

STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL
PROTECTION



Bureau of Natural Resources

Division of Forestry

FOREST MANAGEMENT PLAN
2013 through 2023

Pachaug State Forest
Wyassup Block

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A. Executive Summary

The Wyassup Block of Pachaug State Forest is located in the town of North Stonington Connecticut and consists of 2,664 acres. It is one of seven forest blocks that make up Pachaug State Forest, the State's largest forest holding at 28,000 acres.

The Wyassup Block is a regionally important area for [New England Cottontails](#) (NEC), a candidate species for listing under the Federal Endangered Species Act. A computer model developed by scientists working on the regional initiative to restore NECs throughout their range ranked the Wyassup Block number one in the northeast region for this species. For this reason, the Divisions of Forestry and Wildlife joined together to prepare a forest management plan. This area is currently vacant of a Department of Energy and Environmental Protection (DEEP) forester.

The Division of Forestry has recommended silvicultural prescriptions for approximately 745 acres of forest land, of which 343 acres will be for the enhancement of NEC habitat.

This plan will serve as the resource guide for the Wyassup Block until the year 2023.

B. History

Pachaug State Forest (PSF) was established in 1928 when Mr. Elliot B. Bronson negotiated the purchase of 1,100 acres from the Briggs Manufacturing Company in Voluntown CT. As funding became available, the forest quickly grew totaling 12,000 acres by 1937. The actions of the Resettlement Administration in 1937 acquired an additional 9,000 acres (under the U.S. Department of Agriculture), and leased the land to the state for forest production. Eventually this land was deeded to the state. The state board of Fisheries and Game also contributed many key pieces of property over the years. The forest consists mostly of rocky runs, ridges, and ledges. Elevations are 100 to 600 feet above sea level.

- 1. Reasons for acquisition and funding sources:** Most recent acquisitions have been funded largely through the Recreation and Natural Heritage Trust Fund, (RNHTF) DEEP's primary program for acquiring land to expand the state's system of parks, forests, wildlife areas, and other natural open spaces.
- 2. Development of Resource:** Prior to settlement, this region of Connecticut was the hunting grounds of the Narragansett Indians; in fact the word "Pachuag" comes from the Indian word "Patchooge" and is said to signify a "turning point" or river of many turns. The exact meaning or reference to a turning point is unknown.

Initial development and improvement of the forest was accomplished almost entirely by relief labor created during programs stemming from the New Deal, during the Roosevelt (FDR) administration. Work was carried out under Works Progress Administration projects (WPA) and through the Civilian Conservation Corp (CCC).

During this period of development (1930s-1941), nearly 2,000 acres were planted, and 40 miles

of truck trails were constructed. In addition, several thousand acres of the forest were improved by weeding around planted conifers, and favored tree species in natural stands. Thinning and improvement cuts were made in both softwood and hardwood stands (Winch and Schreeder 1954).

Today, the forest consists of approximately 28,000 acres. It is the largest state forest in Connecticut, managed by the DEEP Division of Forestry (DEEP Forestry).

The Wyassup Block consists of 2,664 acres located in the town of North Stonington. It is the southernmost forest block of the seven that make up Pachaug State Forest. The area has been separated into 115 management units which are identified by an assigned compartment (C) and stand (S) number. (e.g. C 4, S 11 is identified on the maps as management unit 4-11)



3. Changes in the last Management Period

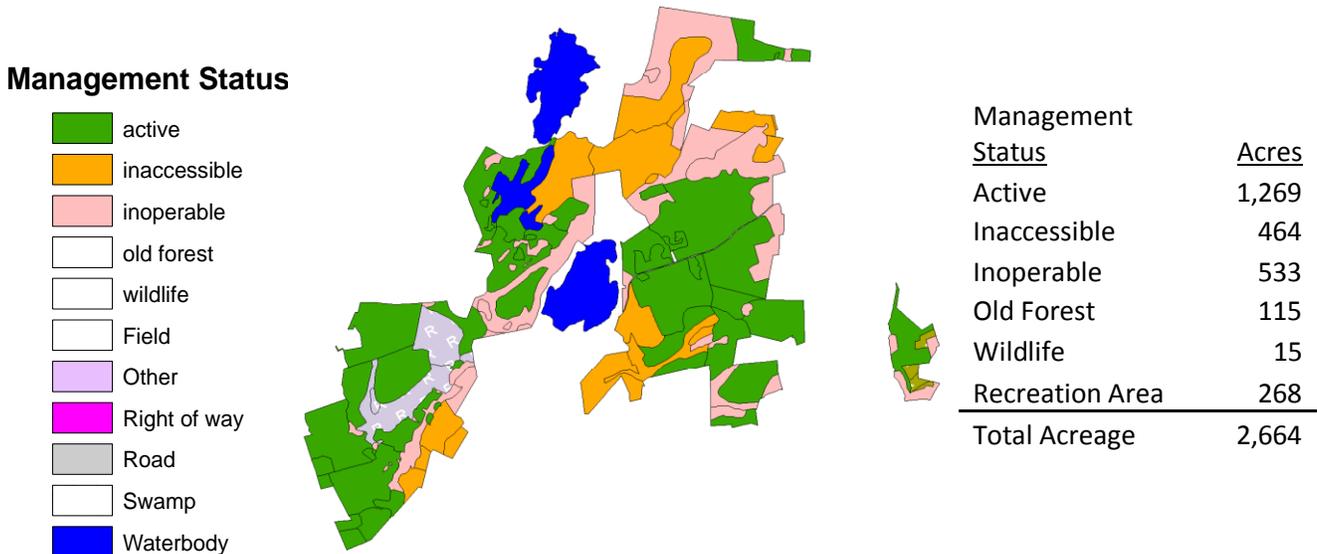
- 384.5 acres were acquired during the last planning period. 40 acres have been added to C 7, 130 acres to C 8, 92.5 acres to C 4, and 122 acres to C 16 of the forest.
- Since 2002, the DEEP Wildlife Division has conducted breeding shrubland and forest interior bird surveys (point count method) throughout the Wyassup Block. Nightbird surveys have been conducted since 2009 in C 9.
- Invasive species have become pervasive throughout sections of the forest, reducing cover of native plant communities and disrupting sustainable forest management.
- Silviculture- Since the last management period, silvicultural operations have been completed on 231 acres; 6 acres were thinned, and the remaining were shelterwood harvests to establish regeneration.

4. Rotations and cutting cycles being used on managed forest land: An even aged forest stand contains trees in the main canopy that are within 20 years of one another in age. Management of even age stands is accomplished by establishing a rotation or a period of time that trees can be established and grown to sawtimber, harvested, and re-established. A one-hundred (100) year rotation has been chosen for managing 938 acres of active forest stands with the Shelterwood System. A twenty year (20) cutting cycle has been chosen for uneven aged stands managed with the Selection System on approximately 332 acres.

C. Acres and Access

1. Total Acres: 2,664

2. **Present Access:** The forest is accessible by Connecticut Department of Transportation maintained roads Routes 201 and 49, as well as the following town maintained roads: Wyassup Road, Wyassup Lake Road, and Fowler Road. Ledgen Wood Road* passes through the block but is only maintained up to the entrance of the state forest. Road conditions on Ledgen Wood Road in the forest have deteriorated to the point where the road is considered impassable by all but off-road vehicles. (* Road name as recorded by the town of North Stonington)
 Six gates are maintained by DEEP Parks. All gates are in working condition and will receive maintenance as needed during this management period



The forest has been evaluated and categorized into groups affected by current physical conditions, policy, or management principles. The table above provides the acreage by category of the forest as it exists today. “Active” is forest land that is actively managed for timber resources which directly enhance the wildlife habitat in the forest. “Old Forest” is a contiguous block of land, interior to the forest that has been set aside to allow for the natural processes of stand development to occur without the influence of active forest management. “Inoperable” land contains physical features such as steep slopes, excessively rocky terrain, or wetlands that prevent active management for resource protection or operator safety. “Inaccessible” areas are stands that cannot be accessed due to the deterioration of forest roads. “Wildlife” areas are managed by the Wildlife Division to maintain grasslands and other early successional habitats, such as old fields and shrublands, and the “Recreation Area” refers to state land that is managed for recreational activity. In this case, the Recreation Area refers to the lakes.

