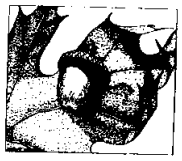
dcr

# FOREST MANAGEMENT PLAN

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

APR 20 2010



## CHECK-OFFS

| CH61 | CH61A | CH61B | STWSHP | C-S |
|---|---|---|---|---|
| cert. ☐ | cert. ☐ | cert. ☐ | new ☒ | EEA ☐ |
| recert. ☐ | recert. ☐ | recert. ☐ | renew ☐ | Other ☐ |
| amend ☐ | amend ☐ | amend ☐ | Green Cert ☐ | |
| Plan Change: _____ to _____ | | | Conservation Rest. ☐ | |
| | | | CR Holder _____ | |

## Administrative Box

| | | | |
|---|---|---|---|
| Case No. | 153-856 | Orig. Case No. | — |
| Owner ID | 502499 | Add. Case No. | — |
| Date Rec'd | 4-20-10 | Ecoregion | 221Ah |
| Plan Period | 2011-2020 | Topo Name | Fitchburg |
| Rare Spp. Hab. | yes | River Basin | Nashua R. |

## OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) ***Leominster Water Department,*** *c/o Patrick LaPointe*
Mailing Address *109 Graham Street, Leominster, MA 01453* Phone 978-534-7590 (501)

Property Location: Town(s) *Leominster (Fall Brook Reservoir)* Road(s) *Wachusett Street*

**Plan Preparer** ***Gary H. Gouldrup, New England Forestry Cons., Inc.*** Mass. Forester License # 81
Mailing Address *72 Townsend Street, Pepperell, MA 01463* Phone 978-433-8780

## 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 |
|---|---|---|---|---|---|---|---|---|
| 360 | 2 | 488 | 194 | * | NA | NA | 0.00 | * |
| 360 | 3 | 102 | 533 | * | NA | NA | 0.00 | * |
| 360 | 4 | UK | UK | * | NA | NA | 0.00 | * |
| 360 | 6 | 89 | 121 | * | NA | NA | 96.30 | * |
| 360 | 7 | UK | UK | * | NA | NA | 0.00 | * |
| 548 | 4A | 869 | 350 | * | NA | NA | 0.00 | * |
| | | | **TOTALS** | **330.80** | **NA** | 0.00 | **96.30** | **234.50** |

**Excluded Area Description(s)** **(if additional space needed, continue on separate paper)**
*There are 96.30 acres of land to be excluded from forest stewardship management. The excluded area includes the 88+/- acres of Fall Brook Reservoir as well as 8.30 acres of open support land around the reservoir, buildings, access roads and a water tank.*

## HISTORY

Year acquired 1897 Year management began 2004
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. *NA* treatment *NA* reason *NA*

Previous Management Practices (last 10 years)

| Stand # | Cutting Plan # | Treatment | Yield | Value | Acres | Date |
|---|---|---|---|---|---|---|
| *All* | *NA* | *Trail Management* | *NA* | *NA* | *NA* | *2004-2009* |

Remarks: (if additional space needed, continue on separate page)
* *Acreage for the Fall Brook Reservoir is based on GPS field work and calculations. Total acreage was not available for all of the lots listed at the Assessor's office.*

(Form revised May 2008)

***RECORDS*** (continued)

| 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 |
|---|---|---|---|---|---|---|---|---|
| 360 | 2 | 488 | 194 | * | NA | NA | 0.00 | * |
| 360 | 3 | 102 | 533 | * | NA | NA | 0.00 | * |
| 360 | 4 | UK | UK | * | NA | NA | 0.00 | * |
| 360 | 6 | 89 | 121 | * | NA | NA | 96.30 | * |
| 360 | 7 | UK | UK | * | NA | NA | 0.00 | * |
| 548 | 4A | 869 | 350 | * | NA | NA | 0.00 | * |
| | | | TOTALS | **330.80** | **NA** | 0.00 | **96.30** | **234.50** |

***EXCLUDED AREA DESCRIPTION*** (continued):

*There are 96.30 acres of land to be excluded from forest stewardship management. The excluded area includes the 88+/- acres of Fall Brook Reservoir as well as 8.30 acres of open support land around the reservoir, buildings, access roads and a water tank.*

**Acreage for the Fall Brook Reservoir is based on GPS field work and calculations. Acreage was not available for all of the lots listed on the Assessor's maps.*

***HISTORY*** (continued):

*Trail management and general reservoir maintenance has been conducted on the property over the years.*

*Partial boundary work has been done on privately owned properties abutting the Fall Brook Reservoir. The Leominster State Forest boundaries have been blazed and painted with light blue paint.*

## Property Overview, Regional Significance, and Management Summary

The Fall Brook watershed property is located in a south central section of Leominster just north of the Heywood Reservoir and southeast of the Haynes Reservoir. The property was initially acquired by the Town of Leominster in the 1890's with other parcels being added in 1931 and 1960.

The property lies in the Nashua River Watershed. Fall Brook and seasonal tributaries flow into the Fall Brook Reservoir from the northwest. Water from the Fall Brook watershed flows south into the Heywood Reservoir watershed in Sterling. Heywood Reservoir is approximately 550 south of the Fall Brook Reservoir.

Forest soils on the property are capable of producing high quality timber resources. Upland areas consist of well and moderately drained fine sandy loam soils (Paxton-Chatfield-Hollis-Canton-Woodbridge). The poorly drained sites consist of fine sandy loam soil on upland drainages and in low lying areas (Whitman).

The property is comprised of mature upland forest types which include red pine and white pine plantations, white pine-hardwoods, and oak-hardwoods. The only young forest habitat can be found in areas near and along the Fall Brook Reservoir.

The ice storm of 2008 has severely damaged the red pine plantations and many areas within the oak-hardwood forest type. Approximately 15-20 acres of the red pine stands have received over 75% overstory mortality. Red pine crowns snapped off of the main stems leaving standing snags throughout the damaged stands. The hardwood stands have also received crown damage, and mortality from the storm is estimated to be approximately 10-20% of the total overstory.

