by the Sudbury Valley Trustees is an open space gem lying in western Middlesex County along the western boundary of the town of Sudbury. The property, with its stunning pine woodland clear meandering streams, is part of an open space matrix of protected lands located in a highly desirable suburb of Boston, reasonably close to several highways. As a result of its location, Sudbury has undergone extensive commercial and residential development. While the Memorial Forest area 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 forest land on this property covers about 182 acres is bounded by very distinct natural and manmade features. The southerly and easterly boundary is defined by Hop Brook and Trout Brook while the old Mass Central railbed and a cleared gas pipeline easement respectively form the northerly and westerly boundaries. The meandering Cranberry Brook divides this forest in two. Both Trout Brook and Cranberry Brook support native brook trout populations. Ranging in elevation from 170-200 feet above sea level, this glacial lake bed area is characterized by very well drained sandy soils with gentle 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 Memorial Forest. Of the 1.1 million board feet (MMBF) of timber inventoried, roughly 75% is white pine while pitch pine (13%) and mixed hardwoods (oak and red maple) (12%) make up the remaining timber volume. There is no viable access to this property for heavy equipment other than through neighboring properties.

There is no evidence of past harvesting activities but there is evidence of past fires. As a result, there is a significant amount of low grade material (about 650 cords of fuelwood and 1650 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 and the absence of late seral stage forest, both of which are important wildlife habitat features. The majority of this property is listed as priority habitat for Box Turtle and Wood Turtle. It also includes 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.



## Overview (cont.)

### Regional Significance

All runoff from this woodland drains either directly into Hop Brook or indirectly via Trout and Cranberry Brooks. 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. Residents of this part of Sudbury obtain water from town wells. 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 conservation land, and Marlboro 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 land trust'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 land trust wishes to be good stewards 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 to improve the pitch pine-scrub oak habitat that is so unique in New England and appears indigenous to this area. The management plan acknowledges the complexity of this type of management by recommending that these efforts be directed towards stands that display site characteristics that favor this species composition and perhaps have less tendency to revert to the more common white pine-oak type.

## Overview (cont.)

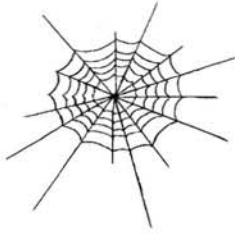
This plan also recognizes that while pitch pine barren management is important, that it does not have to be at the expense of other important forest values. These include the aesthetic value created by the extensive pine forests which provide an striking backdrop for the extensive trail network. Additionally many parts of this pine forest contain a valuable timber asset which the previous owners' meticulously tended (via pruning) to increase its value at maturity. Careful management of this timber crop can produce periodic income that will help defray the significant expenses associated with habitat management. Another consideration is the importance of managing for mast production (oak and cherry), age-class diversity, and late-seral forest conditions. 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.

The implementation of these recommendations first requires 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 complexity of carrying out a prescribed fire over a large area. 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 have to 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 Memorial Forest 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 winter field work done in conjunction with this plan found relatively manageable densities of invasive species which confirmed a 2009 invasive species survey carried out by the owners (SVT) with one exception, **glossy buckthorn**. In spite of these 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 and wood turtle—two species rare in Massachusetts—is present on the Memorial Forest.** *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. The wood turtle is aquatic and terrestrial, overwintering and breeding in perennial streams, and nesting on land in sandy stream banks or open areas.*

*Management implications for both species involve reducing risk of crushing them with motorized vehicles, including timber harvesting equipment during the terrestrial portion of their life cycle. Specific guidelines for management vary by species. The **box turtle** 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. **Wood turtle** restrictions involve buffers of varying width around perennial streams where the turtle breeds and overwinters, depending on the season when timber harvesting is carried out. These buffers, which restrict motorized vehicles, do not extend further than 600' from the stream unless specific conditions exist and are reduced during the fall, winter, and spring months. Between November 15 and February 28 there are no motorized vehicle restrictions within the stream buffer. All perennial stream crossing should be bridged. Harvest plans should involve management specifics for both species and habitat areas and buffers should be flagged prior to the harvest, and preferably prior to snow. For more information and management recommendations, please see the attached condensed version of "Massachusetts Forestry Conservation Management Practices" (CMP's) for both species.*





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

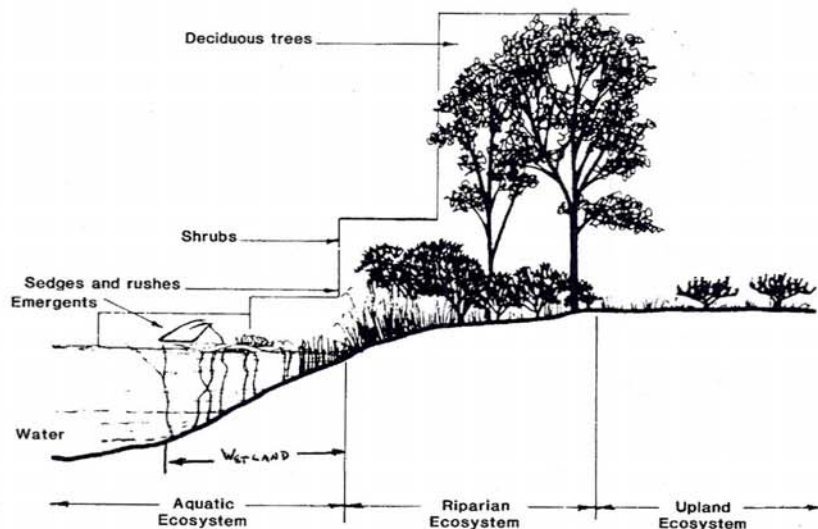


Figure 1: Example of a riparian zone.

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 throughout 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 17<sup>th</sup> and 18<sup>th</sup> 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.

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**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.





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### STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	1	PS	3.4ac	14.0"	19	1.34MBF 1.7cd(f)	RO:47-65;WP:55-65

**Forest Type:** Pitch Pine-Scrub Oak

**Species Composition**

Canopy: wh. pine 50%, bl. oak 50%, pitch pine, scarlet oak

Regeneration: Good, strongly to oaks, WO and BO. Limited PP.

