

# PROPERTY MANAGEMENT PLAN

Prepared For:

**ESEK HOPKINS PARK**  
Scituate Conservation Commission  
Scituate, Rhode Island



PREPARED BY:  
MARC J. TREMBLAY, CF  
LAND MANAGEMENT  
SERVICES

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## EXECUTIVE SUMMARY

Esek Hopkins Park is a 94.1 acre parcel in the northeastern portion of the town of Scituate, with frontage on Danielson Pike and Battey Meetinghouse Road. It is owned by the State of Rhode Island, with a Park Use Agreement provided to the Town of Scituate by the RI Department of Environmental Management and the State Properties Committee. The Scituate Conservation Commission and Scituate Land Trust have jointly managed the property in conjunction with the Town of Scituate's Recreation Commission.

The Park Use Agreement is authorized by RIGL 37-6-27, which permits the use of state-owned property for park or recreational purposes. The Town of Scituate is responsible for its maintenance and care.

To address the future management of this property, this Land Management Plan includes the following components:

- A Forest Management Plan that addresses vegetation and habitat improvements in the wooded areas, as well as providing access to those areas for implementation;
- A Recreational Use Plan that provides guidelines on recreational access that is compatible with the protection of conservation values.

The major issues at the site includes significant oak mortality in and around areas where trails and recreational uses take place, along with the difficulties associated with developing a hunting program in a small area adjacent to active recreational uses of the property, especially in light of the current absence of DEM-allowed hunting in this area.

The Plan's recommendations include:

- Immediate closure of trails in central and southern areas of the eastern parcel until such time that overtopping dead oaks can be safely removed/dropped;
- Salvage harvesting of dead oaks throughout the wooded areas of the property;
- Forest stand improvement thinning in upland and pine stands;
- Trail maintenance activities in the wooded areas;
- Control small patches of invasive plants before they develop into large problems;
- Due to the logistical difficulties of implementing a hunting program on a limited area with significant active recreational uses and abutting residential uses, the SCC and the Town of Scituate should pursue the removal of any deeded requirement to allow hunting on the Esek Hopkins Park;
- If required, an archery-only hunting area in coordination with the PWSB's Trimtown Hunting Area, along with their program management assistance would allow the town to implement hunting without having to develop their own program, which otherwise does not currently exist for any other town property. Appendix II includes PWSB guidelines.

LAND MANAGEMENT PLAN  
Title & Signature Page

Property Owner(s):

Plan Date: September, 2019

State of Rhode Island Dept. of Environmental Management  
235 Promenade Street  
Providence, RI 02908

Management Agreement Holder:  
Town of Scituate, Rhode Island by Park Use Agreement  
Conservation Commission and Land Trust

Property Information:

Town: Scituate

Plat: 32

Lots: 7, 39

Total Acres: 94.1

Open & Pond Acres: 14.7

Wooded Acres: 79.4

Property Location: Southerly of Danielson Pike (RI Route 6-A), at Battey Meeting House Road, in the northeastern portion of the town of Scituate, just west of the village of North Scituate.

USGS Topo Quad: No. Scituate

Signatures:

I hereby attest that this plan was prepared according to the owner's management objectives, and that all information provided is as accurate as current forestry practices allow.

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

On behalf of the Town of Scituate, I (we) certify that this Land Management Plan is prepared in accordance with the Land Use Agreement covering the referenced parcel of land, and that I (we) agree to the recommendations provided, until such plan is further revised and approved by the RI DEM.

\_\_\_\_\_  
Town of Scituate as Agreement Holder

.....

\_\_\_\_\_  
RI DEM representative for Plan approval

Date: \_\_\_\_\_

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# ESEK HOPKINS PARK MANAGEMENT PLAN

## INTRODUCTION

This Management Plan has been developed for the purposes of documenting the natural resources of the subject parcel, and developing guidelines and recommendations for the use, maintenance, and management of the prescribed uses of these lands.

### **Ownership and Purpose:**

Esek Hopkins Park is a 94.1 acre property in two (2) parcels owned by the State of Rhode Island. The RI Department of Environmental Management (RI DEM) entered into a Park Use Agreement with the Town of Scituate on April 16<sup>th</sup>, 1991 under the authority of RIGL 37-6-27, as cited below. The term of this agreement is for thirty (30) years, until May 1, 2021.

#### ***37-6-27. Use of state property for city park purposes.***

*(a) The state properties committee may, upon receipt of a request from a city or town, permit the use of state-owned property within the city or town for park or recreational purposes. The city or town receiving permission to use state property shall be responsible for its maintenance and care.*

*(b) Nothing contained in this section shall be construed to pass the legal title of any property to a city or town when permission for use is granted.*

The town's Recreation Commission refers to the active recreation area on the property as the Dean Andrews Memorial Field.

The Mission of the Scituate Conservation Commission (SCC) is: "Working to Conserve Scituate's Natural and Community Resources" (SCC Annual Report, 2018). The SCC is a board of the Town, with volunteer commissioners and associates whom, as part of their function, monitor and manage several properties in town on behalf of the Town. The SCC has enlisted volunteer Property Stewards to regularly monitor its various properties and report on any problems or issues for resolution.

According to the proposed deed for transfer of the property from the State of RI to the Town of Scituate, the town "shall perpetually use and maintain the Premises in good condition for public recreational purposes", and that "this provision shall not preclude wildlife and forest habitat preservation, education, conservation, restoration, and best management practices consistent with said recreation purposes and in accordance with the Management Plan" for the property that "sets forth specific procedures by which the Premises shall be managed", including making the property "open for hunting in accordance with the Management Plan". The proposed deed provides the Town of Scituate with the right, from time to time, to amend the Management Plan, and said amended plan must be approved by the RI DEM.

## **Goals & Objectives:**

The primary goal of the SCC in the management of the Esek Hopkins Park is to provide for public recreation while protecting the wildlife habitat and forest resource values of the property in accordance with the conditions provided by the RI DEM through the Park Use Agreement and the proposed deed. To accomplish this, the challenge is to balance the native wildlife habitat values with provision of public access for both passive and active recreational uses, along with the potential for hunting access.

This Management Plan addresses the SCC's overall Mission and their goal for Esek Hopkins Park by providing guidelines and recommendations for the following Objectives:

- Continue the active recreational uses of the park's open fields, ball field, and playground, and maintain the aesthetically valuable open nature of the landscape;
- Improve the productivity of the woodland areas for improved forest health and woodland habitat values, while providing for public safety along the woodland trails;
- Provide public access for conducting traditional hunting uses that are compatible with the active recreational uses that have been taking place on the property, as well as protecting the integrity and diversity of the forest, its herbivory, and associated plant and wildlife habitat communities.

To address these objectives, this Plan includes the following components:

- A Forest Management Plan that addresses vegetation and habitat improvements in the wooded areas, as well as providing access to those areas for implementation;
- A Recreational Use Plan that provides guidelines on recreational access that is compatible with the protection of conservation values, including recommendations on implementing access for hunting.

## **Criteria for Management Plans:**

This Forest Management Plan has been prepared according to Forest Stewardship guidelines, as developed and implemented by the US Forest Service's Forest Stewardship Program, and in accordance with the American Forest Foundation's Tree Farm Certification Guidelines, which meet PEFC performance standards for green certification. These standards also comply with the RI DEM's standards for Open Space acquisition and Conservation Easement programs.

## **Inventory Method:**

The preparation of this Forest Management Plan has included a forest resource inventory, the results of which are included in each of the Stand Descriptions that will follow. Forest stands are determined through a combination of forest cover, geographic features,

and potential management considerations, with soil types, slope, and aspect each having a major influence on the delineation of these stands.

This forest inventory was conducted by the randomized distribution of variable radius sampling plots, with the use of a 10-factor prism and measuring the diameters of all “in” trees. Extrapolation of the recorded data provides average diameter and stocking level across the stand. Data recorded includes species, determination of acceptable or unacceptable growing stock (AGS vs. UGS), understory vegetation, and any additional site factors that influences the health and viability of the stand.