No commercial timber harvesting has been conducted on the property since field abandonment. The only timber management on the property was the establishment of the red and white pine plantations. Increment borings of the stands should be made to determine the date of planting for historical records. Cellar holes can be found along Wachusett Street. These sites will be preserved as cultural resource areas.

Trails have been established on the property by volunteers from the Leominster Land Trust, Leominster Recreation Department, Boy Scouts of America, Trustees of Reservations and Leominster Trail Stewards. Signs at the entrance to each trail indicate the prohibited and allowable uses of the property. Prohibited activities include motor vehicle use, smoking, dogs, horses, fires, fishing, camping, ATV's, snowmobiles, boats, and swimming. Allowable uses include cross country skiing, snowshoeing, hiking, archery, and hunting.

## Property Overview, Regional Significance, and Management Summary

The primary management objective of the Fall Brook Reservoir will be to preserve, maintain and improve water quality as a public water resource supply for the residents of Leominster. The Leominster Water Department Commission has reviewed the Quabbin Reservoir Watershed System Land Management Plan, 2007-2017. The Quabbin Forest Management Objectives can be found on page 144 of the Plan. The Leominster Water Department would like to pursue management of the Fall Brook Reservoir as stated in the first paragraph under the "Primary Objectives" (5.2.3.1). "*The primary objective of forest management of the Quabbin* (Fall Brook) *forest is to create and maintain a complex forest structure, which forms a protective forest cover and a biological filter on the watershed land. This watershed protection forest is designed to be vigorous, diverse in species and age, actively accumulating biomass, conserving ecological and economic values, actively regenerating, and most importantly maintaining a predictable flow of high quality water from the land*". The Leominster Water Department will use the Quabbin Plan as a guide when managing the Leominster watershed lands.

Management on the Morse and Distributing Reservoirs will be approached by using the "*Subwatershed Administration of Forest Management*". The Quabbin Plan defines a subwatershed on page 145 (5.2.3.21). "*A subwatershed is defined in most cases as the land area that drains to a perennial tributary of the reservoir.*" The Quabbin Plan defines this management theory on page 146 (5.2.3.2.2). "*The general theory behind the use of subwatershed-based planning is to control the proportion of a drainage area that is disturbed by management activities (e.g., logging or road work) during the management period in order to reduce the chances of water quality impacts. This approach is partly based on research on experimental watersheds throughout the eastern US that indicate that until approximately 25-30% of the watershed overstory stocking is harvested (assuming nearly 100% forest cover type), there is no detectable increase in water yield (Hornbeck and Kochenderfer, 2004: Hornbeck et al., 1993). As increases in transport of sediments and nutrients to tributaries and the reservoir are directly related to increases in water yield, it follows that the 25-30% threshold also applies to water quality changes (so long as Conservation Management Practices are in place, the greatest concern is with the movement of nutrients rather than sediments). The same research also demonstrated that water yield generally returns to pre-harvest conditions as the harvested area regenerates – usually within 3-10 years.*"

The Quabbin Plan further goes on to say that "*While the 25-30% figure provides a guideline for meeting water quality standards, other factors, such as soil types, topography, proximity of the management work to water courses, and the concentration and distribution of the harvesting can affect the decision about acceptable levels of harvesting.*"

Management priorities will focus on storm damage clean-up to reduce the forest fire threat that has been created from the ice storm. Efforts to reduce the red pine component will also be a priority in order to move towards more natural forest conditions. Creating forest diversity for the overall health of the forest will also be pursued.

Trails on the watershed property are managed by the Leominster Trail Stewards (LTS). The mission of the Leominster Trail Stewards is "*to improve and maintain the City's trails and to promote their appropriate use for the benefit and enjoyment of its residents and visitors*". LTS is responsible for developing new trails and enhancing the trail/fire roads network. They are responsible for monitoring and maintaining the trails and work with the Leominster Water Department when determining location, access, parking and safety issues. Their goal is to provide a user-friendly trail system that encourages residents to enjoy the open spaces, parks and conservation land in Leominster. They promote the trails by providing a comprehensive website, distributing trail maps, providing trail pamphlets, maintaining the map houses, running walks and jogs, sponsoring public events and cleanups, setting up and staffing booths for town activities and celebrations, and giving presentations. They foster community involvement by identifying projects and tasks that can be done by youth organizations and volunteers.

Wildlife habitat will be improved in the timber harvesting practices that are scheduled for this forest. Very little young and early successional forest types beneficial to many form of wildlife exist on the property. Salvage and patch cutting in the red pine stands will promote this valuable habitat for wildlife.

Invasive species on the property include Japanese barberry and bittersweet. There do not appear to be any major problems with forest regeneration or the destruction of natural communities as a result of these species. Efforts to eliminate or control the spread of invasive species will be pursed mainly through good timber harvesting practices aimed at establishing vigorously growing regeneration in the forest understory.

Timber management will focus on salvage, individual tree selection harvesting, group selection, shelterwood harvesting, patch cutting, and improvement thinning. These practices will be designed to improve tree growing conditions, diversify age classes, increase the timber value of forest stands for the future, and most importantly maintain a healthy watershed environment that produces high quality water for the residents of Leominster. As a general rule, evenaged management (patch cutting and shelterwood harvesting practices) will not be conducted within 400 feet of the bank of the reservoirs and at least 200 feet from the bank of any tributary.

The Forest Cutting Practices Act (Chapter 132) contains BMP's for work in wetland and stream crossing areas which will be followed. The City of Leominster will go above and beyond the general Best Management Practices in areas deemed sensitive by the Conservation Commission when harvesting near wetlands, open bodies of water, or when crossing tributaries of the reservoir. This will involve installing bridges and mitigation structures deemed necessary to protect water quality.

