STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

Bureau of Natural Resources
Division of Forestry

FOREST MANAGEMENT PLAN
2014 through 2024

Massacoe State Forest

399 Acres

Approvals:

Feb 7, 2014
Christopher Martin, Director Date
Division of Forestry

4/17/14
William Hyatt, Bureau Chief Date
Bureau of Natural Resources

Susan Whalen April 22, 2014
Susan Whalen, Deputy Commissioner Date
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Contents

I would like to acknowledge the following colleagues who have made the completion of this plan possible; DEEP State Lands Forester I, Francis Trafidlo for contributions made during all phases of the planning process; and DEEP Wildlife Biologist, Peter Picone, for contributing wildlife resource information and recommendations.

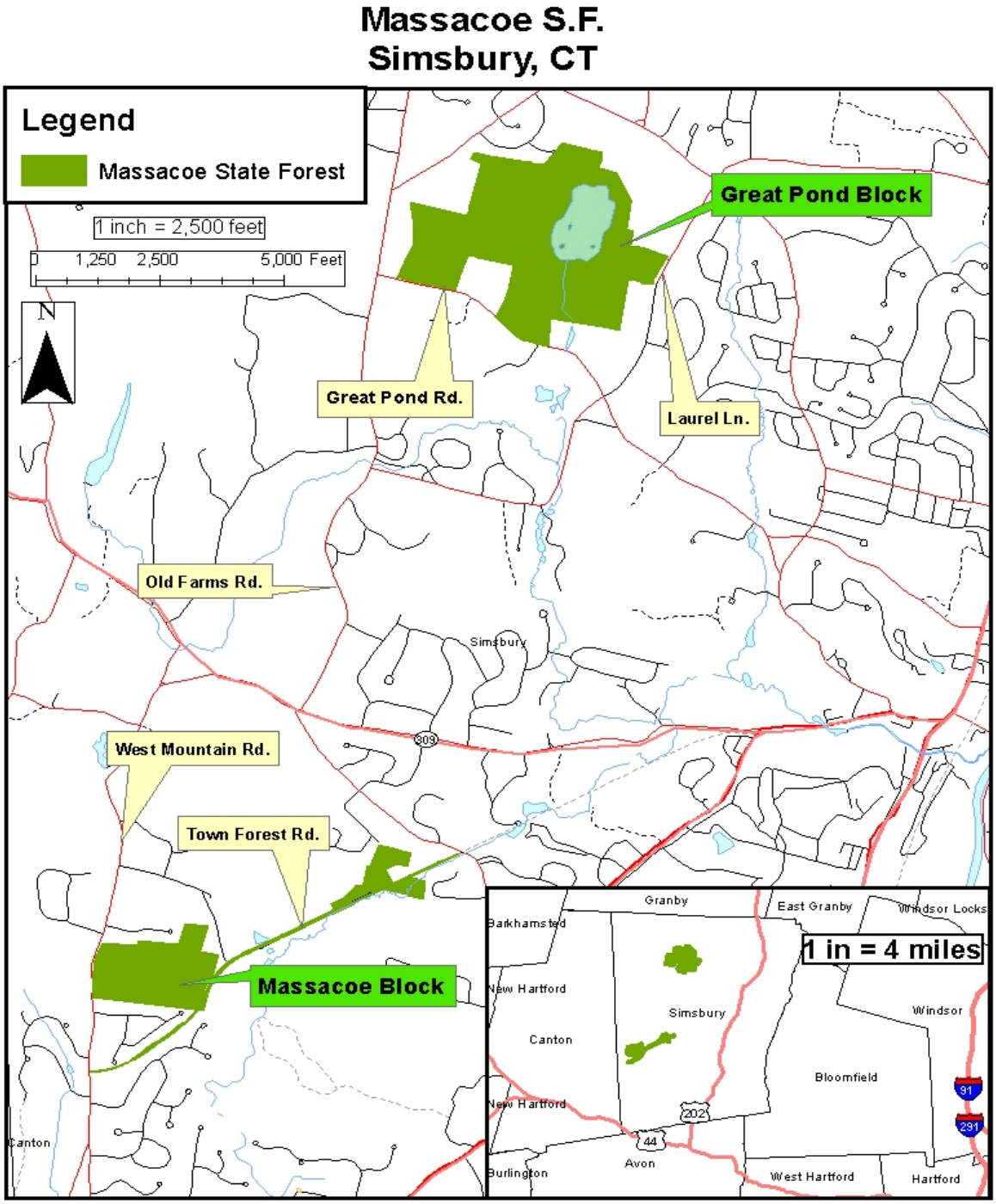
A. Executive Summary

This forest management plan covers the Massacoe State Forest. The plan assesses and describes the property's forest-related resources, and provides forest management recommendations for the next ten years.

- Long-term management history – nearly one century of forest management.
- Forest Management – 100 year rotation, 20 year cutting cycle.
- 399 acres within Massacoe S.F.; 314 acres will be actively managed as a Tree Farm Demonstration Area.
- 163 acres slated for management during this plan period.
- Before any timber harvest, the sale area will be evaluated for treatment to eradicate non-native invasive plants.
- Establish a walking tour/demonstration area through which the public will gain a better understanding of forest ecology and forest management.
- The Great Pond Block was formerly Connecticut Tree Farm #1 owned by James L. Goodwin.
- Forest manager staffing is vital to accomplishing plan objectives.

Location

Massacoe State Forest is in the town of Simsbury in Hartford County, Connecticut. The Forest has two blocks, the Massacoe Block and the Great Pond Block. The Massacoe Block is east of West Mountain Road, south of Sachems Trail, west of Town Forest Road, and north of Lostbrook Road. The Great Pond Block is south of Holcomb Road and Firetown Road, west of Laurel Lane, north of Great Pond Road, and east of Old Farms Road.



B. History

Simsbury was settled in 1642 by colonists from Windsor, who were attracted to the area because of the dense pine trees growing on its sandy glacial ridges and its fertile farmland. From these trees came pitch, tar, and turpentine for the British Navy and lumber for the housing needs of the colony.

The Connecticut General Court used the name "Mossocowe," derived from the Algonquin Indian words "massa" (large and great) and "agwu" (alluvial meadow land), in a court order that granted permission for the governor to dispose of lands there to the Windsor inhabitants.

In 1653, land for farming was granted, followed by an intensive settlement program in 1666. By 1670 town privileges were obtained from the General Court, town bounds were defined, and the name "Simmsbury" was adopted.

The origin of the name "Simsbury" is not clear, but it is believed that Simsbury derives from the pronunciation of the English "Simmondsbury" from where the ancestors of several prominent early settlers came from.

The Massacoe Forest, originally called the Simsbury Forest, was never large enough to be an important timber producing unit of the State Forests. However, it has played a significant role in fire control research, recreation, and as a Tree Farm Demonstration Area.

1. Reason for acquisition and funding sources: The Massacoe Block of the Forest was originally purchased to demonstrate that woodlands damaged by fire could be made productive and that forest fires could be prevented. In effect, the forest became an outdoor laboratory for fire control practices. The forest was located on both sides of a railroad track and had been burned repeatedly. In addition, it had been cut over before purchase. Although the forest was ideally suited for fire research studies, there was little to recommend it as a site for a productive State Forest.

The first purchase was a tract of 118.7 acres, for $118.70, made on May 22, 1908. Later that same year 11.4 acres were added to bring the total to 130.1 acres. No further additions were made until 1941 when a purchase from the railroad company brought the area to a high of 244.25 acres. The next change came in 1949 when the two original pieces and one of the parcels bought from the railroad were turned over to the Park Division for administration as what is now Stratton Brook State Park. The forest shrank to 99.25 acres through that transfer.

In 1930, James L. Goodwin bought a 25-acre pond and 75 acres of forest from Sherman W. Eddy and began managing the forest for sustainable timber yield and conversion to softwoods. Mr. Goodwin made additional purchases of adjoining property between 1940 and 1966. All of these purchases make up 296 acres of what is now called the Great Pond Block.

2. Development of resource before acquisition: Mrs. Antoinette Eno Wood, an aunt of Gifford Pinchot, made available $500.00 to carry out experiments in 1908 within the Massacoe Block. Also, although it is not sure how it was done, the experiments were started before the land was purchased. One of the early experiments was clearing and burning a strip along both sides of the railroad right-of-way and along the highway. During the year 1908, there were no fires started by trains on that area.

Money from the fund was also used that spring to acquire tree seedlings. 10,000 three year old white pine transplants were purchased from Dr. Schenck in North Carolina, and 10,000 two-year old Scotch pines from the Connecticut Agricultural Experiment Station Rainbow Forest Plantation in Windsor were

also planted. The fund was also used to purchase, for $25.00, a few scattered pines which the lumbermen had not yet cut, and another $25.00 was spent in buying a small grove which the grantor, Mr. Eno, had reserved on the road.

Evidently the same fund was used to pay the State's share of a railroad foot patrol; one of the first such patrols in the State. The expenses of this patrol, which was not confined to the State Forest, were paid one-half by the Central New England Railroad and one-half by the Town of Simsbury, the adjoining landowners, and the State. This patrol lasted six weeks, beginning in April 1908, and the patrolmen extinguished thirty-five small fires during that period over a stretch of approximately three miles. This patrolling system was in effect for several years.

One of the features of this Forest was the rare "Hartford Fern" (*Lygodium palmatum*). This rare fern had been under protection since 1869, when the legislature passed the following act; "Any person who shall willfully and maliciously sever or take from the land of another any of the species of plants known as *Lygodium palmatum* or Creeping Fern growing and being thereon, shall be punished by a fine not exceeding Seven Dollars or imprisonment in county jail not exceeding thirty days or by such fine and imprisonment both at the discretion of the court." This climbing fern was very plentiful in one area of less than an acre, and even in the 1930s almost every tree and high bush supported a fern. By the early 1950s, no trace of the fern could be found. The fern was the first plant protected by law in the United States and remains a Species of Special Concern today.

This Forest had been a failure insofar as demonstrating that fires could be prevented, for it was not until the railroad had been abandoned that fires were no longer a menace. The early plantings on the forest were burned but later ones grew well, and slowly the barren area became attractive. The abandonment of the railroad aided in the transformation. The Civilian Conservation Corps (CCC) built a road on each side of the railroad right-of-way. A small pond and pavilion were constructed by the CCC, the Civil Works Administration (CWA), the Federal Emergency Relief Administration (FERA), and State crews. Some Simsbury citizens donated money for materials to develop this recreational area. The desolate, burned area of 1908 blossomed into an attractive picnic area which, because of its proximity to Hartford, became very popular.

In 1944 the State granted a right-of-way over the old railroad bed to the Town of Simsbury so that the town could develop its recreational area. The old right-of -way that had carried spark-scattering trains which devastated the woodlands of the Massacoe Block served to open the area for uses never dreamed of back in 1908.

Massacoe S.F. grew in size with the addition of the Great Pond property from James L. Goodwin. The original purchase of Great Pond property was made in 1930 from Sherman W. Eddy of Avon. It consisted of a pond of about 25 acres and 75 acres of woodland. At this time, the pond consisted of only two acres of open water. The rest was covered with a floating mat of grassy turf that was two feet thick. Underneath the mat was two or three feet of water, below which was a layer of mucky peat ranging from two to twenty-five feet deep. Mr. Eddy's original idea was to drain the pond and convert the area of peaty soil into a celery farm. This project proved too big to be practical so the property was sold to James L. Goodwin.

One of the first tasks undertaken after the original purchase was to improve the pond. The entire shoreline was excavated and regraded. The floating bog was gathered and three islands were built. A dam about six feet high was constructed at the south end of the pond. According to the engineers, the pond should have filled up and run over the spillway, but it did not. Surface water and springs were the only source of water for the pond. Apparently the loss of water by evaporation was too great. The pond still proved to be valuable for wildlife and waterfowl, providing an excellent nesting site. It also served as a source of water for the Great Pond nursery.

Figure 1: A view of Great Pond with fall foliage (Northeast aspect).

Mr. Goodwin was interested in sustainable forest management. The first forestry operation was the planting of 20 acres of red pine in 1931. In 1932, a nursery was established to produce planting stock for Great Pond Forest, as Goodwin called it, and Pine Acres Farm, now the James L. Goodwin State Forest in Hampton, Connecticut.

The land was inventoried to ascertain the best method of forest management. Because the area historically was a natural site for growing white pine, forestry operations were geared towards converting the stands from mediocre hardwoods to pure white pine.

Much of the work involved removing 50% to 60% of the hardwoods during the winter and underplanting with white pine in the spring. Weedings, usually three, were completed to permit the white pine to become well established. When an adequate number of weevil-free sixteen foot trees were present, the remaining hardwood overstory was removed. Pruning was done to all the white pine when they were large enough to be pruned to six feet. Only crop trees were eventually pruned to seventeen feet.

In addition to the planting and pruning of the pine, 1300+ rhododendron roots were planted. Several forest products were also produced. These consisted of 152,628 B.F. of timber, 1,420 cords of hardwood, 108 cords of pulp, and 1,454 cedar and chestnut posts.

One stand worth mentioning is pine stand #1 along the main entrance road. This has become a fine example of an uneven-aged white pine stand. Because of his dedication to forest management, Mr. Goodwin's Great Pond Forest was selected to be the first Tree Farm in Connecticut in May, 1956. It was rededicated as a Tree Farm Demonstration Area in 1991.

The State acquired the property after Mr. Goodwin's death in 1967. Mr. Goodwin bequeathed Great Pond Forest to the State "to be kept and maintained in accordance with its usual method of operation as a State Forest."

A proposal was made to construct a two bay pole garage and shop along the main entrance road, but

this was never built. Because of operating costs, nursery operations were phased out by May 1968. At that time the cost of the trees ranged from $40.00 to $75.00 per thousand. The nursery shed was also removed.