## **PROPERTY OVERVIEW**

This 94.1-acre property is a mix of open, recreational fields and facilities, woodlands, and a bog/pond complex. There are about 10 acres of open field and active recreational sites along the Battey Meetinghouse Road frontage between both parcels. There are 80.4 acres of forested land, including forested wetlands in three (3) distinct wetland and riparian sites. An old-field pine stand and an upland site stocked with upland hardwoods dominates the eastern parcel. The smaller western parcel includes former gravel and stone mining pits, and abuts the former North Scituate Town Dump.

The property, comprising of two parcels divided by Battey Meetinghouse Road, is located in the northeastern portion of the town of Scituate, with frontage on Danielson Pike and Battey Meetinghouse Road. (see Figure 1, Locus Map).

The property is situated on the northern slopes of a small knoll with mid- to lower-slope sites that descend to the Danielson Pike frontage. Most of the property’s drainage runs to the west under Battey Meetinghouse Road and into the small pond in the northwest portion of the property. That pond is identified as Dexter Pond on the Topographical Maps, although Dexter Pond is actually located to the west along Danielson Pike. A narrow strip of the eastern edge of the property includes intermittent stream valleys that flow easterly onto the property of the PWSB.

The pond outlet that flows north under Danielson Pike flows into a small cove of the Regulating Reservoir, under Spring Brook Road. The eastern intermittent streams flow easterly into the northern tip of the Scituate Reservoir. Both the Regulating Reservoir and the east branch of the Scituate Reservoir were originally Peepthead Brook and the Moswansicut River, and are part of the Scituate Reservoir surface water public water supply. That water supply system provides drinking water for approximately 60% of the state’s population. The outlet of the Scituate Reservoir, at Gainer Dam, is the North Branch of the Pawtuxet River, eventually reaching Narragansett Bay at Pawtuxet Cove. On the way it travels through a groundwater recharge area that is an important source of drinking water, wildlife habitat, and recreational flows for the residents of central Rhode Island.

The forest cover is a mix of old-field White pines, and upland areas that are predominately hardwoods, with Red maple in the wetlands and riparian zone. These woodlands were at one time cleared for pasture, as is evident by the presence of stone walls and barbed wire fencing along some of the boundaries. Those less productive, abandoned fields and wetland areas have reverted to woodlands.

The soils underlying the upland portions of the southeastern areas of the property are primarily well-drained, upland Canton/Charlton very stony fine sandy loams, with an area of Gloucester/Hinckley gravelly sandy loams in an old-field area that is stocked with White pines. These upland soils are best-suited to growing White pine.

The soils underlying the western parcel is a mix of sandy, gravelly loams that have been altered by the excavation of gravel and stone, particularly in the southern and western portions of that parcel. The stream and shallow marsh and pond that cuts through that parcel is underlain with Scarboro mucky sandy loam, as is the wetland area in the northeastern portion of the property. These conditions produce a variety of growth and windthrow hazard conditions, but overall the property has good soils for growing White pine timber, and fair soils for growing oak and other hardwood timber. Please refer to the Custom Soil Resource Report in the Appendix of this Plan for more detailed information on these soils and their suitability for management.

There is good access throughout the property, with recreational trails that have been developed and maintained by the SCC. Parking is provided for vehicles at the softball field in the center of the property, with access from Battey Meetinghouse Road.

### **Management History:**

Property management activities by the Town of Scituate and the SCC since acquiring responsibility for management of the property in 1991 have focused primarily on the management of the recreational facilities and the development of a recreational trail system.



## **Stewardship Issues:**

### Wildlife habitat:

From a landscape approach, the parcel is located within a residentially-developed area that includes small farms and woodlots, along with open aquatic habitats. (See Figure 2.) The proximity of the watershed protection lands of the PWSB to the east and south, and other forested private lands in the area, along with relatively small, open fields and some brushy lands, comprise a relatively diverse mix of habitats that are valuable for a wide variety of wildlife.

The aquatic features of the property are its primary habitat feature. The pond in the northwest area of the property has a marshy area associated with it, and there are two vernal pools in the eastern parcel, that provide a diversity of habitat conditions for amphibians and other wetland obligate species of wildlife.

The open recreational fields do provide some feeding ground for certain birds, especially for geese due to its proximity to the pond, but its mowed condition and the presence of recreational activities does not provide any particular breeding/nesting sites.

There is some favorable habitat diversity within the woodlands of the property, with some mature oak/hickory woodlands that provide good crops of hard mast (nuts like acorns and hickory nuts), and some mature White pines that provide soft mast and nesting sites. The small wetland areas and the stream valley, with its riparian zone, has some diversity in its species composition, and has a heavy understory providing good cover.

### Recreation:

The Esek Hopkins Park is available to the general public for both active and passive recreation, with a softball field and playground area adjacent to a parking area on the eastern parcel off Battey Meetinghouse Road, and a small picnic area opposite those facilities in the western parcel.

Additionally, the SCC will develop hunting guidelines for the Park, with consideration for public safety, in accordance with the proposed RI DEM requirement to do so as a condition of the transfer of the property to the Town of Scituate.

A well-developed forest trail system has been established in the eastern upland areas of the Park, with access from the rear of the parking lot, as well as access to Battey Meetinghouse Road in the southwest portion of the eastern parcel. The SCC has a trail map available on their website for users of the trails.

The recent mortality of oaks in this area, with dead trees over-topping the trails, represents an immediate concern for safety of the trail users.

Forest management and habitat vegetation management activities recommended in this plan will require access by harvesting equipment. Establishment of access into the proposed harvest areas by timber harvesting equipment may facilitate the development of additional trails for the recreational/educational trail system.

The issue of unauthorized access and degradation of trails and steep slopes in the western parcel by ATV's must be factored into the establishment of additional woods roads on the property, and dealt with through a consistent effort at monitoring and enforcement. Obstructing trails often provides interesting challenges for the more aggressive riders, who will put considerable effort into overcoming these challenges. Where woods roads are to be established, they should be placed in non-sensitive sites to avoid future damages.

Any improvements to the wildlife habitat conditions through vegetation management and habitat manipulation will increase the quality of the recreational and educational experiences by providing a diversity of bird and animal habitat conditions.

#### Aesthetics/Scenic values:

The property is located in a scenic, semi-rural setting, with a well-traveled 2-lane highway traversing the northern edge of the property, and has value for its contribution to the aesthetic landscape.

The presence of trails within the property provides some opportunity for recreational use, and aesthetic practices along the sides of these trails will improve the quality of woodland walks. These aesthetic practices can include pruning of trees, slash management, and retention of visually interesting trees within view of the trails.

Silvicultural practices recommended in this plan will not adversely affect the aesthetic values of the woodlands if carried out with proper planning of skid trails. Smaller, low-impact logging equipment and practices will minimize any adverse impacts of equipment access. Landings and main trails should be cleaned up and seeded upon completion of use.

#### Water Resources/Water Quality:

This property is in the watershed of the Scituate Reservoir, which is a public water supply reservoir and watershed, and which helps feed a groundwater recharge area in the North Scituate area that provides an important source of groundwater for local residents. Any activities on this property could have some effect on the quality of the water that flows off the property towards the Scituate Reservoir.

The wooded riparian zone along the stream and surrounding the wetland areas provides a good buffer to any activities on the adjacent uplands, including the presence of heavily-travelled recreational trails. These buffers will also filter any contaminants that runoff from the Park's turf management activities and stormwater from the highway and town road runoff. Handling and application of fertilizers in those areas should be carried out with caution to prevent polluting the groundwater, which eventually will enter the stream and the well water.

Forestry practices can have an impact on water quality. Stream crossings can disturb the soil, and soil disturbance on the hillsides can lead to erosion. Sediment entering the riparian zone can impact the ability of those wetland buffers to function properly.

Implementation of best management practices (BMPs) during logging operations and for road maintenance will help protect the quality of the water that flows off the property. Please refer to the Rhode Island Best Management Practices manual for more information on planning skid trails and working within and adjacent to wetlands. Providing buffers to wetlands and the proper installation of stream crossings are important practices to consider.