*The Forest Cutting Practices Act protects the benefits of forests through a permitting process. Applicable to timber harvesting on both public and private forestland, the FCPA regulates any commercial timber cutting of wood products greater than 25 thousand board feet or 50 cords on any parcel of land at any one time. Activities exempt under the FCPA include harvesting for: 1) rights-of-way for public utilities and public highways, 2) cultivation, pasture or pasture maintenance, 3) non-commercial use of the landowner or tenant, 4) changing land use when permitted by town or city, 5) small commercial harvests (However, a cutting plan may be filed to gain exemption to M.G.L. Ch. 131 the Wetlands Protection Act if wetland resources are involved.)*

*If an activity is not exempt, the FCPA requires filing a Forest Cutting Plan with the Department of Conservation and Recreation and the local conservation commission at least ten business days before the proposed start date. At the same time the landowner or agent prepares the Notice of Intent to Abutters form, which must be sent to abutters of record whose boundaries are within 200 feet of the cutting area. The purpose of the Notice of Intent to Abutters is to provide an opportunity for landowners to determine if boundary lines have been accurately marked, it is not an opportunity for comment on the operation itself.*

Leominster Water Department _____

**Landowner Goals**

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

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

   *To thin out over-grown forest areas to enhance water quality for all of our watersheds.*

## Stewardship Purpose

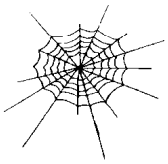
By enrolling in the Forest Stewardship Program and following a Stewardship Plan, I understand that I will be joining with many other landowners across the state in a program that promotes ecologically responsible resource management through the following actions and values:

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** 4/20/00

## Stewardship Issues

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



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

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

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

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

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

Indispensable to rare species protection is a set of maps maintained by the Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) that show current and historic locations of rare species and their habitats. The maps of your property will be compared to these rare species maps and the result indicated on the upper right corner of the front page of the plan. Prior to any

regulated timber harvest, if an occurrence does show on the map, the NHESP will recommend protective measures. Possible measures include restricting logging operations to frozen periods of the year, or keeping logging equipment out of sensitive areas. You might also use information from NHESP to consider implementing management activities to improve the habitat for these special species.

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

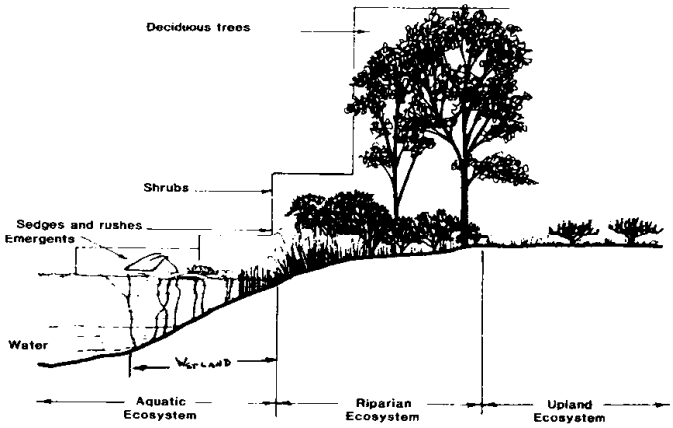



Figure 1: Example of a riparian zone.

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

**Filtration:** Riparian zones capture and filter out sediment, chemicals and debris before they reach streams, rivers, lakes and drinking water supplies. This helps to keeps 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 then to cure them. This preventative approach usually involves two steps. First, it is desirable to maintain or encourage a wide diversity of tree species and age classes within the forest. This diversity makes a forest less susceptible to a single devastating health threat. Second, by thinning out weaker and less desirable trees, well-spaced healthy individual trees are assured enough water and light to thrive. These two steps will result in a forest of vigorously growing trees that is more resistant to environmental stress.

**Fire:** Most forests in Massachusetts are relatively resistant to catastrophic fire. Historically, Native Americans commonly burned certain forests to improve hunting grounds. In modern times, fires most often result from careless human actions. The risk of an unintentional and damaging fire in your woods could increase as a result of logging activity if the slash (tree tops, branches, and debris) is not treated correctly. Adherence to the Massachusetts slash law minimizes this risk. Under the law, slash is to be removed from buffer areas near roads, boundaries, and critical areas and lopped close to the ground to speed decay. Well-maintained woods roads are always desirable to provide access should a fire occur.

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

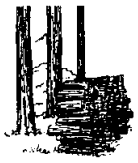
**Wildlife Management:** Enhancing the wildlife potential of a forested property is a common and important goal for many woodland owners. Sometimes actions can be taken to benefit a particular species of interest (e.g., put up Wood Duck nest boxes). In most cases, recommended management practices can benefit many species, and fall into one of three broad strategies. These are **managing for diversity, protecting existing habitat, and enhancing existing habitat**.

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

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

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

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



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

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

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

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

Massachusetts has a long and diverse history of human habitation and use. Native American tribes first took advantage of the natural bounty of this area over 10,000 years ago. Many of these villages were located along the coasts and rivers of the state. The interior woodlands were also used for hunting, traveling, and temporary camps. Signs of these activities are difficult to find in today's forests. They were obscured by the dramatic landscape impacts brought by European settlers as they swept over the area in the 17$^{th}$ and 18$^{th}$ 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 | 1 | OH | 45.60 | 9.9" DBH<br>Pole-Sawtimber | 110 sqft | 3,355 BF<br>& 20.8 Cds | 65 (RO) |

Red oak and mixed hardwoods are the dominant overstory species in this adequately stocked pole and sawtimber sized stand. Species composition, stand density and size class varies throughout the area. Areas within this stand were damaged in the 2008 ice storm. Mortality from the storm in this stand is estimated to be 10% of the total overstory. The red oak stems that were not severely damaged tend to be fair to high in timber quality. The mixed hardwood component includes red maple, black birch, black cherry, American beech, hickory, sugar maple, white ash, white birch, yellow birch, aspen, white oak, and black oak of poor to good form and timber quality. Scattered hemlock and white pine poles and sawtimber can also be found. Forest regeneration is scattered and includes mixed hardwood saplings. Witch hazel and mountain laurel are present in the understory in varying densities. The terrain is gently to moderately sloped with well and moderately drained fine sandy loam soils (Paxton-Woodbridge) capable of producing high quality timber resources. Management will focus on salvage and improvement thinning and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 2 | WH | 37.40 | 12.2" DBH<br>Sawtimber-Pole | 130 sqft | 9,593 BF<br>& 22.0 Cds | 63 (WP) |