3. Changes in the last 10 years: In 2003 there was a hardwood thinning in stand 5. The record of silvicultural activities in Massacoe State Forest (the Forest) since the State's acquisition started in the early 1970s, after the Department of Environmental Protection (now the Department of Energy and Environmental Protection (DEEP)) was established. A summary of these activities follows:

Year	Activity	Thin/Release Pine (Acres)	Cords	Board Feet	Value ($)
1972	RP Thin/Overstory Removal	15	11	36,000	930
1973	TSI (Timber Stand Improvement)	-	5	-	15
1975	TSI	10	42	-	6.00 + S.R.*
1976	TSI	-	12	-	36
	Salvage	24	-	24,700	
1977		-	6.5	2,330	State Use
		-	100	36,000	1,115
		6	30	1,800	S.R.
1978	TSI	-	60	-	240
	Hardwood TSI		100	6000	225
		4	80	2,500	S.R.
1979		-	12	4,500	273
	Hardwood Thinning	6	100	4,000	225
		7	51	2,000	S.R.
1980	TSI	-	71	-	288
		3	5	6,000	S.R.
1981	TSI	-	70	-	333
	TSI	4	7	-	S.R.
1982	TSI	-	12	-	120
1983	TSI	-	15	-	150
		5	-		S.R.
1984	TSI	-	17	-	170
		1.5	-	3,200	S.R.
1985	TSI	-	21	-	210
	Hemlock Thinning	-	-	9,590	383
	TSI	4	4	-	State Use
1986	TSI	-	13	-	130
1987	TSI	1	20	-	200
1988	RP Pre-salvage/Thinning	1	25	-	250

1989	RP Pre-salvage	18	15	285,125	10,655
1990	TSI	1	17	-	170
1991	TSI	1	10	-	100
1992	TSI	1	20	-	200
1993	TSI	2	15	-	150
1994	TSI	3	5	-	100
1995	TSI	-	11	-	220
1996	TSI	2	5	-	100
1997	WP/Hemlock Salvage	10	-	15,000	675
2001	Hemlock Pre-salvage	9	-	76,740	5,000
2003	Hardwood Thinning	-	-	101,355	10,357
TOTAL		**128.5 Acres**	**987.5 Cords**	**616,840 BF 1,200 lineal ft**	**$33,026 + S.R.**

Figure 2: Silvicultural activity records since 1973 when the State of Connecticut acquired the property.
* S.R. = Services Received

In addition, 17 acres of pine were pruned and 3,750 white pine seedlings were planted.

4. Rotations and cutting cycles used: The previous management plan prescribed a rotation age of 100 years for most of the Forest. The present stands may be carried past the rotation age to avoid having the entire forest regenerated within a short period of time. Once stands have been regenerated, the 100-year rotation will be followed.

Intermediate harvests will be implemented until the stands are mature. An exception is stands 1, 8, and 20, which will be regenerated in portions through uneven-aged management. These stands will be put on a 20 year cutting cycle.

C. Acres and Access

1. Acres: The total deeded acreage of the management unit covered under this plan is 399 acres. The total Geographic Information Systems (GIS) acreage for the Forest is 418 acres (for the purposes of this plan, all tables, charts, and acreage figures will be based on GIS acreage). The Forest is composed of 357 forested acres, 26 non-forested acres, and 35 acres of water (34 acres of forest land consisting of critical wetland areas will not be included under active management). The total forested acreage under active management is 314 acres.

Land Cover	Acres
Forest stand	357
Water body	35
Wetland	34
Road	17
Right of way	9
Total	**418**

Figure 3: Land cover by acreage; forest stand includes wetland acreage.

The Forest has been evaluated and categorized into groups affected by current physical conditions, policy, or management principles. The pivot chart on Page 10 illustrates the Forest as it exists today. The category labeled “Active” is forestland actively managed for timber resources which enhance wildlife habitat. Land classified as “Wildlife” status is included in land receiving active management. “Inoperable” land consists of steep slopes, excessively rocky terrain, or wetlands that prevent active management for resource protection or operator safety. The “Inactive” category refers to land that is not forest (e.g. water bodies, rights of way).

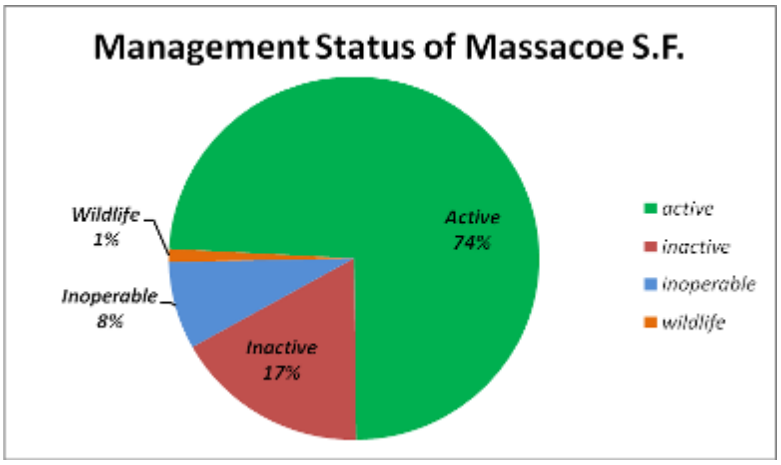


Figure 4: Management status of Massacoe S.F. by percent.

Active	309 acres
Inactive	71 acres
Inoperable	33 acres
Wildlife	5 acres
Total	**418 acres**

Figure 5: Management status of Massacoe S.F. by acreage.

2. Present Access: Most of the Forest varies from nearly level to gently rolling, with steeper slopes, up to 15%, in portions of the southeastern corners of both Blocks. A large road network (21,400 feet) was constructed in the 1930s for fire breaks and access to the Forest. These old forest roads, now narrowed on both sides by vegetation, are used by hikers and bikers.

There are approximately 36,260' (6.9 miles) of roads that abut or pass through the Forest. Of this, approximately 9,460' are paved and 26,800' are gravel.

Road	Paved	Gravel	Gates
Town Forest Road	5,320'	4,000'	-
Great Pond Road	2,200'	-	4
West Mountain Road	1,240'	-	1
Laurel Lane	700'	-	1
Fleetwood Drive	500'	-	1
Entrance Road	-	1,400'	3
Forest Access Roads	-	21,400'	-
Total	**9,460'**	**26,800'**	**10**

Figure 6: Summary of town and forest roads that abut or pass through the Forest.

The paved roads are town maintained and open year round for public access. The gravel roads are in good condition. Aside from the main entrance road to Great Pond, the other gravel forest roads are behind closed gates year round and are in good condition. Wooden gates in disrepair will be phased out and replaced with metal gates. There are currently ten wooden gates in the Forest.

Total Management Unit Acreage	418 acres
Forested Acreage	357 acres
Pond and Wetland Acreage	69 acres (35 pond, 34 wetlands)
Inoperable ROW	26 acres
Actively Managed Forested Area	314 acres
Acres of Stands Accessible from Town/DOT roads	221 acres
Acres of Stands Accessible from Forest Roads	136 acres
Miles of Public Vehicle Access Roads	1.02 miles
Miles of Gated Access Roads and Number of Gates	4.05 miles, 10 gates

Figure 7: Acres and access table.

3. Inaccessible Areas: Stand 7 is inaccessible due to presence of wetland soil types entering the stand from stand 8. Stand 23 is inaccessible due to presence of wetland soil types entering the stand from stand 22. Stand 23 was classified as inactive due to its small size, inaccessibility, and close proximity to residential properties.

4. Rights of Way (ROW):

Parcel	Date	Encumbrance, Easement, Etc.
Great Pond - 1	1940	Right-of-way to Connecticut Light and Power Co.
Great Pond - 3	1941	Right-of-way to Connecticut Light and Power Co.
Great Pond - 4	1941	Right-of-way to Connecticut Light and Power Co.
Great Pond - 5	1940	Right-of-way to Connecticut Light and Power Co.
Massacoe	1944	Right-of-way to Town of Simsbury, Town Forest Road
Massacoe	1974	Drainage easement to Town of Simsbury

Figure 8: Right-of-ways over State of Connecticut land by year and easement.

5. Boundary conditions and total miles of boundary: There are approximately 50,100' (9.5 miles) of total boundary throughout the entire Forest. The Great Pond Block itself has roughly 21,600' (4.1 miles) of boundary lines. The Massacoe Block has a total boundary length of about 28,500' (5.4 miles). It is necessary to maintain the boundary on a regular basis. The Forest will be remarked in the next 10 years.

6. Known boundary problems: There are approximately 20,200' (3.8 miles) of boundary along the old railroad right-of-way within the Massacoe Block. The location of this line is unknown and will require a survey.

D. Special Use Areas

1. Lakes and Ponds: Through Goodwin's improvements, Great Pond is approximately 35 acres. It is located in the northeastern portion of the Great Pond Block. Although the pond as we know it today was a result of man manipulating the original site, it is considered a natural feature. The pond and its shoreline are listed on the Connecticut Natural Heritage Registry by The Nature Conservancy. This area was noted as a significant site on the basis of one or more of the following attributes: biologic, geologic, hydrologic, archeological, cultural, aesthetic and research/educational. Although it is listed on the Registry, this site receives no legal status or protection. There is an un-named half-acre water body in a natural depression located in the southeastern part of the Great Pond Block.

2. Rivers and streams: Great Pond Brook flows south from Great Pond before leaving the Forest boundaries and entering Brooks Pond. Great Pond Brook flows south to Hop Brook which feeds the Farmington River.

Stratton Brook flows northeast through the Massacoe Block and drains into Hop Brook and then into the Farmington River.

3. Cultural sites: A wooden podium, commemorating James L. Goodwin, once stood at an assembly area in the pines along the entrance road to Great Pond. This area was first used in the dedication of Great Pond as a State Forest in May, 1967, and more recently as the outdoor setting for weddings. The podium has since been vandalized and no longer stands at this site. A new location for a similar amphitheater will be on the southwestern shore of Great Pond where a new engraved stone memorial honoring Goodwin now stands (Figure 9). Removal of brush along the shore will provide a scenic view of the pond from the amphitheater.

Figure 9: Engraved commemoration stone memorial honoring James Goodwin for his sound forest management.

The dam on the southern shore of Great Pond requires some maintenance. Large trees on the dam could potentially uproot during high winds or large storms, causing damage to the dam and possible loss of the pond. Information from DEEP Inland Water Resources Division classifies the Great Pond Dam (#12814) as a low hazard Class A dam.

4. Recreation and scenic sites – trails and signs: An extensive trail system, consisting mainly of service roads, is found throughout the Forest, primarily within the Great Pond Block. One of the more scenic trails found in the Great Pond Block, the one official "foot path," loops around the pond. Hikers using this trail will find a foot bridge and a boardwalk along the northern tip of the pond where the trail crosses a wetland area. The old railroad bed serves as a bike trail within the Massacoe Block.

One of the goals of this plan is to establish a "walking tour/demonstration area" in the Great Pond Block, because of the extensive management that has taken place since Mr. Goodwin acquired the property. The areas that may be included are the stands along the main entrance road from Great Pond Road to the old nursery site and the stands along the pond loop. These areas were chosen because they appear to receive the most use. It is expected that the public will gain an understanding of the management practices that have been used on this Forest. Public awareness efforts will be similar to methods used in the James L. Goodwin State Forest in Hampton.

As part of the American Tree Farm System's 50th anniversary and the 35th anniversary of Tree Farming in Connecticut, Great Pond was rededicated as Connecticut's First Tree Farm on June 22, 1991. The National Tree Farm Committee approved the re-dedication, but due to its policy for State and Federal lands, Great Pond became known as a Tree Farm Demonstration Area. Management activities will continue to reflect this designation, demonstrating proper forest management methods to private landowners.

In 2003, to honor the Centennial of the State Forest system, the Division of Forestry established a series of letterboxes throughout the State Forests. In letterboxing, you visit interesting locations and collect unique stamps to mark your visit. The letterbox in the forest is maintained by the Division of Forestry. Information and clues can be found at: **ct.gov/deep/letterboxing**

5. Critical Habitat: A review of the State Natural Diversity Database indicates the presence of several State Species of Special Concern in, or within close proximity of the property. These species include the Whip-poor-will, Hoary bat, Eastern box turtle, and Wood turtle. For more information on each species, refer to the NDDB Review in the Appendix of this plan.

6. Natural Area Preserve: There are no state-designated Natural Areas in the Forest (Section 23-5c of the State Statutes).

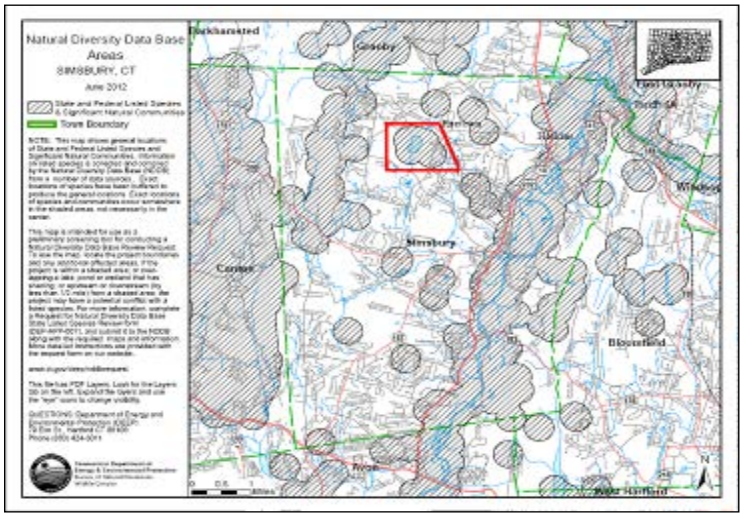


Figure 10: The Natural Diversity Data Base map that represents approximate locations of endangered, threatened and special concern species and significant natural communities in Simsbury, CT.

7. Old Forestland Management Sites: No sites meet the criteria to be designated as Old Forestland Management Sites.

8. Research Areas: A permanent forest health monitoring plot has been established on the Great Pond Block by the Connecticut Agricultural Experiment Station. This plot is located in Stand 10 of the Great Pond Block on the west side of the pond (see Special Features map).

9. Miscellaneous: Stands 6, 8, 12, 13, and 20 will be considered when awarding two-cord firewood lots to lottery winners in the Division of Forestry's Homeowner Firewood Program. These are primarily white pine and oak-pine stands where the focus will be removing competing, undesirable hardwood tree species, releasing pine trees and advanced regeneration.

There may be an opportunity to supply the DEEP Depot Sawmill with pine logs from Stand 4 to mill products for state use. Work may be performed by crews from the State Parks and Division of Forestry programs or may be contracted outside of the Department.

E. Extensive Areas of Concern

1. Trails/signs: The one DEEP-sanctioned trail (designated as a foot path) begins in Stand 8, weaving through a portion of red pine and rhododendron, going north on the east side of the pond. The trail circles the northern shore, crossing a wetland on a foot bridge and a raised boardwalk, and heads west towards the old nursery site in Stand 10A. The foot path then turns south and parallels the western edge of the pond back towards the parking area. All other "trails" that are currently used by hikers and bikers are actually old forest access roads constructed for fire protection and forestry operations. The DEEP Division of Forestry (DoF) will use these roads during harvest operations and forest fires in accordance with Connecticut's Best Management Practices for Water Quality While Harvesting Forest Products (BMPs).

During an active timber sale, portions of the road system will be posted with 'Temporarily Closed' and other cautionary signs. During harvests surrounding the road system, hazardous trees along it will be marked for removal, and roads will be cleared of debris before the close of sale. Informational signs explaining the purpose of the harvest will be posted at the sale area.