There is an existing road crossing with a large culvert in the southwest portion of the western parcel, where access to the gravel banks was provided during the days when mining was occurring. This existing crossing can provide a stable stream crossing for equipment that will protect the stream and its banks from any impacts related to equipment use.

Water quality impacts from the long-closed North Scituate Town Dump has been found to be negligible by both the RI DEM and the PWSB. Surface water testing of the outlet stream of the pond and the small stream that flows along the western boundary just west of the pond by PWSB have not resulted in any negative impacts from the closed landfill.

Various reports concerning the North Scituate Town Dump have been prepared over the years since its closure in 1971. Please refer to the Baseline Documentation Report for more information about those reports and any potential impacts to water quality that may be presented by the proximity of the closed landfill in this watershed.

#### Forest Health:

The silvicultural practices recommended in this plan will seek to improve forest health conditions by maintaining optimum stocking levels for vigorous tree growth. Encouraging regeneration of the appropriate tree species for the soils present in various sites will help assure sustainability of the forest into the future.

Soil conditions have the most significant impact on tree and forest health, and soil quality is expressed through the use of a site index, which is based upon the height growth of a

tree species in 50 years. Certain soil types are better suited to white pine, while others are better suited to oaks or other hardwoods. The origin of the forest and its past treatment will also have an effect on current forest health conditions.

Typically, young forests and those with a variety of age classes, including young trees, are growing most vigorously, and are best suited to minimizing impacts from insects and diseases, and disturbances such as windstorms. Vigorous growth of trees will also absorb and retain carbon dioxide from the atmosphere more effectively than older, slower growing trees. This process of carbon sequestration is an atmospheric benefit that decreases as a forest approaches a mature condition.

Insect and disease problems are a normal part of forest ecosystems, but maintaining the optimum stocking levels and increasing species diversity and age structure can minimize their impacts. Recurring defoliations by the Gypsy moth caterpillars, Forest Tent caterpillars, and the Orange-striped oakworms has had a major influence on the viability of the oak resource in Rhode Island in the past few years. Repeated defoliations and the presence of other insects and diseases, Two-lined chestnut borer, and Shoestring root rot will seriously affect forest health conditions, leading to high mortality rates.

Recent defoliations and drought events have led to the mortality of a significant amount of the oak resource on the Esek Hopkins Park property. Although some scattered dead oaks are present throughout the upland areas of the property, the highest mortality has occurred in the central areas, surrounding the small pond in the woods just south of the parking lot, and amongst the pines south of the picnic area. These dead oaks are also highly visible from the road and parking lot, as well as along the recreational trail that skirts the small pond. They present an immediate hazard to the public, both along Battey Meetinghouse Road and in the woods along the trail. Several dead oaks are also present over the picnic tables in the picnic area.

Current activity of the Orange-striped oakworm during the late summer of 2019 may lead to further mortality of the stressed oaks in the upland areas where they were observed.

Encouraging regeneration of the appropriate tree species for the soils present in various sites will help assure sustainability of the forest into the future. Impacts to the forest from a natural disturbance or from an insect or disease outbreak will be minimized when there is an established younger generation of trees available for re-stocking.

#### Invasive Plants:

Invasive plants can have a negative impact on native plant communities, and can interfere with any attempts at establishing regeneration of tree species. Disturbed sites and exposed areas, such as the open fields and adjacent residential sites, and the disturbances created by timber harvesting, can often lead to problems with the spread of invasive plants.

There is a minor presence of invasive plants in the some of the wooded areas of the western parcel, with Japanese barberry in the extreme northwest corner of that parcel, and some bittersweet vines in the southeast corner, where the old access road runs into the property down to the stream crossing. A detailed review of those plants, their locations, and control methods is provided in the Forest Management component of this Management Plan. See also the Invasive Plant Fact Sheets in Appendix III.

### Carbon Cycle:

All forest plants and soils “store” carbon, so management influences the natural cycles of that storage in both living and dead plant material. Carbon sequestration is the process by which atmospheric carbon dioxide is consumed by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils.

Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while enhancing other ecosystem services, such as improved soil and water quality. Improving forest health conditions by increasing tree vitality and growth rates through thinning and release harvesting are some of the ways to increase forest carbon in the long run. Harvesting and regenerating forests can also result in net carbon sequestration in wood products and new forest growth.

The current conditions of the pine and hardwood stands, with oak mortality that will release stored carbon, may also result in increased growth rates of surviving trees, and encourages a growth response in the understory. This growth response in forest vegetation will serve to enhance sequestration of carbon that should partially compensate the loss in the dead trees.

Future thinnings and harvests of timber will serve to increase sequestration in other areas of the property, once the residual stand increases its growth rate, and the understory responds with new growth.

In future assessments of forest health conditions, the identification of potential improvements to growing conditions for certain stands should be included with regard to opportunities for increased carbon uptake.

### Wildfire Risk Assessment:

Generally, the current condition of Rhode Island’s woodlands does not constitute a major fire risk. Maturing forest conditions, the presence of intervening wetlands, streams, and rivers, and the presence of many roads and the vigilance of local residents and fire districts keeps fire incidents at a minimum.

Central Rhode Island does have a history of fire events, with some large, catastrophic fires that burned in the 1940's and 1950's, following the Hurricane of 1938 and the abandonment of many farms during the previous era, resulting in many acres of brushland and fallen timber from the hurricane.

The current situation with the mortality of the oak overstory from drought and insect defoliations has raised the fire risk situation for the foreseeable future. With many acres of standing dead oaks that will shed limbs, and the responding understory brush conditions, fire dangers during dry periods may result in some significant wildland fires occurring, with ladder fuels carrying crown fires through the landscape.

The RI DEM Division of Forest Environment is currently advising landowners to lay down trees through salvage harvesting and/or felling so that these oak crowns are in contact with the ground, which will speed up the decay process and minimize the fuel ladder conditions. Fire breaks, cleared access roads, and cleared vegetation around structures will also improve the ability of fire departments to access and protect property when fires do break out.

The presence of public road frontage is where the risk of incendiary fires occurs, with passing vehicles, ATV's, and adjacent residential sites being the lead cause of wildland fire ignition. Fire breaks and access roads can be established keeping these abutting land uses in mind, and salvage harvests will also result in improved access roads into currently inaccessible areas of the property.

The presence of a good access road system, with forest trails that can accommodate fire equipment, is important to minimize the risk of fire to this forest.

#### Forest products:

The yield of forest products from this property is not a high priority, but is one of several management objectives for certain portions of the property. Implementation of the management recommendations of this plan could provide some revenue that could be utilized to offset the costs of trail maintenance, road and access improvements, signage, and educational programs.

Proposed salvage harvesting of dead trees, with a priority of safety for recreational uses, will result in the creation of forest products, including the potential of sawtimber and firewood.

#### Boundaries:

The perimeter boundary lines of the parcel include stone walls and fencing, yellow blazes, and a few monumentation points that are readily identifiable as property boundaries. The eastern boundary is along PWSB property, and is well maintained.

The southern boundary of the eastern parcel runs along the rear of several houses on Highland Terrace, with evidence of trespass and leaf dumping which may include some encroachment onto the property. There is a minor encroachment along the house lot boundary in the northeast portion of the eastern parcel, with a small shed situated over the line onto Park property.

The western boundary is not well identified, and should be determined and marked.

Cultural and Archeological Sites:

Historical use for agriculture is evident by the presence of stone walls in the upland portions of the property. These walls should be avoided during any timber harvesting activities to protect them from damage. Existing gaps in the walls should be utilized whenever possible.

The Esek Hopkins Park is named after the first Commander of the Continental Navy who went on to a political career in Rhode Island after the American Revolution.

An historic cemetery is located on the property (Scituate #30) with the internment of Stephen Kimball, a Colonel with the RI Militia during the American Revolution.