White pine and mixed hardwoods dominate the overstory of this well stocked sawtimber and pole sized stand. The white pine stems range from poor to good in form and timber quality. The mixed hardwood component includes red oak, black oak, black cherry, hickory, and red maple poles and sawtimber sized stems of poor to good form and timber quality. The 2008 ice storm has damaged sections within the stand. The understory vegetation includes scattered pockets of witch hazel and mountain laurel. Forest regeneration is scattered and consists of mixed hardwood and white pine saplings. The area is gently to moderately sloped with well to moderately drained fine sandy loam soils (Paxton-Woodbridge) capable of producing high quality timber resources. Management will focus on timber resource management and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 3 | RP | 16.60 | 11.3" DBH<br>Pole-Small Sawtimber | 30 sqft | 2,890 BF<br>& 3.5 Cds | 65 (RP) |

Red pine is the dominant overstory species in this severely damaged plantation. The plantations are located on the north and south side of Wachusett Street. The 2008 ice storm has resulted in approximately 80-90% mortality. Tree crowns have snapped off of the main stems and currently there are more standing dead snags than living trees. A few areas on the south side of Wachusett Street did not suffer extensive damage. The area is gently sloped with well to moderately drained fine sandy loam soils (Paxton-Woodbridge) capable of producing high quality timber resources. Management will focus on salvaging the storm damaged trees to remove fire hazards as well as removing a majority of the red pine component that still remains in order to establish native regeneration in the understory. The desired future condition is a stand that is free from the threat of forest fire fuel in the understory as well as a stand that is regenerating native species in the understory for the benefit of early successional and young forest wildlife species.

## *STAND DESCRIPTIONS*

| OBJ | STD NO | TYPE | AC | MSD OR SIZE-CLASS | BA/AC | VOL/AC | SITE INDEX |
|---|---|---|---|---|---|---|---|
| STEW | 4 | WP | 3.60 | 13.0" DBH<br>Sawtimber | 260 sqft | 30.692 BF<br>& 30.6 Cds | 65 (WP) |

White pine is the dominant overstory species in this sawtimber sized plantation. The red pine sawtimber sized stems can also be found on the south side of Wachusett Street. Timber quality ranges from poor to good. Some storm damage to the canopy is evident. Mixed hardwood and white pine regeneration is present in the understory. The area is gently sloped with well drained soils (Chatfield-Hollis) capable of producing high quality timber resources. Management will focus on timber resource improvement. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 5 | OH | 47.40 | 9.9" DBH<br>Pole-Sawtimber | 110 sqft | 2,648 BF<br>& 23.0 Cds | 65 (RO) |

Red oak and mixed hardwoods are the dominant overstory species in this adequately stocked pole and sawtimber sized stand. Species composition, stand density and size class varies throughout the area. Areas within this stand were damaged in the 2008 ice storm. Mortality from the storm in this stand is estimated to be 10-20% of the total overstory. The red oak stems that were not severely damaged tend to be fair to high in timber quality. The mixed hardwood component includes red maple, black birch, black cherry, American beech, hickory, sugar maple, white ash, white birch, yellow birch, aspen, white oak, and black oak of poor to good form and timber quality. Scattered hemlock and white pine poles and sawtimber can also be found. Red maple is the primary species along Fall Brook. Storm damage is extensive in the low lying areas around Fall Brook. Forest regeneration is scattered and includes mixed hardwood saplings. Witch hazel and mountain laurel are present in the understory on the upland sites. The terrain is gently to moderately sloped and rocky with well and moderately drained fine sandy loam soils (Paxton-Woodbridge-Canton) capable of producing high quality timber resources. Poorly drained sites along Fall Brook are poorly drained (Whitman). Management will focus on salvage and improvement thinning and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 6 | WH | 16.80 | 11.7" DBH<br>Sawtimber-Pole | 100 sqft | 8,347 BF<br>& 14.1 Cds | 65 (WP) |

White pine and mixed hardwoods dominate the overstory of this well stocked sawtimber and pole sized stand. The white pine stems range from poor to good in form and timber quality. The mixed hardwood component includes red oak, black oak, black cherry, hickory, and red maple poles and sawtimber sized stems of poor to good form and timber quality. The 2008 ice storm has damaged sections within the stand. The understory vegetation includes scattered pockets of witch hazel and mountain laurel. Forest regeneration is scattered and consists of mixed hardwood and white pine saplings. The area is gently to moderately sloped, rocky in spots, with well to moderately drained fine sandy loam soils (Paxton-Woodbridge-Chatfield) capable of producing high quality timber resources. Management will focus on timber resource management and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

## *STAND DESCRIPTIONS*

| OBJ | STD NO | TYPE | AC | MSD OR SIZE-CLASS | BA/AC | VOL/AC | SITE INDEX |
|---|---|---|---|---|---|---|---|
| STEW | 7 | OH | 14.20 | 10.8" DBH<br>Pole-Sawtimber | 105 sqft | 2,969 BF<br>& 20.4 Cds | 65 (RO) |

Red oak and mixed hardwoods are the dominant overstory species in this adequately stocked pole and sawtimber sized stand. Areas within this stand were damaged in the 2008 ice storm. Mortality from the storm in this stand is estimated to be 10-20% of the total overstory. The red oak stems that were not severely damaged tend to be fair to high in timber quality. The mixed hardwood component includes red maple, black birch, black cherry, American beech, hickory, sugar maple, white ash, white birch, yellow birch, aspen, white oak, and black oak of poor to good form and timber quality. Scattered hemlock and white pine poles and sawtimber can also be found. Forest regeneration is scattered and includes mixed hardwood saplings. Witch hazel and mountain laurel are present in the understory in varying densities. The terrain is gently to moderately sloped and rocky with well and moderately drained fine sandy loam soils (Paxton-Woodbridge-Canton) capable of producing high quality timber resources. Management will focus on salvage and improvement thinning and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 8 | WH | 13.20 | 10.9" DBH<br>Sawtimber-Pole | 160 sqft | 7,751 BF<br>& 26.4 Cds | 65 (WP) |