Over the years, vegetation has closed in and narrowed the roadbeds. Efforts to brush back the road edges will begin during this management plan period. This will be done by the Support Services Division and/or Division of Wildlife with machinery such as Tiger-cat or Fecon mowers.

2. Wetlands: There are approximately 34 acres of wetlands; these areas may include, but are not limited to, vernal pools, woodland seeps, potholes, and forested wetlands (red maple swamps). Wetlands are critically important landscape features due to the role they play in water filtration, pollutant mitigation, storm-water collection, wildlife habitat, and groundwater protection. Management actions occurring adjacent to these areas will meet or exceed current BMP's for the protection of water quality on logging jobs in CT. Efforts will be made in individual forest operation plans to eliminate the potential for impact to these areas.

3. Unauthorized or illegal activity: Unauthorized trail construction is the most common illegal occurrence in the forest, followed by dumping of brush and debris onto state property from abutting landowners. A recently used fire pit and old mountain bike ramps were found in the western-most portion of the Great Pond Block in Stand 18. Within the Massacoe Block, there are unauthorized trails blazed with orange and blue paint that seem to receive limited hiking and mountain biking use. The Great Pond Block has an unauthorized yellow trail in stand 8 that receives use from hikers and bikers.

F. Wildlife Habitat

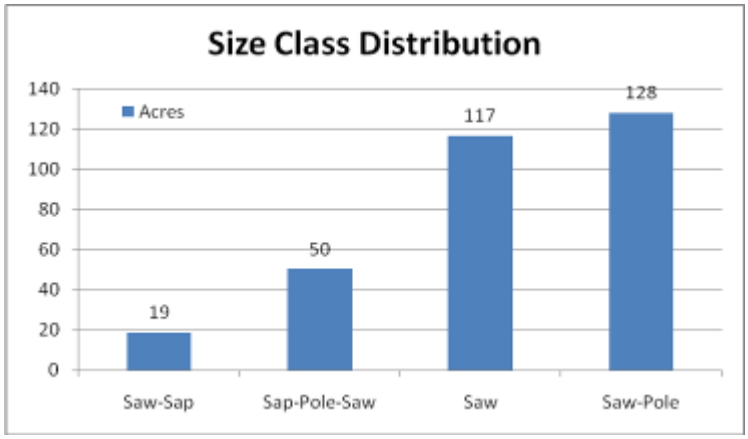
1. Investment in habitat improvement: There has been no specific wildlife habitat improvement work such as mowing or prescribed burns. In winter of 2012 the DEEP Wildlife Division installed four Wood Duck nest boxes within Great Pond. DEEP wildlife biologist Peter Picone recommends forest practices that continue to open up the canopy allowing increased sunlight to perpetuate the beneficial dense evergreen component and continue to benefit wildlife by increasing vertical stratification of the understory, mid-canopy and overstory. Forest cuts that encourage greater interspersion of evergreens into predominantly deciduous stands should be prescribed. Stands 9 and 10 were recommended for thinning to achieve a dense understory that will benefit American woodcock and shrubland nesters. A thinning along the western edges of the power-line can improve conditions for disturbance-dependent wildlife such as the cottontail rabbit, prairie warbler, eastern towhee and whip-poor-will (Refer to Wildlife Recommendations for the Forest in Appendix).

2. Existing diversity situation - wetlands: Based on inventory data collected in 2011, the Forest is primarily sawtimber-sized oak woodlands and white pine plantations (55% oak and 34% white pine dominated forest types). A small portion of the Forest (9%) is a mixture of oak and pine, with oak the dominant species in the canopy and advanced white pine regeneration in the understory.

The majority of the total forested acreage (78%) is predominately sawtimber size classes. The remaining forested acres are a mixture of sawtimber with saplings growing in the understory. Roughly 8% of the total acreage of the Forest is characterized by inland wetland soil types. Of the total acreage, 2.2% is classified as open, non-forested grassland.

To reach a more balanced distribution of size classes, overstory trees will eventually be removed to bring along the next generation of trees. Over time, this disparity should become less as stands will begin to be regenerated, adding to the amount of young, sapling-sized stands.

Size class has been determined by data analysis generated from NED 2 forestry software. Size class has been broken out by the following diameters;



- Seedling <= 1.0”
- Sapling 1.0” <= 4.5”
- Poletimber 4.5” <= 10.5”
- Sawtimber 12” and larger

Figure 11: Size class distribution of forest under active management (acres).

Management should increase the existing diversity of the forest. Stands under even-aged management will contribute additional acreage to early-successional wildlife habitat while uneven-aged stands will be more productive sites with increased vertical stratification.

3. Landscape context – DEEP Wildlife: The Great Pond Block provides habitat for a variety of species requiring predominantly conifer forest dominated by white pine, with mixed stands of hardwood Although fairly small in size, the Massacoe Block of the Forest adds undeveloped forestland to a largely developed, residential area (Refer to Wildlife recommendations for the Forest in Appendix D).

4. Recreation based wildlife – DEEP Wildlife: The Forest is closed to hunting and trapping. Bird watching is a popular activity among many local residents.

G. Vegetative Condition

The first forest management plan for the Forest was written in 1956 and approved by James Goodwin before the State acquired the property. Since then, forest operation plans have been written, however, no comprehensive management plan was written by the Division of Forestry until 1998. As a result of different harvests taking place over the years, stands can have multiple age-classes represented in them. The table on page 16 explains the age-class criteria. The multiple size-class designations such as sawtimber-seedling (saw-seed), sawtimber-sapling (saw-sap), and sapling-pole (sap-pole), indicate stands with both sizes represented in the inventory data. The sawtimber component can represent any trees 12” DBH and larger.

Land Cover Group	Size Class	Acres	%	Total %
Oak-Hickory	Sawtimber-Pole	91	25%	
	Sawtimber	104	28%	53%
White Pine	Sawtimber-Sapling	19	5%	
	Sawtimber-Pole	5	1%	
	Sawtimber-Pole-Sapling	50	14%	
	Sawtimber	45	12%	33%
Elm-Ash-Red Maple	Sawtimber-Pole	11	3%	3%
Oak-Pine	Sawtimber-Pole	32	9%	9%
Grassland (ROW)	Grass	9	2%	2%
TOTAL		366	100%	100%

Figure 12: Land cover groups by percent within the Forest (excludes 35 acres of water bodies).

Since the last forest management plan in 1998, 24 acres, or 8% of the actively managed forest has received silvicultural treatment. This treatment focused on an intermediate thinning in an overstocked stand.

In the last 40 years, the majority of harvested acres have been treated with even-aged silviculture aimed primarily at thinning overstocked stands to prepare the stands for a future first stage shelterwood treatment when the stand would be regenerated (refer to Figure 2). There were approximately 43 acres of red pine pre-salvage harvests in the 1970-80s as a result of the red pine scale, along with roughly 19 acres of mixed pine and hemlock pre-salvage sales. In the next 10-year management plan, focus will shift towards preparing stands for regeneration harvests.

1. Silviculture: 53% of the actively managed acreage of the Forest is to be maintained as an even-aged system perpetuated through applications of shelterwood and seed-tree system silviculture and 100-year rotations to manage for white pine. Approximately 148 acres, 47%, will be maintained as an uneven-aged system to create stands with a patch mosaic of differing age classes and species. Uneven-aged areas will have recurring harvests every 20 years, give or take a couple years to coincide with prolific seed years.

In accordance to goals Goodwin originally set for the Forest, there is a responsibility to perpetuate white pine as the primary species. Management activities will continue to enhance white pine plantations and convert suitable sites from hardwoods to conifers. Stands with higher site-quality indexes will be managed for oak and various hardwoods.

Oak forests have been declining at a rate of 5% per decade in Connecticut since 1938, because of forest succession, lack of forest fire, high-grade harvesting practices and high deer densities. Oaks play essential roles in forest ecosystems as a valuable food source for wildlife, their relationship with overall forest insect and bird biodiversity, and their value as a high-quality forest product. However, oaks are relatively intolerant of shade. A combination of release and regeneration treatments will favor oak establishment and stand development. As appropriate silviculture for securing oak regeneration is seldom accomplished on private lands, it is important these forest type ecosystems be maintained on State lands when possible.

Stands were prioritized for silvicultural treatments based on four factors; their ratio of unacceptable growing stock (UGS) to acceptable growing stock (AGS), the relative soil-index quality, the relative

density of the stand in relation to stocking, and the presence or absence of desirable white pine and oak regeneration.

Stand data illustrate a forest condition heavily weighted to the sawtimber size classes, and Oak-Hickory composition. Analysis suggests the sawtimber size class is exceeding habitat suitability measurements by over 50%. Many stands classified as sawtimber stands are making a transition from poletimber to sawtimber and are a mixture of both. These stands have been designated as sawtimber stands based upon their respective medial DBH. If medial DBH values from NED2 forestry software were greater than 12" DBH, the stand was considered sawtimber.

The DoF will begin to shift this sawtimber surplus by focusing treatments on sawtimber stands to establish desirable advanced regeneration that can be released with irregular and delayed shelterwood harvests in the future. Additionally, new age classes of desirable species will be created by establishing and promoting advanced regeneration of shade-intolerant species. These removals will begin to shift the size-class distribution to include higher proportions of under-represented early-successional forest habitat. Over the following three to five management plan cycles, the DoF will aim to sustainably balance the proportion of different size-classes to better meet the desired future condition outlines below in Figure 13.

Current Forest Size-Class Distribution vs. Desired Future Condition

Forest Size Class	Present Condition	Desired Future Condition
Sawtimber	91%	40%
Poletimber	7%	15%
Sapling	2%	25%
Seedling	0%	20%

Figure 13: Current Forest Size-Class Distribution vs. Desired Future Condition of a balanced forest ecosystem. Sawtimber includes stands with a medial DBH > 12".

2. Forest size classes by forest type:

Forest Type	Saw-Sap	Sap-Pole-Saw	Saw-Pole	Saw	Total
Eastern White pine	19	50	5	23	98
Scarlet oak			91		91
White oak/red oak/hickory				55	55
Mixed upland hardwoods				28	28
Other pine/hardwood			25		25
Eastern White pine/Eastern hemlock				21	21
Northern red oak				12	12
Red maple/lowlands				11	11
White oak				9	9
Eastern White pine/northern red oak/white ash			7		7
Total	**19**	**50**	**128**	**149**	**357**

Figure 14: Acres of each forest cover type within the Forest (Excludes water bodies, ROW's and developed areas).

Four broad forest cover groups are found within the Forest. These are oak-hickory, white pine, oak-pine, and elm-ash-red maple. Percentages for each forest cover group can be found in Figure 15 on page 18.

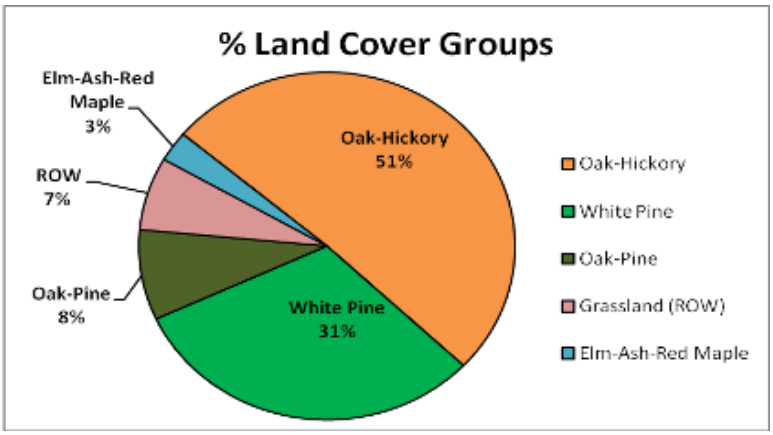


Figure 15: Percent of each land cover group within the Forest (excludes 35 acres of water bodies).

3. Forest group, size class and condition class on areas to be managed:

Oak - Hickory Cover Group

Size Class	Satisfactory Growing	Needs Thinning	Needs Regeneration	Convert Uneven-Aged	Total
Saw	65	40	0	0	105
Saw-Pole	0	15	0	76	91
Total	**65**	**55**	**0**	**76**	**196**
Scheduled to Operate	0	55	0	76	131

Figure 16: Oak-Hickory cover group current size class and silvicultural prescriptions for actively managed forestland at this point in time. "Scheduled to Operate" acres are stands designated for treatment during this plan period.

White Pine Cover Group

Size Class	Satisfactory Growing	Needs Thinning	Needs Regeneration	Convert Uneven-Aged	Total
Saw	7	38	0	0	45
Saw-Pole	5	0	0	0	5
Saw-Sap	19	0	0	0	19
Saw-Sap-Pole	44	7	0	0	51
Total	**75**	**45**	0	0	**120**
Scheduled to Operate	0	32	0	0	32

Figure 17: White Pine cover group current size class and silvicultural prescriptions for actively managed forestland at this point in time. "Scheduled to Operate" acres are stands designated for treatment during this plan period.

Oak-Pine Cover Group

Size Class	Satisfactory Growing	Needs Thinning	Needs Regeneration	Convert Uneven-Aged	Total
Saw-Pole	27	5	0	0	32
Total	**27**	**5**	**0**	**0**	**32**
Scheduled to Operate	0	0	0	0	0

Figure 18: Oak-Pine cover group current size class and silvicultural prescriptions for actively managed forestland at this point in time. "Scheduled to Operate" acres are stands designated for treatment during this plan period.

Elm-Ash-Red Maple Cover Group

Size Class	Satisfactory Growing	Needs Thinning	Needs Regeneration	Convert Uneven-Aged	Total
Saw-Pole	11	0	0	0	11
Total	**11**	**0**	**0**	**0**	**11**
Scheduled to Operate	0	0	0	0	0

Figure 19: Elm-Ash-Red Maple cover group current size class and silvicultural prescriptions for actively managed forestland at this point in time. "Scheduled to Operate" acres are stands designated for treatment during this plan period.

4. Forest Health: The condition of the forest vegetation could be described as above average. Much of this is due to Mr. Goodwin and his interest in forest management. The softwood stands have had much cultural work and are perhaps healthier than the hardwood stands. Severe gypsy moth infestations and the October 2011 snow storm have broken several crowns in the hardwood stands. Since the State acquired the property forest management activities have continued, although they may not have been as intense as Mr. Goodwin's. Future management should maintain or improve the vegetative condition of this forest.

Since one third of this forest is composed of pine, it is important to be aware of some insects and diseases that may attack this specie. White pine weevil *(Pissodes strobi)* may cause a problem in the white pine stands as they attack and kill the terminal leader, causing undesirable defects such as multiple stems. A practical method of controlling the weevil is to allow the young white pine to grow under the cover of 40-60% overstory until they are at least sixteen feet tall. *Fomes annosus*, a root rot, can be prevented by treating freshly cut stumps with borate. In the case of a *Fomes* outbreak, control could be accomplished through a sanitation cut and borate application. Another disease of note is white pine blister rust (*Cronartium ribicola*). There have been scattered occurrences of blister rust throughout the northwestern portion of the State. Blister rust is best controlled by eliminating the alternate hosts of the *Ribes* genus (Currants).