Past use of the land for a combination of gravel and stone mining is a major feature of the western parcel. Use of the stone was for the construction of the State Police HQ on the north side of Danielson Pike. A stone quarry pit is located in the western parcel, where cut stone remnants are located. This quarry would have been for farm use and construction.

The site of the State Police HQ is known as the Rhodes Coggeshill Farm, and there are other historic candidate sites, along with the North Scituate Village Historic District, in the vicinity of the Park. Please refer to the Cultural Resource Database Map (figure 4).

#### Rare and Endangered Species and Habitats:

Presently, there are no known federal or state endangered plants or animal species within the 94.1 acres. Please refer to Figure 3, the RI Natural Heritage Database map illustrating the area's rare and endangered species locations.

Although no listings are present, there are a couple of wetland habitat sites where some state-listed species may be present. There are two small vernal pool sites that have ephemeral characteristics in the eastern parcel, and the wetland associated with the pond in the western parcel have the diversity of vegetation and wetland soil conditions that may support any of these species, which tend to be insects, wildflowers, and amphibians that utilize these wetlands at some stage of their life cycle.

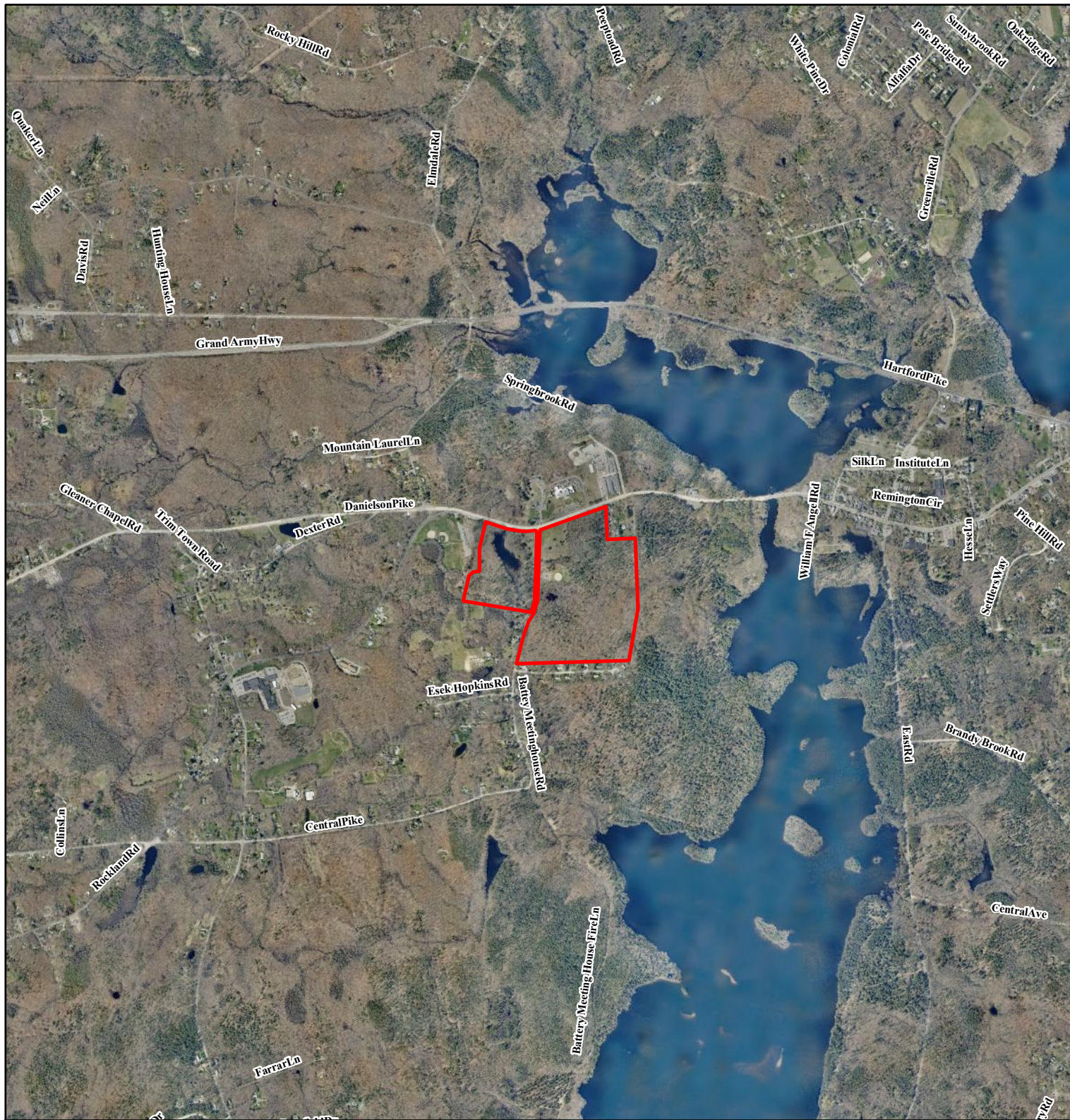
Recommendations to avoid impacting species, and the habitats that are likely to support species of concern, involve the timing of forest management activity, with no disturbances taking place during the spring breeding seasons. Recent information regarding the Northern long-eared bat and the Wood turtle extends the no-disturbance recommendation for upland areas, especially with regard to the establishment of habitat clearings, during the summer and through October, until the Wood turtle goes into hibernation, to prevent disruption of bat and turtle life cycles.

This presents an April through October limitation on the use of heavy logging equipment to avoid impacts to wildlife nesting, breeding, and travel seasons. This is not a mandated limitation unless the SCC is planning to carry out this type of work with federal assistance, or unless the RI DEM determines that the sites and habitat values warrant placing such a limitation on the SCC. The SCC may impose these limitations on itself in keeping with the recommendations of state and federal biologists.

Further investigation may be warranted. There are biologists affiliated with the RI Natural History Survey ([www.rinhs.org](http://www.rinhs.org)) that may be available, for a fee, to identify the presence of unique species, at various seasons of the year.

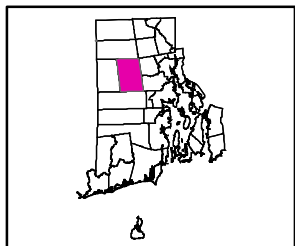
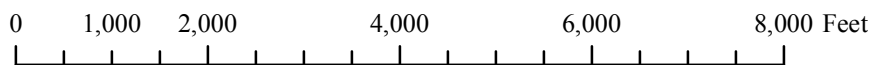