- 3. Inaccessible Areas:** A total of 464 acres are considered inaccessible. 244 acres of forest could be reclassified to active management status if Ledgen Wood Road were to be repaired. The road has eroded down to its base material including large boulders and ledge, and would require resurfacing along its entire length to be restored. Repairs would be costly and therefore will not be scheduled at this time.
- 4. ROW's:** AT&T maintains 2.5 miles of underground cable through the block. It can only be crossed with permission from AT&T following their crossing specifications which includes surface reinforcement and notifications. **CALL BEFORE YOU DIG 1-800-922-4455.**

The State has acquired a ROW along its northern boundary in Comp. 7 which was purchased in 2008. Currently the ROW is inaccessible, but could be utilized if the private parcel to the north is purchased in the future.

- 5. Boundary Conditions and Total Miles of Boundary:** There are 24.5 miles of boundaries that require maintenance every 5 to 7 years. Currently the line needs to be repainted and tagged, and the new parcels in Comp. 7 and Comp. 16 need to be located, blazed, painted and tagged. Boundaries adjacent to harvest areas will be clearly marked prior to harvest.
- 6. Known Boundary Problems:** None

D. Special Use Areas

- 1. Lakes and Ponds** – The Wyassup Block consists of two large water bodies; [Wyassup Lake](#)- 101 acres with public access and boat launch, and [Billings Lake](#)- 97 acres with public access and boat launch. Three other small water bodies, Yawbuc Marsh (5 acres), and Legend Woods #1 and #2 (51 acres total) are located interior to the forest with access from Comp.11 and 5. These



impoundments were created in the 1950's and 1960's for wetland dependant wildlife with a focus on providing high quality breeding sites for waterfowl. The impoundments were constructed using Federal Aid in Wildlife Restoration Program funds. Wood duck nest boxes have been installed, monitored and maintained by DEEP staff and volunteers at all impoundments since the 1960's. Several bird species such as mallards, wood duck, black duck, and green-winged teal are known to use these impoundments seasonally.

- 2. Rivers and Streams** – The northeastern portion of Comp. 7 and Billings Lake, fall within the sub regional Pachaug Basin which drains into the Thames River. The majority of the forest falls within the sub regional Pawcatuck Main Stem, which drains into the Pawcatuck River. Several streams and rivers flow through the block including Yawbucs Valley Brook, Wyassup Brook, and Hetchel Swamp Brook. The fisheries resources in these streams are highly valued by DEEP, therefore efforts must be expended to preserve and maintain existing instream, riparian and water

quality conditions. This can be accomplished through the utilization of [best management practices](#) recommended by DEEP Forestry for all timber harvest operations that can include:

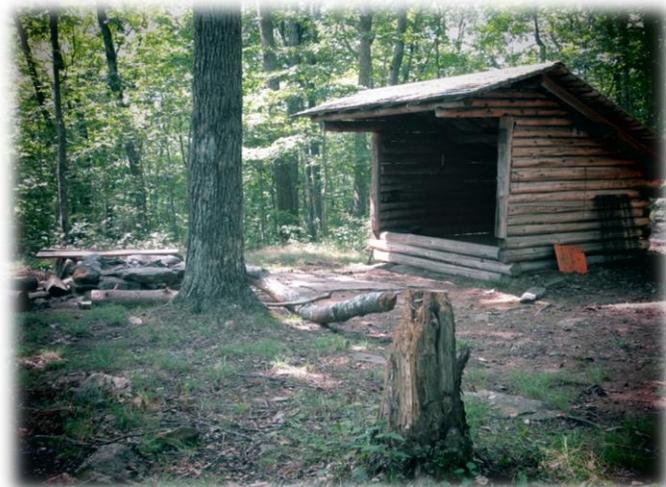
- That riparian corridors be protected with an undisturbed 100 ft. wide riparian buffer zone. A riparian wetland buffer is one of the most natural mitigation measures to protect the water quality and fisheries resources of watercourses. This policy and supportive documentation can be viewed on the DEEP website at: <http://www.ct.gov/deep/lib/deep/fishing/restoration/riparianpolicy.pdf> and <http://www.ct.gov/dep/lib/dep/fishing/restoration/riparianpositionstatement.pdf>.
- The Inland Fisheries Division (IFD) will review any forest road maintenance projects that involve replacement of culverts. These projects are assessed for ensuring fish passage needs.
- Forestry operations will avoid stream crossings if possible. If necessary, forestry will cross streams when there is no flow or use corduroy or a temporary bridge at the crossing. Log bridges should be constructed over streams that have either steep approaches or soft stream bottoms. Temporary bridges should be removed upon harvest completion. Forestry will consult with recommended Connecticut stream crossing guidelines, details of which can be found at: <http://www.ct.gov/deep/lib/deep/fishing/restoration/streamcrossingguidelines.pdf>

The IFD will continue to provide specific fisheries resource guidance during reviews of individual forest operation plans.

- 3. Cultural sites** – There is one known cultural site; a cemetery located off of Wyassup Road in Comp.7 (1 acre) which is maintained by volunteers from North Stonington. The area will remain undisturbed.

In addition, abandoned stonewalls which are prevalent throughout the block and are unique to forests of New England, are currently being threatened. Markets have developed in recent years for field stone, and stonewalls are an easy source for suppliers. While collecting field data, DEEP inventory crews noted that several walls have been stolen. Safe guarding all resources is critical to protecting the character of our forests. Any suspicious activity seen on state land will be reported to DEEP Environmental Conservation Police (ENCON) to protect all state resources.

- 4. Recreation and scenic sites** –There are two sanctioned DEEP trails within the forest. The first is the Narragansett Trail which is maintained by the [Connecticut Forest and Parks Association](#) (CFPA), and has approximately five miles of the trail passing through the Wyassup



Block. A spur trail leads backcountry backpackers to the [Legend Wood Shelter](#), an Adirondack style shelter available for reservation through the DEEP Parks Division.

A 58 mile [Pachaug State Forest Motorcycle Trail](#) is open for public riding except during mud season. The trail passes over public roads and forest trails. The trail is marked with small red arrows, and all users must have a current motor vehicle registration and operator's license. Large group rides or Enduros require a special use permit issued by the DEEP Parks Division. Four miles of the motorcycle trail passes through the Wyassup Block, between Wyassup Lake Road and Ledgen Wood Road. Motorcycles are required to ride either on the designated motorcycle trail or on roads that are open to passenger vehicle use. They are not allowed on hiking trails or any other section of a multiple use trail that is not part of the designated motorcycle trail.



In 2003, in honor of the Centennial of the State Forest System, Connecticut DEEP's (then DEP) Division of Forestry invited the public to visit State Forests by placing a series of letterboxes throughout the State Forest network. DEEP Forestry has maintained the letterbox program since that time. Pachaug State Forest was the 15th of 32 state forests designated, and is identified in the letterboxing program as number 15. For additional information regarding letterboxing and for clues to find the boxes, please visit [DEEP: Letterboxing in Connecticut's State Forests](#) website.

Opportunities exist for hunting throughout the entire forest. For specific information regarding hunting on state lands please refer to the [DEEP Hunting and Trapping Guide](#). Two lakes, [Billings](#) and [Wyassup](#), are open to the public for boating and fishing

5. **Critical habitat** – Connecticut's Natural Diversity Data Base records indicate that six wildlife and three plant species of Special Concern occur within the Wyassup Block: smooth green snake (*Liochlorophis vernalis*); eastern box turtle (*Terapene carolina carolina*); Whiteriver crayfish (*Procambarus acutus*); red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), Whip-poor-will (*Caprimulgus vociferous*), needlegrass (*Aristida longespica*), weak rush (*Juncus debilis*, presumed extirpated), and Clasping-leaved water horehound (*Lycopus amplexans*). Additionally, the New England cottontail (*Sylvilagus transitionalis*), a candidate species for listing under the federal Endangered Species Act, has been documented in this forest block. Forest operation plans scheduled during the next management period will take into consideration the presence of these species and efforts will be made to promote and protect the habitats these species use.
6. **Natural Areas** – No legislated natural areas exist within this block of Pachaug State Forest.
7. **Old Forest land Management Site (OFMS)** – DEEP Forestry has designated 115-acres (Comp. 4 stand 10) as an OFMS, to naturally develop without forest management.
8. **Research areas** – The Connecticut Agricultural Experiment Station ([CAES](#)) has established a Forest Health Monitoring Plot in Comp. 9 stand 7. No cutting will occur within the plot and a 50 foot buffer is to be left if harvesting is to occur adjacent to the area.

E. Extensive Areas of Concern

The Wyassup Block is a regionally important area for [New England Cottontails](#) (NEC), a candidate species for listing under the Federal Endangered Species Act (See also Wildlife Habitat section). The disappearance of dense shrub/young forest habitat has led to the decline of this species and many other shrubland-dependant wildlife species regionally. Based on hunter reports and extensive fieldwork conducted by the DEEP Wildlife Division, the Wyassup Block supports significant numbers of NEC. It has been a source of rabbits for the regional captive breeding effort. Some of this area is quickly losing its habitat value as it matures. Habitat restoration efforts are necessary to maintain this valuable local population of NEC and other shrubland wildlife.