In 1989, DoF salvaged 285MBF of red pine in stands 8 and 10A infested with the red pine scale (*Matsucoccus resinosae)*. Red pine remains standing in "critical areas" of stand 8. These critical areas include a portion of stand 8 with the heavy rhododendron understory and a portion of stand 8 between the trail and the pond. The red pine that was left is expected to die in the near future. White pine was previously planted in portions of stands 8 and 10A.

Although it occupies a small portion of the Forest, hemlock is a species of some concern. In 1985 the hemlock woolly adelgid (*Adelges tsugae*) was noticed in the State. This insect is known to cause the death of hemlock within five years. Control is possible on ornamentals by spraying. In a typical forest, control for the adelgid is impractical because complete tree spray coverage is needed. The rate of spread and the severity of a future infestation of the hemlock, if it occurs, may alter the management of this species. Another pest of hemlock is the elongate scale insect (*Fiorinia externa*), which attack the needles, defoliating the tree within three to five years.

The remainder of this Forest, approximately 52% of the actively managed area, is composed of hardwoods, of which oak is a major component. In these areas the hardwood defoliators will be of concern. The most important of these is the gypsy moth (*Lymantria dispar*). The gypsy moth and its associates, the two lined chestnut borer (*Agrilus bilinaetus*) and shoestring root rot (*Armillariella mellea*), are responsible for many of the dead oaks that remain in the forest as a result of outbreaks during the early 1970's and early 1980's. When mixed with hardwoods, hemlock and pine can be defoliated, especially if they are in the understory. The pine is known to "re-needle" whereas the

hemlock is not, so its chance for survival is reduced.

The species of most recent concern within Connecticut is the presence of the invasive insect Emerald Ash Borer (*Agrilus planipennis*), which can kill all species of ash trees within three to five years of infestation.

There are no practical and economical methods for controlling many of these forest pests on a wide scale basis on State property. An active forest management program that removes trees killed and weakened by these pests will create a healthier forest with more vigorous trees, which will be able to withstand future attacks by these forest pests. In the future, control of these insects with naturally occurring viruses and parasites may be a common occurrence in addition to any silvicultural activities.

Currently there are no significant outbreaks of pests or diseases that are a concern. Outbreaks of Sudden Oak Death, or the presence of the Asian Long-horned Beetle or Emerald Ash Borer, would change the characteristics of the forest unlike any disturbance since the loss of the American chestnut. The forest will be continually monitored for the presence of these, and any other destructive forest pests.

a. **Understory concerns:** The predominant understory concern is the lack of seedling and sapling size classes. With intermediate thinning followed by shelterwood silviculture in most of the stands, and through uneven-aged management in stands 1, 8, and 20, a more balanced distribution of seedling/sapling sizes will be achieved as light is allowed to penetrate to the forest floor. This increase in sunlight to the ground layer will allow seedling and sapling white pine to grow into the next size class of poletimber, followed by sawtimber further along in the rotation cycle. Stands will be evaluated for the presence and eradication of non-native invasive plants prior to harvesting.

H. Landscape Context

Massacoe S.F. provides 357 acres of protected forestland in Simsbury. Much of the area around the Great Pond Block is comprised of residential communities. The Forest serves as a recreational getaway for many locals. One farm abuts the Great Pond Block to the north. The Massacoe Block is bordered by residential communities to the north and south and by Town of Simsbury forestland to the west and east. A baseball field maintained by the Town of Simsbury abuts the forest on the eastern boundary. Stratton Brook State Park is connected to the Massacoe Block by an old railroad bed that is now partly a trail used by local hikers and bikers, while the remainder is Town Forest Road which is leased to the Town.

I. Specific Acquisition Desires

Any undeveloped land that abuts Massacoe State Forest and would allow access into currently inaccessible stands should be considered for purchase. Any parcels of forestland surrounding the Massacoe Block should be considered for purchase if for sale. Currently no parcels are for sale.

J. Public Involvement

A copy of this plan was sent to the Town of Simsbury Conservation Commission, the Simsbury Land Trust and the Friends of Goodwin group for comment. Comments received from the Simsbury Land Trust are attached in Appendix C.

K. Adaptive Management

The DoF understands the nature of forest management as it occurs as part of a dynamic landscape. Management actions are often affected by outside variables, which influence the outcome of resource decisions. The DoF reserves the right to reasonably change our management approach as environmental change and resource needs warrant. Some of these changes may be associated with biological factors such as insect and disease outbreaks. Increased unauthorized motorized recreation, which erodes trails and roads, may require action unforeseen during the composition of this plan. Additionally, environmental conditions such as hurricanes or record-breaking precipitation may additionally affect resource condition. The DoF will use an adaptive-management philosophy and additionally reserve the right to address unforeseen circumstances should they arise during the tenure of this forest management plan.

During the time period covered by this plan, it may be necessary to cut timber in areas not included in this plan. A salvage cut would be an example of such a harvest operation. The area will have to be evaluated to determine the management practices that will be followed.

L. 10 Year Goals

James Goodwin performed intensive forest management in the Great Pond Block of Massacoe dating back to the early 1930s. Due to the site and soil conditions of the property, white pine is the desired tree species that would competitively occupy the majority of the forest. Goodwin planted pine seedlings under a hardwood canopy, removed the overstory once the pine became established, then thinned and pruned the converted pine stands. This labor intensive work and dedication to management of this forest is now displayed in the current conditions of fully-stocked, straight-stemmed pine stands. The forest has not undergone much forest management in the past decade, and as a result, once vigorous pine stands are beginning lose productivity as trees are becoming over-crowded. Many stands require intermediate thinning to the B-level of stocking to achieve optimal productivity.

Objectives: The following goals and objectives are established for Massacoe State Forest.

1. To continue the management goal established of James Goodwin; that is, favor the growth of white pine on suitable sites to produce stands of high-quality sawtimber.
2. To maintain a diversity of forest species and forest age classes.
3. To use silvicultural practices to accomplish the goals and objectives of forestry and other natural resource disciplines.
4. To minimize the losses of timber and fuelwood due to insects, disease, and weather. When losses occur, material will be salvaged as soon as practical.
5. To provide monetary returns to the State of Connecticut on a regular basis through sawtimber and fuelwood sales.
6. To provide the general public with the opportunity to cut fuelwood.
7. Intermediate harvests will aim at upgrading the quality and vigor of the residual stand.
8. Control and remove non-native invasive plants to allow forest regeneration and enhance the diversity of native species.
9. Establish a walking tour/demonstration area through which the public will gain a better understanding of forest ecology and forest management.

Even-aged management: The silvicultural treatments used under this plan will be regeneration cuttings and intermediate cuttings. Because of the planned demonstration area on the Great Pond Block, this forest will have both even-aged and uneven-aged management. Generally, the stands within Massacoe will be managed on an even-aged basis.

With even-aged management the regeneration methods are shelterwood, seed tree, or clearcutting. When needed, the majority of the stands will be regenerated by the shelterwood or seed tree methods. A delayed shelterwood system may be used, especially with the hardwood stands. With a delayed shelterwood, the final overstory removal is delayed for a period of up to 40 to 60 years. This would give the appearance of an uneven-aged stand for a portion of the rotation.

The intermediate harvests will consist of thinnings and improvement cuttings. Thinnings will primarily be used to release crop trees. Improvement cuts will be used to remove trees of undesirable species, over-mature trees, and trees unacceptable due to poor form. These cuts are not designed to create regeneration, although some regeneration may occur. The purpose of the cuts is to favor the better trees by removing the above mentioned trees. In general, stands will be thinned of overstory oaks and other hardwood species with the objective of releasing crop trees along with white pine in the understory. Many of the pine stands are at the upper end of full stocking, or barely above the A-level of overstocked. Although these pine stands are at the A-level, there are other stands that are more overstocked, prioritizing them on the work plan. However, almost all of the pine stands would benefit from a light improvement cut to optimize their growing space. At the end of the current 100 year rotation (within 10 to 20 years) some pine stands will be re-evaluated after receiving thinning to determine if they could be placed under uneven-aged management, similar to stand 1.

166 acres will remain in even-aged management. Using an area-based approach to sustainability, 1.66 acres could be regenerated per year (or 16.6 acres over ten years) over the course of the 100 year cycle. No regeneration cuts will be made during this plan period. Management will be concentrated on thinning overstocked stands to improve the condition of the forest.

Uneven-aged management: With uneven-aged management the regeneration methods are single tree, group, or patch selection. Single-tree and group selection methods work well with shade tolerant species. Patch selection will tend to favor shade intolerant species. Group and patch selection may be the best methods for white pine, a species of intermediate tolerance. Stands are generally worked once every 20 years, with occasional light TSI/improvement cuts occurring around ten years. Stands 1, 8, and 20 will be placed under uneven-aged management.

148 acres will be under uneven-aged management. Using an area-based approach to sustainability, 7.4 acres per year could be harvested (or 74 acres over ten years). For the duration of this plan, approximately 70 acres will undergo single tree and small group selection harvesting within stand 20.

1. Road maintenance: Roads will be cut back utilizing a Tiger-cat or Fecon mower during this plan period. This work will be performed by the Agency Support Services or Wildlife Division.

Several forest roads will require upgrades and placement of additional material before harvests. A list of forest roads from their respective access points off of town roads is provided below in Figure 20 with approximate distances. More specific details for each forest road maintenance project will follow in the forest operation plans. This work will be performed by the Agency Support Services Division or contractors.

Forest Road (Access from)	Stand #	Length*	Material Required	Funding Source
Great Pond Road	18	1,000'	Crushed/Processed Stone	Timber Sale/P.A. 11-192
Laurel Lane	8	250'	Crushed/Processed Stone	Timber Sale/P.A. 11-192
West Mountain Road	20	50'	Crushed/Processed Stone	Timber Sale/P.A. 11-192

Figure 20: Forest roads requiring gravel and road maintenance during this plan period. *Lengths are approximate distances and may change upon further evaluation during the forest operation plan writing phase.

2. Road construction, gates, and signs: There are no proposals for construction of new roads.

During this management plan period, wooden gates with be replaced with metal gates. Priority areas to initially have metal gates installed are stands that will be actively managed during the next ten years. If funding and labor sources are available, gates along the Great Pond entrance road and in the Fleetwood Drive cul-de-sac will be the next priority. This work will be performed by the Penwood State Park Unit.

3. Boundary marking: All boundaries will be remarked within the next ten years. A request for survey assistance will be made to the Land Acquisition and Management Division (LAMD) in 2014. This work will be performed by the Forestry Division.

4. Stream Improvement: None

5. Cultural site maintenance: Next to the commemorative stone on the southern end of Great Pond, there is a level area that could be cleared for a new amphitheater site. Small hemlocks and brush will be cleared from the understory to provide a scenic view of the pond from this area. This work will be performed by the Penwood State Park Unit.

Trees and woody plants along the dam will be removed to protect the integrity of the dam. Large trees on the dam could potentially uproot during high winds or large storms, causing damage to the dam and possible loss of the pond. The Forestry Division will initiate a project plan in 2014 to complete this work.

A walking tour/demonstration area of the Great Pond Block will be developed to provide information and educational signage on forestry-related topics. This work will be performed by the Forestry Division.

6. Recreation or scenic site work: None

7. Improvement of critical habitat: None

8. Trail maintenance: Routine maintenance will be performed by the Penwood State Park Unit.

9. Upland wildlife opening work or leasing: None

10. Wildlife habitat improvement: None

11. Wildlife population controls: None

12. Forest stand thinning and conversion:

Stand #	Acres	Type of Activity
6	28	Thinning
16	10	Thinning
18	12	Thinning
12	21	Thinning
13	15	Thinning
20	77	Selection Harvest

Figure 21: Work plan of stands to be managed during this plan period; conducted through three separate timber sales; 163 acres total.

Additional work of pruning and TSI may be accomplished during the period of this plan. Areas that may be worked include 1, 2, 3 and 15.

Stand 4 may receive a light thinning to release sawtimber white pine and provide pine logs to the DEEP sawmill for state use.

Prior to a timber harvest, the sale area will be evaluated for the presence and eradication of non-native invasive plants.

13. Forest stand rotational cutting: The following criteria will be used in the implementation of this plan:

1. A rotation age of 100 years will be used. The stands may be carried past the rotation age to avoid having the entire forest regenerated within a short period of time. Once the stands are regenerated, the 100-year rotation will be followed.

2. Stands will be carried to the rotation age. Only intermediate harvests will be implemented until the stands are mature. An exception to this is stand 1 which may be regenerated in portions to serve as a demonstration area.

14. Pre-Fire suppression work: None

Appendix A: References

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Appendix B: Definitions

This glossary contains a list of commonly used forestry terms.

- **acre** A unit of measure describing surface area. One acre contains 43,560 square feet. A football field (without the end zones) is 45,000 square feet -- slightly larger than an acre. The inside of a professional baseball diamond is about 1/4 of an acre.
- **advance regeneration** Young trees that have become established naturally in a forest before regeneration methods are applied. In other words, the regeneration is present in advance of any treatment.
- **age class** The trees in a stand that became established at, or about, the same time. The range of tree ages in a single age class is usually less than 20 percent of the expected age of that class.
- **basal area** The area of the cross section of a tree's stem at 4 1/2 feet above ground, or breast height, in square feet. Basal area of a forest stand is the sum of the basal area's of the individual trees in the stand. It is usually reported in square feet of BA per acre and is used as a measure of stand stocking, stand density, and stand volume.
- **board-foot volume** The amount of wood products expressed as the number of boards 1 foot wide by 1 foot long and 1 inch thick that are sawn from logs.
- **biological diversity** The variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur. Also, the variety of ecological structures and functions at any one of these levels.
- **Best Management Practices** Procedures and treatments that lessen soil erosion, sedimentation, stream warming, movement of nutrients, and visual quality during or following activities that alter the land.
- **buffer strip** An area of land that is left relatively undisturbed to lessen impacts of treatments next to it. Common examples include visual buffers used to screen the view from roads, and stream side buffers used to protect water quality.
- **canopy** The continuous cover of branches and foliage formed collectively by the crowns of trees.
- **Clearcutting** An even-aged silvicultural technique involving the removal of all stems in the stand. Strip cutting is a form of clearcutting.
- **crop tree** Any tree selected to provide a specific benefit such as mast, dens, veneer, or sawtimber. Crop trees are usually selected when they are young.
- **cutting cycle** The planned interval between treatments in forest stands.
- **damaging agent** Any one of various factors that injure trees. They include some insects, diseases, wildlife, abiotic factors, and human activities.
- **dbh** Diameter at breast height; the diameter of the trunk of a tree measured at 4-1/2 feet above ground level. It is measured on the uphill side of the tree.
- **den tree** A living tree that has holes in the trunk, or stem, from broken branches and decay, or hollow trunks; a cavity tree.
- **even-aged stand** A stand containing trees in the main canopy that are within 20 years of being the same age. Even-aged stands sometimes are designated by age-class (10-year-old stand, 40-year-old stand) or broad size-class: seedling stand (most trees are <1 inch dbh); sapling stand (trees 1-4 inches dbh); poletimber stand (trees 5-10 inches dbh); and sawtimber stand (trees > 10 inches dbh).
- **even-aged system** A planned sequence of treatments designed to maintain and regenerate a stand with one age class.
- **forest condition** Generally, the current characteristics of forested land including but not limited to cover type, age arrangement, stand density, understory density, canopy density, and forest health.

