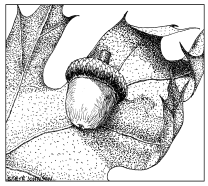
FOREST MANAGEMENT PLAN

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



CHECK-OFFS					*Administrative Box*			
CH61	CH61A	CH61B	STWSHP	C-S	Case No.		Orig. Case No.	
cert. ☐	cert. ☐	cert. ☐	new ☒	EEA ☐	Owner ID		Add. Case No.	
recert. ☐	recert. ☐	recert. ☐	renew ☐	Other ☐	Date Rec'd		Ecoregion	
amend ☐	amend ☐	amend ☐	Green Cert ☐		Plan Period		Topo Name	*Athol*
			Conservation Rest. ☐		Rare Spp. Hab.		River Basin	*Millers*
Plan Change: _____ to _____			CR Holder _____					

OWNER, PROPERTY, and PREPARER INFORMATION

Property Owner(s) ***City of Gardner, Gardner Forest Stewardship Committee, c/o Ed Goss***
Mailing Address *City Hall Room 226, 95 Pleasant Street, Gardner, MA 01440* Phone *978-630-4010*

Property Location: Town(s) *Gardner* Road(s) *Snake Pond Road & Whitney 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	Stewardship *Excluded Acres*	Stewardship *Agricultural* Acres	Stewardship Acres
							Forest Legacy Only		
*	*	*	*	156.48	0.00	0.00	1.40	0.00	155.08
			TOTALS	**156.48**	**NA**	**NA**	**1.40**	0.00	**155.08**

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

There are 1.40 acres to be excluded from forest stewardship management. This area is a water treatment facility owned by the City of Gardner.

HISTORY Year acquired *Since 1920's* Year management began *2012*

Is subdivision plan on file with municipality? Yes ☐ No ☒
Are boundaries blazed/painted/flagged/signs posted? (circle all that apply) 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*
(if additional space needed, continue on separate page)

Previous Management Practices (last 10 years)

Stand #	Cutting Plan #	Treatment	Yield	Value	Acres	Date
NA	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*

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

This is the first Forest Stewardship Management Plan that has been prepared for this property.
** Please See Page # 2 for the Assessor's Map & Lot, Deed Book & Page, and acreage listings.*

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	Stewardship *Excluded Acres*	Stewardship *Agricultural* Acres	Stewardship Acres
Gardner									
J 14	8A-6A	UK	UK	0.01	NA	NA	0.00	0.00	0.01
M 12	7F-2A	24334	152	15.53	NA	NA	0.00	0.00	15.53
H 12	13A-23A	20244	234	2.30	NA	NA	0.00	0.00	2.30
M 12	7D-10	UK	UK	1.77	NA	NA	0.00	0.00	1.77
M12	7A-5	24334	154	9.07	NA	NA	0.00	0.00	9.07
K 15	1-1	1945	89	0.93	NA	NA	0.00	0.00	0.93
K 15	2-2	28116	331	18.01	NA	NA	0.00	0.00	18.01
M 12	37E-11	2732	289	9.94	NA	NA	0.00	0.00	9.94
J 15	12-4	UK	UK	4.20	NA	NA	0.00	0.00	4.22
M 12	7C-9	19187	126	18.33	NA	NA	0.00	0.00	18.33
J 15	10-3	20172	226	8.90	NA	NA	0.00	0.00	8.90
M 12	7E-2	24334	149	28.28	NA	NA	0.00	0.00	28.28
M 12	7B-8	1941	480	5.12	NA	NA	0.00	0.00	5.12
M 12	7G-3	3387	597	3.00	NA	NA	0.00	0.00	3.00
M 12	7F-7	2756	5	2.78	NA	NA	0.00	0.00	2.78
M 12	71-1	UK	UK	4.63	NA	NA	0.00	0.00	4.63
H 12	24A-22A	19496	110	4.09	NA	NA	0.00	0.00	4.09
M 15	1-1	44504	106	19.59	NA	NA	0.00	0.00	19.59
			TOTALS	**156.48**	**0.00**	**0.00**	**1.40**	0.00	**155.08**

Owner(s) City of Gardner – Snake Pond Watershed Town(s) Gardner

Property Overview, Regional Significance, and Management Summary

The 155+/-acre Snake Pond forest stewardship property is located in a southwest section of Gardner along the Templeton town line on the south side of Route 2. The Gardner Municipal Airport is adjacent to the property in the town of Templeton. A water treatment facility was established on the property in 2006 and is located off of Snake Pond Road. Protecting and improving water quality is an important goal on this property for the City.

The property lies in the Miller's River Watershed. Water that passes through the property flows north into Otter River and eventually into the Miller's River approximately 7 miles northwest of the property.

The forest stewardship land is diverse and consists of mature white pine and mixed hardwood woodlands (39%), hemlock hardwood forests (13%), and forested and open wetland resource areas (48%). White pine, mixed oaks and hemlock are the dominant tree species in the upland forest areas. Forested wetlands consist of primarily red maple. The timber quality ranges from poor to good throughout the forest. Timber harvesting has been conducted within several sections of the forest in the past. Invasive and non-native vegetation on the property include barberry, buckthorn, and honeysuckle.