Increased public pressure on forest land, specifically unauthorized use of paths and trails by four wheelers and dirt bikes, has created varying degrees of erosion. The condition of the trails along the Pachaug Motorcycle trail was documented in, "[An Assessment of Trail Conditions Along Enduro Routes Within Cockaponset, Nipmuck, Pachaug and Shenipsit State Forests](#)", a report prepared for the DEEP in 2009 by Baystate Environmental Consultants, Inc. In the report, 35 problem areas were identified over the 48 miles of trail that was assessed in Pachaug. A cooperative effort between the DEEP Parks, DEEP Forestry, and the Central Cycle Club has worked to correct many of these areas and will continue to address issues as problems arise.

In addition, mountain biking has become increasingly popular over the past two decades and has become an activity that occurs on state forest land with little oversight. Consideration should be given to creating a wilderness pass that could be sold on an annual basis that would require recreational mountain bikers to register, authorize users to ride "non-maintained" forest roads and trails, and would allow for enforcement of ethical trail use guidelines. Guidelines under this permit could include limited group sizes for organized rides (may require a Special Use Permits), restricting trail use to existing natural features, and honoring trail closures during certain periods of the year due to high soil moisture content or active timber harvesting. Such permit could also restrict mountain bike riding to state parks only during hunting season except on Sundays.

F. Wildlife Habitat

1. **Investment in Habitat Improvement:** The New England cottontail has been documented in the Wyassup Block east and west of Wyassup Lake in areas that were harvested during the 1980s and 1990s. These rabbits require large patches, 10 to 25 acres or greater, of dense shrub or young forest to maintain viable local breeding populations (www.newenglandcottontail.com). A computer model developed by scientists working on the regional initiative to restore NECs throughout their range identified the parcel that includes Wyassup Block Comp. 4, 5, 7, 8 and 11 as having exceptionally high potential to support NEC (ranked number 1 in the northeast region by the model). This model and its ranking were substantiated by over a decade of field work conducted by DEEP Wildlife documenting the presence of NEC in the Wyassup Block. NEC habitat creation and restoration work is targeted within 12 Focus Areas throughout the state where clusters of high-ranking parcels occur. All of Pachaug State Forest falls within the Pachaug Focus Area, which has an NEC habitat goal of 4,000 acres by the year 2030. The

Rangewide New England Cottontail Initiative grant will fund the creation of young forest and shrubland habitat in stands 7-7 and 8-1 (see section M. Work Plan).

Numerous at risk shrubland birds, as well as herptiles and invertebrates, also utilize dense shrubby young forest habitat, such as the type found in the Wyassup Block. Many birds use shrublands at some point in their lives, but about 40 shrubland habitat specialists rely specifically on these areas for breeding; 80% of these species are in population decline (Schlossberg and King 2007). This group includes the state-listed golden-winged warbler (*Vermivora chrysoptera*), brown thrasher, whip-poor-will (*Caprimulgus vociferous*), and yellow-breasted chat, as well as other regionally declining species of Greatest Conservation Need, as identified and defined by the [State Wildlife Action Plan](#), such as blue-winged warbler, field sparrow (*Spizella pusilla*), eastern towhee (*Pipilo erythrophthalmus*), and prairie warbler. For many of these species, population decline is linked almost exclusively to the decline in shrubland habitat.

Because of its location in the state, the Wyassup Block has the potential to serve as much needed habitat for many declining shrubland birds. The Wyassup Block was identified as one of the remaining focal areas with viable whip-poor-will populations in the state of Connecticut. It also is fairly close to large populations that exist over the border in Rhode Island. Whip-poor-will populations' benefit from interspersed harvested patches with mid-rotation patches and some mature forest. This patchwork of different succession types provides the birds with adequate nesting habitat (interior forest) adjacent to more open foraging habitat. Habitat openings up to 20 ha (50 acres) are optimal for whip-poor-will use; whip-poor-wills will concentrate their foraging in these openings within 200m from the edge of the forest (Wilson and Watts 2008).

Southern New England holds regional conservation responsibility for the Blue-winged warbler and prairie warbler populations.(Dettmers and Rosenberg 2000). Statewide shrubland bird surveys have been conducted at two points in the Wyassup Block. Site abundance estimates for blue-winged warblers were among the higher levels at these sites compared to other sites around the state (DEEP unpublished data). Prairie warbler abundance was the highest estimate of all the surveys sites (DEEP unpublished data). Forest openings of at least 2 acres will be used successfully by these birds in this area. Southeastern Connecticut is devoid of golden-winged warblers, thus conservation actions targeting blue-winged warblers should not result in any detrimental effects to golden-winged warblers.

Fields, shrubland, and young forest habitat are ephemeral ecosystems because they succeed over time to mature forests without appropriate disturbance. There is presently inadequate replacement of these important habitats because of the lack of recently abandoned farmland, severe fires and clear-cuts that historically produced them. Forest management conducted during the 1980s and 1990s in the Wyassup Block provided several sizable areas of young forest. However, these areas are now maturing. The forests in the Wyassup Block are now dominated by sawtimber stands that owe their origins to the widespread fires, clear-cutting, and farm abandonment that occurred around a century ago. There is an opportunity in this plan to conduct beneficial forestry practices to help to reverse these declines, and can be expanded upon during future planning periods.

2. **Existing diversity situation:** Management will occur on the active acres in the forest. There are 938 acres of active land that is even aged and will be managed using the shelterwood system or

clearcutting. The remaining 323 acres are uneven aged and will be managed on a 20 year cutting cycle.

The table below shows the current distribution of size classes on the acreage that is considered actively managed as well as the desired future condition that will support sustainable forestry.

Size Class	Current Condition	Desired Future Condition
Seedling	4%	20%
Sapling	2%	25%
Pole	10%	15%
Sawtimber	84%	40%

In order to obtain a sustainable level of resources in the Wyassup Block, a reduction in sawtimber needs to occur to allow for the establishment of seedlings to renew the process of forest succession. Due to the habitat needs for NEC, the DEEP Forestry and DEEP Wildlife Divisions will take an accelerated approach to create adequate habitat to aid in the recovery of NEC.

DEEP Forestry will use an area based approach to sustainability by applying silvicultural prescriptions on approximately 745 acres of forest land, of which 266 acres will be reclassified as seedling or sapling size class during the next management period. The stands that will be converted to early successional forest will be selected to provide habitat for the NEC and other species that require such habitat. Treatments such as Irregular Shelterwoods, and clear cuts are being recommended to create viable habitat for a period of 10-15 years after completion of harvest.

G. Vegetative Condition

- Silviculture** - The following tables provide additional information regarding the current size class of the cover types in stands that are actively managed as well as information assessing the overall condition of the these stands.

Forest Size Class by Forest Type; Actively Managed Stands

Size Class	Northern Hardwoods	Oak-Hickory	Oak-Pine	Spruce-Pine	Larch	Eastern White Pine	Grand Total
Seedling		77					77
Sapling		42					42
Pole		212					212
Saw		306		23	1	12	342
Saw-Pole	71	362	11	46		10	499
Saw-Sap		89					89
Grand Total	71	1087	11	69	1	22	1261