Invasive Species: none noted

**Description:** This is a two-aged stand consisting of scattered residual small sawtimber trees of pitch pine, white pine, black, scarlet and white oak with a dense understory dominated by scrub oak. There is evidence of a killing fire that occurred roughly 20 years ago. Overstory trees are survivors of this fire event, and many have char and/or fire scars along the bole. The effect of the fire was to kill what appears to have been already widely spaced overstory trees, and create conditions beneficial to scrub oak dominance. Limited pitch pine regenerated as a result of the fire. The present stand consists of insignificant timber volumes found in scattered trees. The site is mainly level with a slight south and east slope facing. The soils are very well drained glacial till (Charlton-Hollis) and rock outcrop. The soils tend to be droughty and have areas of exposed rock, but are best suited to trees. Equipment access to this stand will be contingent upon cooperation with neighboring landowners.

Overstory trees vary in age from 50-100 years and are generally of poor timber quality. While this area holds very little timber value, 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. Maintaining the valuable habitat that stands like this provide requires prescribed fire and/or routine mowing in order to ensure that the understory remains young and vigorous.

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.

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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) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH

## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	2a	WO	3.5 ac	11.4"	148	5.3MBF	RO:49;WP:53-60
	2b		9.2 ac			4.9cd(f)/8.6cd(p)	
	2c		6.1 ac				
	2d		4.0 ac				
	total		22.8 ac				

**Forest Type:** White Pine - Oak

**Species Composition**

Canopy: 48% wh. pine, 15% bl. oak, 10% scarlet oak, 8 % pitch pine, 10% w. oak; 5% aspen, 3% red oak; 1% r. maple

Regeneration: Overall good, tends to be old: w. pine, w. oak, s. oak, b. oak, r. maple, chestnut

Invasive Species: honeysuckle noted at one plot

**Description:** This stand consists of 4 non-contiguous sections that are roughly 80 years old and are dominated by sawtimber-sized stand white pine and a variety of oaks (black, scarlet, white, red) with red maple, pitch pine and aspen as its chief associates. It was likely a post-agricultural pioneer forest when the 1938 hurricane hit the region, leaving limited impact on the trees which would have been short. There was no evidence noted of recent cutting. The sections that comprise this stand generally have slope and soil qualities in common. They occur on south facing slopes varying from 0-25%. Stand section 2c is level with a slight southern slope. Section 2b occurs along a topographic line and curves with the stream, ranging from northeast facing to west facing. The soils are well-drained loamy sands (Hinckley & Carver) that will grow good quality white pine sawtimber. There are no logging access constraints specific to this stand though access to stand 2b, 2c, and 2d will require a crossing of Cranberry Brook.

64% of the timber volume consists of fair-good quality white pine. The oaks make up about 26% of the timber volume and are generally of fair quality. The growth rates of the dominant oaks have been moderate over the last 20 years (4.5 yr./in) and may still be able to show some growth response to thinning. The overall health of this stand is fair. Oak is strongly represented in regeneration along with white pine. The presence of a higher percentage of overstory oak makes this stand distinct from the rest of the property. It has potential as habitat and food source for a variety of species.

The desired future condition is an even-aged oak-pine stand with individual legacy trees. Management will favor oak and include removals around selected crop trees.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH



## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	3a	RM	12.9ac	12.6"	138	4.3MBF	RM:50
	3b		15.9 ac			12.9cd(f)/2.6cd(p)	
	total		28.8 ac				

**Forest Type:** Red Maple

### Species Composition

Canopy: r.maple, 45%; wh. pine, 31%; wh. oak, 13%; red oak, 4%; scarlet oak, 4%; pitch pine, 3%

Regeneration: white pine and red maple dominate; also, w. oak, r. oak, b. oak, ash, cherry

Invasive Species: buckthorn, barberry, Euonymus, honeysuckle

**Description:** This is an even-aged stand (80-100 years old) dominated by medium sized red maple firewood and white pine sawtimber with white oak as the chief associate. Pitch pine, red oak, and scarlet oak are the minor associates. There is no evidence of recent harvesting. These are riparian corridors associated perennial (Trout and Cranberry Streams) and intermittent stream. These are floodplain sites with 0-3% slope. The soils are at the transition of well-drained Hinckley loamy sands to poorly drained Swansea and Freetown mucks. This would explain the species mix of the drier site oak and pine and the moisture-adapted red maple and ash. Erosion and compaction are major concerns in these soils, and equipment access will be very limited.

52% of the timber volume in the stand consists of poor quality white pine. An additional 31% of the sawtimber is in various oaks of fair quality and 7% is in red maple. The poor quality and lower relative volume of the growing stock in the stand makes it less valuable for timber production than other stands on the property. Given the proximity of the stand to water, 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, often found close to disturbed areas along trails and streams. The density of invasive exotic plants is the highest of all stands on the property.

The desired future condition is an uneven-aged, red maple and white pine dominated stand with components of 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 limited to extremely dry or frozen ground conditions.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH

## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	4	WP/PP	40.8ac	12.4"	185	9.5MBF 2.0cd(f)/12.4cd(p)	WP:53

**Forest Type:** White Pine-Pitch Pine

**Species Composition**

Canopy: wh. pine, 62%; p. pine, 23%; b. oak, 6%; r. maple 5%; wh. oak, 3%; red oak & scarlet oak 1%

Regeneration: often dense carpets of stunted white pine, also w. oak, r. oak, b. oak, r. maple and chestnut

Invasive Species: glossy buckthorn, euonymus, Japanese barberry, mainly along edges and near old homestead area

**Description:** This is a densely stocked, sawtimber-sized stand dominated by white pine with pitch pine as its main associate. Also present in the stand are scattered oaks and red maple. There are two-aged 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. The hurricane of 1938 seems to be the regeneration event for the white pine. There is limited evidence of the hurricane as an initiator, including leaning or swooped older trees present, but no pillows and cradles that suggest extensive uprooting of trees. 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. There is no evidence of harvesting since the initiation of the 1938 hurricane age class, but white pines in some areas have been pruned to a height of one log (16'). There are gentle, 0-3% slopes found on this well-drained glacial lacustrine site (Carver loamy coarse sand). The soil as described is not well suited to growing timber trees, which might account for the fair quality of sawtimber stems observed throughout. Equipment access to this stand will be contingent upon cooperation with neighboring landowners. Access will require crossing an intermittent stream in stand 3a.