Upland forest soils on the property include well drained gravelly loamy sand (Colton), well drained fine sandy loam (Alagash-Adams), and moderately drained stony soils (Peru-Marlow). The low lying drainage areas consist of poorly drained soils (Pillsbury-Peacham-Lyman) and the open wetlands consist of very poorly drained muck (Bucksport-Wonsqueak).

Wildlife habitat is diverse throughout the property. Mature woodlands and open shrub wetlands provide habitat for numerous native wildlife. The open wetlands and ponded areas are prime habitat for water foul. Early successional and young forest habitat is sparse within the forest. Stand #3 is the youngest stand of trees being primarily in the pole class (4-9" DBH). Efforts to create pockets and areas of young forest habitat will be pursued during this ten year management period. The young forest habitat will be beneficial to many forms of wildlife for feeding, nesting and mating purposes.

Access to the forest can be sought through the Gardner Municipal Airport property and off of Snake Pond Road, although there are no designated parking areas for public access.

A Forest Management Plan has also been prepared for the Gardner's Cowee Pond Reservoir, the Perley Brook Reservoir, the Crystal Lake Reservoir and Wildwood Cemetery properties. This Plan will reflect many of the same goals and objectives as stated in the above mentioned Forest Management Plans.

The City of Gardner established the Gardner Forest Stewardship Committee in 2010. The Forest Stewardship Committee has developed the following goals for the Snake Pond Watershed property:

Management will focus on promoting a healthy forest environment for the safety and enjoyment of the residents of Gardner and others who will visit the property. The City would like to specifically accomplish the following on this property:

Continued ……

- Enhance both the quality and quantity of future timber products;
- Conduct timber harvests and biomass operations to improve regeneration and aesthetics;
- Enhance wildlife habitat by diversifying tree age and species, creating and maintaining successional "pockets", and protecting heritage trees.
- Discourage unauthorized ATV access and use on the property.
- Protect water quality.
- Improve hiking trails for public recreational use.

Timber resource management will be aimed at enhancing the quality of timber resources into the future while improving wildlife habitats and aesthetics throughout the property. Commercial sales of timber may require whole-tree chipping of low quality trees and portions of trees that do not have firewood or sawtimber products primarily for aesthetic and fire protection purposes.

One of the primary management objectives of the Snake Pond Watershed property will be to preserve, maintain and improve water quality as there is a water treatment facility located off of Snake Pond Road. The Gardner Forest Stewardship Committee 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 Forest Stewardship Committee would like to pursue management of the Snake Pond Watershed property as stated in the first paragraph under the "Primary Objectives" (5.2.3.1). *"The primary objective of forest management of the Quabbin* (Snake Pond Watershed) *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 Gardner Forest Stewardship Committee will use the Quabbin Plan as a guide when managing the Snake Pond Watershed lands.

Management on the property 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*

Continued …….

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."

Wildlife habitats will be enhanced through the timber harvesting practices. Creating multiple age classes within the forest will benefit a variety of wildlife species. Artificial nest boxes for wood ducks will be installed in the open water resource areas with emergent vegetation. Patch cutting within the very poor quality forest stands will be done to create young forest habitat for wildlife. Identifying large "Legacy Trees" will be done to promote "Old Growth" characteristics within the forest where these trees exist and where this practice is applicable. Beaver activities will also be monitored as they may have an impact on water quality.

All forest management activities will be sensitive to protecting water quality, soils, cultural resources, wildlife habitats, rare and endangered species and their habitats, aesthetics and recreational values. When harvesting timber resources on the property a Chapter 132 Cutting Plan will be filed with the Department of Conservation and Recreation. The Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) will make recommendations to protect any special vegetation or wildlife and their habitats should they exist on the property.

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		X		
Improve Fishing			X	
Preserve or Improve Scenic Beauty	X			
Protect Water Quality	X			
Protect Unique/Special/ Cultural Areas	X			
Other: Public Education & Outreach	X			

*** 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:

The City of Gardner would like to improve and protect the forest resources on the Snake Pond Watershed property for the benefit of the residents of Gardner. Protecting the Snake Pond Watershed is a high priority. These goals will be accomplished by periodically harvesting timber resources, discouraging the use of unauthorized motor vehicle use (ATV's), enhancing wildlife habitat and educating the public on forest stewardship matters.

Stewardship Purpose

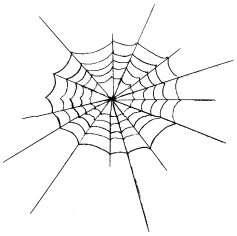
By enrolling in the Forest Stewardship Program and following a Stewardship Plan, I understand that I will be joining with many other landowners across the state in a program that promotes ecologically responsible resource management through the following actions and values:

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:** _____

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.