2. Forest type, size class, and condition class on areas to be managed

Oak and Hardwood Commercial Management Unit

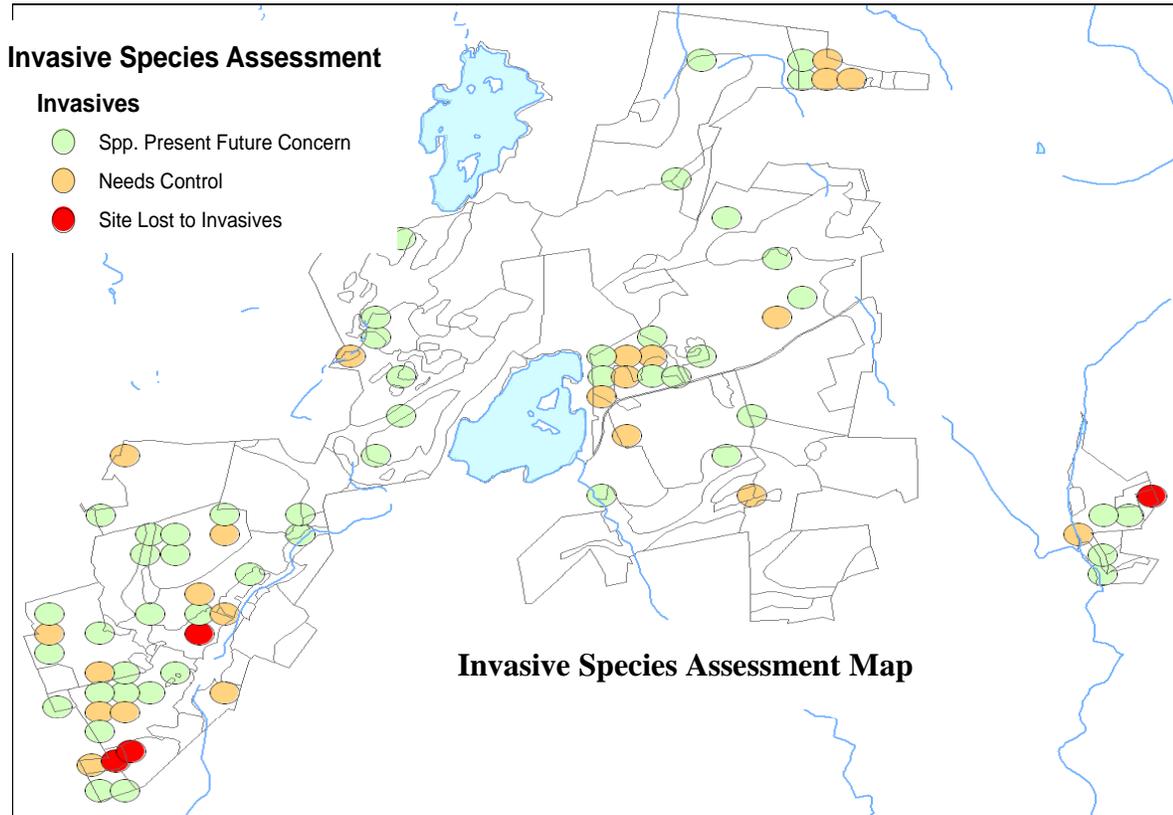
Size Class	OK at present	THIN – Overstocked Acceptable AGS	REGENERATE – AGS too low
Seedling-Sapling	119	0	0
Pole Timber	147	35	29
Sapling-Sawtimber	89	0	0
Pole-Sawtimber	222	173	48
Sawtimber	281	26	0

Softwood Commercial Management Unit

Size Class	OK at present	THIN – Overstocked Acceptable AGS	REGENERATE – AGS too low
Seedling-Sapling	0	0	0
Pole Timber	0	0	0
Sapling-Sawtimber	0	0	0
Pole-Sawtimber	46	0	10
Sawtimber	12	1	23

- 3. Forest Health** –Non-native species are detrimental to the health of the forest ecosystem because natural biological controls do not exist in newly established populations, resulting in rapid dispersal and the displacement of native species. Today, two invasive insects are poised to become the latest threat to Connecticut’s forests. First, the [Emerald Ash Borer](#), which only affects ash trees, was discovered in New Haven County during the summer of 2012. Second is the [Asian Longhorned Beetle](#) that was discovered in Worcester, Massachusetts in 2008 which would impact common species such as maple and birch. The forest ecosystem hosts native pests and pathogens that perform a critical role in maintaining the health of the ecosystem however the introduction of invasive species threatens that natural balance. Retaining diverse, vigorous stands of forest trees with optimal stand density levels reduces the impact of environmental stress within the forest and associated plant community.

The following map was produced based on an assessment from data gathered during the forest inventory.



There are several sites in the forest that contain established populations of herbaceous invasive species which will become more problematic over time. The Invasive Species Assessment Map illustrates the location and severity of invasive plant populations recorded during the 2012 growing season. The plants noted during the last inventory include [euonymus](#), [Japanese barberry](#), [multi-flora rose](#), [Japanese Stilt Grass](#), and [oriental bittersweet](#). Winged euonymus appears to be the most disruptive, but potential exists to establish control.

Stands near boundaries adjacent to fields, residential development, and along town roads are populated with non-native invasive plants which dominate the understory to the exclusion of native shrubs. Abundant turkey and deer populations affect acorn mast crops; which are eaten before germination occurs, or consumed as browse during the seedling stage of development. Small natural canopy gaps caused by severe weather events favor the growth of black birch, beech and red maple. Additionally, the oak forests that exist today are being threatened as the pressures mentioned herein are trending toward the establishment of mixed hardwood forest. Foresters must be diligent to identify the stands suitable to regenerating oak species and work to establish and retain this hard mast producing species. Citing the [Forest Regeneration Handbook](#) released by the Connecticut Agricultural Experiment Station, “oak forests have been declining at a rate of 5% every decade since the hurricane of 1938.”¹ If this trend continues, the oak forests that our native communities rely on for food will be replaced by birch, maple and beech and the ecological, economic and aesthetic values that are associated with oak forests will be lost.

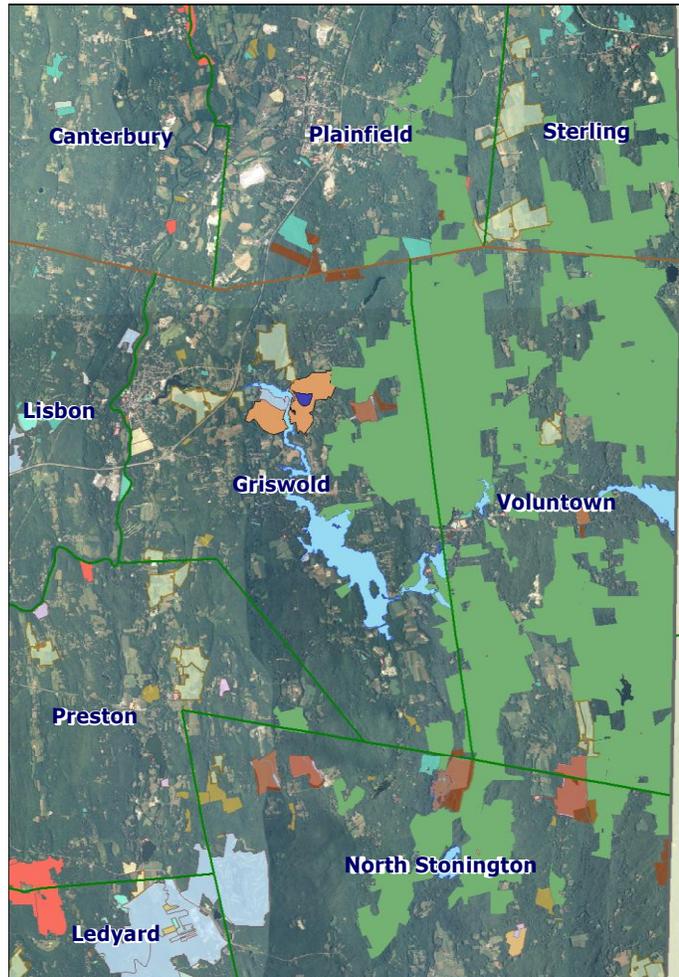
¹ [Forest Regeneration Handbook](#)

H. Landscape Context

Pachaug State Forest provides 28,000 acres of protected forest land for communities living in southeastern Connecticut. In addition, farm and forest land preservation efforts have created one on the largest areas of protected land in the state.

An assessment of current forest inventory data shows that the vast majority of the state owned forest land is considered even aged sawtimber. A goal of this plan is to create more early succession habitat within this region; diversifying the age classes to enhance the functionality of the eco-region and specifically to provide increased early successional habitat for NEC and other obligate species.

As additional plans are prepared for other forest blocks in Pachaug State Forest, areas of forest interior habitat should also be identified and managed for habitat values.



I. Specific Acquisition Desires

Three parcels located at the northeast end of Ledgen Wood Road totaling 162 acres have been identified as desirable parcels that would improve access to interior sections of the forest and create access to 36 acres of inaccessible land. Currently these parcels are not for sale.

There are numerous large parcels of land within the Wyassup Road and Route 49 area of North Stonington. This area has known populations of NEC and increased acreage would enhance the concept of developing an area that is managed on a sustainable basis for species dependent upon early successional habitat. Also, connecting the land off of Route 49 (comp 8) to the rest of the forest block would protect the forest corridor.

Future property reviews conducted for parcels within the area should consider any abutting parcel of undeveloped land of 50 acres or more, or parcels that improve access to the interior portions of the forest allowing for an increase in actively managed acres.

J. Public Involvement

The town of North Stonington and CFPA received a copy of the draft plan for review and were given the opportunity to submit comments however, none were received.

At any time during the current planning period, DEEP Forestry and or Wildlife will be available to talk to town Commissions for the purpose of explaining the objectives of the proposed management activities, and coordinating open space planning and acquisition.