72% of the timber volume consists of fair quality white pine, with individual good-excellent stems. Pitch pine makes up 18% of the timber volume and is of fair quality. The growth rates at young age appear rapid, but declined as the crown closed. The overall health of this stand is good with no major health problems noted. The exception is that some pitch pine appears to be declining in vigor. There is ample and in places dense stocking of white pine regeneration, though most of it is stunted and older. While the habitat value of uniform softwood stands like this is relatively low, northern Goshawk is one species found in this area that favors heavily forested coniferous woodlands such as this. There is a vernal pool along the southern edge of this stand that is listed on the NHESP atlas. Proper protection measures will be taken during any harvesting activities.

The desired future condition is an even-aged softwood forest of similar species composition as currently exists but harvested in a manner that promotes improved growth of the best sawtimber. Control of the invasive species should be the primary management goal in this stand. Vigorous pitch pine and a percentage of the large mast producing hardwoods like white oak should be retained.

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

Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH



## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	5a	PP	16.3 ac	12.8"	112	3.3MBF	RO:49;WP:60
	5b		21.4 ac			1.1cd(f)/12.2cd(p)	
	5c		6.1 ac				
	total		43.8ac				

**Forest Type:** Pitch Pine

### Species Composition

Canopy: p. pine, 46%; wh. pine, 43%; scarlet oak, 6%; wh. oak, 1%; r. maple, bl. oak, aspen, & bl. cherry, 4%

Regeneration: good w. oak, b. oak, w. pine; some pitch pine, s. oak, gray birch

Invasive Species: none noted

**Description:** These three areas are all dominated by a mix of pitch pine and white pine as in Stand 4, but here pitch pine predominates and individual trees are more widely spaced than other stands. Also, there is a vigorous shrub and sapling understory. Unlike Stand 1, the overstory in this stand is relatively well stocked even though a few charred trees were noted indicating some fire history. The white pine midstory is about 25 years old and may have succeeded that fire. Within these stands are two distinct age classes. Stand 5a is a small sawtimber-sized stand (about 50 years old) while stands 5b and 5c are roughly 85 years old. Stand 5a is unique from the rest of the stand in that it was open field until approximately 50 years ago. There are still 2 small clearings within Stand 5a, both of which are adjacent to the old railroad bed. One is an open sand pit that is free of any invading vegetation. It is not clear if this was actually used as a sand pit but aerial photos date its existence back to at least 1928. A second, smaller opening to the west has partially filled in with early-successional vegetation such as gray birch, white pine, and pitch pine, scrub oak and huckleberry. No evidence of past harvesting was found and the present stand is dominated by softwood pulp along with a some sawtimber and a small amount of hardwood fuelwood. There are stone walls in proximity to all three of these stands which would seem to imply that there was likely a history of cultivation here. The site slopes slightly with southerly and northerly aspects. The soils are dominated by well-drained loamy sands (Hinckley) that are best suited to growing white pine sawtimber. Access to stand 5a will require crossing an intermittent stream in stand 3a. Access to stand 5b and 5c will require installation of a stream crossing on Cranberry Brook.

71% of this timber volume consists of poor to fair quality white pine. Fair quality pitch pine makes up the majority of the remaining timber volume. The overall health and vigor of the stand is good with no significant pest issues. The growth rates of the older dominant pitch pines (St-5b and 5c) over the last 20 years has been quite slow ( $\pm 14$  yr./in). The shrub layer includes bear oak, blueberry, huckleberry, sheep laurel while sapling regeneration is made up of white pine, white, black and scarlet oak. Pitch pine was not commonly found to be regenerating within this stand. Where there is a midstory, white pine predominates. 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. As with stand 1, pitch pine-scrub oak dominated stands are fairly rare in central Massachusetts and can potentially 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. Maintaining the valuable habitat that stands like this provide requires prescribed fire and/or routine mowing in order to ensure that the understory remains young and vigorous.

Given the overall low timber potential and the presence of pitch pine and scrub oak, 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. Edges of the stand may be expanded into adjacent stands that appear suitable for this species composition.

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BA= basal area VOL= volume

Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH

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### STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	6	WH/RP	6.1ac	10.6"	124	2.3MBF 5.4cd(f)/8.6cd(p)	RO:49;WP:60

**Forest Type:** White Pine-Hardwood/Red Pine

**Species Composition**

Canopy: r. maple, 48%; wh. pine, 40%; r. pine, 8%; p. pine, 4%

Regeneration: w. pine, r. maple, ash, w. oak, b. oak

Invasive Species: buckthorn, barberry, Euonymus

**Description:** This stand is even-aged and comprised mainly of medium firewood red maple and medium sawtimber white pine with pitch pine as the associate. The southeast section of the stand includes a small red pine plantation that was part of the original memorial forest planted in 1950 by the Woman's Club. The stand originated from an old agricultural field along Cranberry and Hop Brook that was abandoned around 60 years ago. Besides the plantings, there is no evidence of management or harvesting. The soils are at the transition of well-drained Hinckley loamy sands to poorly drained Swansea and Freetown mucks. The site slopes gently down to the stream, with varied aspect. Equipment access to this stand will require installation of a stream crossing on Cranberry Brook.

61% of the sawtimber volume is in poor quality white pine. Fair quality red pine comprises 17% of the sawtimber volume. Stand health appears to be good with no major health issues noted. Several invasive species were found in the stand, likely due to the disturbance history, and proximity to the trails. There is a vernal pool-like depression along the westerly boundary of this stand that is not currently listed on the NHESP atlas. Regardless of classification, proper protection measures will be taken during any harvesting activities.