# Parcel Locus Map



## Legend

 Property

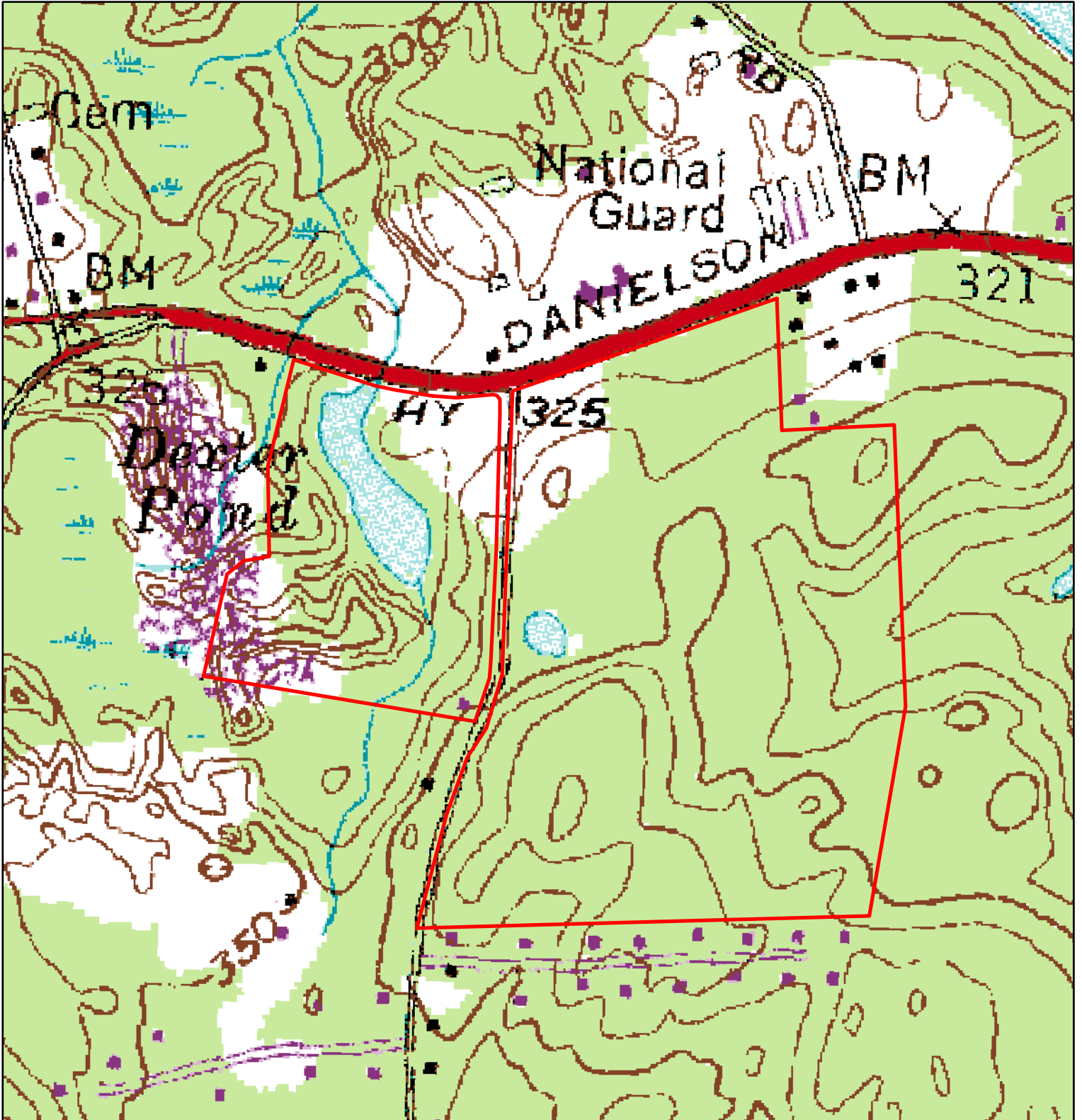


**Project:** Esek Hopkins  
**Town:** Scituate  
**County:** Providence  
**State:** Rhode Island  
**Date:** 8/28/19  
 Prepared for: Land Management Services  
 with assistance from:  
**Natural Resource Services, Inc.**



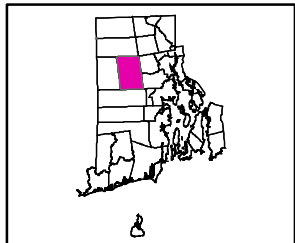
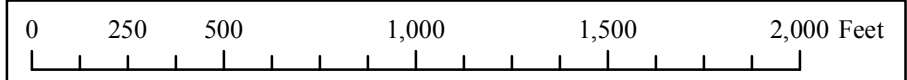
Figure 1

# Topographic Map



## Legend

 Property



Project: Esek Hopkins  
Town: Scituate  
County: Providence  
State: Rhode Island  
Date: 8/28/19  
Prepared for: Land Management Services  
with assistance from:  
**Natural Resource Services, Inc.**



Figure 2

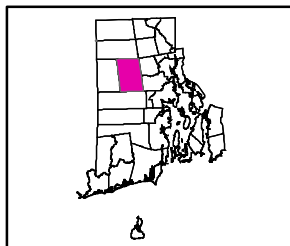
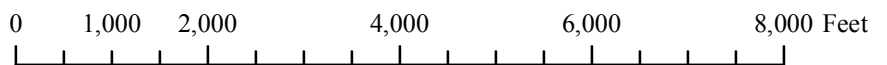
# Endangered Species Map



## Legend

- Property
- Natural Heritage Area

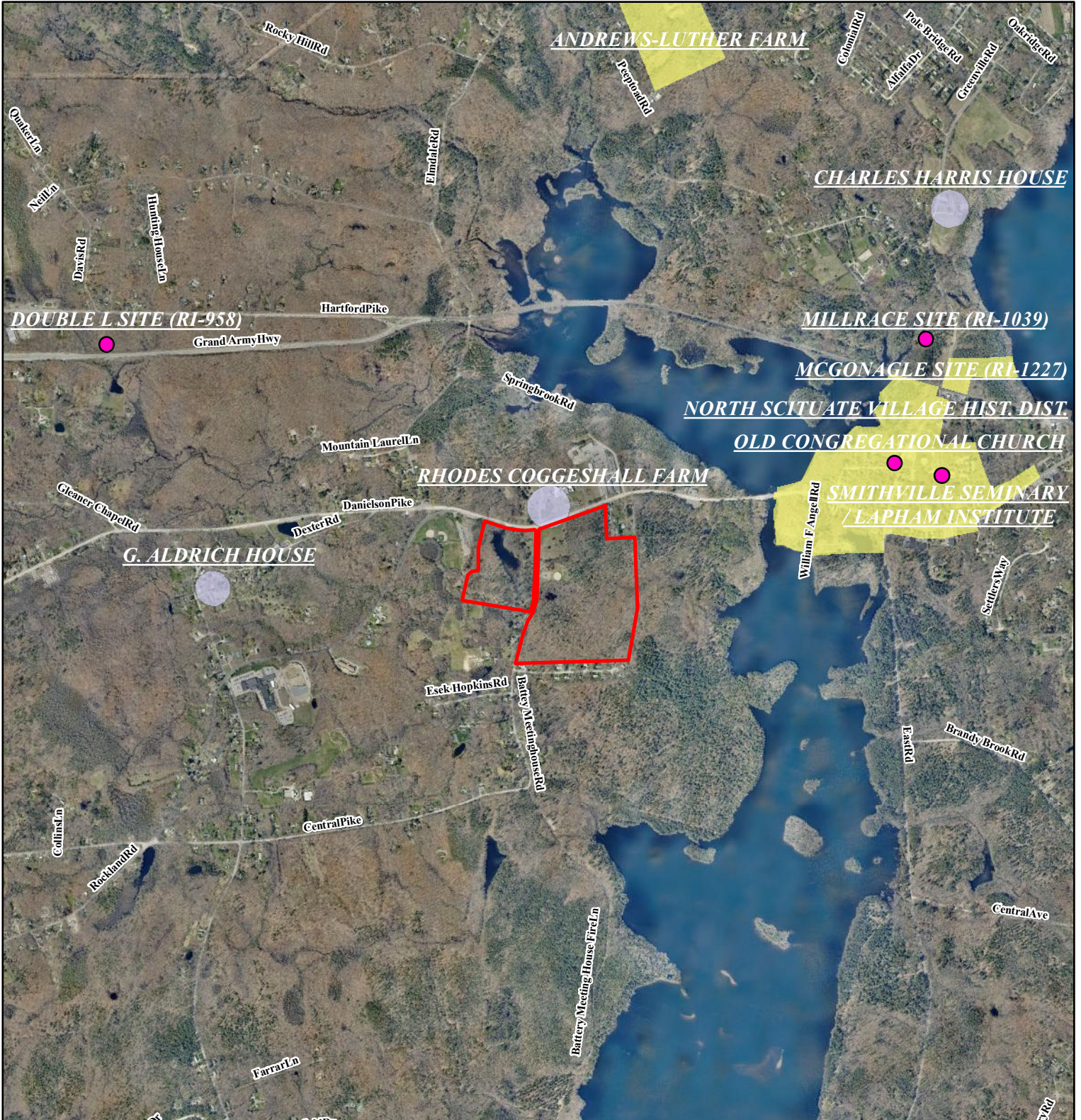
Figure 3



**Project:** Esek Hopkins  
**Town:** Scituate  
**County:** Providence  
**State:** Rhode Island  
**Date:** 8/28/19  
 Prepared for: Land Management Services  
 with assistance from:  
**Natural Resource Services, Inc.**