K. Adaptive Management

The DEEP Forestry 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 DEEP Forestry 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 insects and disease, including invasive species population outbreaks. Increased unauthorized motorized vehicle use, which erodes trails and roads, may require future action unforeseen during the composition of this plan. Additionally, environmental conditions such as hurricanes or record-breaking precipitation may additionally affect resource conditions and work requirements. The DEEP Forestry and our colleagues in other DEEP Divisions including Parks, Wildlife, Fisheries, and Agency Support Services, evaluate circumstances and 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.

L. Ten Year Goals

1. Maintain forest ecosystem health focusing improving tree growth rates, wildlife productivity, and protection against insect, disease and weather catastrophes.
 - a. Control non-native invasive plants to prevent the displacement of native trees, shrubs, and regeneration established following silvicultural prescriptions.
2. Retain wildlife, aesthetic and historic values:
 - a. Develop and enhance habitat for the NEC, in efforts to strengthen populations.
 - b. Control and monitor intensive uses that might cause soil erosion or stream siltation.
 - c. Maintain wildlife carrying capacity and habitat quality through hunting, a continuum of early successional habitat, and controlled recreation.

M. Work Plans

1. **Road Maintenance-** Access roads will require improvement work in order to conduct silvicultural operations in Comp.4, 5, and 11. The work will be completed by contractors as part of the work requirements for each specific harvest plan. The work schedule has been created to build off prior improvements to expand access along interior forest roads.
2. **Road Construction, Gates and Design-** The six gates will be maintained by DEEP Parks.
3. **Boundary Marking-** Boundary lines require repainting and tagging every 5-7 years. DEEP Forestry
4. **Stream Improvement-** None scheduled.
5. **Cultural Site Maintenance-** The two sites will remain undisturbed.
6. **Recreation or Scenic Site Work-** Maintenance to the Enduro trail will occur as needed by DEEP Parks. Boat launches at Billings and Wyassup Lake will be maintained by DEEP Parks, DEEP Support Services, and DEEP Boating Division.
7. **Improvement of Critical Habitat-** 343 acres of NEC habitat will be created (see table p.17) DEEP Wildlife
8. **Trail Maintenance** – Narragansett Blue Blazed trail to be maintained as needed by CFPA, Enduro Trail to be maintained as needed by DEEP Parks, DEEP Forestry, and Central Cycle Club.
9. **Upland Wildlife Opening Work or Leasing-** Two areas have been leased for agricultural production. 7 acres off of route 201 for corn, and 14 acres off of route 49 for hay. DEEP Wildlife will continue to review and administer these agreements.
10. **Wildlife habitat improvement** Wood duck nest boxes installed at Yawbucs Marsh, and Legend Woods #1 and #2 will be maintained by DEEP staff and volunteers.
11. **Wildlife Population Controls-** Hunting is permitted in the Wyassup Block. DEEP Wildlife.

12. Forest
Silvicultural Harvests

Comp	Stand	Treatment	Acres	Lead	Year
7	7 (west)	Wildlife Habitat Project	74	Wildlife/NEC	2013
8	1 (west)	Wildlife Habitat Project	39	Wildlife/NEC	2013
4	2	2nd Shelterwood	26	Forestry	2014
4	3	1st Shelterwood	55	Forestry	2014
11	2	TSI	9	Forestry	2015
8	2	TSI	21	Forestry	2015
8	3	2nd Shelterwood	52	Forestry	2015
7	5	thinning	15	Forestry	2016
8	6	1st Shelterwood	42	Forestry	2016
7	7 (east)	Wildlife Habitat Project	74	Wildlife/NEC	2017
8	1 (east)	Wildlife Habitat Project	38	Wildlife/NEC	2017
5	6	Thinning	1	Forestry	2019
5	8	2nd Shelterwood	14	Forestry	2019
5	10	2nd Shelterwood	16	Forestry	2019
11	1	Selection Harvest	71	Forestry	2021
9	7	Wildlife Habitat Project	89	Wildlife/NEC	Evaluate 2021
5	7	1st Shelterwood	64	Forestry	2022
7	12	TSI	5	Forestry	2023
7	13	Clear Cut	29	Forestry/NEC	2023
16	1	2nd Shelterwood	11	Forestry	2023

Appendix A - References

- Askins RA, Folsom-O'Keefe CM, Hardy MC (2012) Effects of Vegetation, Corridor Width and Regional Land Use on Early Successional Birds on Powerline Corridors. PLoS ONE 7(2): e31520. doi:10.1371/journal.pone.0031520.
- Baystate Environmental Consultants, Inc, 2009. An Assessment of Trail Conditions Along Enduro Routes Within Cockaponset, Nipmuck, Pachaug, and Shenipsit State Forests, CT. (Online) Available at www.atfiles.org/files/pdf/CTEnduroRouteAssess.pdf
- DeGraaf, etal. 1992. New England Wildlife: Management of Forested Habitats, U.S. Forest Service.
- Dettmers, R., and K. V. Rosenberg. 2000. Partners In Flight Landbird Conservation Plan: Physiographic Area 9: Southern New England. Version 1.0: October 2000. [Online.] Available at http://www.blm.gov/wildlife/plan/pl_09_10.pdf
- Lancaster, Kenneth F. and Leak, William B. Sept. 1977. A Silvicultural Guide for White Pine in the Northeast, Forest Service General Technical Report NE-41, Northeast Experiment Station.
- Leak, William B. Solomon, Dale S. and Filip, Stanley M. 1969. A Silviculture Guide for Northern Hardwoods in the Northeast, USDA Forest Service Research Paper NE-143, Northeast Experiment Station.
- Parda, James. Vegetative Management Plan, 2001 through 2010, Pachaug State Forest, (Wyassup Lake Block), Approved 20 April 2001.
- Roach, Benjamin, and S. Gingrich. Dec. 1968. Even-Aged Silviculture for Upland Central Hardwoods, Agriculture Handbook 355, US Forest Service.
- Schlossberg, S. and D. I. King. 2007. Ecology and management of scrub-shrub birds in New England: A comprehensive review. Report submitted to U. S. Department of Agriculture Natural Resources Conservation Service, Resource Inventory and Assessment Division. [Online.] Available at <ftp://ftp-fc.sc.egov.usda.gov/NHQ/nri/ceap/schlossbergkingreport.pdf>
- Wilson, M. D., B. D. Watts. 2008. Landscape configuration effects on distribution and abundance of whip-poor-wills. The Wilson Journal of Ornithology. 120(4): 778-783.
- Winch and Schreeder 1954 CT DEP Archives-History of Pachaug State Forest.

Appendix B - Definitions

Forest Stand Size Classes

Sawtimber - hardwood trees 12-inch dbh (diameter breast height or 4.5 feet off the ground) and larger, and softwood trees 10-inch dbh and larger, that contain at least one 8-foot sawlog.

Poletimber- hardwood trees between 5 and 11 inches dbh, and softwood trees 5 to 9 inches dbh. These trees are too small for sawlogs, but could be sold as pulpwood, fuelwood, or other small products where such markets exist.

Saplings - trees 1 to 5 inches dbh.

Seedlings - Trees less than 1 inch dbh.

Stand – an area of trees of a certain species, composition (cover type), age class or size class distribution and condition (quality, vigor) usually growing on a fairly homogeneous site.

An even-aged stand contains trees in the main canopy that are within 20 years of being the same age. Even-aged stands sometimes are designated by age-class (e.g. a 40- year old stand) or broad size-class (e.g. seedling/sapling, poletimber, sawtimber).

An uneven-aged stand contains trees of several 15-20 year age-classes. These stands generally contain trees of many sizes (seedlings through sawtimber) due to the range in ages and the differences in growth rates among species.

Management units are composed of stands and compartments. For mapping purposes and historical reference a stand is the basic unit of forest designation identifying a contiguous group of trees uniform in age, composition, and structure on a specific site of uniform quality that can be identified as a distinguishable unit. Compartments are composed of stands defined for purposes of locational reference often by a physical feature on the land.

Shelterwood Used in even-aged management; involves the removal of the understory and lower crown canopy trees to allow the new stand to regenerate in partial shade. Trees to be retained are usually of the best quality to serve as a desirable source of seed. Once adequate regeneration is established, the overstory is removed in one or two cuts.

Selection harvest used in uneven-aged management; involves the removal of trees singly or in groups of 2 or 3, or in patches of up to 1/3 acres, maintaining a fairly continuous canopy.

Forest Types (U.S. Forest Service)

Forest Type is based on species composition of the overstory. Species composition is based on the proportion of the total stand basal area represented by each species or species group.