The desired future condition is an even-aged, white pine and red maple stand thinned to promote the establishment of pine regeneration. Management will focus on the control of invasive plants. All harvesting should be limited to dry or frozen ground conditions. The red pine stand will be thinned to improve vigor of the healthiest specimens.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH



## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	7a	WP	6.1 ac.	13.1"	167	10.3MBF	RO:49;WP:60
	7b		2.0 ac			0.9cd(f)/9.7cd(p)	
	7c		23.5 ac				
	total		31.6ac				

**Forest Type:** White Pine

**Species Composition**

Canopy: wh. pine, 79%; p. pine, 12%; s. oak, 4%; wh. oak, 3%; bl. oak, 2%

Regeneration: mainly w. pine, but also w. oak, b. oak, r. maple and chestnut

Invasive Species: none noted

**Description:** This is one of the larger stands on the property consisting of a nearly pure stocking of large white pine sawtimber. The one large section and two smaller sections to the west are even-aged (about 80-90 years old). Pitch pine is the main associate while a lesser amount of oak can be found scattered throughout the stand. Stand structure is relatively simplistic, with a main canopy, and in places white pine regeneration in the shrub layer or midstory. Stems are well spaced, and the stand has an open, park-like understory, aesthetically pleasing to the eye. Current spacing may have been achieved by an early thinning, but no stumps were noted in the stand. Underlying soils are Hinckley loamy sands, which are moderately productive. The site is generally gently sloping or rolling with a slightly southern aspect. Equipment access to this stand will require installation of a stream crossing on Cranberry Brook.

91% of the sawtimber volume is in fair to good quality white pine, with pitch pine and oak comprising the remaining 9%. In the eastern portion of the stand, many large (20"+) white pines have been pruned to one log (16') and as a result this is the most value timber stand on the property. Stand health and vigor appear to be very good. White pine weevil appears to have some activity in the area, as many trees had a major defect related to forking above the first log. The growth rates of the dominant trees has been variable over the last 20 years ranging from relatively vigorous white pine ( $\pm 4$  yr./in) to slow growing pitch pine ( $\pm 14$  yr./in).

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.

STEW	8	SS	6.1ac	N/A	N/A	N/A	N/A
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**Forest Type:** Shrub Swamp

**Species Composition**

Canopy: scattered red maple and white pine

Regeneration: n/a

Invasive Species: none noted

**Description:** This area is a shrub swamp comprised mainly of blueberry with scattered red maple and white pine trees. It is in a lowland position with steep slopes surrounding it. Soils are very poorly drained Swansea muck. There appears to be no outlet for the water on this property (the swamp extends west and south into the neighboring conservation land), so any open water is stagnant. The area presents mainly as valuable habitat to swamp and shrubland species. Blueberry picking should be excellent here in the summer.

The desired future condition of this area is as productive wildlife habitat allowed to mature and decline naturally.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/MARLBOROUGH

## STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	9	MS	41.3ac	N/A	N/A	N/A	N/A

**Forest Type:** Shallow Marsh

**Species Composition**

Canopy: shrubs

Regeneration: n/a

Invasive Species: Glossy buckthorn, Phragmites

**Description:** This area is a grass and shrub filled riparian corridor surrounding Cranberry, Hop and Trout Brooks. Some invasive species are present, including buckthorn along the forest edge and Phragmites in the mucky stream edges. A beaver lodge and activity was noted near the northeastern edge along Hop Brook.

The desired future condition of this area is as a protected filter strip for water quality and productive wildlife habitat. Chemical control of invasive species should be considered.

STEW	10	OP	5.0ac.	n/a	n/a	n/a	RO:49;WP:60
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**Forest Type:** Gas Pipeline Easement

**Species Composition**

Canopy: N/A

Regeneration: shrub, pitch pine, white pine, mixed hardwoods

Invasive Species: purple loosestrife, common buckthorn, black locust, oriental bittersweet, Japanese barberry

**Description:** This stand follows a gas pipeline easement that runs north and south along the westerly boundary of the property. It is a rolling, gently sloping site with a mix of excessively drained glacial outwash soils (Hinckley, Carver, Windsor) that are crossed by two streams and a shrub swamp. This stand will be maintained by the gas company as early successional habitat and shrub meadow. The opening creates browse for deer and low shrub cover for songbirds and small mammals, and is an ideal hunting area for predators such as hawks.

**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.

**mechanical treatment** - human or mechanized exertion of force to sever stems and reduce height of the shrub layer; mowing.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/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
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**Description:** The control of glossy and common buckthorn, oriental bittersweet, winged euonymus, Japanese barberry, and honeysuckle, all unland invasive exotic species is of primary concern across the property. Phragmites and purple loosestrife are wetland invasives that are also of concern but are not necessarily impacted by the management activities described in this plan. The winter field work done in conjunction with this plan found relatively manageable densities of invasive species and this was confirmed by a 2009 invasive species survey carried out by the owners (SVT) with one exception, glossy buckthorn. In spite of these 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. 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 will 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 with a focus on the primary seed sources (i.e. open grown populations). This project will require a long-term commitment and ongoing funding for it to be successful. Fortunately such funding sources are available through the Mass Wildlife Landowner Incentive Program (LIP) and the Natural Resources Conservation Services' WHIP and EQIP Programs. 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 strategy for addressing the invasive species problem on this property will be three pronged and prioritized as follows:

1. Maintain "clean zones" which are those stands that have low densities of invasive species with pre- and post-harvests herbicide treatments (moderate expense)
2. Carry out herbicide control of areas of high seed production such as trails and wetland edges (moderate expense)
3. Carry out herbicide control in areas of dense infestation by using the timber harvest as a first step in reducing the height of the invasive plants. Carry out the foliar herbicide treatment of resprouting invasives the following season. (significant expense). Fortunately no such sites were identified on this parcel.