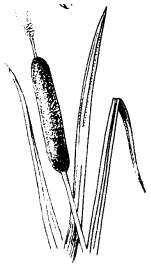
Another factor influencing biodiversity in Massachusetts concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that, for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1" in diameter). Yet we currently 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.

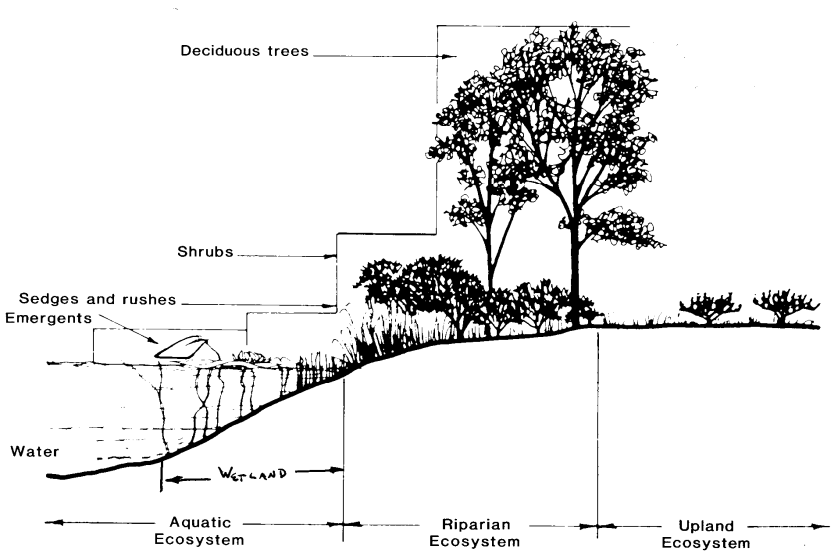


Figure 1: Example of a riparian zone.

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.

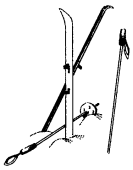
Cultural Resources: Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago, or the remains of a farmstead from the 1800's, these features all tell important and interesting stories about the landscape, and should 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 17th and 18th centuries.

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

One particularly ubiquitous legacy of this period is stone walls. Most were constructed between 1810 and 1840 as stone fences (wooden fence rails had become scarce) to enclose sheep within pastures, or to

exclude them from croplands and hayfields. Clues to their purpose are found in their construction. Walls that surrounded pasture areas were comprised mostly of large stones, while walls abutting former cropland accumulated many small stones as farmers cleared rocks turned up by their plows. Other cultural features to look for include cellar holes, wells, old roads and even old trash dumps.



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

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

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

It can be helpful and enjoyable to visit other properties to sample the range of management activities and see the accomplishments of others. This may help you visualize the outcome of alternative management decisions and can either stimulate new ideas or confirm your own personal philosophies. Don't hesitate to express your thoughts, concerns, and ideas. Keep asking questions! Please be involved and enjoy the fact that you are the steward of a very special place.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	1	MD	39.94	Wetland	5 sqft	0.5 Cords	50 (RM)

This wetland resource area is understocked with areas of scattered red maple poles and saplings. Most of the wooded areas are found in the northwestern sections of the area. Most of the remaining areas are open and vegetated with wetland shrubs and plants which include alders, silky dogwood, winterberry, highbush blueberry, cattails, heath, and grasses. The area is flat and hummocky with very poorly drained organic soils (Bucksport-Wonsqueak Muck). The soils are not capable of producing high quality timber resources due to the high water table. Management will focus on wildlife habitat enhancement by installing wood duck boxes. The desired future condition is an area that provides habitat for wildlife and protects wetland and water resources.

STEW	2	WH	32.17	12.8" DBH Sawtimber-Pole	148 sqft	13,986 BF & 22.4 Cds	63 (WP)

White pine and mixed hardwoods dominate the overstory in this well stocked sawtimber and pole sized stand. The white pine stems are poor to good in form and timber quality. The mixed hardwoods include red maple, red oak, birch, black cherry, aspen, and white ash poles and sawtimber of poor to good form and timber quality. Scattered hemlock trees are present as well. Forest regeneration is scattered and includes white pine, hemlock and mixed hardwood saplings. The area is gently to moderately sloped with well drained gravelly loamy sand soils (Colton) and moderately drained soils (Peru-Marlow). The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while providing habitat for wildlife and protecting the Snake Pond Watershed.

STEW	3	WH	12.21	6.3" DBH Pole	115 sqft	368 BF & 18.1 Cds	60 (HM)

White pine and mixed hardwoods dominate the overstory in this overstocked pole sized stand. The white pine stems are poor to good in form and timber quality. The mixed hardwoods include red maple, red oak, birch, black cherry, aspen, and white ash poles of poor to good form and timber quality. Scattered sawtimber sized stems can also be found. The area is gently to moderately sloped with well drained gravelly loamy sand soils (Colton) and moderately drained soils (Peru-Marlow). The forest soils are capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while providing habitat for wildlife and protecting the Snake Pond Watershed.