White pine and mixed hardwoods dominate the overstory of this well stocked sawtimber and pole sized stand. The white pine stems range from poor to good in form and timber quality. The mixed hardwood component includes red oak, black oak, black cherry, hickory, and red maple poles and sawtimber sized stems of poor to good form and timber quality. The 2008 ice storm has damaged sections within the stand. The understory vegetation includes scattered pockets of witch hazel and mountain laurel. Forest regeneration is scattered and consists of mixed hardwood and white pine saplings. The area is gently to moderately sloped, rocky in spots, with well to moderately drained soils (Chatfield-Hollis) capable of producing high quality timber resources. Management will focus on timber resource management and trail maintenance. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 9 | OH | 18.40 | 9.2" DBH<br>Pole-Sawtimber | 50 sqft | 1,465 BF<br>& 8.7 Cds | 55 (RO) |

Red oak and mixed hardwoods are the dominant overstory species in this understocked stocked pole and sawtimber sized stand. This stand received moderate to high damage from the 2008 ice storm. Mortality from the storm in this stand is estimated to be 20-40% of the total overstory. The red oak stems that were not severely damaged tend to be fair in timber quality. The mixed hardwood component includes red maple, chestnut oak, black oak, black birch, black cherry, and white birch of poor to good form and timber quality. Scattered hemlock and white pine poles and sawtimber can also be found in the higher elevations to the west. Forest regeneration is scattered and includes mixed hardwood saplings. Witch hazel and mountain laurel are present in the understory in varying densities. The terrain is moderately to steeply sloped with exposed ledge and rocks. The soils are well drained rock outcrop (Charlton-Hollis) capable of producing only fair quality timber resources due to the shallow soils. Management will focus on salvage and improvement thinning and trail maintenance. Steep slopes in close proximity to the Reservoir may limit harvesting in this sensitive watershed area. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

## *STAND DESCRIPTIONS*

| OBJ | STD NO | TYPE | AC | MSD OR SIZE-CLASS | BA/AC | VOL/AC | SITE INDEX |
|---|---|---|---|---|---|---|---|
| STEW | 10 | RP | 11.30 | 11.7" DBH<br>Small Sawtimber | 75 sqft | 6,019 BF<br>& 9.7 Cds | 65 (RP) |

Red pine is the dominant overstory species in this moderately to severely damaged plantation. White pine and mixed hardwoods can also be found scattered throughout the area. Approximately 50% overstory mortality occurred within the stand on average. Tree crowns have snapped off of the main stems and trees have blown over as well in the wetter soils. Southern sections of this stand received most of the damage. The area is flat to gently sloped with well to moderately drained fine sandy loam soils (Paxton-Woodbridge) capable of producing high quality timber resources. A few areas are seasonally wet and poorly drained. Management will focus on salvaging the storm damaged trees to remove fire hazards as well as removing a majority of the red pine component that still remains in order to establish native regeneration in the understory. The desired future condition is a stand that is free from the threat of forest fire fuel in the understory as well as a stand that is regenerating native species in the understory for the benefit of early successional and young forest wildlife species.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 11 | MH | 3.80 | Sapling | 10 sqft | 0.5 Cords | 63 (MH) |

Mixed hardwood saplings dominate the overstory of this early successional and young forest type. Birch, maple, ash, aspen, oak, black cherry and white pine saplings can all be found in varying densities. The area is flat to gently sloped with well drained soils (Paxton) and poorly drained soils (Whitman). No management is recommended at this time except for general reservoir maintenance. The desired future condition is a stand that provides a forest cover filter to the reservoir. Areas along the dam will remain open.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 12 | WP | 6.20 | 13.3" DBH<br>Sawtimber | 230 sqft | 28,449 BF<br>& 25.1 Cds | 65 (WP) |

White pine is the dominant overstory species in this sawtimber sized plantation along May Street on the east side of the reservoir. Timber quality ranges from poor to good. Mixed hardwood and white pine regeneration is present in the understory. The area is flat with well drained fine sandy loam soils (Paxton) capable of producing high quality timber resources. Management will focus on timber resource improvement. The primary desired future condition is a stand that is growing a healthy crop of trees in several age and size classes for the protection of water quality on the Fall Brook watershed.

## MANAGEMENT PRACTICES
*to be done within next 10 years*

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

### *Timber Management*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 3 | RP | Salvage & Patch Cut | 16+/- | 30 sqft | 45 MBF & 300 Tons | 2010 |

Management will focus on salvaging dead and dying red pine stems that have been severely damaged in the ice storm of 2008. These trees and portion of trees will be cut and skidded to a landing area where they will be chipped and trucked off of the property in order to reduce the threat of forest fire. Patch cutting the remaining red pine that remains within the plantations will also be done to encourage native forest regeneration in the understory and create valuable young forest habitat for wildlife. Efforts will be made to leave any red oak, white pine and mixed hardwoods that appear to be wind resistant and have healthy crowns that are capable of dispersing seed into the former plantation areas.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 10 | RP | Salvage & Selection Harvest Individual & Small Group | 8+/- | 40 sqft | 25 MBF & 160 Tons | 2010 |

Management will focus on salvaging dead and dying red pine stems that have been severely damaged in the ice storm of 2008. These trees and portion of trees will be cut and skidded to a landing area where they will be chipped and trucked off of the property in order to reduce the threat of forest fire. Individual and group selection within the remaining red pine that remains within the plantations will also be done to encourage native forest regeneration in the understory and create valuable young forest habitat for wildlife. Efforts will be made to leave red oak, white pine and mixed hardwoods that appear to be wind resistant and have healthy crowns that are capable of dispersing seed into the former plantation areas. Filter strips will be retained along the edges of the Haynes reservoir.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | 2 | WH | Selection Harvest Individual & Small Group | 25+/- | 40 sqft | 65 MBF & 500 Tons | 2010-2015 |

Management will focus on harvesting white pine, mixed oak, red pine and mixed hardwood poles and sawtimber by selection harvesting. Efforts to remove the storm damaged trees will be a priority. Removing individual and small groups of trees will be done to improve the growth and value of the developing high quality white pine and red oak poles and developing sawtimber. The harvest will be designed to release advanced regeneration as well as improve growing conditions of trees in the pole (4-11" DBH) and small sawtimber (12-16" DBH) classes. The cutting will assist in the development of wind-firm trees. The percentage of the overstory removal will vary based on the varying tree sizes and stand density that currently exists within the stand. The target is approximately 20 to 30% of the overstory. Harvesting low quality hardwoods for firewood will also be done as part of the thinning. Thinning will also prepare the site for new production. Utilizing the wood to the lowest possible diameter will be done to maintain good aesthetics. Selecting a harvester with the ability to chip tops will also be considered for aesthetic purposes.