- **forest cover type** A category of forests based on the kind of trees growing there, particularly the composition of tree species. Forest cover types are often referred to as forest types, cover types, stand types, or types.
- **group selection** An uneven-aged silvicultural technique involving the removal of trees in groups usually 1/10 to 2/3 acre in size, but sometimes up to 1 to 2 acres on large properties. Group selection can be applied in combination with single-tree selection between groups.
- **horizontal diversity** The degree of complexity of the arrangement of plant and animal communities, and other habitats across a large area of land.
- **inactive forest –** Management category designated for forests on marginal growing sites often with dense mountain laurel in the understory. May be activated if beneficial to biodiversity.
- **interior species** Species found only or primarily away from the perimeter of a landscape element. Species commonly requiring or associated with interior habitat conditions.
- **intermediate cuttings** Silvicultural cuttings applied in the culture of even-aged stands and are normally noncommercial (no products sold) or commercial thinnings (timber sold), designed to favor certain species, sizes, and qualities of trees by removal of competitors. Thinnings designed to grown quality timber commonly maintain a closed canopy; however, low-density thinning (50-70% residual crown cover) can be used to hasten diameter growth and stimulate understory development for wildlife purposes. At rotation age, the stand in considered to be mature and a regeneration cutting is applied to produce a new stand.
- **intermediate treatment** Any treatment or "tending" designed to enhance growth, quality, vigor, and composition of the stand after seedlings are established and before mature trees are regenerated. For example, thinning is an intermediate treatment.
- **mast tree** A tree that produces nutlike fruits such as acorns, beechnuts, hickory nuts, seeds of certain pines, cherries, apples, samaras. Hard mast includes acorns, beechnuts, and hickory nuts. Soft mast includes cherries, apples, and samaras (on maple and ash trees).
- **matrix** The matrix is the dominant landscape element on a landscape in which smaller differentiated elements (patches) are embedded. It is commonly highly connected throughout the landscape.
- **native plant** A species that naturally occurs in a given location where its requirement for light, warmth, moisture, shelter, and nutrients are met.
- **non-commercial treatment** Any activity that does not produce at least enough value to cover the direct costs of that treatments.
- **overtopped** A condition or position where a tree's crown is completely covered by the crowns of one or more of its neighboring trees. An overtopped tree's crown is entirely below the general level of the canopy and does not receive any direct sunlight either from above or from the sides.
- **patch** A patch is a relatively homogeneous area that differs in some way from its surroundings (e.g., woodlot in a corn field, conifer plantation in a mixed-deciduous forest).
- **plantation** A forest stand in which most trees are planted or established from seed sown by people. Typically, planted trees are in rows, with equal spacing between each tree in a row and between rows.
- **pole** A tree, usually young, that is larger than 4 inches dbh and smaller than 8 to 11 inches dbh.
- **prescribed burn** The application of fire in forested or other areas, usually under specific conditions of weather and fuel moisture, to control vegetation for silvicultural purposes or to reduce hazards.
- **regeneration** The seedlings and/or saplings in a new forest stand or age class. Natural regeneration originated from seeds, sprouts, or root suckers.
- **Regeneration method** A cutting method by which a new age class is created. These methods include clearcutting, seed tree, shelterwood, single-tree selection, and group selection; also called reproduction method.

- **Regeneration cuttings** Silvicultural cuttings designed to naturally regenerate the stand by providing for seedling (or vegetative stems) establishment or development, or both. Two even-aged techniques; clearcutting and shelterwood, and two uneven-aged techniques; single-tree selection and group selection.
- **residual spacing** The distance between trees that remain in the forest after a silvicultural treatment.
- **rotation** The planned interval of time between treatments that regenerate a stand.
- **runoff** Surface streamflow leaving a watershed. Sources of runoff are precipitation falling in the channel, overland flow (rare in forested areas), and subsurface water exiting from soils and bedrock.
- **sapling** A tree, usually young, that is larger than a seedling but smaller than a pole-sized tree. Size varies by region, but a sapling is usually taller than 6 feet and between 1 and 4 inches in dbh..
- **sawtimber** Trees greater than 11.5" in diameter
- **sedimentation** The accumulation of organic and mineral soil particles and rocks in streams and water bodies due to erosion. Sedimentation often accompanies flooding. The application of Best Management Practices will usually protect against sedimentation during and after treatments.
- **seed tree** A tree that produces seed. Seed trees are usually mature and high in quality.
- **seedling** A tree grown from a seed. Usually the term is restricted to trees smaller than saplings, or less than 6 feet tall or smaller than 1 inch dbh.
- **shade intolerance** The relative inability of a plant to become established and grow in the shade.
- **shade tolerance** The relative capacity of a plant to become established and grow in the shade.
- **shelterwood** An even-aged silvicultural technique involving the removal of the understory and lower crown canopy trees to allow the new stand to regenerate under shade. Subsequent removal of the overstory in one or several cuts.
- **silvicultural system** A planned process whereby a stand is tended, and re-established. The system's name is based on the number of age classes (for example even-aged or two-aged), and/or the regeneration method used (for example, shelterwood, crop-tree, or selection).
- **silvicultural treatment** A process or action that can be applied in a controlled manor according to the requirements of a prescription or plan to a forest community to improve real or potential benefits.
- **silviculture** The art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics.
- **single-tree selection** An uneven-aged silvicultural technique involving the removal of trees singly or in groups of 2 or 3, which maintains a continuous canopy and an uneven-aged or uneven-sized mixture.
- **site** The combination of biotic, climatic, topographic, and soil conditions of an area; the environment at a location.
- **snag** A standing dead tree without branches, or the standing portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.
- **softwoods** A term describing both the wood and the trees themselves that in most cases have needles or scale-like leaves (the conifers); gymnosperms.
- **species composition** The collection of plant species found in an area. Composition is expressed as a cover type, or a percentage of either the total number, the density, or volume of all species in that area.
- **species diversity** The number of different plants and animals, and other life forms, coexisting in a community.
- **species richness** The number of different species present in an area.
- **stand** An area of trees of a certain species composition (cover type), age class or size class distribution and condition (quality, vigor, risk), usually growing on a fairly homogeneous site. The trees are sufficiently uniform in spacing, condition, age arrangement and/or forest type to be distinguished from neighboring stands. The conditions of the site are relatively uniform, including soil properties, water drainage, slope, exposure to weather, and productivity. Stands of 5 acres and larger commonly

are recognized, though minimum stand size depends upon size of ownership and intensity of management.

- **stand composition** The collection of plants, particularly trees, that are found in a stand.
- **stand condition** The number, size, species, quality, and vigor of trees in a forest stand.
- **stand density** A quantitative measure of the proportion of area in a stand actually occupied by trees. This is an absolute measure rather than a relative measure, or percentage.
- **stand structure** The arrangement of trees of different sizes and ages in a stand.
- **succession** A gradual and continuous replacement of one kind of plant and animal community by a more complex community. The environment is modified by the life activities of the plants and animals present thereby making it unfavorable for themselves. They are gradually replaced by a different group of plants and animals better adapted to the new environment.
- **thinning** The removal of some trees to improve and enhance the vigor and growth of other trees. Thinning enhances forest health and allows you to recover any excess of potential mortality.
- **understory** The small trees, shrubs, and other vegetation growing beneath the canopy of forest trees and above the herbaceous plants on the forest floor.
- **uneven-aged stand** A stand with trees in three or more distinct age classes, either intermixed or in small groups, growing on a uniform site; a stand containing trees of several 20-year age-classes. These stands generally contain trees of many sizes (seedling through sawtimber) due to the range in age as well as differences in growth rate among species.
- **vertical stratification** The extent to which plants are layered within an area. The degree of layering is determined by three factors: 1. the arrangement of different growth forms (trees, shrubs, vines, herbs, mosses and lichens); 2. the distribution of different tree and shrub species having different heights and crown characteristics; and 3. the number of trees of different ages.

Appendix C: Comments

Parks and Recreation:

From: Talbot, Tammy
Sent: Tuesday, January 15, 2013 7:49 AM
To: Clark, Jeremy
Cc: Messino, Vincent
Subject: FW: Massacoe State Forest Management Plan District Review

Morning Jeremy,

I haven't heard anything from Vinny on this…but overall I think Parks is fine with the plan. I do have concerns about logging the parcels directly adjacent to the bike path. This bike path is fairly heavily used and I would be concerned about conflicts with bikers, and even with closing it down. I'd like to discuss this aspect further with you…time frames, duration of potential closures, etc.. Thanks for the opportunity to comment.

Tammy

Having reviewed the Massacoe management plan I would agree with the comments made by several other DEEP agents that your proposed plan is a good one.
Any concerns with interrupting daily Forest or Park activities and or safety can easily be addressed with proper signage, temporary closure or temporary rerouting of any trail usage in question.
Like any other construction or contracted job if all safety practices are followed to the best of one's ability I think this plan is sound.
Vincent Messino
Park and Recreation Supervisor

Agency Support Services:

From: Kearns, Skip
Sent: Friday, January 18, 2013 1:20 PM
To: Clark, Jeremy
Subject: RE: Massacoe State Forest Management Plan District Review

Jeremy,

I do not have any issues or concerns with the proposed plan. The Support Services work items in the plan can be scheduled and fit into the road maintenance repair plans as the management plan progresses.

Have a good weekend
Skip

Inland Fisheries Division:

From: Mysling, Donald
Sent: Thursday, March 7, 2013 12:04 PM
To: Clark, Jeremy
Subject: RE: Massacoe State Forest Management Plan District Review

Jeremy,
I have completed my review of your Management Plan for the Massacoe State Forest, Simsbury. There are no fisheries resource issues of concern.

Best regards,
Don
Don Mysling, Senior Fisheries Biologist
CT DEEP Inland Fisheries Division
Habitat Conservation & Enhancement Program
Western Headquarters, 230 Plymouth Road, Harwinton, CT 06791
(P) 860.567.8998 (E-mail) donald.mysling@ct.gov

Wildlife Division:

Refer wildlife comments and recommendations in Appendix D.

Natural Diversity Database (NDDB):

Comments and Department Fact Sheets can be found in Appendix E.

Simsbury Land Trust:

From: Sally or Don Rieger [dfrandssr@aol.com]
Sent: Saturday, February 23, 2013 3:28 PM
To: Clark, Jeremy
Cc: amyzeiner@aol.com; radavis@Cornerstoneadvisers.com; CHoward@goodwin.com
Subject: RE: Massacoe State Forest Management Plan

Hello Jeremy,

Thank you for including Simsbury Land Trust in the groups that you have asked for comments on your management plan. I wanted to point out that along the dam at Great Pond there is a lot of invasive buckthorn coming in and crowding out more desireable species such as shrubby dogwoods. It would be great if it could be scheduled for management.

Additionally, you might find helpful the report from the Farmington Valley Biodiversity Project, available at www.frwa.org/publications/biodiversity_report_final.pdf. You will find the methodology that was used and the Simsbury section provides some information about Great Pond.

Bill Moorhead, a consulting botanist, had concerns about rare plants along part of the shore of the pond at Great Pond. He considered the annual drying up of the edges of the pond important to their survival. He may be able to provide you more information or might want to comment on your draft. He did the botanical work for the Biodiversity Project that I mentioned above. His e-mail address is whmoorhead@optonline.net.

I will do a more careful reading and get back to you if I have other comments. Thanks again for sending the invitation to comment and the document to Amy.

With my best wishes,
Sally Rieger

Appendix D: DEEP Wildlife Recommendations for Massacoe State Forest

To: Jeremy Clark, DEEP Forestry Division
From: Peter Picone, DEEP Wildlife Division December 18, 2012

Massacoe State Forest

Wildlife Management Considerations

The Great Pond Block provides habitat for a variety of wildlife species including mammals, birds, reptiles, amphibians and insects. Deer, coyote, fox, and red squirrel sign was observed during two site visits in early December of 2012 in the forested habitats. Black ducks and Canada geese were observed in the pond foraging or resting in the pond/wetland habitat. Cutting of vegetation by beaver was evident along the pond edges and at least 3 beaver lodges were present.

Past forest cutting practices has allowed increased sunlight to reach the understory and resulted in increased density of white pine and hemlock saplings. The dense evergreen understory provides good winter wildlife cover for resting, nesting and predator avoidance.

A variety of wildlife species can be anticipated to utilize Great Pond block during the four seasons of the year. The forested habitats may include species such as wild turkey, ovenbird, nuthatches (red and white), woodpeckers (pileated, downy, hairy, red-breasted), warblers (pine, black-throated green), and hawks (sharp-shinned, Cooper's, goshawks, red-tailed, red-shouldered). A greater variety of birds can be expected to forage and rest in this forest during spring and fall migrations.

Approximately 35 acres of open water conditions and scrub-shrub wetlands provides habitat for a variety of waterfowl. It can be expected that the following wildlife use this wetland habitat: wood ducks, mallards, black ducks, hood mergansers, ring-necked ducks, Canada geese, great blue herons, belted kingfishers, beaver, river otters, muskrats, bull frogs, green frogs, spotted salamanders, red spotted newts, painted turtles, and water snakes.

The Massacoe block contains 130 acres of forest dominated by hardwoods located in an area that is becoming suburbanized with housing becoming more prevalent along the edges. Common wildlife species can be expected here and has increasing value as a migratory stop-over habitat for migratory songbirds.

Management Considerations

Great Pond Block

There are few places in the western district of Connecticut that has such dense evergreen understory conditions. Pine and hemlock seedlings and saplings are growing densely throughout the area; especially in previously cut areas. Forest practices that continue to open up the canopy to allow increased sunlight will perpetuate this beneficial dense evergreen component. Forest thinnings will continue to benefit wildlife by increasing vertical stratification of the understory, mid-canopy and overstory vegetation. Forest cuts that encourage greater interspersion of evergreens into predominantly deciduous patches should be prescribed.