STAND DESCRIPTIONS

OBJ	STD NO	TYPE	AC	MSD OR SIZE-CLASS	BA/AC	VOL/AC	SITE INDEX
STEW	4	HH	20.43	6.7" DBH Pole-Sawtimber	87 sqft	1,648 BF & 15.2 Cds	60 (WP)

Hemlock, white pine, red maple, red oak, red spruce, and black cherry poles and sawtimber can all be found within this stand. Species composition, stand density and size class varies throughout the area. The overall timber quality is poor to fair. Eastern sections of this stand were harvested approximately 10 years ago by the previous landowner. The area is flat to gently sloped with moderately well to poorly drained soils (Peru-Marlow-Pillsbury-Peacham). The soils are capable of producing high quality timber resources. No management is recommended at this time. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while providing habitat for wildlife and protection of the Snake Pond Watershed.

STEW	5	P	34.71	Marsh-Pond	NA	NA	NA

This area is a shallow pond and open marsh. The Otter Brook headwaters start here and flow northwest towards the Miller's River. This site provides prime habitat for water foul. Management will focus on wood duck box installation and maintenance. The desired future condition is an area that provides habitat for wildlife while protecting water and wetland resources.

STEW	6	WH	15.62	10.7" DBH Sawtimber-Pole	128 sqft	6,332 BF & 22.7 Cds	63 (WP)

White pine and mixed hardwoods dominate the overstory in this adequately stocked sawtimber and pole sized stand. The white pine stems are fair to good in form and timber quality. The mixed hardwoods include red maple, red oak, birch, black cherry, aspen, and white ash poles and sawtimber of poor to good form and timber quality. Scattered hemlock and spruce trees are present as well. Forest regeneration is scattered and includes white pine, hemlock and mixed hardwood saplings. Harvesting occurred in the northern section of this stand approximately 10 years ago. The area is gently sloped with well and moderately drained loamy sand soils (Adams) capable of producing high quality timber resources. Management will focus on improvement thinning by selection harvesting. The desired future condition is a stand that is growing high quality timber resources in several size and age classes while providing habitat for wildlife and protecting the Snake Pond 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

The following timber harvesting recommendations have been made based on the "Subwatershed Administration of Forest Management". The target is to conduct timber harvesting on approximately 30% of the total forest land area within this ten year management period. The proposed areas may change based on priority, markets, storm damage, disease and insect damage, and landowner goals for the property.

STEW	2	WH	Selection Harvest Improvement Thin	20+/-	40 sqft	60 MBF & 700 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/4 -1/3 of the overstory volume. The emphasis will be to harvest mature white pine and mixed hardwood sawtimber (16" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed hardwood poles and small sawtimber sized stems. Poorly formed and low quality white pine and mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. The recommendation is to have a harvesting firm that is capable of chipping the tops of trees and very poor quality trees in order to reduce fire hazards and improve the aesthetics of the harvest area. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. A portion of the poor quality hardwoods will be sold as firewood.

STEW	3	WH	Improvement Thin	10+/-	45 sqft	2 MBF & 350 Tons	2012-2021

Management will focus on improvement thinning by harvesting individual and small groups of poorly formed and low quality white pine and mixed hardwood pole sized stems (4-10" DBH). The target is to harvest approximately 1/3 of the overstory volume. The emphasis will be to leave the best formed white pine and red oak stems that have the potential of developing into high quality sawtimber in the future. Some of the large diameter white pine sawtimber sized stems (20" DBH+) will also be harvested to improve the growing conditions of the residual stand. The recommendation is to have a harvesting firm that is capable of chipping the tops of trees and very poor quality trees in order to reduce fire hazards and improve the aesthetics of the harvest area. This practice will create small openings in the stand that will be beneficial to early successional forms of wildlife.

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	6	WH	Selection Harvest Improvement Thin	12+/-	30 sqft	30 MBF & 360 Tons	2012-2021

Management will focus on improvement thinning by selection harvesting. The target is to harvest approximately 1/4 -1/3 of the overstory volume. The emphasis will be to harvest mature white pine and mixed hardwood sawtimber (18" DBH+) in order to improve the growing conditions of the developing high quality white pine and mixed hardwood poles and small sawtimber sized stems. Poorly formed and low quality white pine, hemlock and mixed hardwood stems of all sizes will also be harvested to improve the health and productivity of the stand. Advanced regeneration will be released and the site will be prepared for new production in the understory as a result of thinning. The recommendation is to have a harvesting firm that is capable of chipping the tops of trees and very poor quality trees in order to reduce fire hazards and improve the aesthetics of the harvest area. High value sawtimber will be sold as sawlogs, while the low quality softwood trees and portions of trees will be chipped and utilized at wood burning facilities that generate electricity. A portion of the poor quality hardwoods will be sold as firewood.