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) Leominster Water Department (Fall Brook Reservoir) Town(s) Leominster

## 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 | Selection Harvest<br>Individual & Small Group | 10+/- | 40 sqft | 25 MBF<br>& 200 Tons | 2010-2015 |

Management will focus on harvesting white pine, mixed oak, red pine and mixed hardwood poles and sawtimber by selection harvesting. Efforts to remove the storm damaged trees will be a priority. Removing individual and small groups of trees will be done to improve the growth and value of the developing high quality white pine and red oak poles and developing sawtimber. The harvest will be designed to release advanced regeneration as well as improve growing conditions of trees in the pole (4-11" DBH) and small sawtimber (12-16" DBH) classes. The cutting will assist in the development of wind-firm trees. The percentage of the overstory removal will vary based on the varying tree sizes and stand density that currently exists within the stand. The target is approximately 20 to 30% of the overstory. Harvesting low quality hardwoods for firewood will also be done as part of the thinning. Thinning will also prepare the site for new production. Utilizing the wood to the lowest possible diameter will be done to maintain good aesthetics. Selecting a harvester with the ability to chip tops will also be considered for aesthetic purposes.

## *Recreation Management*

Trails on the watershed property are managed by the Leominster Trail Stewards (LTS). The mission of the Leominster Trail Stewards is "*to improve and maintain the City's trails and to promote their appropriate use for the benefit and enjoyment of its residents and visitors*". LTS is responsible for developing new trails and enhancing the trail/fire roads network. They are responsible for monitoring and maintaining the trails and work with the Leominster Water Department when determining location, access, parking and safety issues. Their goal is to provide a user-friendly trail system that encourages residents to enjoy the open spaces, parks and conservation land in Leominster. They promote the trails by providing a comprehensive website, distributing trail maps, providing trail pamphlets, maintaining the map houses, running walks and jogs, sponsoring public events and cleanups, setting up and staffing booths for town activities and celebrations, and giving presentations. They foster community involvement by identifying projects and tasks that can be done by youth organizations and volunteers.

## *Fire Road Management*

Fire road maintenance will be a cooperative effort between the Leominster Water Department (LWD), the Leominster Trail Stewards (LTS) and the Leominster Fire Department (LFD). The 2008 ice storm has blocked many of the existing fire roads and trails on the Fall Brook Reservoir. LTS has re-opened most of the trails. Timber harvesting operations will further improve access to some of the more remote areas of the property over time.

## *Wildlife Habitat Enhancement*

Timber harvesting practices alone will enhance wildlife habitat. Creating an unevenaged forest structure while maintaining a variety of forest types and vegetation will greatly increase the diversity of wildlife species using the Fall Brook Reservoir property for food, protection, mating and nesting. For more information on wildlife management please refer to "*Enhancing Wildlife Habitats; A Practical Guide For Forest Landowners*".

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) Leominster Water Department (Fall Brook Reservoir) Town(s) Leominster

## MANAGEMENT PRACTICES
***to be done within next 10 years***

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

### *General Reservoir Maintenance & Water Quality Monitoring*

General reservoir maintenance will include the cleaning of spillways, waterways and dams by removing undesirable vegetation. Forest areas that are contributing high levels of TOC (Total Organic Carbon) will also be managed. The following was taken directly from the Quabbin Reservoir Watershed System Land Management Plan: "*TOC is composed of dissolved organic carbon (DOC) and of particulate organic carbon (POC). DOC normally accounts for approximately 90% of TOC. DOC is directly related to the eutrophic state of a water body. Eutrophication is related to the amount of nutrients, mainly nitrogen and phosphorous, available for algal growth, with phosphorous usually the most limiting. Eutrophication is driven by external loading of organic matter, nutrients and silt. A well managed, forested watershed sequesters nutrients*". Removal of trees and vegetation within forested areas that are contributing to TOC will be done based on water quality monitoring by the Water Department.

### *Boundary Management*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEW | All | All | Identify, Blaze & Paint | 330+/- | NA | NA | 2010- |

Boundary identification, blazing and painting of the property lines will be done along property lines abutting private lands and lands not belonging to the City of Leominster.

### *Forest Stewardship Education*

Public notices and pre-harvest timber walks will help educate the residents of Leominster about the forest resources and management of the Fall Brook Reservoir.

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) Leominster Water Department (Fall Brook Reservoir) Town(s) Leominster

## 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**. I pledge to abide by the management provisions of this Stewardship Management Plan for a period of at least ten years, following approval. I understand that in the event that I convey all or a portion of the land described in this plan during the period of the plan, I will notify the Department of Conservation and Recreation of this change in ownership.