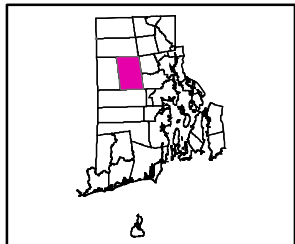
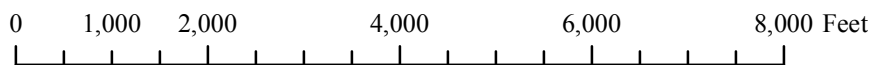


# Cultural Map



## Legend

- Property
- Historic Sites
- Historic Districts
- Historic Candidate Sites



**Project:** Esek Hopkins  
**Town:** Scituate  
**County:** Providence  
**State:** Rhode Island  
**Date:** 8/28/19  
 Prepared for: Land Management Services  
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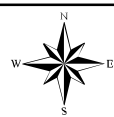
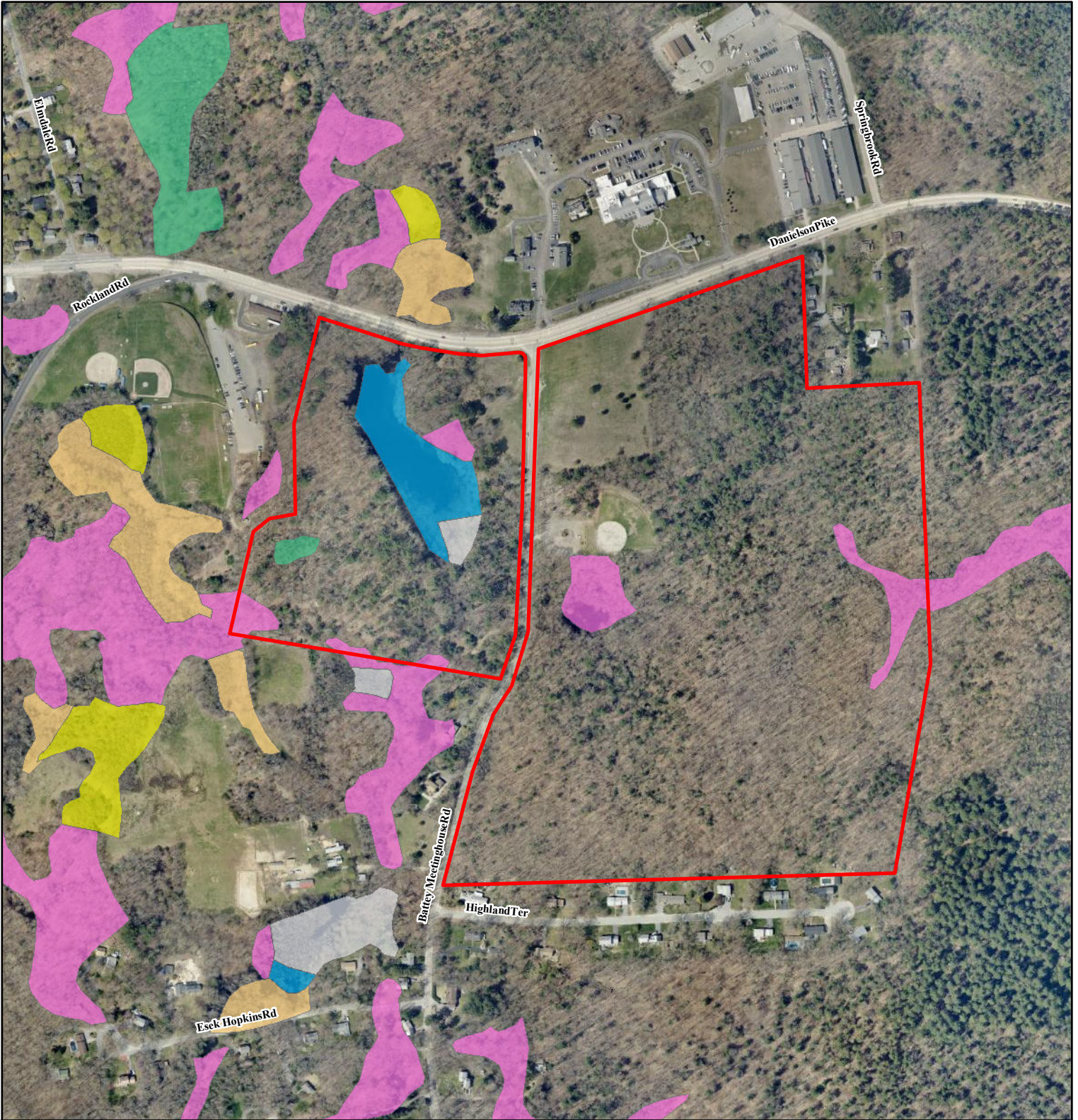


Figure 4

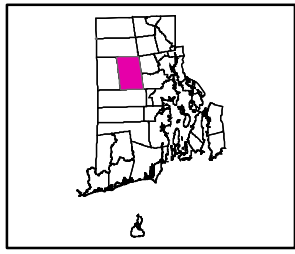
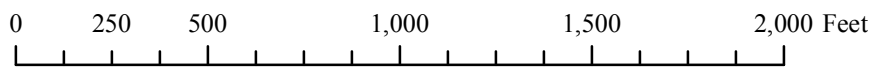
# Wetlands Map



## Legend

Figure 5

- Property
- Emergent Wetland: Marsh/Wet Meadow
- Forested Wetland: Coniferous
- Forested Wetland: Deciduous
- Palustrine Open Water
- Scrub-Shrub Swamp
- Scrub-Shrub Wetland: Shrub Fen or



**Project: Esek Hopkins**  
**Town: Scituate**  
**County: Providence**  
**State: Rhode Island**  
**Date: 8/28/19**  
**Prepared for: Land Management Services**  
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**Natural Resource Services, Inc.**



# Soils Map

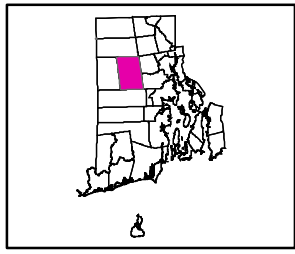
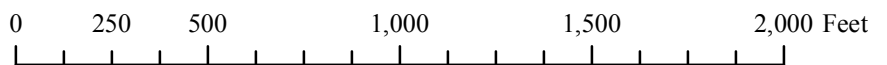
## Soils Legend

AfB - Agawam fine sandy loam, 3-8% slopes: non-hydric  
 CaD - Canton-Charlton-Rock outcrop complex, 15-35% slopes: non-hydric  
 CeC - Canton and Charlton fine sandy loams, very rocky, 3-15% slopes: non-hydric  
 ChB - Canton and Charlton very stony fine sandy loams, 3-8% slopes: non-hydric  
 ChC - Canton and Charlton very stony fine sandy loams, 8-15% slopes: non-hydric  
 GhC - Gloucester-Hinckley very stony sandy loams, rolling: non-hydric  
 HkC - hinckley gravelly loam, rolling: non-hydric  
 Pg - Pits, gravel: non-hydric  
 Rf - Ridgebury, Whitman, and Leicester extremely stony fine sandy loams: hydric  
 Sb - Scarborough mucky sandy loam: hydric  
 Ss - Sudbury sandy loam: non-hydric  
 SwA - Swansea muck: hydric  
 Wa - Walpole sandy loam: hydric



## Legend

- Property
- Soils



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**Town:** Scituate  
**County:** Providence  
**State:** Rhode Island  
**Date:** 8/28/19  
 Prepared for: Land Management Services  
 with assistance from:  
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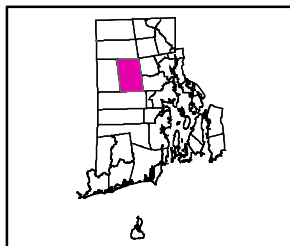
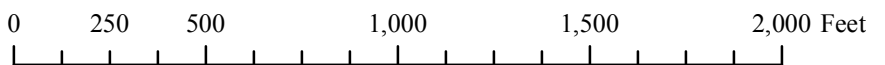
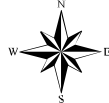
Figure 6

# Forest Stand Map



## Legend

-  Property
-  Stand Boundary
-  Stand Number



**Project:** Esck Hopkins  
**Town:** Scituate  
**County:** Providence  
**State:** Rhode Island  
**Date:** 9/12/19  
**Prepared for:** Land Management Services  
with assistance from:  
**Natural Resource Services, Inc.**

Figure 7

## FOREST MANAGEMENT PLAN -- STAND INFORMATION

### EASTERN PARCEL:

STAND: 1                      ACRES: 4                      COVER TYPE: Mixed Hardwoods

MANAGEMENT OBJECTIVE(S): Provide Wetland Wildlife Habitat, while protecting the quality of the water that flows through the stand's riparian zone.