Biological Diversity

STEW	1-18	All	Invasive Species Control	155+/-	NA	NA	2012-2021

The Forest Stewardship Committee is interested in promoting biological diversity on the property. Eliminating invasive and non-native trees, plants and shrubs will be done where these species exist and when economically feasible and practical. Buckthorn, honeysuckle, and Japanese barberry are known to be growing on the property. Cutting the stems with saws will help reduce and control the spread of the invasive species. Controlling the invasive species through well timed timber management activities is another management tool. Encouraging vigorous growth of native tree species in the forest understory will be accomplished by scarifying the soil prior to seed dissemination. Another biodiversity issue is the distribution of forest growth stages. Trying to maintain multiple forest age and size classes on the property will also be pursued by the landowner on this property through periodic timber harvests and wildlife habitat management. Please see the Biological Diversity issues on page #7 for more details.

MANAGEMENT PRACTICES
to be done within next 10 years

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

Wildlife Habitat Enhancement

STEW	1, 5		Artificial Nest Boxes Wood Duck	74+/-	NA	NA	2012-2021

These wetland resource areas provide habitat for ***wood ducks***. The open water and emergent vegetation within these areas are important for the development of young wood ducks. The boxes should be set up approximately four feet above open water on cedar, or metal poles to protect the young and eggs from predators. The boxes should also be set up over water that is 1-4 feet deep. The boxes should be cleaned every year and new bedding placed on the bottom of the box. The Division of Fisheries and Wildlife can provide further information about the box dimensions, installation, and maintenance. Several wood duck boxes were observed during the forest resource inventory. These may be suitable for continued use and may need to be maintained for use in the future.

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 this 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"*. Please also see the Timber Management recommendations on pages 15-16.

Recreation Enhancement&
Forest Stewardship Education

STEW	All	All	Trail Construction & Maintenance Forest Stewardship Education	155+/-	NA	NA	2012-2021

Creating new trails and maintaining the existing trails will be done for the safety and enjoyment of the residents of Gardner and general public. New trail sites will be selected as the landscape, topography and wetland water resources permit. Trail markers, self guided maps and interpretive signs will all be used to guide and educate the public on forest stewardship issues pertaining to this forest. Public site walks, local media and City Hall meetings will all be useful when educating the residents of Gardner about the management practices in this Plan and forest stewardship in general.

MANAGEMENT PRACTICES
to be done within next 10 years

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

Boundary Maintenance

STEW	All	All	Blaze & Paint	155+/-	NA	NA	2012-2021

Abutting property surveys and existing deeds for the property will be used to identify the unknown property lines. Blazing and painting the property lines should be done prior to any timber harvesting activities. Many of the property lines and corners were identified and painted during the field inventory in 2012. Stone bounds and stone walls that were found during the field inventory have been indicated on the boundary maps on page 21.

All forest management activities will be sensitive to protecting water quality, soils, cultural resources, wildlife habitats, rare and endangered species and their habitats, aesthetics and recreational values. When harvesting timber resources on the property a Chapter 132 Cutting Plan will be filed with the Department of Conservation and Recreation. The Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) will make recommendations to protect any special vegetation or wildlife and their habitats should they exist on the property.

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 _____

_____ Date _____

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

Plan Preparer _____ Date _____

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

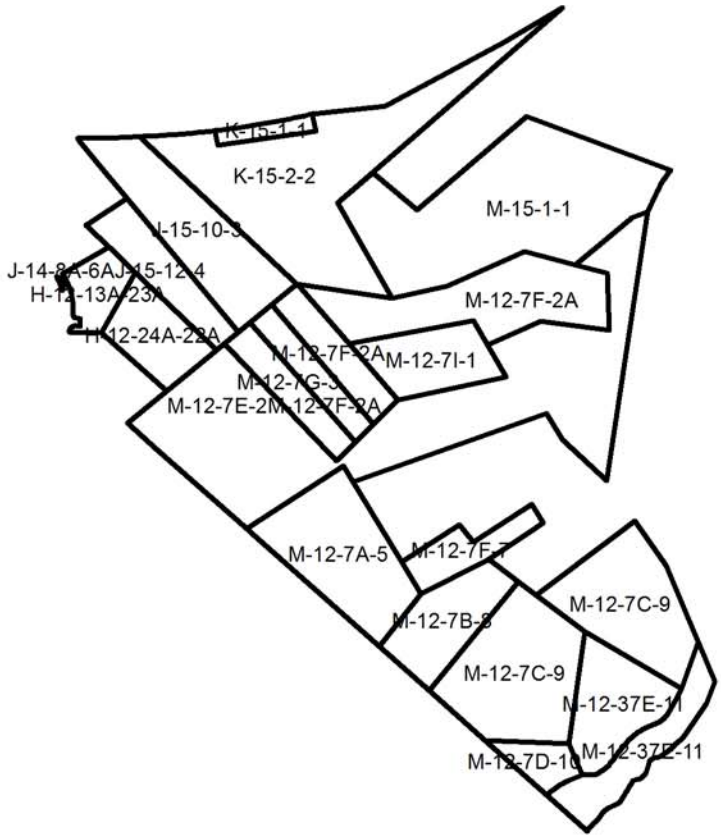
Approved, Service Forester _____ Date _____