Signed under ~~the pains~~ of perjury:

Owner(s) _____ Date 4/20/10

_____ Date _____

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

Plan Preparer _____ Date 4/17/2010

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

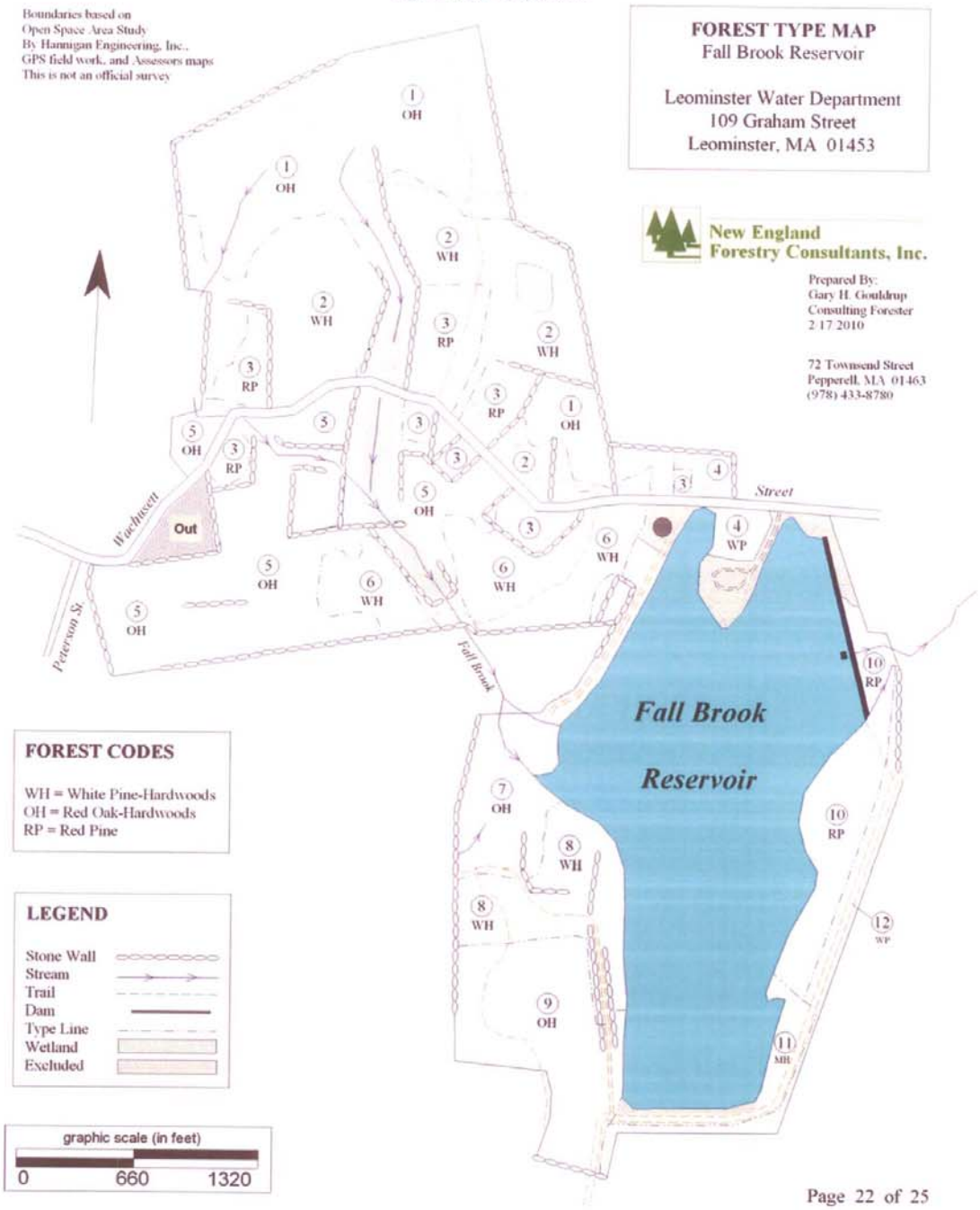
Approved, Service Forester _____ Date 5-6-10

Approved, Regional Supervisor N/A 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) Leominster Water Dept. (Fall Brook Reservoir) Town(s) Leominster

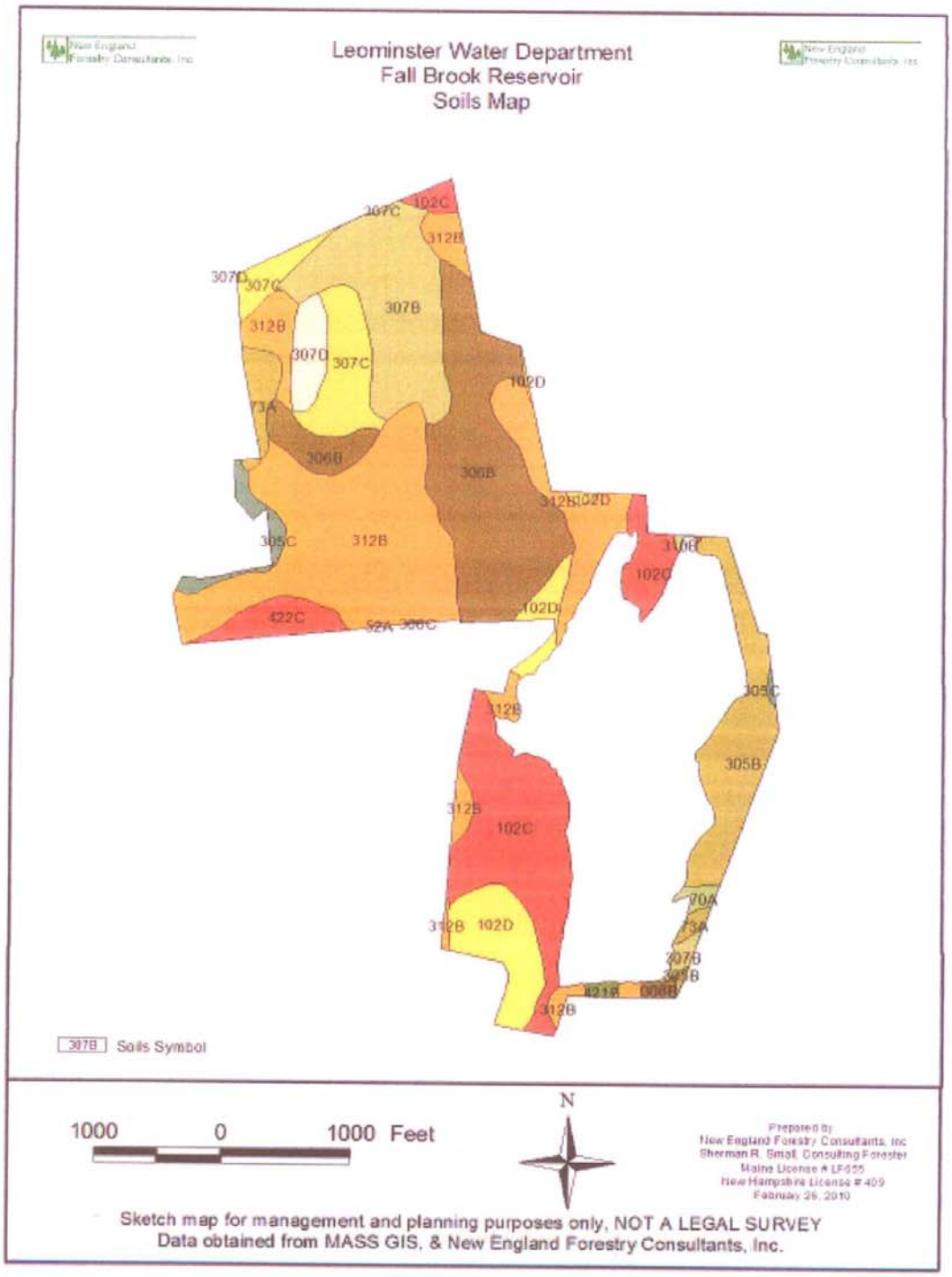
Leominster Water Department
Forest Stewardship Plan
Fall Brook Reservoir