SITE QUALITY:      Poor. Soils are Scarboro mucky sandy loam, with a site index of 55 for both White pine and Red maple. Where soil conditions are not completely saturated, White pine and White oak can become established and become productive for timber purposes. There are severe limitations for seedling survival and a windthrow hazard due to the saturated soil conditions.

### FOREST RESOURCE DATA:

STAND DENSITY: 135 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE:              171                      AVG. DIAMETER (DBH): 12"

STOCKING LEVEL: Fully-stocked at 80% on Red maple chart

### STAND DESCRIPTION:

This stand occupies the Red maple swamp along the Danielson Pike frontage in the north central portion of the larger, eastern parcel.

The stand includes a round, boggy patch of wetlands, and there is a drainage ditch that runs northeasterly out of the bog towards a culvert that crosses under Danielson Pike. This feature would have been established by farmers many years ago in an attempt to increase the arable land of their farm.

The overstory is dominated by mature Red maples, along with some scattered White oaks. The Red maple comprises about 85% of the total stocking, and is found in the 12 to 30+ inch dbh size classes. The White oaks are found in the 16 to 24 inch dbh size classes.

There are some scattered smaller diameter stems of Red maple that are present, but the intermediate size classes are thinly stocked due to the mature canopy and high stocking conditions.

Understory species include thickets of Sweet pepperbush and Highbush blueberry shrubs.



#### HABITAT & WILDLIFE USE:

This stand provides important wetland wildlife habitat, with thickets of shrubs that provide cover, nesting sites, and food sources. The ephemeral nature of the vernal pool site and associated forested wetland area, despite the drainage ditch that limits the retention time of water within that area, provides spring breeding habitat for amphibians.

The impact of the drainage ditch may be to limit which species of amphibians can successfully breed, with perhaps only the early breeders, like the tree frogs, that will have time to mature before the bog's pool dries out.

#### RECREATIONAL OPPORTUNITIES:

There are no recreational values associated with this stand.

#### WATER QUALITY ISSUES:

Although the drainage ditch tends to lower the wetland's water table prematurely, there does not appear to be any water quality issues within this area. The adjacency of the open grass field may result in surface water runoff into this wetland complex that could be tainted with any fertilizer or pesticides that the Recreation Dept. may be using as part of their turf management activities.

#### MANAGEMENT RECOMMENDATIONS:

- Investigate the Recreation Dept's turf management activities to determine any potential threats to water quality within this wetland complex.

STAND: 2                      ACRES: 9.6                      COVER TYPE: Pine/Hardwoods

MANAGEMENT OBJECTIVE(S): Maintain recreation trail access while improving forest health and wildlife habitat conditions.

SITE QUALITY: Good. Gloucester/Hinckley very stony sandy loam soil is a somewhat excessively drained soil that has low productivity for Red oak and moderate productivity for White pine. Site index for Red oak ranges from 49 to 60 while that of White pine equals 60 - 61.

FOREST RESOURCE DATA:

STAND DENSITY: 130 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE:            161                      AVG. DIAMETER (DBH): 12.5"

STOCKING LEVEL: fully-stocked at 80% on Mixed Wood chart

STAND DESCRIPTION:

This stand is situated on some old field sites in the northern portion of the parcel, just east of the recreational fields.

The overstory is predominately White pine, with a mix of upland oaks present. The proportion of pine stems varies in the stand, with clumps of all pine in some areas of the stand. The trails tend to go through these clumps of pine-dominated sites, providing an aesthetically valuable recreational experience.

The pines, which also include some Pitch pine, represents about 60% of the total stocking. They are found in all size classes, with the larger dominant stems in the northern portion of the stand. There are also some intermediate and suppressed stems that are mixed in with the hardwoods in the eastern and southern portions of the stand.

The mixed upland oaks, which includes Scarlet, Black, and White oaks, represent about 25% of the total stocking. There are a few Northern red oaks also present. There are some larger diameter Black and White oak stems, with a few older pasture oaks included. Most of the oak stocking is found in the 14 to 20 inch dbh size classes. There are some dead oaks found in the stand as a result of recent drought and defoliation events.

Other species in the stand include Red maple, Black birch, and Sassafras. These other species are found mostly in the smaller, suppressed size classes.

The stocking of UGS (Unacceptable Growing Stock, or the poorly-formed and suppressed trees that are typically subject to Timber Stand Improvement (TSI) activities) comprise about 15% of the total growing stock, but are concentrated in the eastern and southern portions of the stand where the presence of hardwoods is higher.

The understory includes advanced Black birch saplings, and some more recently established pine and Black oak seedlings, which is likely due to the increased sunlight from the scattered dead oaks that are in the overstory. In the northern portion of the stand, where the White pine is so dominant, there are thickets of pine saplings, and some Sassafras and Red maple saplings.

Shrub species include some highbush blueberry, and a ground-level presence of lowbush blueberry and greenbriers.

#### HABITAT & WILDLIFE USE:

Mature oaks provide a crop of hard mast (acorns) and the mature pines provide soft mast (pine seed), along with a diversity of structural habitat in the various levels of tree branches and crowns that are utilized as nesting sites. These areas are productive feeding sites, particularly in conjunction with the adjacent wetland and open field areas.

#### RECREATIONAL OPPORTUNITIES:

A trail loops through this stand from the main recreational areas of the property. The mature pine canopy provides a valuable aesthetic value to this trail. There is a side trail that leads north to one of the residential sites in the northeast corner.

#### POTENTIAL FOR TIMBER PRODUCTION:

Pine and oak sawtimber and firewood is available for harvest during stand improvement operations, and the creation of small openings should encourage the development of some white pine regeneration. TSI should focus on improving habitat conditions rather than timber production due to the relatively poor soil conditions and the recreational objectives of the property, with trail user safety and aesthetic considerations being a higher priority than forest productivity.

#### WATER QUALITY ISSUES:

Although there are no water resource features within this upland site, any erosion on the trails could lead to sediment deposition in the adjacent wetland sites and streams. Proper planning of any future skid trails, along with maintenance of the recreational trails, must take the potential for erosion on the slopes into account.

#### MANAGEMENT RECOMMENDATIONS:

- Conduct a salvage and Timber Stand Improvement (TSI) harvest to improve safety along the recreational trails, while also thinning out some over-crowded areas of the stand to release oak and pine crowns for increased mast production and improved aesthetic values. Poorly formed trees that may be competing with the crop trees for crown space and soil resources should be marked for removal and harvested for use as firewood.

The benefits of TSI also include the increased production of understory plants and sprouting stumps that increase the availability of browse for wildlife.

Retention of certain “legacy” trees within the stand, such as the old pasture oaks that are present, will help illustrate to trail users the historic agricultural aspect of this land.

STAND: 3

ACRES: 5.4

COVER TYPE: Oak-Hardwoods

MANAGEMENT OBJECTIVE(S): Provide Wetland Wildlife Habitat through the enhancement of native tree and shrub species, while protecting the quality of the water that flows through the stand's riparian zone.