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) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/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	

**FOREST MANAGEMENT RECOMMENDATIONS**

STEW	1	PS	Mowing/Prescribed Fire	3.4 ac	n/a	n/a	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 overstory with scrub oak understory. Management will involve mechanical and fire treatments to maintain shrub land character. Given the existing low overstory stocking in this stand of 20 square feet of basal area per acre (which is equal to approximately 20-14" dbh trees to the acre), very little cutting in the overstory is required, and would be limited to individual white pine trees. The residual stand should have 10-30 trees per acre, 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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**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	2a-d	WO	Crop Tree Release	20ac	50 sf/ac	80cd(f) 80cd(p)	Winter 2014-2018
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**Description:** The focus of this harvest is primarily to maintain this as an aesthetically pleasing even-aged white pine and oak stand harvested to encourage the growth and development of the healthiest hardwood and softwood trees while maintaining a relatively closed canopy. The relative uniqueness of this oak stand within this pine dominated forest is the basis for managing this area primarily to increase yields of mast (i.e. acorns) for wildlife. Management in the immediate planning period will be limited to releasing crop trees on at least three sides by removing adjacent competing crowns. Approximately 1/3 of the basal area can be removed in the form of poor form and low vigor firewood and pulpwood. Taken by itself, this would be considered a pre-commercial harvest. The desired rotation age for the crop trees is extended to 100-120+ years. This type of thinning may, additionally serve to help promote the establishment and development of oak regeneration. However oak regeneration will likely be constrained by overbrowsing by deer.

STEW	4	WP/PP	Crop Tree Release/ Commercial Thinning	36 ac	60sf	65MBF 20cd(f)/250cd(p)	Winter 2014-2016
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**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, particularly any white pine trees previously pruned. 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 a small amount of 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. 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 (December 1 to March 31) in order to comply with the seasonal equipment restriction imposed by NHESP and described in the Conservation Management Practices (CMP) for Box Turtle. A winter harvest will reduce soil compaction and ground scarification which in turn will help minimize the dispersal of invasive plant seed. State best management practices (BMP's) require that a 50' filter strip will be left around the vernal pool located within the stand.

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) SUDBURY VALLEY TRUSTEES      Town(s) SUDBURY/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	5a-c	PP	Seed Cut-Shelterwood Brush Mowing/Prescribed.Fire	39 ac.	60sf	80MBF 30cd(f)/240cd(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 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 just over 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 a few 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<sub>[TS1]</sub>. 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 1 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. Sections 5a and 5c have a purer component of pitch pine and more scrub oak in the understory, but a similar treatment to 5b will be applied and potentially expanded into adjacent stands where a high proportion of pitch pine and relatively low timber quality exists. Aerial photography suggests that 5a and 5c extend onto the neighboring properties. Management across boundary lines would be especially favorable in the restoration of pitch pine-scrub oak barrens.

Due to the large size of the stand and the fact that it is divided into non-contiguous sections, it will be likely difficult to carry out a prescribed fire across the whole acreage all at once. Several areas across the property, 5-10 acres in size can be treated per year. 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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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/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	6	WH/RP	Pre-commercial Thinning	6.1ac	31sf	12cd(f)/18cd(p)	Winter 2016-2018
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**Description:** The desired future condition is an even-aged stand of similar species composition. The red pine stand will be thinned to improve vigor of the healthiest specimens. Because this area was part of the originally "Memorial Forest" tree planting effort of the Women's Club, one goal of this treatment will be to identify and release the healthiest specimens from this historic planting. Currently the growth of most of these trees is relatively stagnant and thinning will greatly improve the vigor of the residual stand. Approximately 1/4 of the basal area will be removed in the form of poorly formed, weakened and small-crowned stems and totaling about 5 cords per acre of firewood and softwood pulp. 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 (December 1 to March 31) in order to reduce soil compaction and ground scarification. This seasonal restriction is consistent with the Conservation Management Practices (CMP) for Box Turtle and will help minimize the dispersal of invasive plant seed. State best management practices (BMP's) require that a 50' filter strip will be left around the vernal pool.

STEW	7	WP	Crop Tree/Commercial Thinning	31.9ac	55sf	50 MBF 220 cd(p)	Winter 2016-2018
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**Description:** The goal of this harvest will be to follow up on the prior investment in pruning selected white pine crop trees. These trees are now large, healthy sawtimber trees with relatively high value that will benefit from a thinning directed at providing more growing space to these specific trees. This harvest will have a dual objective of increasing the value of the forest while maintaining the wonderful park-like feel that this managed forest presently has. The desired future condition is an even-aged stand of similar species composition with large mast-producing hardwoods (e.g. white oak) retained. Stand density (basal area) will be reduced by roughly 1/3 by removing low vigor and poor formed timber and softwood pulpwood. While removals will occur stand-wide, particular focus will be given to releasing individual crop trees that have been selected for excellent growth form and potential as sawlogs. Residual basal area will be 110-120 square feet per acre. It is recommended that this harvest be scheduled for winter months (December 1 to March 31) in order to reduce soil compaction and ground scarification. This seasonal restriction is consistent with the Conservation Management Practices (CMP) for Box Turtle and will help minimize the dispersal of invasive plant seed. State best management practices (BMP's) require that a 50' filter strip will be left around the vernal pool located in the adjacent stand 6.

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Owner(s) SUDBURY VALLEY TRUSTEES      Town(s) SUDBURY/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	

**HARVESTING SUMMARY**

As mentioned, much of the harvesting recommended in this plan should be postponed until an invasive control program is in place. The initial plan should be to obtain funding through the Natural Resources Conservation Services' (NRCS) WHIP and EQIP Programs to carry out invasive control work within and around the priority management areas. Once there has been a reasonable degree of success in maintaining and expanding clean zones, the planned harvesting can be considered.