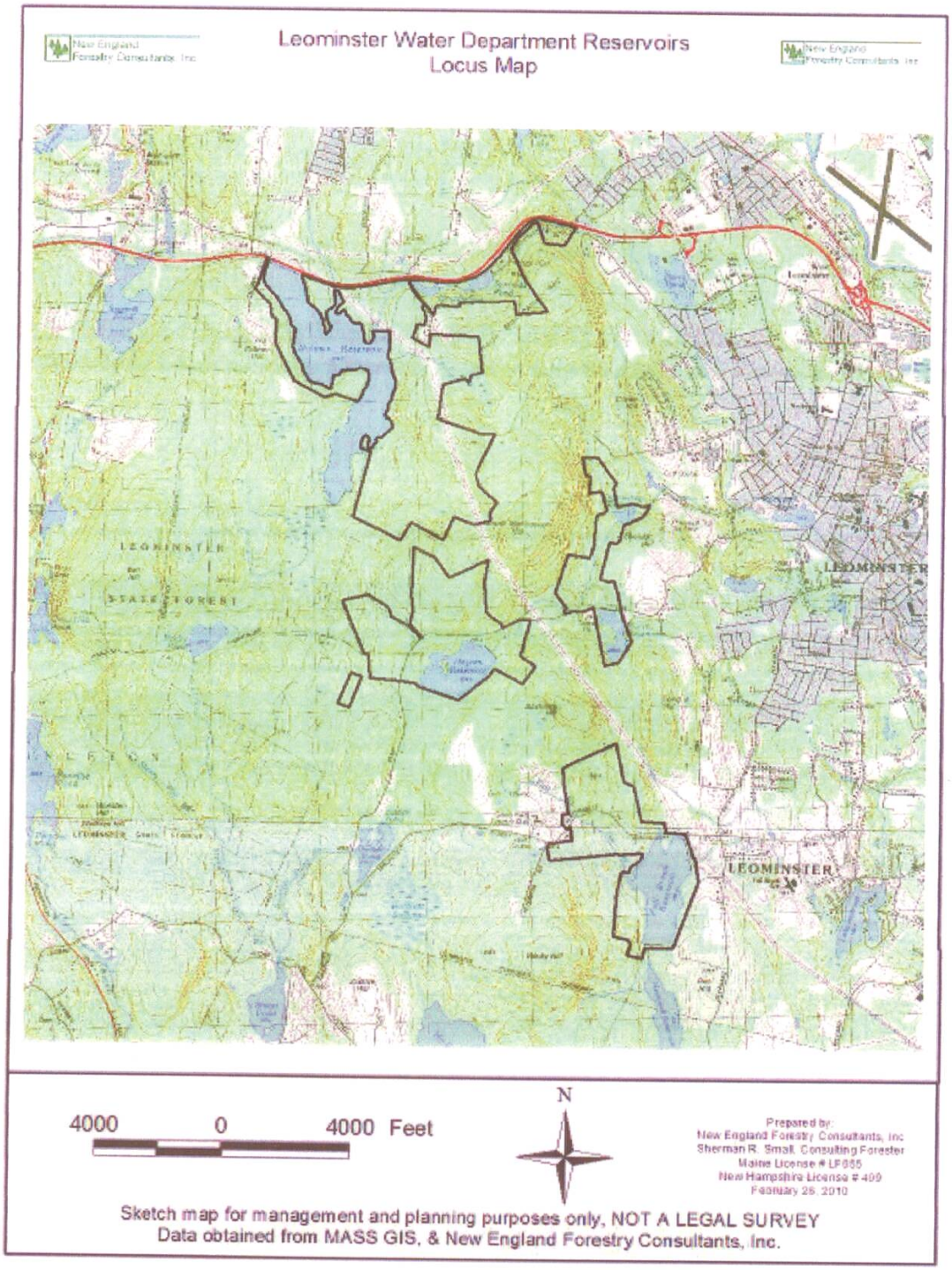



Page 22 of 25

Leominster Water Department
Fall Brook Reservoir
2005 Aerial Photo
1000 0 1000 Feet
N
Prepared by
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF 655
New Hampshire License # 409
February 26, 2010
Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

Leominster Water Department
Forest Stewardship Plan
Fall Brook Reservoir




Leominster Water Department Reservoirs
Locus Map
LEOMINSTER
STATE FOREST
LEOMINSTER
LEOMINSTER
4000 0 4000 Feet
N
Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF055
New Hampshire License # 409
February 26, 2010
Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.