Chestnut oak: Associates – scarlet oak, white oak, red maple, red oak, black oak. Sites - rocky outcrops with thin soil, ridge tops.

Chestnut oak/ black oak/ scarlet oak: Associates – red oak, white oak, hickory, red maple.

Sites – dry upland sites on thin-soiled rocky outcrops on dry ridges and slopes.

Hemlock: Associates - beech, sugar maple, yellow birch, basswood, red maple, black cherry, white ash, white pine, paper birch, sweet birch, red oak, white oak. Sites - prefers cool locations, moist ravines, and north slopes.

Mixed upland hardwoods: Any mixture of hardwoods of species typical of the upland central hardwood region, includes at least some oak. Sites - wide variety of upland sites.

Northern red oak: Associates - black oak, scarlet oak, chestnut oak, tulip poplar. Sites - spotty distribution on ridge crests and north slopes but also found on rolling land, slopes, and benches on loamy soil.

Red maple/oak: Associates - This type is dominated by red maple and some of the wide variety of central hardwood associates including oak, hickory, tulip poplar. Sites - uplands.

Red maple/upland: Associates- the type is dominated by red maple and some of the wide variety of northern hardwoods like sugar maple, beech, and birch. This type is often man-made and may be the result of repeated cuttings. Sites - uplands.

Scarlet oak: Associates – black oak, chestnut oak, white oak, red oak, hickory. Sites – Dry ridges, south or west facing slopes and flats but often moister situations, probably as a result of logging or fire.

Sugar maple/beech/yellow birch: Associates - basswood, red maple, hemlock, red oak, white ash, white pine, black cherry, sweet birch. Sites - fertile, moist, well drained soils.

White oak/ red oak/hickory: Associates - white ash, sugar maple, red maple, beech, tulip poplar, hemlock, white pine, sweet birch. Sites - wide variety of upland soils.

White pine: Associates - red maple, paper birch, sweet birch, yellow birch, black cherry, white ash, red oak, sugar maple, basswood, hemlock, tulip poplar, chestnut oak, white oak. Sites - wide variety, but best development on well drained sands and loams.

White pine/ red oak/ white ash: Associates - red maple, basswood, yellow birch, aspen, sugar maple, beech, paper birch, black cherry, hemlock, sweet birch. Sites - deep, fertile, well drained soil.

White spruce: plantation, not naturally occurring.

Yellow poplar: Associates- red maple, sweet birch, other moist site hardwoods, white oak, red oak. Sites - lower slopes, northerly slopes, moist coves, flats, old fields

Appendix C - Comments

From: Dawley, Scott
Sent: Wednesday, November 28, 2012 8:12 AM
To: Hochholzer, William
Subject: RE: Wyassup Block Management Plan

Hi Will, The Wyassup plan looks fine, Parks an Forest will do what is needed to help with the plan. We have no concerns. Thanks Scott

From: Hochholzer, William
Sent: Thursday, November 15, 2012 11:26 AM
To: Dawley, Scott
Subject: Wyassup Block Management Plan

Hi Scott,

Attached is the Wyassup Block Management Plan. Could you please review for parks and email confirmation of the review and comments back to me before the 1st of December so that I may forward to Hartford at that time?

Thanks,

Will

William Hochholzer
Forester 1
Department of Energy and Environmental Protection
Division of Forestry
209 Hebron Avenue
Marlborough, CT 06447

860-295-9523 ext 125

From: Reid, Michael
Sent: Friday, November 16, 2012 4:22 PM
To: Hochholzer, William
Subject: RE: Management Plan for the Wyassup Block Pachaug State Forest

Hi Will – This looks good (I liked the format). Thanks for the opportunity to review, Mike

From: Hochholzer, William
Sent: Friday, November 16, 2012 9:42 AM
To: Reid, Michael
Subject: Management Plan for the Wyassup Block Pachaug State Forest

Hi Mike,

I have been working on a plan for the Wyassup Block of Pachaug which has been identified as “the spot” for New England Cottontail restoration work. I’ve attached a copy of the draft plan for your review. I imagine you have a lot on your plate the next few weeks, but if you could look this over and send an email (confirmation of review) and comments if you wish, I will include them in the plan. I would like to send this on to Hartford the on 12/1 so if you could review it by then I would appreciate it!

Thanks,

Will

William Hochholzer
Forester 1
Department of Energy and Environmental Protection
Division of Forestry
209 Hebron Avenue
Marlborough, CT 06447

860-295-9523 ext 125

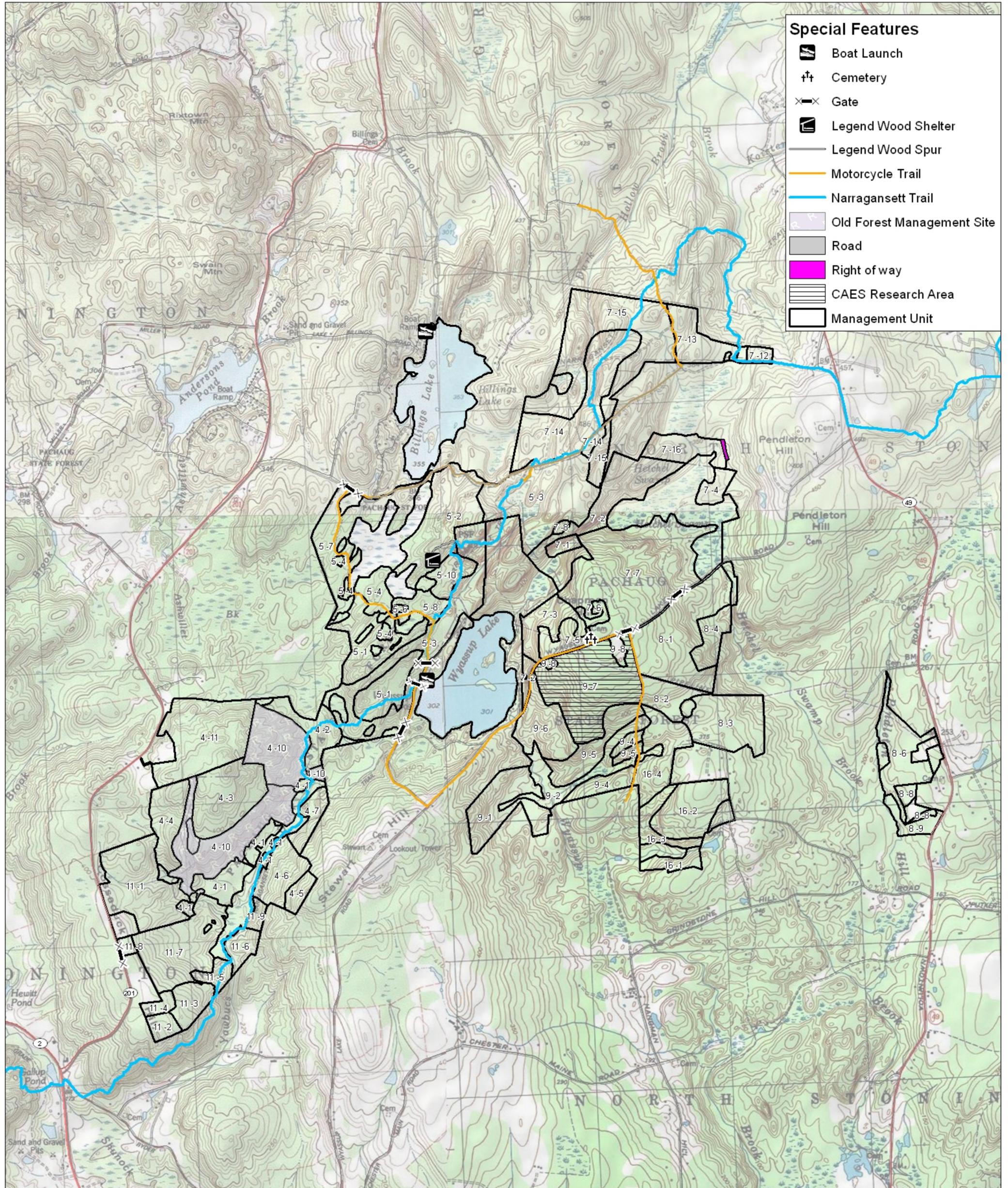


Map E Special Features Pachaug State Forest Wyassup Block North Stonington 2,664 Acres