Approved, Regional Supervisor _____ Date _____

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

Owner(s) City of Gardner – Snake Pond Watershed Town(s) Gardner

City of Gardner
Gardner, MA
2005 Aerial Photo



1,000 500 0 1,000 2,000 Feet

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Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
February 20, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

BOUNDARY & STAND TYPE MAP

Land in Gardner, MA
Snake Pond Watershed Lot
Compartment #12

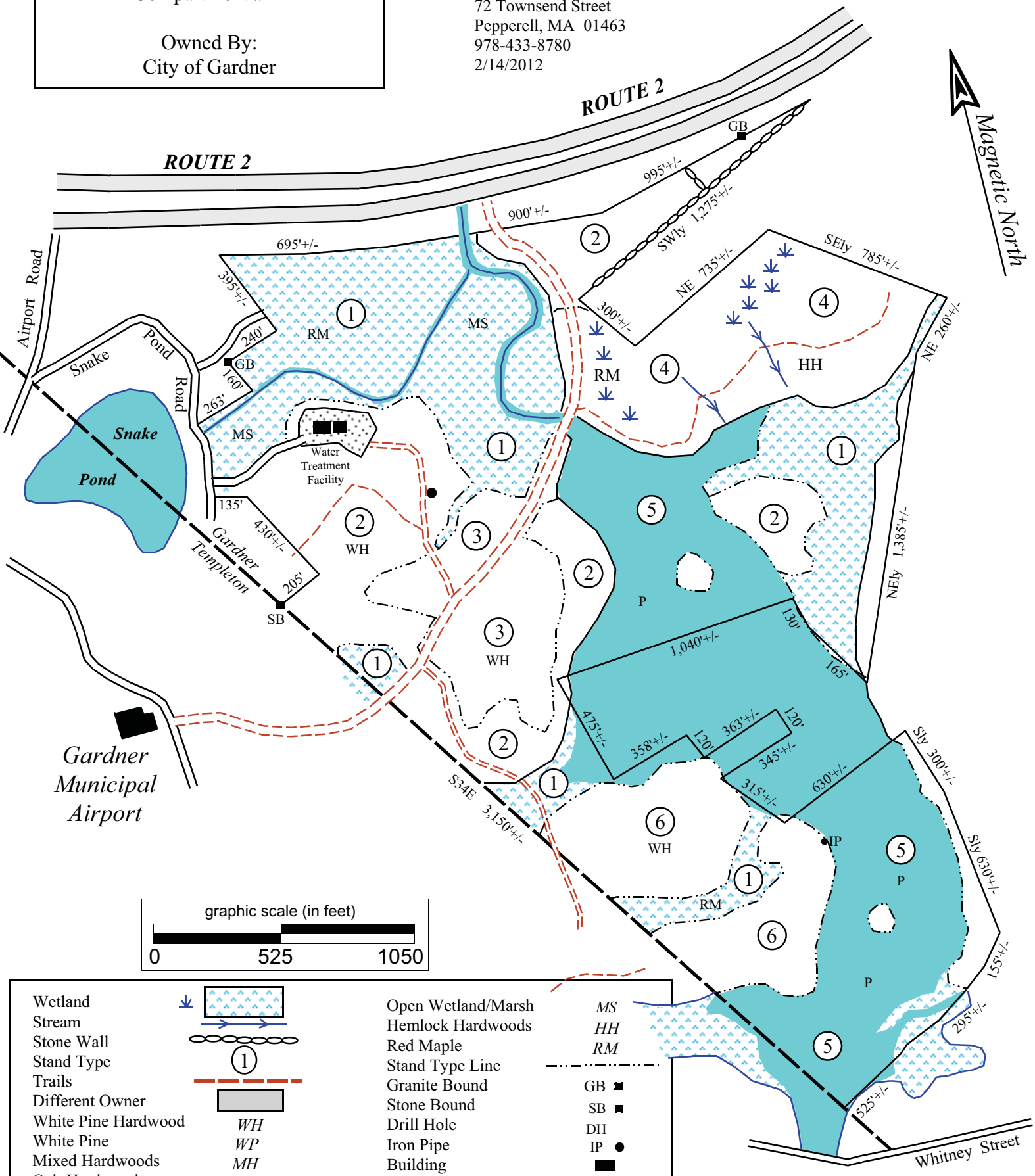
Owned By:
City of Gardner

New England
Forestry Consultants, Inc.