The wetland areas are experiencing cutting by beaver which results in increased sunlight and denser edges along the pond which is especially important for American woodcock during migration and also nesting periods. The thinning of stands 1-09 and 1-10 that allows more sunlight to reach the understory would also benefit American woodcock and shrubland nesters.

Thinning of the forest (crop tree release or group selection) along the western edges of the powerline that runs north-south can improve conditions for disturbance-dependent wildlife such as cottontail rabbits, prairie warbler, eastern towhee and whippoorwill.

The wildlife division installed four wood duck nest boxes on metal posts in the pond on December 13,

2012 (Figure 1). These nest boxes will be checked for use and cleaned out once a year.

Massacoe Block

Forest management through thinnings of this oak-dominated woodland will continue to improve vertical stratification which will add the quality of habitat.

Figure 1. Peter Picone, DEEP Wildlife Biologist and Summer Payne, Seasonal Resource Assistant placing a wood duck nest box in Great Pond State Forest pond.

Appendix E: NDDB Review

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

Bureau of Natural Resources
Wildlife Division
Natural History Survey – Natural Diversity Data Base

October 23, 2012

Mr. Jeremy Clark
Department of Energy and Environmental Protection
Forestry Division
P.O. Box 161
Pleasant Valley, CT 06063

Regarding: Massacoe State Forest, Great Pond Block, Simsbury – management plan
Natural Diversity Data Base 201206201

Dear Mr. Clark:

In response to your request for a Natural Diversity Data Base (NDDB) Review of State Listed Species for Massacoe State Forest, Great Pond Block in Simsbury, our records for this site indicate the following extant populations of species on or within close proximity to the project site:

Whip-poor-will (*Caprimulgus vociferous*) Status: Species of Special Concern

Whip-poor-wills favor forest habitat with an open understory, often adjacent to areas of shrubby, herbaceous habitat. These ground-nesting birds are found in Connecticut during the breeding season (late May through July) and spend the winter in South America.

Recommendation: Preferably any projects should be conducted outside of the breeding season, so that the potential for destruction of nests, eggs, or young is reduced. If whip-poor-wills are seen on the property, the nest should be located, and a protective buffer delineated around the area to avoid disturbing the birds.

Hoary bat (Lasiurus cinereus) Status: Species of Special Concern

Hoary bats are found in Connecticut during the spring and summer seasons and migrate south to overwinter. Their diet primarily consists of moths and beetles. These bats will roost high in large coniferous and deciduous trees. They typically do not roost on buildings.

Recommendation: Female hoary bats are solitary and give birth mid-May to late June. If forest clearing occurs outside this time frame, direct negative impacts to this species will be minimized. Long-term impacts can be minimized by retaining large diameter coniferous and deciduous trees whenever possible.

Eastern box turtle (*Terrapene carolina Carolina*) Protection Status: Species of Special Concern

79 Elm Street, Hartford, CT 06106-5127
www.ct.gov/deep
Affirmative Action/Equal Opportunity Employer

Eastern Box Turtles require old field and deciduous forest habitats, which can include power lines and logged woodlands. They are often found near small streams and ponds. The adults are completely terrestrial but the young may be semiaquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year. Eastern Box Turtles have been negatively impacted by the loss of suitable habitat. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated.

Wood turtle (*Glyptemys insculpta*) Protection Status: Species of Special Concern

Wood turtles require riparian habitats bordered by floodplain, woodland or meadows. They hibernate in the banks of the river in submerged tree roots. Their summer habitat includes pastures, old fields, woodlands, powerline cuts and railroad beds bordering or adjacent to streams and rivers. This species has been negatively impacted by the loss of suitable habitat.

Recommendation: In an effort to protect Eastern box and wood turtles, the following guidelines should be followed:

Workers should be apprised of the possible presence of turtles, and provided a description of the species (http://www.ct.gov/dep/cwp/view.asp?a=2723&q=473472&depNav_GID=1655);

Any turtles that are discovered should be moved, unharmed, to an area immediately outside of the fenced area, and position in the same direction that it was walking;

No vehicles or heavy machinery should be parked in any turtle habitat;

Work conducted during early morning and evening hours should occur with special care not to harm basking or foraging individuals.

Recommendation for plants: Invasive/woody growth plants encroaching on or shading pond shore should be removed.

The Natural Diversity Data Base is not necessarily the result of comprehensive or site-specific field investigations. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEEP for the proposed site. Consultation with the Natural Diversity Data Base should not be substituted for on-site surveys required for environmental assessments.

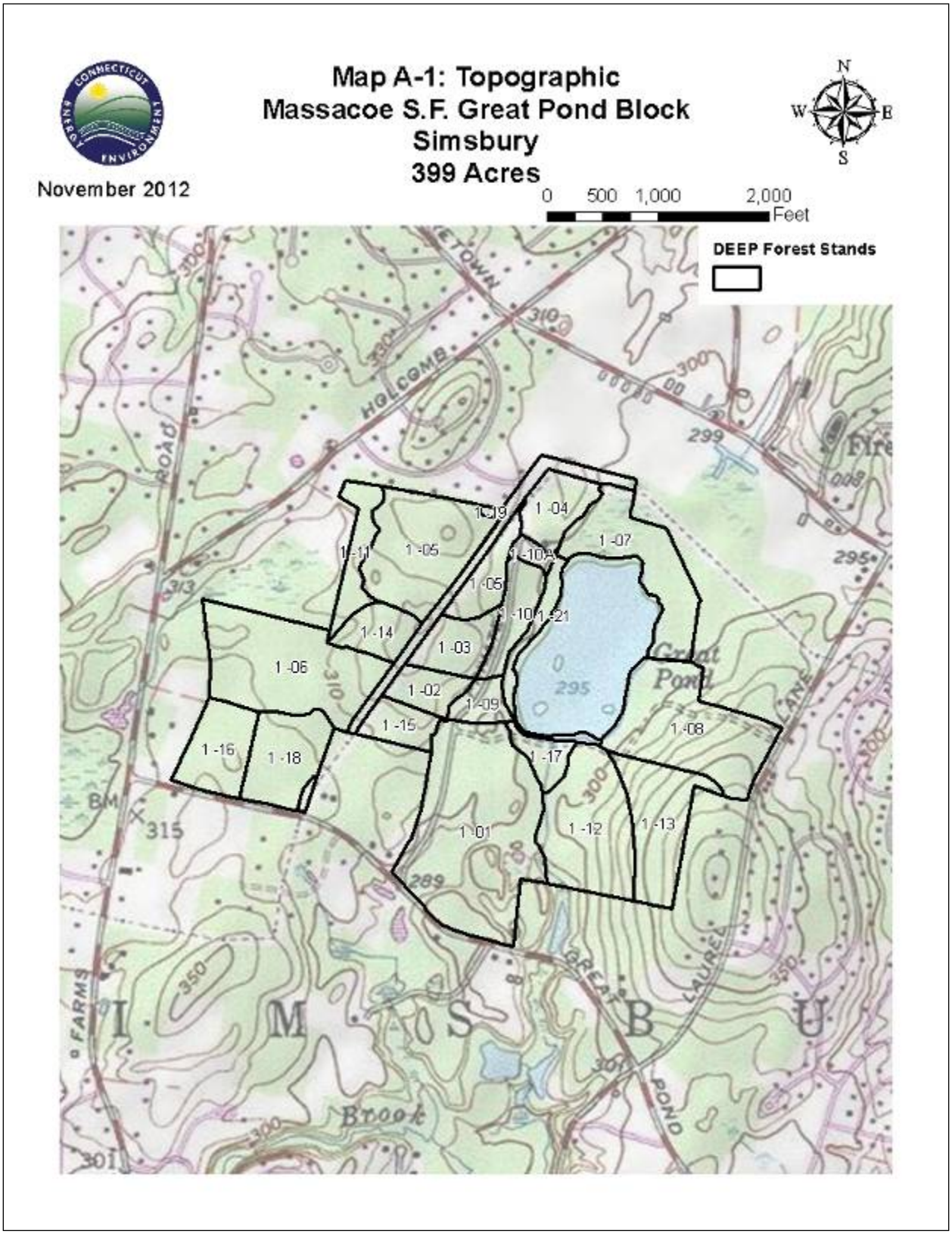
The Natural Diversity Data Base includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects

and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available. If the project is not implemented within 12 months, then another Natural Diversity Data Base review should be requested for up-to-date information.

Thank you for consulting the Natural Diversity Data Base. If you have further questions, I can be reached by email at Elaine.hinsch@ct.gov or by phone at (860) 424-3011.