Normally, it would be recommended that the commercial and precommercial harvesting activities prescribed for Stands 1,2,4,5,6 and 7 be carried out simultaneously. This would minimize the duration of the actual harvest and minimize the disruption of recreational usage. Additionally the economics of a larger sale would be beneficial to the land trust. The total volume of for this sale would be **195 mbf sawtimber, 142 cd. firewood, and 708 cd. softwood pulp**. The combined area of the harvest would be **133 acres**. However, given the desirability of carrying out a prescribed fire immediately following clearing of the brush it may be prudent to divide this sale into two projects to ensure that the follow-up treatment is of a manageable size and carried out in a timely manner.

**GENERAL MANAGEMENT ACTIVITIES**

**Boundaries:** All boundaries should be blazed and painted within the first 2 years of this plan. Repaint in 7-10 years. Land trust 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:** There is currently no vehicular access to the stands where management is prescribed. This harvest would require truck access though and an abutting parcel (city of Marlborough or Federal Refuge land).

Cooperation with neighboring landowners will be necessary to accomplish this, as well as the construction of at least one bridge, crossing Cranberry Brook in the eastern section of the property. 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. See attached Physical Feature Map for trail concept.

**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 and wood turtle populations. During harvesting practices, leave approximately 6-10 cavity trees or potential cavity trees per acre.

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Owner(s) SUDBURY VALLEY TRUSTEES

Town(s) SUDBURY/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.

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

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

Signed under the pains of perjury:

Owner(s) \_\_\_\_\_ Date June, 2010

Owner(s) \_\_\_\_\_ Date \_\_\_\_\_

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

Plan Preparer \_\_\_\_\_ 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 \_\_\_\_\_

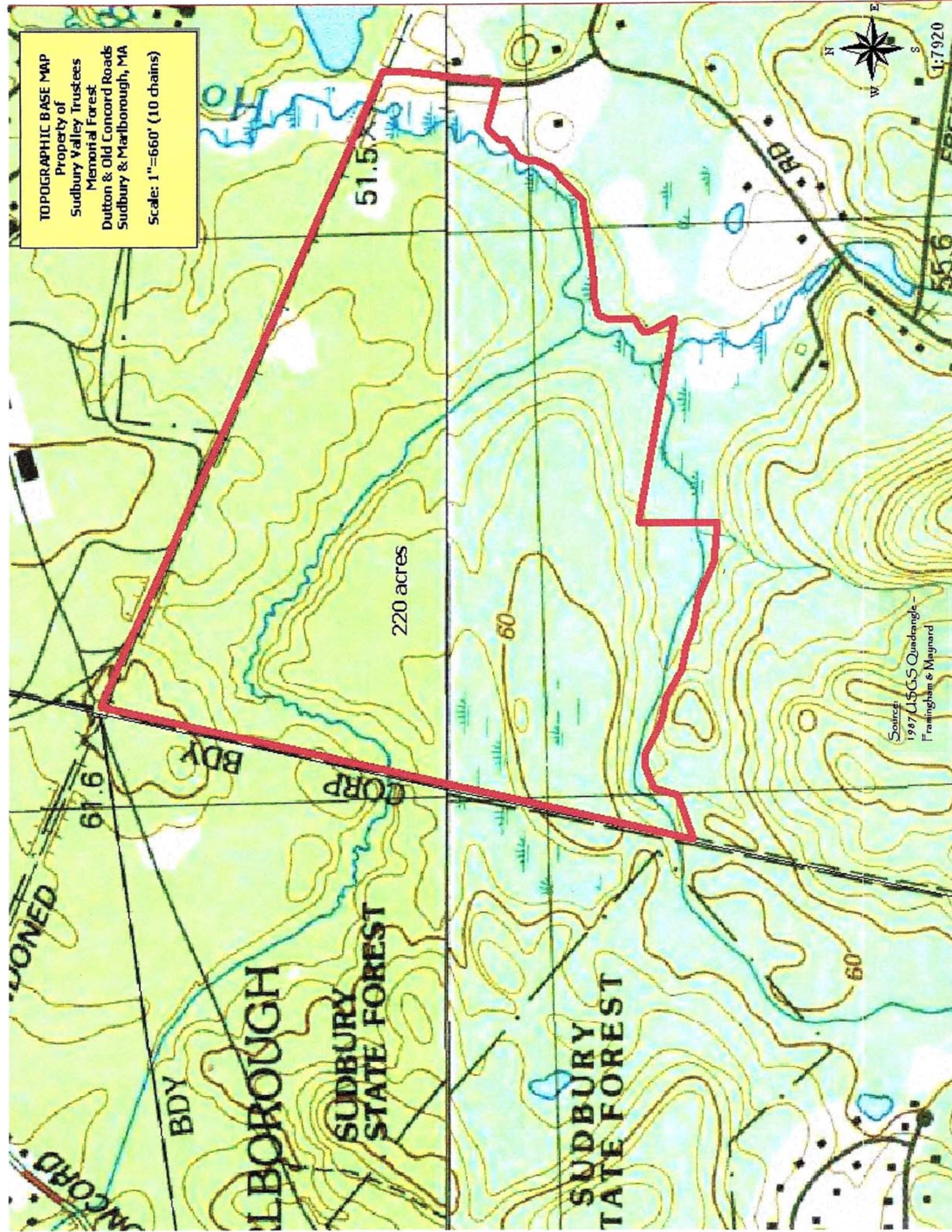
Approved, Regional Supervisor \_\_\_\_\_ Date \_\_\_\_\_

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) SUDBURY VALLEY TRUSTEES Town(s) SUDBURY/MARLBOROUGH



TOPOGRAPHIC BASE MAP  
Property of  
Sudbury Valley Trustees  
Memorial Forest  
Dutton & Old Concord Roads  
Sudbury & Marlborough, MA  
Scale: 1"=660' (10 chains)