Prepared By:
Gary H. Gouldrup
Consulting Forester
72 Townsend Street
Pepperell, MA 01463
978-433-8780
2/14/2012

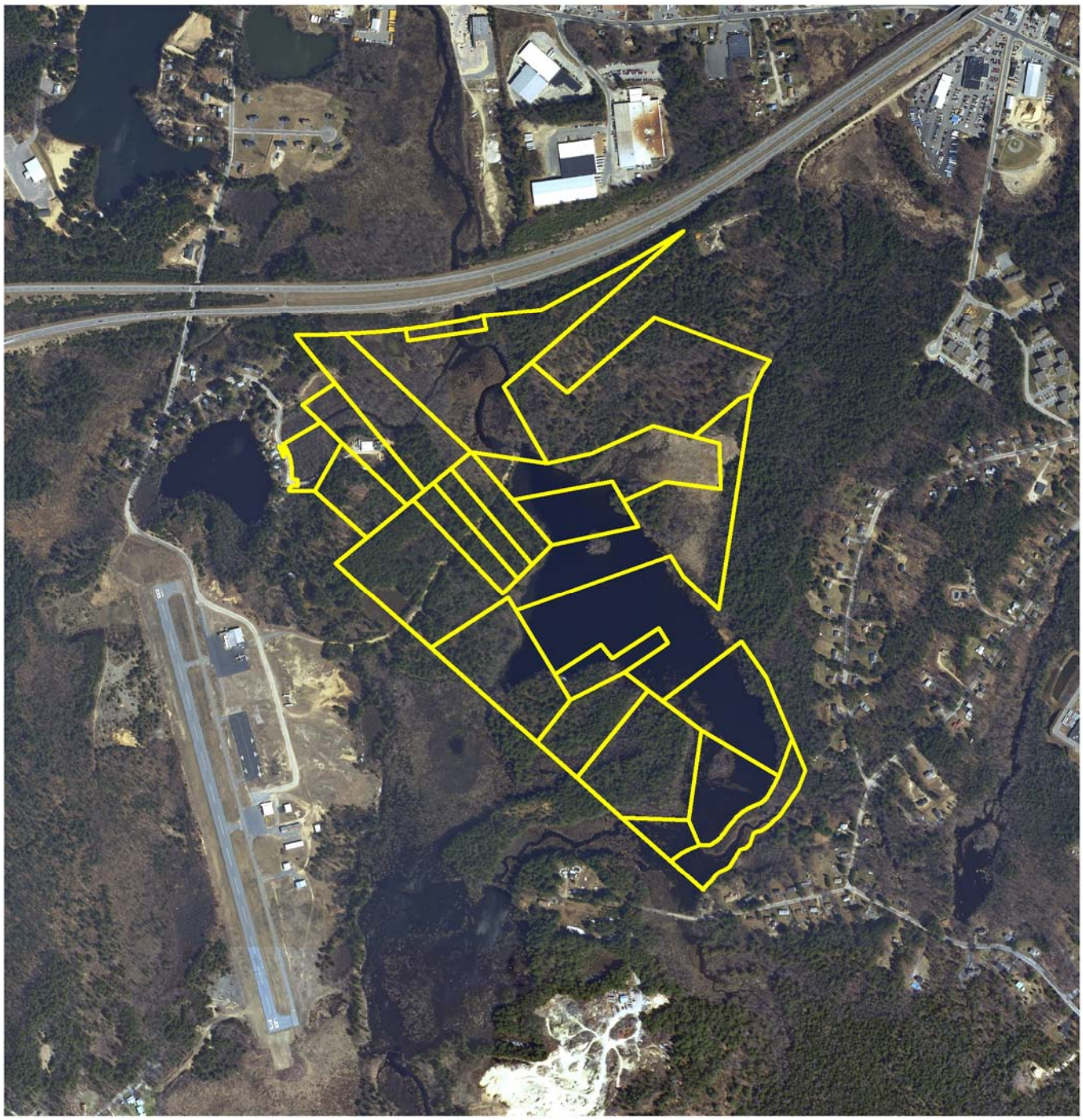
COMPARTMENT #12

156.48 Acres



Wetland		Open Wetland/Marsh	*MS*
Stream		Hemlock Hardwoods	*HH*
Stone Wall		Red Maple	*RM*
Stand Type	(1)	Stand Type Line	
Trails		Granite Bound	GB
Different Owner		Stone Bound	SB
White Pine Hardwood	*WH*	Drill Hole	DH
White Pine	*WP*	Iron Pipe	IP
Mixed Hardwoods	*MH*	Building	
Oak-Hardwoods	*OH*	Pond	P