Sincerely,
/s/
Elaine Hinsch
Program Specialist II
Wildlife Division

Map A – Topographic Maps

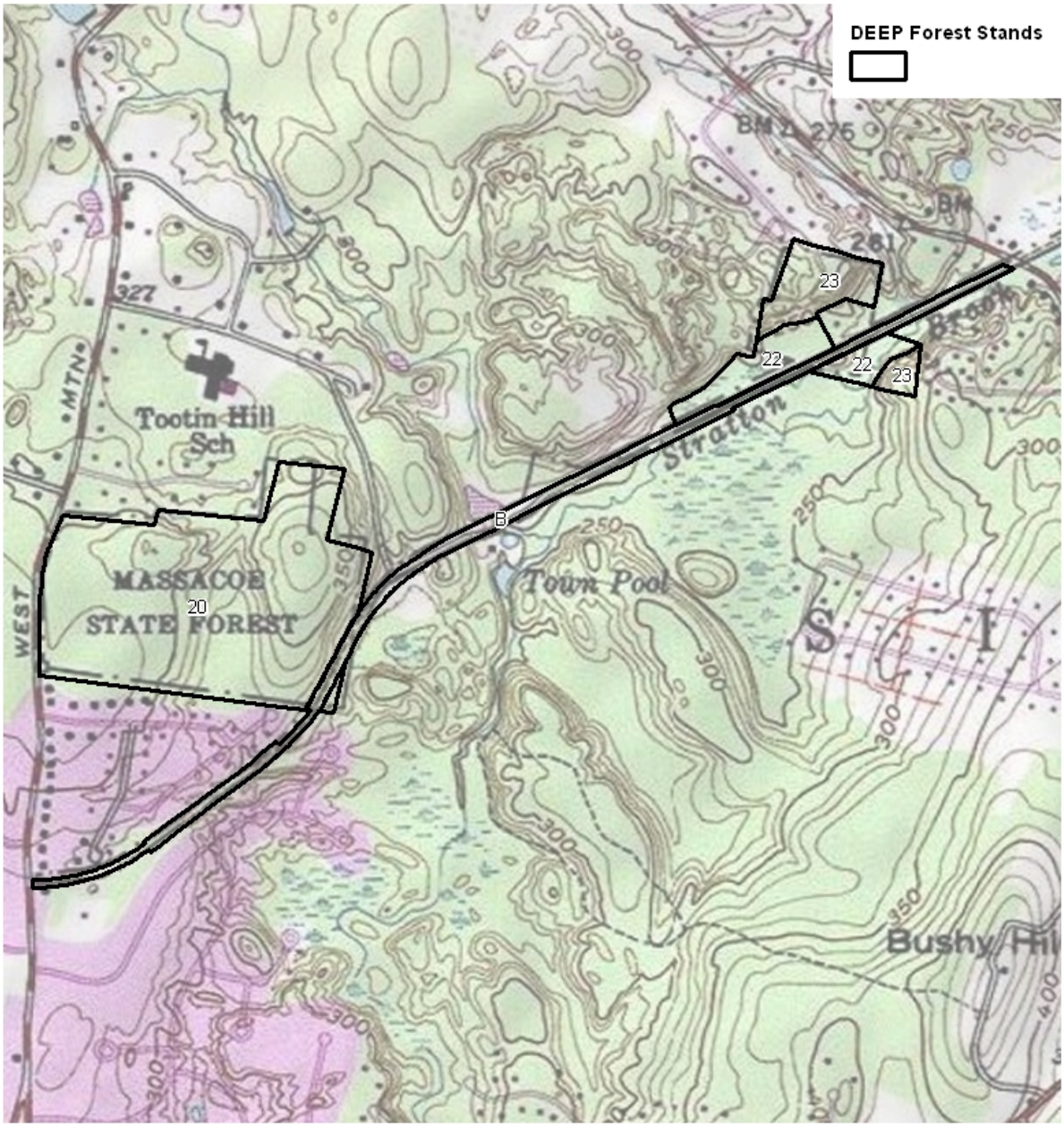


Map A-2: Topographic
Massacoe S.F. Great Pond Block
Simsbury
399 Acres

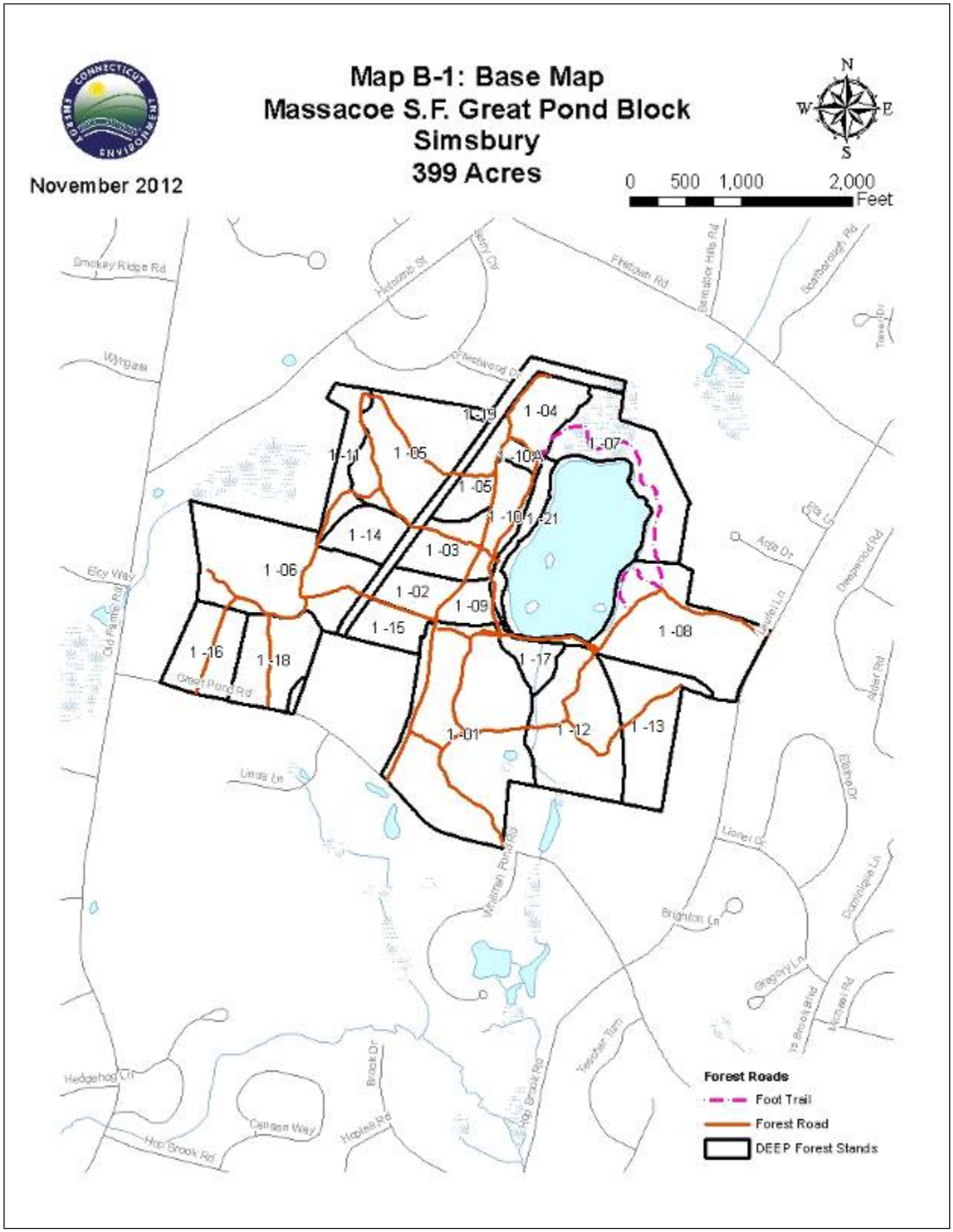
November 2012

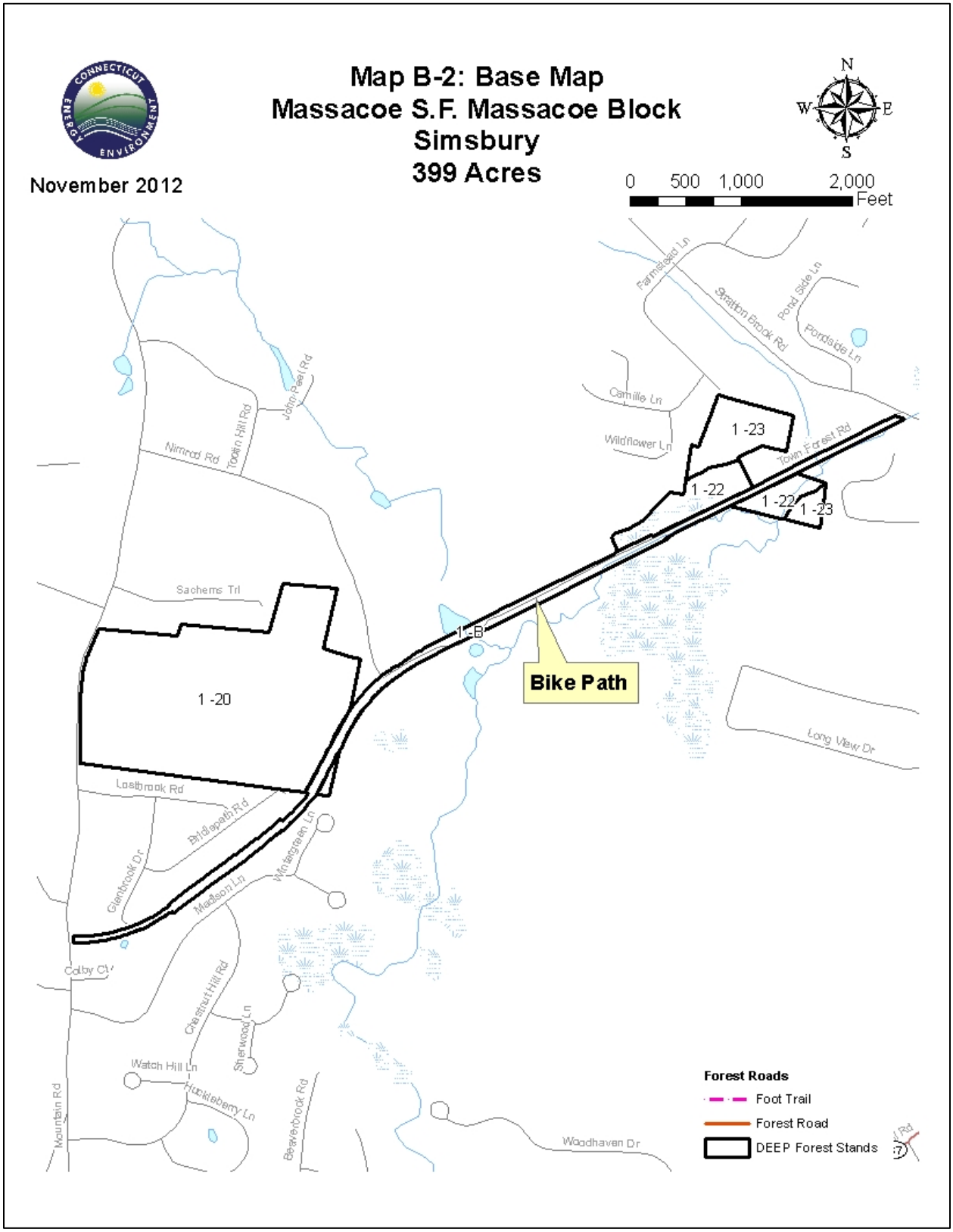
N
W E
S

0 500 1,000 2,000
Feet

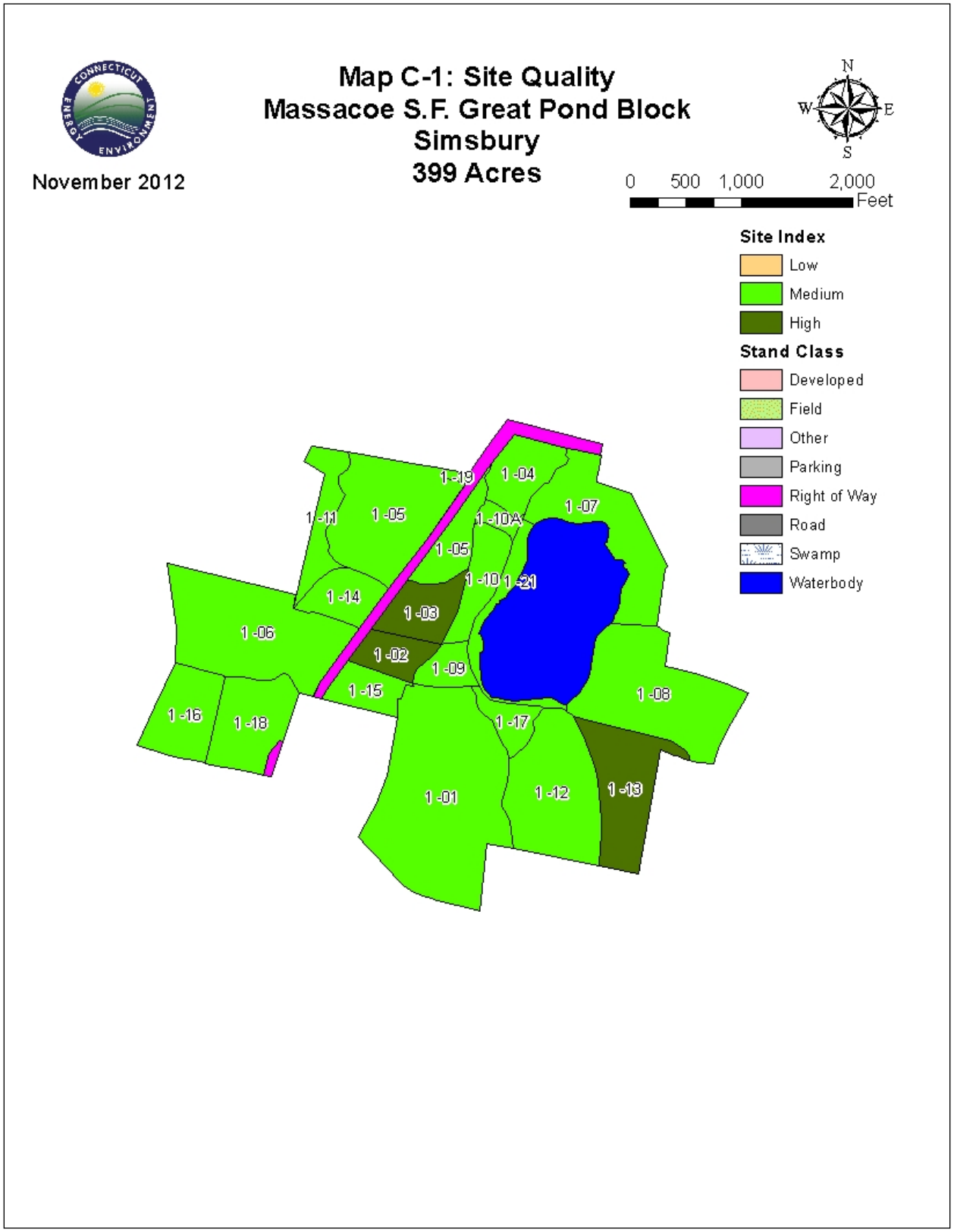


Map B – Base Maps



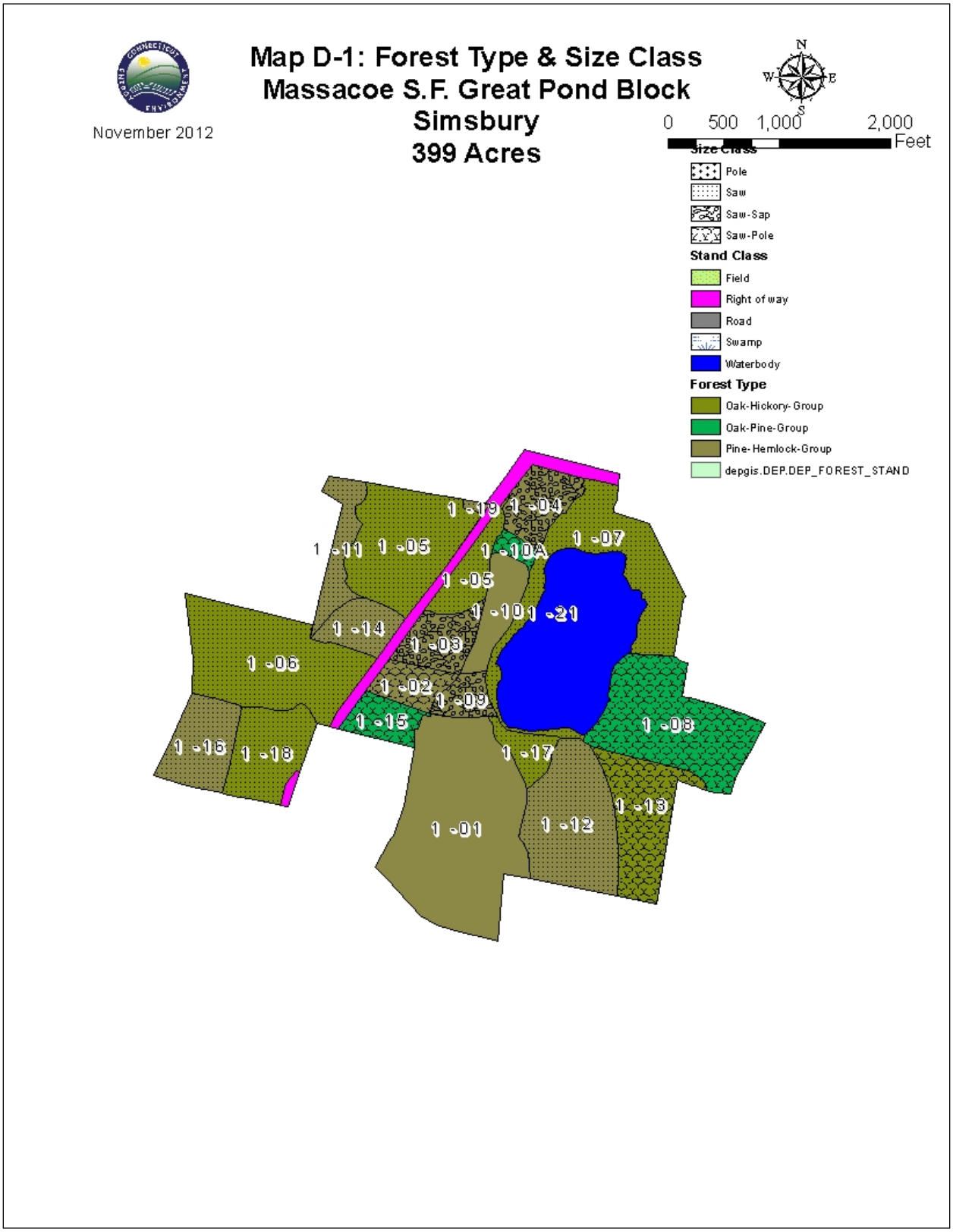

Map B-2: Base Map
Massacoe S.F. Massacoe Block
Simsbury
399 Acres
November 2012
N
W
E
S
0 500 1,000 2,000
Feet
1 -20
1 -22
1 -22
1 -23
1 -23
Bike Path
Sachems Trl
Nimrod Rd
Todkin Hill Rd
John Peet Rd
Farmstead Ln
Stratton Brook Rd
Pond Side Ln
Pondside Ln
Camille Ln
Wildflower Ln
Town Forest Rd
Long View Dr
Lostbrook Rd
Bridgepath Rd
Glenbrook Dr
Madison Ln
Wintergreen Ln
Colby Ct
Chestnut Hill Rd
Sherwood Ln
Watch Hill Ln
Huckleberry Ln
Mountain Rd
Beaverbrook Rd
Woodhaven Dr
Forest Roads
Foot Trail
Forest Road
DEEP Forest Stands

Map C – Site Quality Maps




Map C-2: Site Quality
Massacoe S.F. Massacoe Block
Simsbury
399 Acres
November 2012
N
W
E
S
0 500 1,000 2,000
Feet
1 -23
1 -22
1 -22
1 -23
1 -B
1 -20
Site Index
Low
Medium
High
Stand Class
Developed
Field
Bike Path
Parking
Right of Way
Road
Swamp
Waterbody