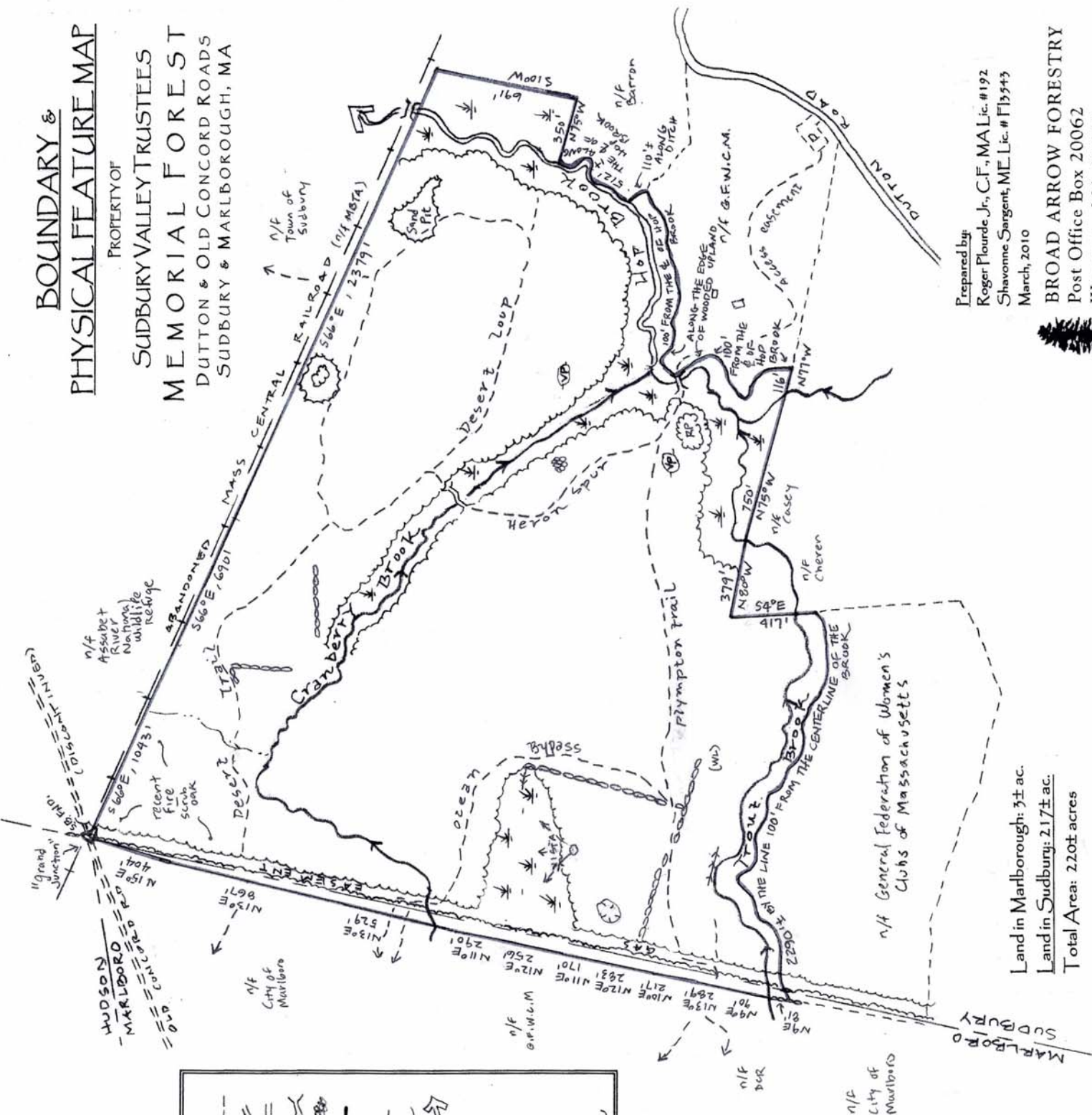




## PROPERTY OF

SUDBURY VALLEY TRUSTEES  
MEMORIAL FOREST

DUTTON & OLD CONCORD ROADS  
SUDBURY & MARLBOROUGH, MA



Prepared by:

Roger Plourde Jr., C.F., M.A Lic. #192

Shavonne Sargent, ME Lic. # F13543

March, 2010

BROAD ARROW FORESTRY

Post Office Box 20062

Worcester, MA 01602

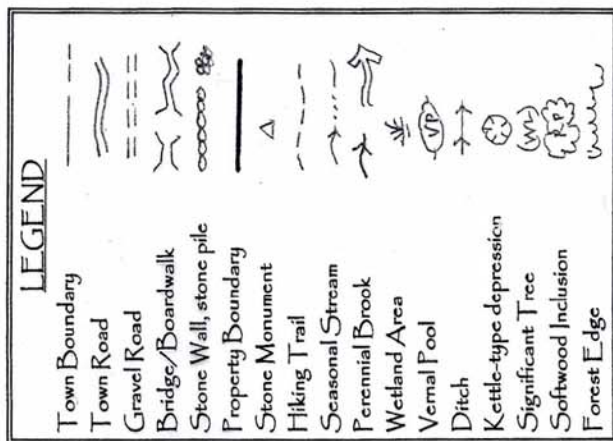
508.792.2414



Land in Marlborough:  $3 \pm \text{ac.}$

Land in Sudbury: 217± ac.

Total Area: 220± acres

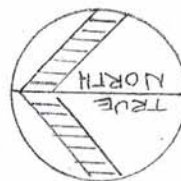


**Source:**

### Aerial photos

2/10 forest inventory

1999 Schofield Brothers Survey Plan



## NO CHAINS

SCALE



**COLOR ORTHOPHOTO BASE MAP**

Property of  
Sudbury Valley Trustees  
Memorial Forest  
Dutton & Old Concord Roads  
Sudbury & Marlborough, MA

Scale: 1" = 660' (10 chains)