May 21, 2013

0 750 1,500 3,000 Feet



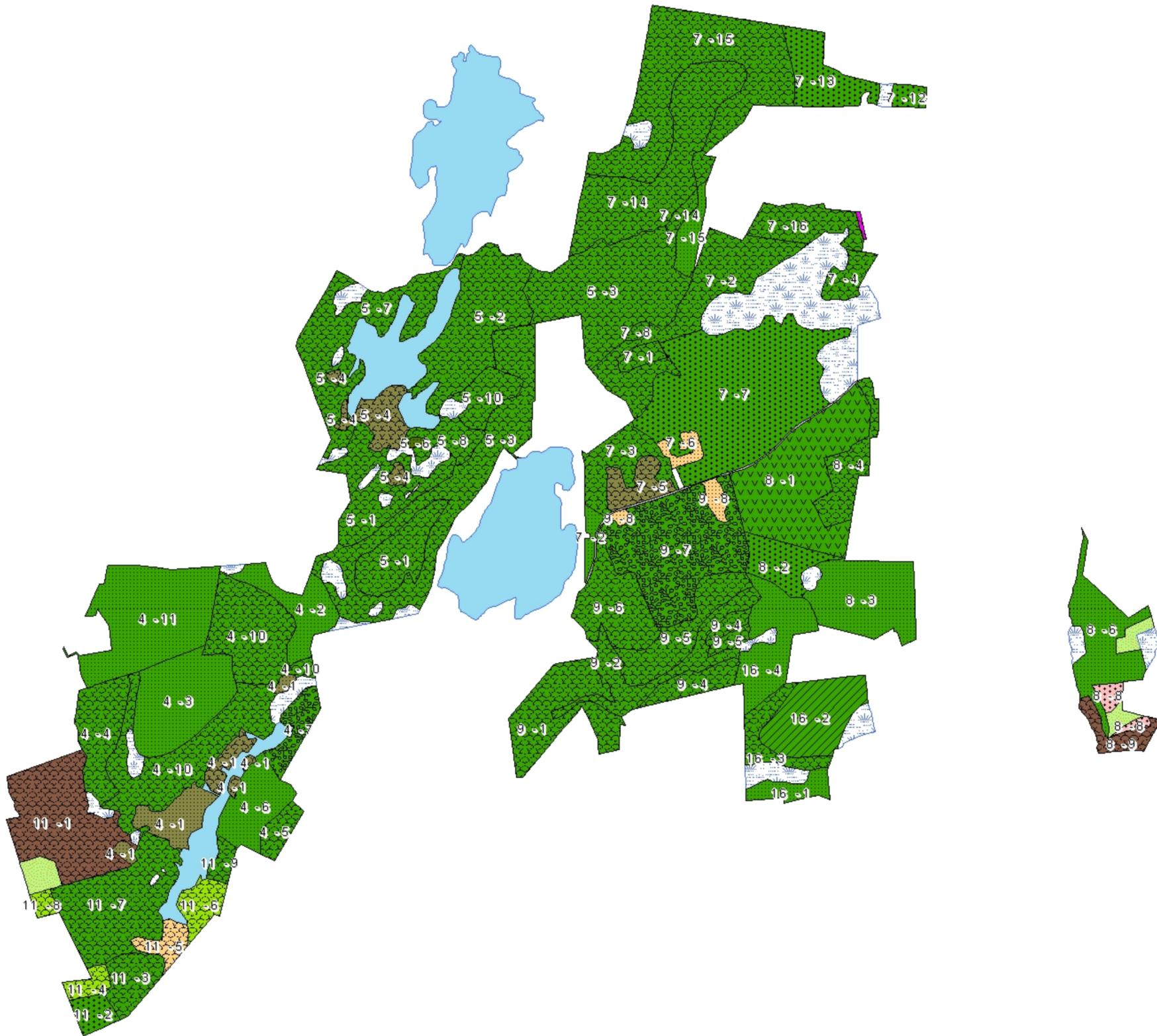


Map D Forest Type & Size Class
 Pachaug State Forest
 Wyassup Block
 North Stonington, CT
 2,664 Acres



May 21, 2013

0 750 1,500 3,000 Feet



Size Class

- Seedling
- Sapling
- Pole
- Saw
- Saw-Seed
- Saw-Sap
- Saw-Pole
- Sap-Pole-Saw

Forest Type

- Aspen-Birch
- Red Maple Lowland
- Exotic Hardwoods
- Exotic Softwoods
- Northern Hardwood-Group
- Oak-Gum-Cypress

- Oak-Hickory-Group
- Pitch Pine-Group
- Oak-Pine-Group
- Other
- Pinyon-Juniper
- Spruce-Fir
- Pine-Hemlock-Group