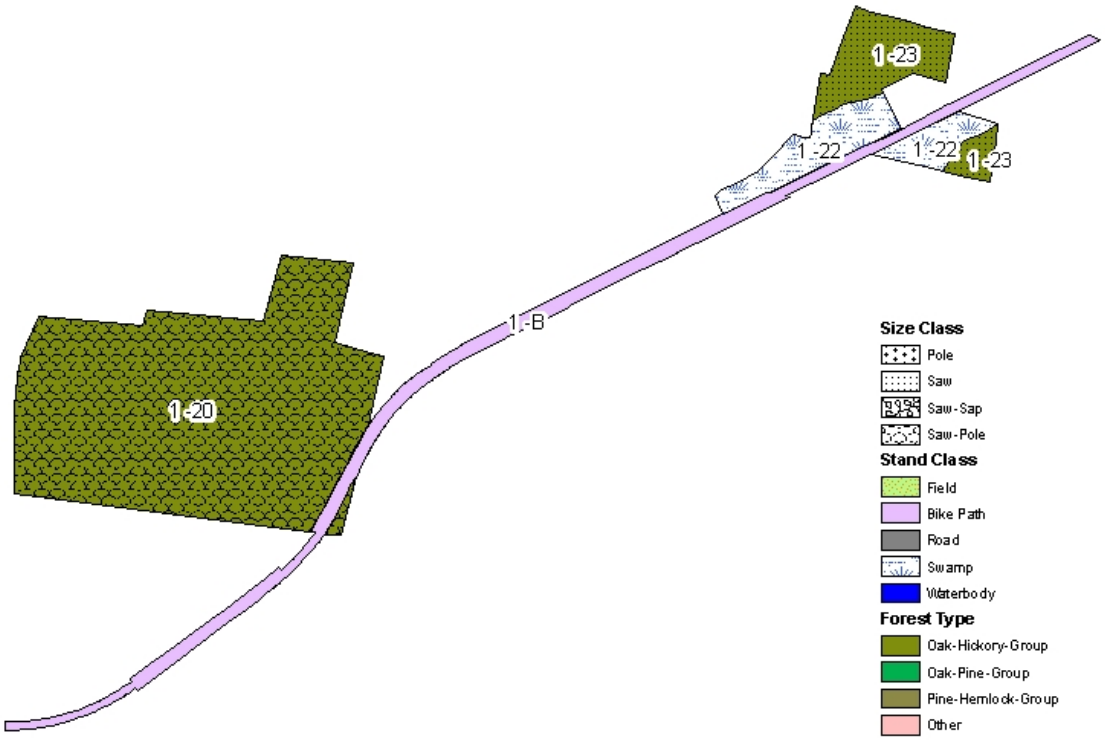
Map D – Forest Type & Size Class Maps



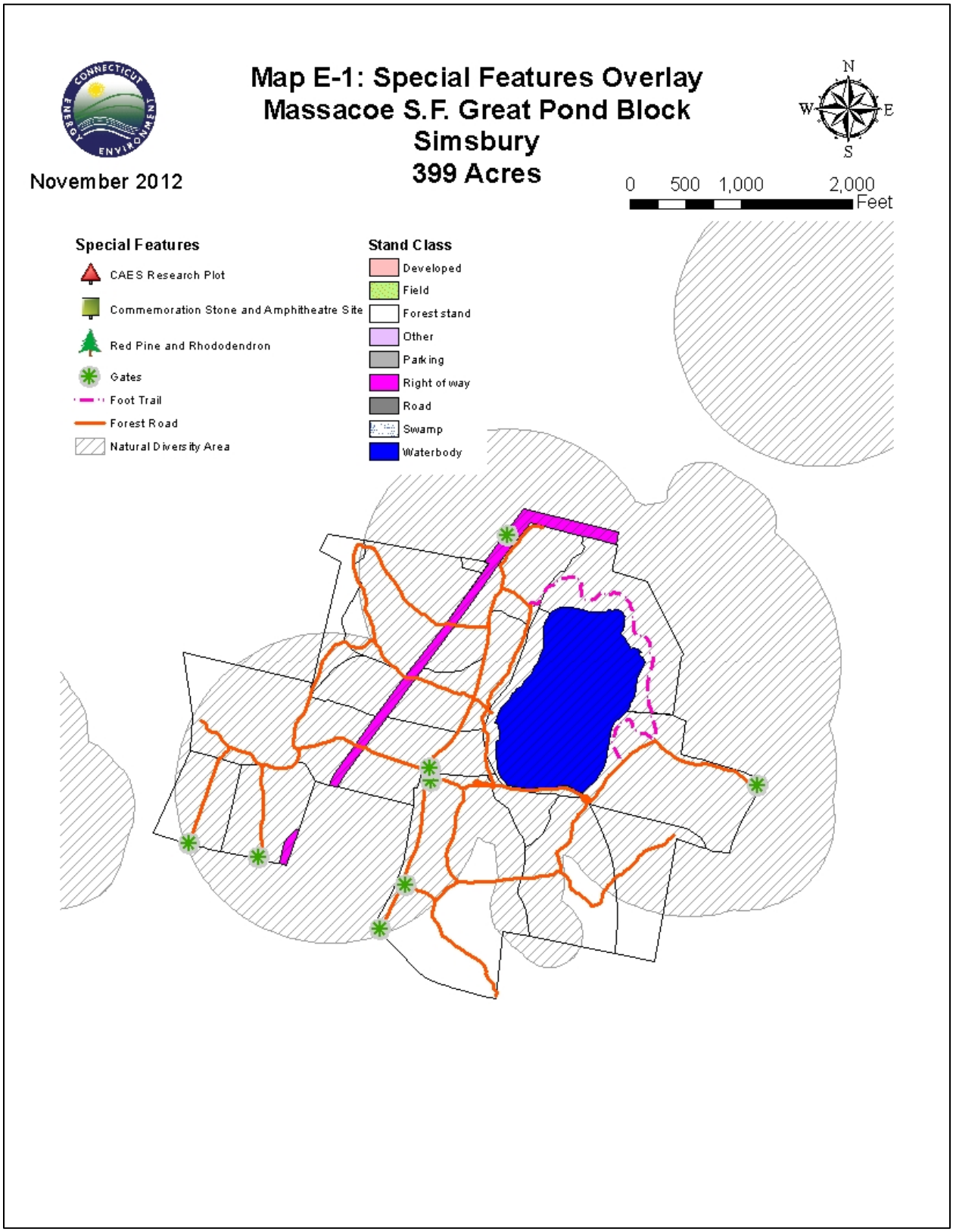
Map D-2: Forest Type & Size Class
Massacoe S.F. Massacoe Block
Simsbury
399 Acres

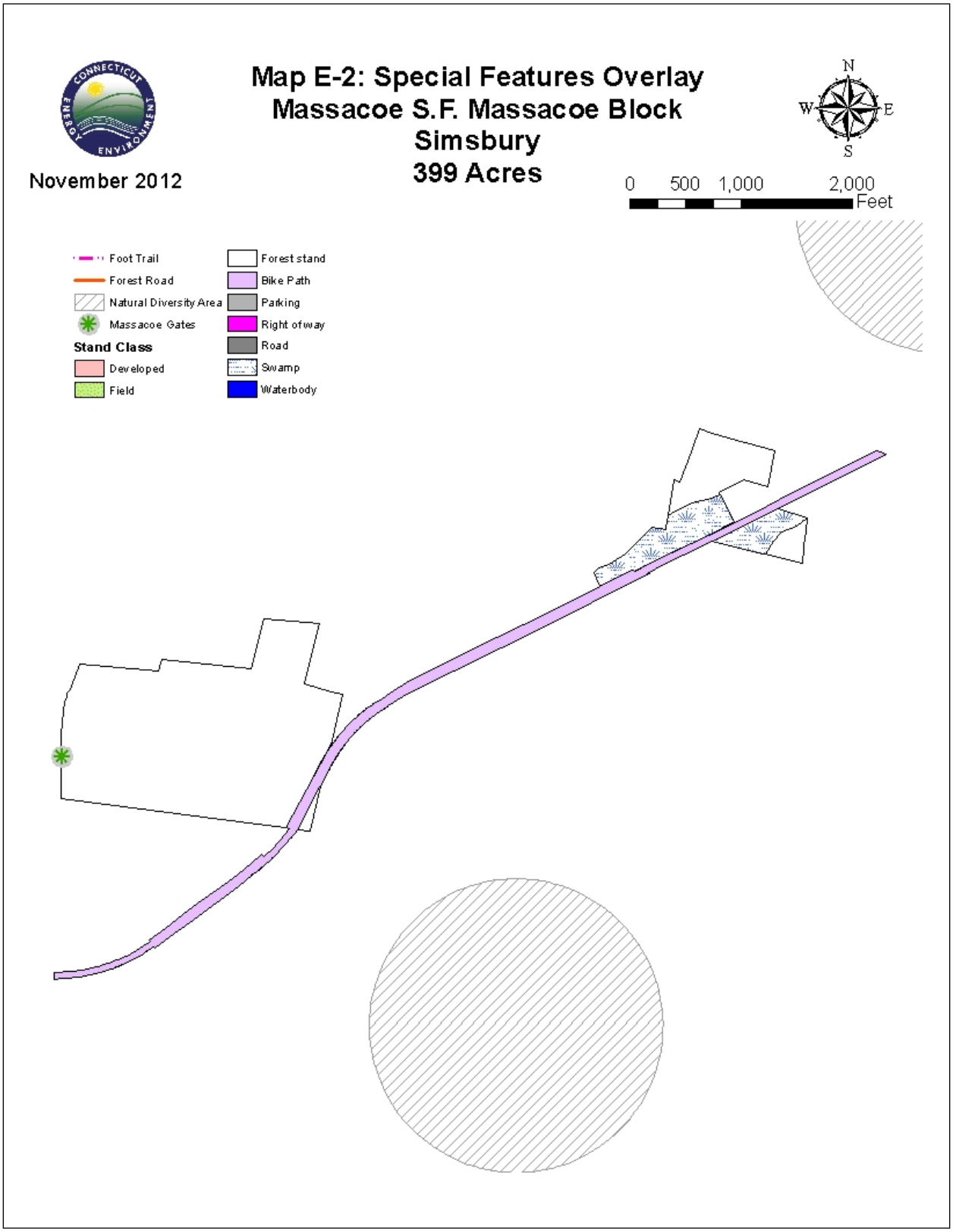
November 2012

0 500 1,000 2,000 Feet

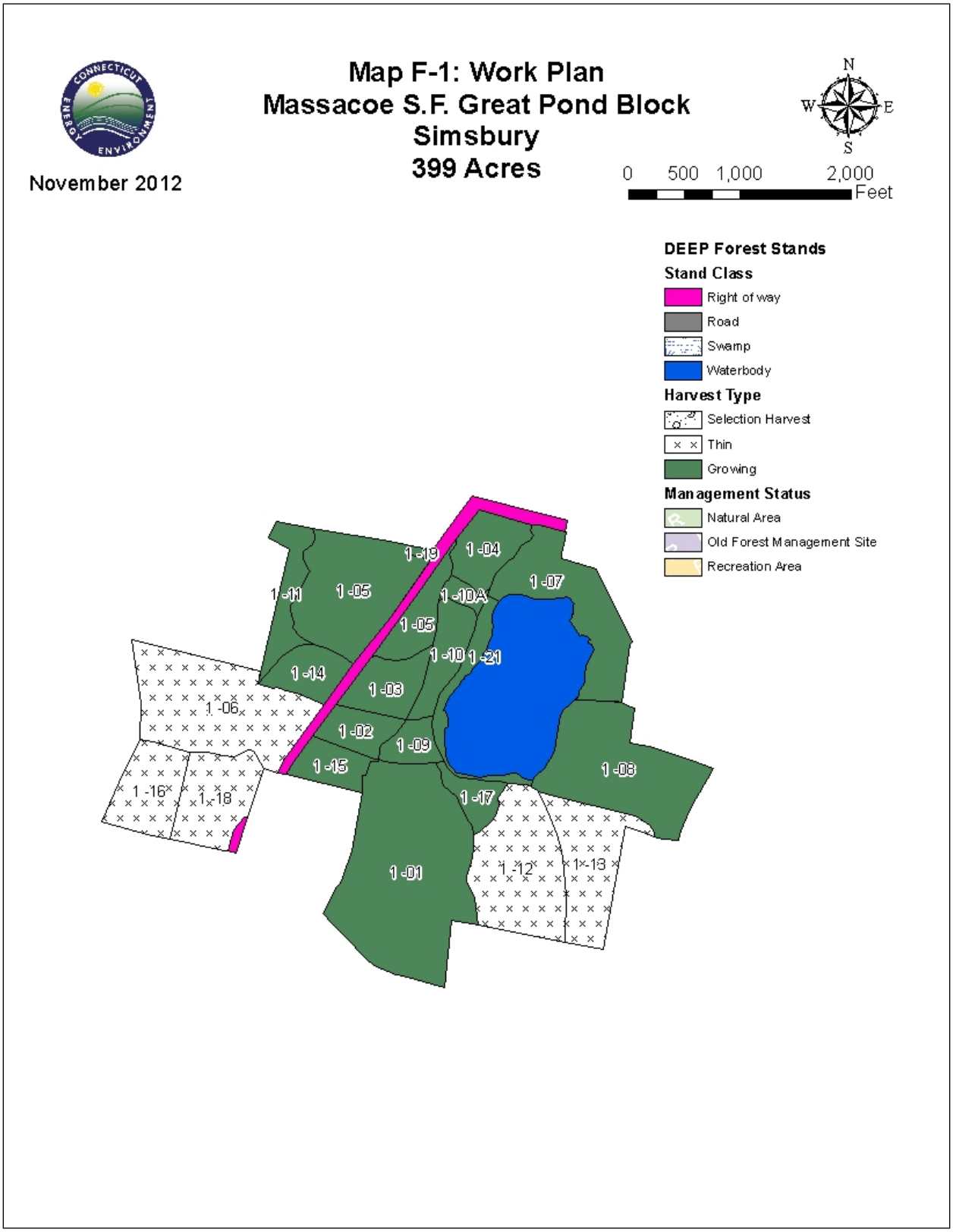


Map E – Special Features Overlay Map




Map E-2: Special Features Overlay
Massacoe S.F. Massacoe Block
Simsbury
399 Acres
November 2012
N
W
E
S
0 500 1,000 2,000
Feet
Foot Trail
Forest Road
Natural Diversity Area
Massacoe Gates
Stand Class
Developed
Field
Forest stand
Bike Path
Parking
Right of way
Road
Swamp
Waterbody

Map F – Work Plan Map



Map F-2: Work Plan
Massacoe S.F. Massacoe Block
Simsbury
399 Acres

November 2012

N
W E
S

0 500 1,000 2,000 Feet

DEEP Forest Stands

Stand Class

- Bike Path
- Right of way
- Road
- Swamp
- Waterbody

Harvest Type

- Selection Harvest
- Thin
- Growing

Management Status

- Natural Area
- Old Forest Management Site
- Recreation Area