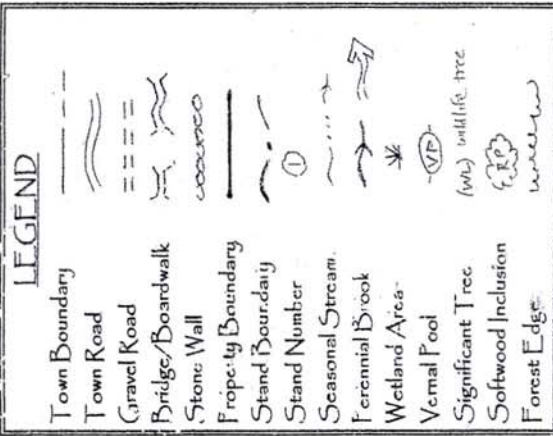
# FOREST STAND MAP

PROPERTY OF

SUDBURY VALLEY TRUSTEES  
DUTTON & OLD CONCORD ROADS  
SUDBURY & MARLBOROUGH, MA

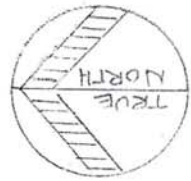
## MEMORIAL FOREST

DUTTON & OLD CONCORD ROADS  
SUDBURY & MARLBOROUGH, MA

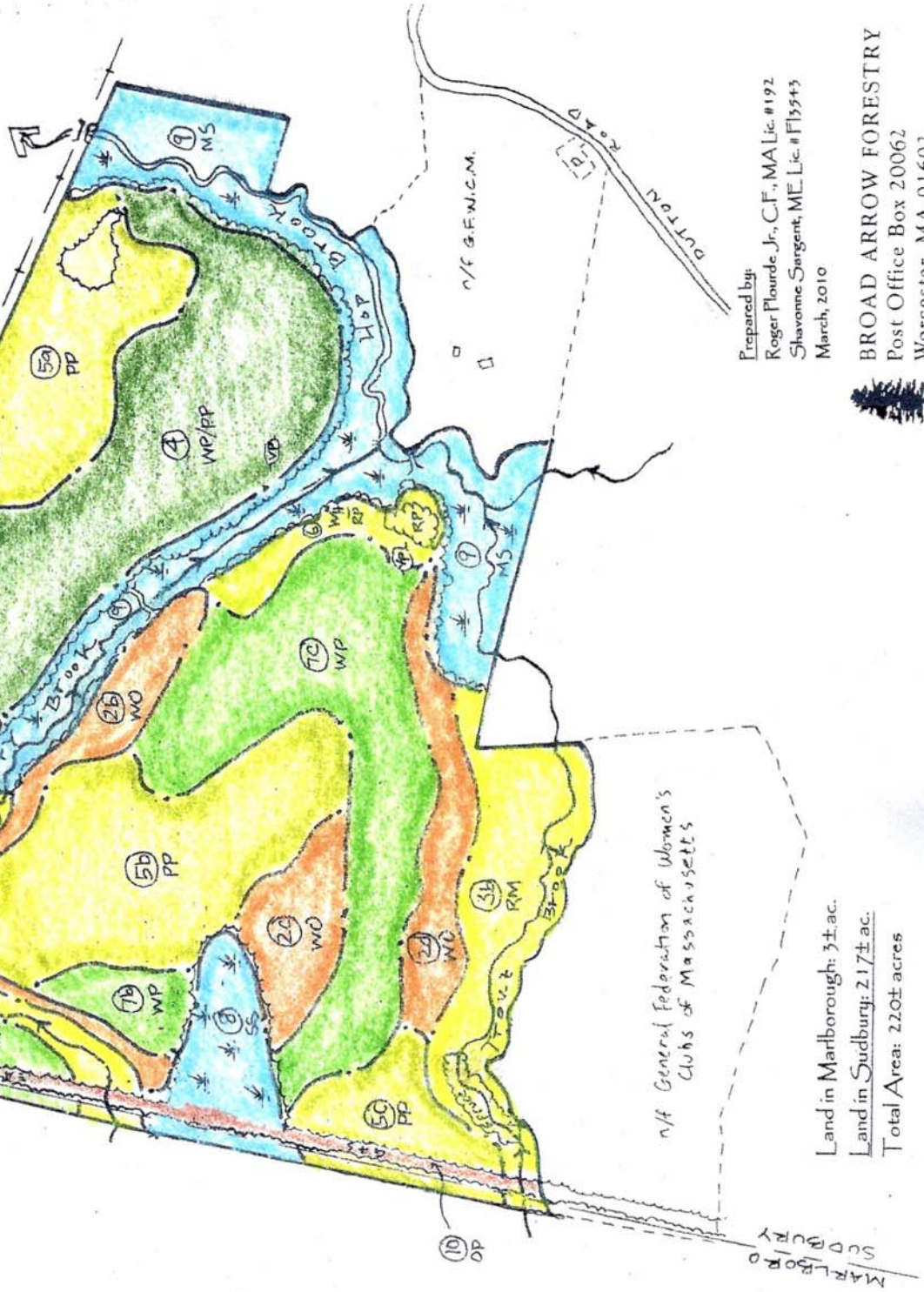


Stand Types	
PS	Pitch Pine-Scrub Oak
WP	White Pine
PP	Pitch Pine
RP	Red Pine
WO	White Pine-Oak
WH	White Pine-Hardwood
RM	Red Maple
MS	Swamp Hardwoods
OF	Shallow Marsh
	Open (pipeline)

Source:  
Aerial photos  
2/10 forest inventory  
1999 Schofield Brothers Survey Plan



SCALE  
1" = 660'



Prepared by:  
Roger Flourde Jr., C.F., MA Lic. #192  
Shavonne Sargent, ME Lic. #F13543  
March, 2010

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



**COLOR ORTHOPHOTO BASE MAP**  
Property of  
Sudbury Valley Trustees  
Memorial Forest  
Dutton & Old Concord Roads  
Sudbury & Marlborough, MA

Scale: 1"=2000'

SVT-Memorial Forest



1:24003



**TOPOGRAPHIC LOCUS MAP**  
Property of  
Sudbury Valley Trustees  
Memorial Forest  
Dutton & Old Concord Roads  
Sudbury & Marlborough, MA

Scale: 1"=2000'

**SVT-Memorial Forest**

Source:  
1987 USGS Quadrangle  
Framingham & Maynard