Stand Class

- Field
- Right of way
- Road
- Swamp
- Waterbody



**Map C Site Quality
Pachaug State Forest
Wyassup Block
North Stonington
2,664 Acres**



May 21, 2013

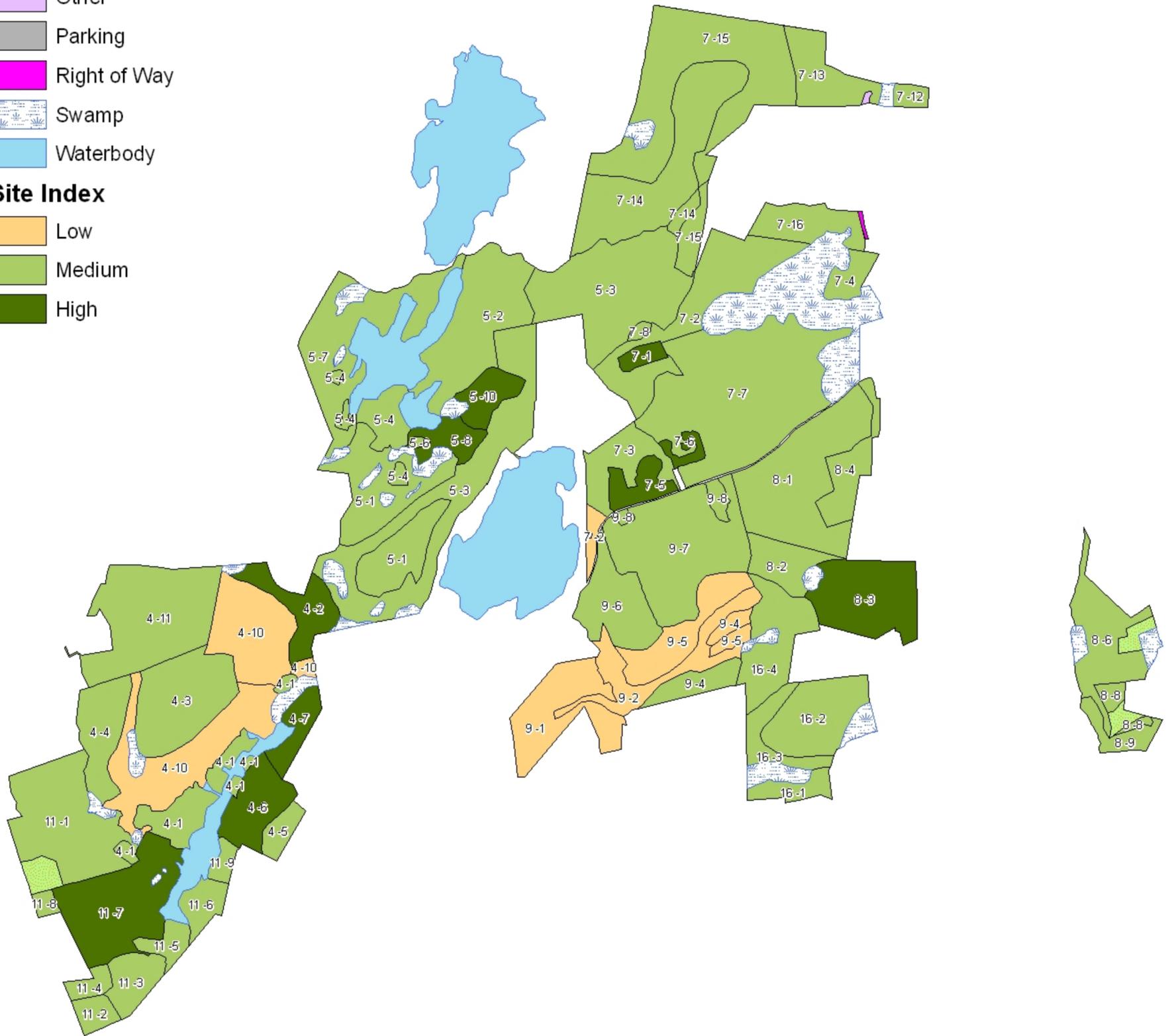
0 750 1,500 3,000 Feet

Stand Class

-  Developed
-  Field
-  Other
-  Parking
-  Right of Way
-  Swamp
-  Waterbody

Site Index

-  Low
-  Medium
-  High



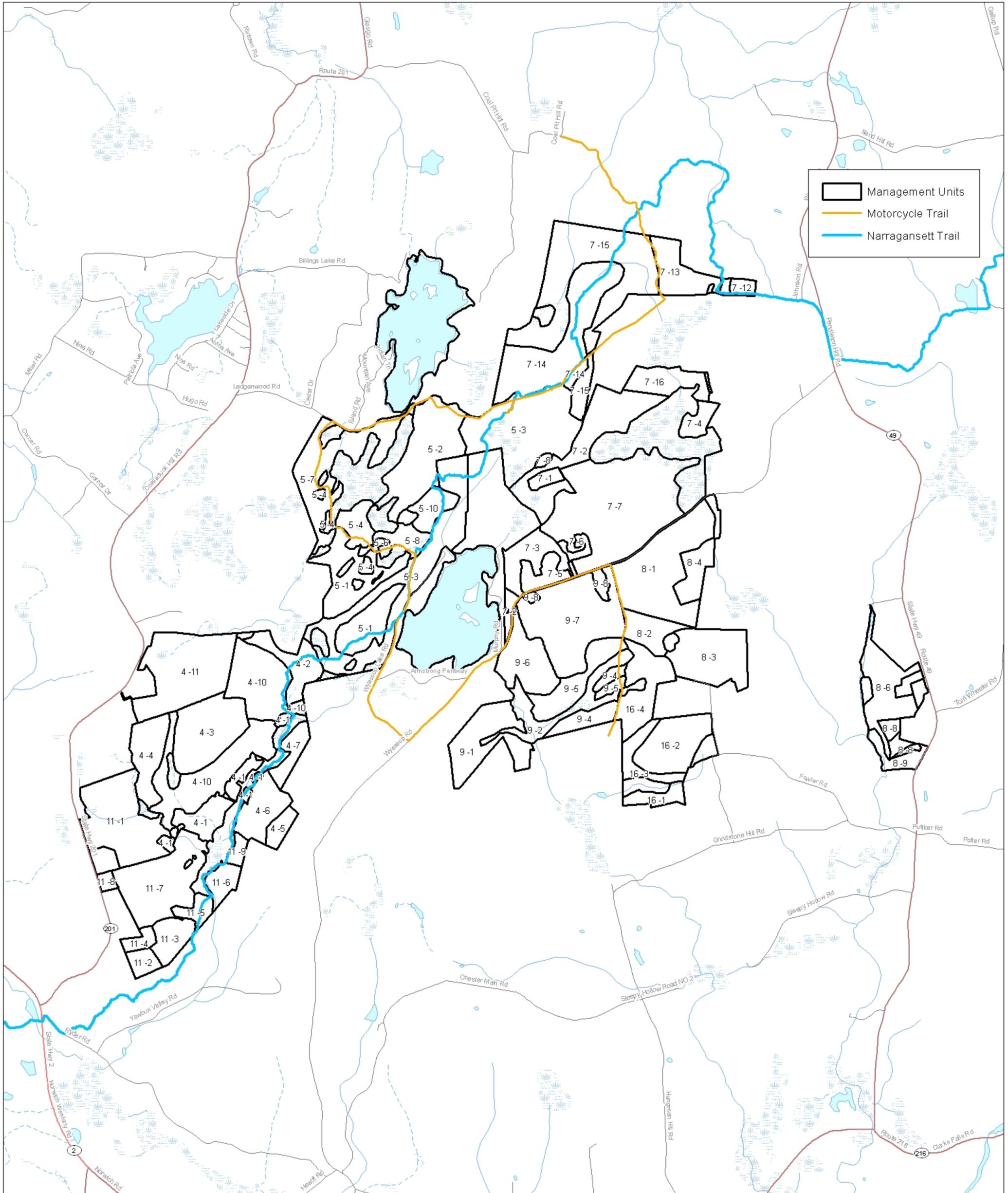


**Map B Base Map
Pachaug State Forest
Wyassup Block
North Stonington
2,664 Acres**



May 21, 2013

0 750 1,500 3,000 Feet





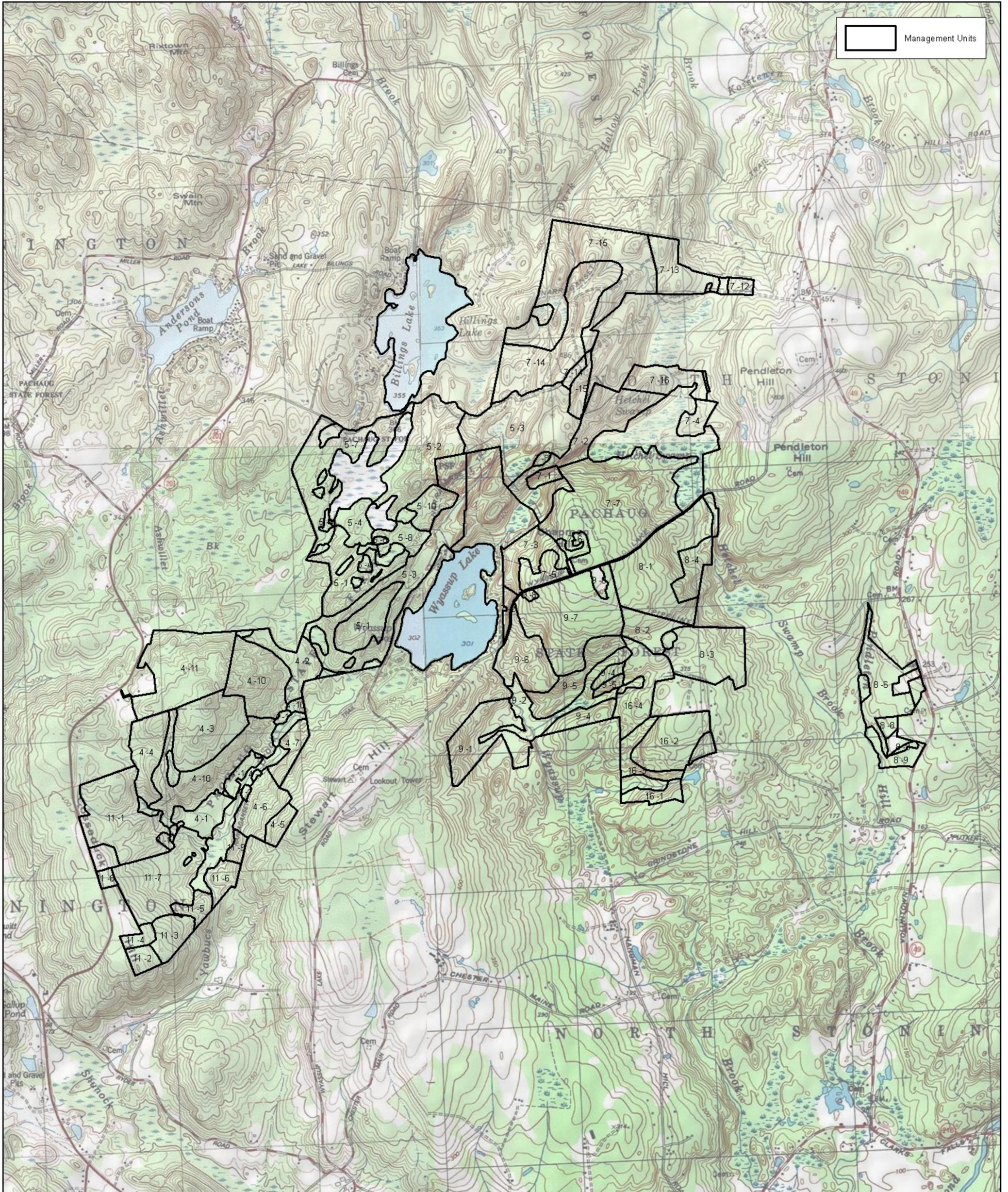
Map A Topographic
 Pachaug State Forest
 Wyassup Block
 North Stonington
 2,664 Acres



May 21, 2013

0 750 1,500 3,000 Feet

Management Units





Map F Work Plan
 Pachaug State Forest
 Wyassup Block
 North Stonington
 2,664 Acres



May 21, 2013

0 750 1,500 3,000
 Feet

Harvest Type

- 1st Shelterwood
- 2nd Shelterwood
- Clear Cut
- Final Shelterwood
- Irregular Shelterwood
- Selection Harvest
- Thin
- Timber Stand Improvement

Management Status

- Natural Area
- Old Forest Management Site
- Recreation Area
- Growing