City of Gardner
Snake Pond Lot
Gardner, MA
2005 Aerial Photo



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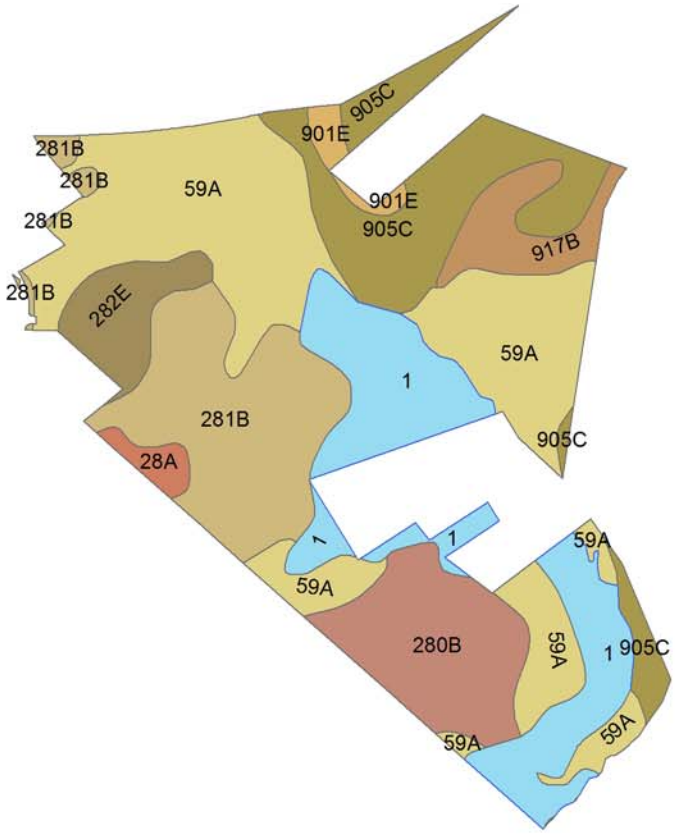
Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
February 24, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

City of Gardner
Snake Pond Lot
Gardner, MA
Soils Map



307B Soils Symbol

1,000 500 0 1,000 2,000 Feet

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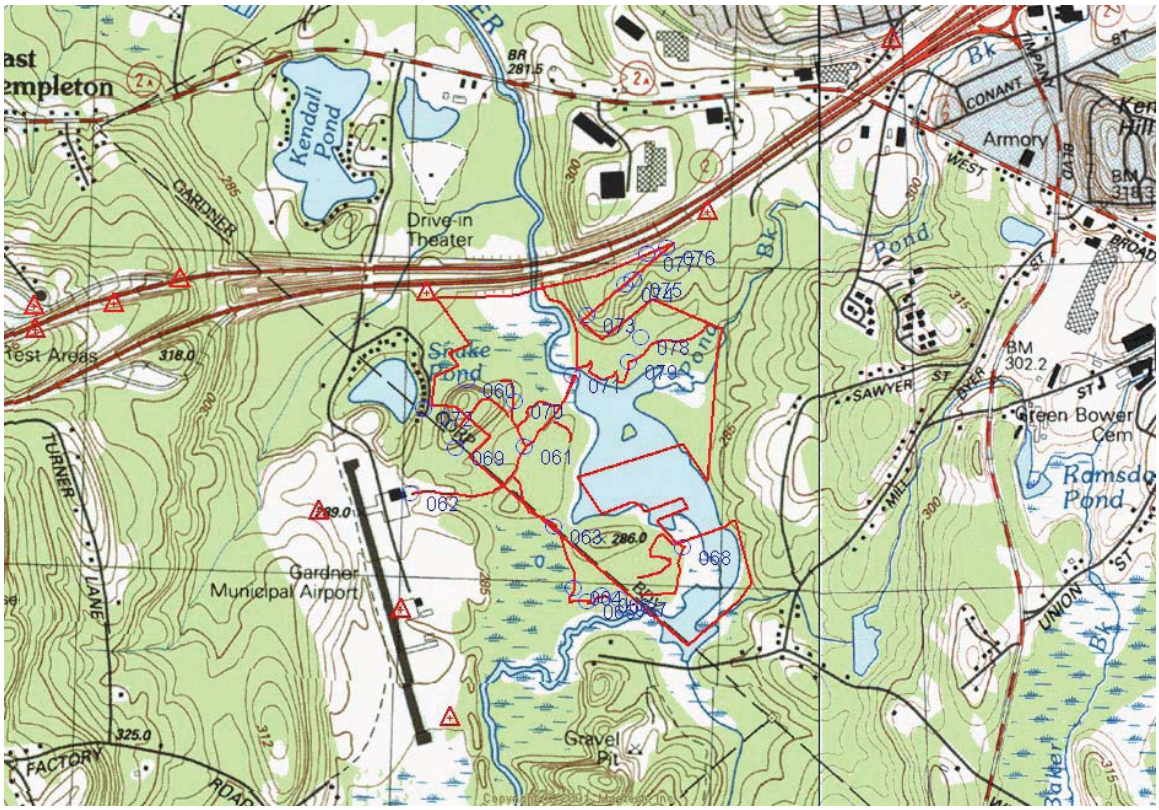
Prepared by:
New England Forestry Consultants, Inc
Sherman R. Small, Consulting Forester
Maine License # LF655
New Hampshire License # 409
February 24, 2012

Sketch map for management and planning purposes only, NOT A LEGAL SURVEY
Data obtained from MASS GIS, & New England Forestry Consultants, Inc.

TOPOGRAPHICAL MAP

Land In:
Gardner, MA

Owned By:
City of Gardner
City Hall Room 226, 95 Pleasant Street
Gardner, MA 01440



Topographical Map – Athol Quadrangle

Scale 1 inch = 2000 feet

February 24, 2012

Prepared By: Gary H. Gouldrup, New England Forestry Consultants, Inc.