SITE QUALITY: Good. Soils are Walpole sandy loam in the central and northern portions, and a steep side slope of well-drained Canton/Charlton very stony fine sandy loam in the southern and eastern portions of the stand. There is a poorly-drained central area of this stand which is a vernal pool and completely saturated, with no tree growth. The site index value for the lower slopes of the area surrounding the pool are 58 for Red oak, according to the soil survey, but the existing condition of the Northern red oaks that are found there exhibits a higher Site Index of 65 to 70.

#### FOREST RESOURCE DATA:

STAND DENSITY: 40 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE: 85                      AVG. DIAMETER (DBH): 9"

STOCKING LEVEL: Under-stocked at 30% on Upland Central Hardwoods chart

#### STAND DESCRIPTION:

This stand occupies the area that surrounds the small vernal pool located south of the recreational area's parking lot.

The central area of the stand has an open pool with emergent shrub vegetation.

The northern portion of the stand has a high water table up to the edge of the parking lot, and is stocked with a mix of some surviving oaks and Red maple.

The southern and eastern portions of the stand are situated on the mid- to lower, very stony slopes of a steep hillside that was stocked with Northern red oak. These oaks are now mostly dead from the recent drought and defoliation events.

The current stocking is predominately the intermediate and understory Red maple and Black birch stems that have not been impacted by the defoliations, along with a few surviving Northern red and White oaks.

The recent mortality has resulted in a flush of understory growth, with White pine, Huckleberry, and Highbush blueberry shrubs all responding to the increased sunlight, as well as ferns.



This condition is highly visible along the trail that runs along the contour of the slope on the southern and eastern sides of the stand, with dead oaks towering over the trail.

#### HABITAT & WILDLIFE USE:

This stand provides important wetland wildlife habitat, with thickets of shrubs that provide cover, nesting sites, and food sources. The standing dead trees are also providing a new source of wildlife habitat, as insects and the birds that feed on them become established. Several standing dead trees per acre are a valuable wildlife resource; hundreds of dead trees with trails are more of an immediate hazard to public safety.

#### RECREATIONAL OPPORTUNITIES:

The recreational trail system that loops through the southern and central upland areas of the property runs through the eastern edges of the stand. Due to the hazards presented by the standing dead trees, this trail should be closed until measures are taken to reduce the hazard.

#### WATER QUALITY ISSUES:

Pedestrian and equipment access along the trail, which is located on the sloping terrain of the adjacent hillside, can lead to sediment deposition within the wetland and vernal pool site, which over time could degrade the quality of the water resource and wildlife habitat values.

Proper planning of any future skid trails, along with maintenance of the recreational trails, must take the potential for erosion on the slopes into account.

**MANAGEMENT RECOMMENDATIONS:**

- Conduct safety improvements by carrying out a salvage harvest on the perimeter of the stand.
- Until such safety improvements are carried out, the trail itself should be closed off to pedestrian use, with an alternate trail established into the central portion of the property from the parking lot.

STAND: 4                      ACRES: 43.4                      COVER TYPE: Upland Oak/Pine

MANAGEMENT OBJECTIVE(S): Maintain recreation trail access while improving forest health and wildlife habitat conditions.

SITE QUALITY:        Fair. Upland site is underlain with well-drained Canton/Charlton very stony fine sandy loams, with a site index of 58 - 65 for White pine, and 52 to 58 for oaks. There is a narrow strip of poorly-drained Ridgebury extremely stony fine sandy loams in the intermittent stream valleys in the northeast portions of the stand, with more favorable soil moisture conditions within the transitional slope areas adjacent to the intermittent streams.

FOREST RESOURCE DATA:

STAND DENSITY: 93 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE:        166                      AVG. DIAMETER (DBH): 10"

STOCKING LEVEL: Fully-stocked at 80% on Upland Central Hardwoods chart

STAND DESCRIPTION:

This upland stand is situated on the upland knolls and hillsides of the central and southern portions of the property.

The overstory is predominately upland oaks, with a mix of Black, Scarlet, Northern red, and White oaks that together comprise about 65% of the total stocking. Most of these oaks are found in the 10 to 18 inch dbh size classes, especially in the southern portion of the stand. The central and northern areas of the stand have a couple of intermittent stream drainages within it, and thereby include some better growing conditions on the lower-slope transition areas into those narrow valleys. These better growing conditions results in some larger diameter stems, along with some Northern red oaks, in the 16 to 26 inch dbh size classes.

Some of the larger diameter oaks are good quality Northern red and Black oaks, but some are also old pasture oaks that have attained large diameters but are relatively open-grown and of poor quality.

This stocking of oak has recently been reduced by the mortality of close to 20 sq. ft. of BA per acre in oak stems due to the recent drought and defoliation events. Some of these stems are hazard trees along the recreational trail.

There is a current presence of feeding on oak leaves by the Orange-striped oakworm, which is particularly evident in the southern portion of the stand. This recurring defoliator tends to have low impacts due to the late season timing of their feeding, but trees that are stressed from past defoliations may be more susceptible to this event.



Other hardwoods in the stand include Black birch, Red maple, Hickory, and Shagbark hickory. Other than a few larger hickories scattered about, most of these other hardwoods are found in the suppressed and intermediate size classes of 4 to 12 inches dbh. Some of these stems are being released by the recent mortality of overtopping oaks, so they will become more of an influence on the future stocking of the stand.

The stocking of UGS comprise less than 15% of the total growing stock, and are typically comprised of the smaller diameter, suppressed stems and some of the over-crowded intermediate stems. These hardwood stems are available as a source of firewood in a forest stand improvement thinning operation.

The White pines in the stand are a minor component of the overstory, with less than 10 percent of the total stocking, in trees that are in the 14 to 24 inch dbh size classes. There are a couple of small patches of pines, with one in the southeast corner of the stand, and one on a knoll top overlooking Stand 3. The primary influence of the pine component in this stand is in the sapling stages, with a varied distribution of advanced regeneration present throughout the stand, except in the intermittent stream valleys. Some mortality of small diameter stems in the 2 to 4 inch dbh size classes occurred from the heavy defoliation events.

Understory species in this stand includes the pine saplings, Black birch, Beech sprouts, suppressed Red maple stems, some newly established White oak and Black oak seedlings resulting from an infusion of sunlight in some areas of the stand, and some scattered American chestnut sprouts. Shrubs include a heath layer of Lowbush blueberry and huckleberry in the drier, upland areas, along with some scattered Highbush blueberry shrubs, and some thickets of Sweet pepperbush and Highbush blueberry in the lower slope sites of the narrow drainages that cut through the northern portions of the stand.

#### HABITAT & WILDLIFE USE:

The oak component of this stand provides a valuable source of acorns for hard mast, as do the hickories. The inventory of standing dead trees will provide a source of wildlife habitat for a number of years, although the presence of hazard trees along the trail will need to be dealt with. There are ample numbers of dead snags to provide habitat.

The intervening drainages provide some wildlife habitat values, with seasonal water flows and pools for insect development. The diversity of tree species within these intermittent stream valleys provide a diversity of nesting sites and values.

#### RECREATIONAL OPPORTUNITIES:

A trail loops through this stand from the main recreational areas of the property. There is a side trail in the southeast corner that leads to an opening along the boundary where the trail runs onto Providence Water property, which constitutes an unauthorized use of their property. Additional access to the southern portion of the trail links to some of the

backyard areas of the lots along the southern boundary, where some minor dumping of yard debris and other trash was noted.

#### WATER QUALITY ISSUES:

The presence of the trail system in the vicinity of the intermittent stream valleys may be an issue for the protection of water quality in these riparian zones. Pedestrian access adjacent to the streams can lead to erosion and sedimentation within the stream channel and downstream water resources. Foot traffic and soil compaction, which prevents vegetation from growing in the riparian zone adjacent to the stream, results in bare soil conditions and erosion problems.

Proper planning of any future skid trails, along with maintenance of the recreational trails, must take the potential for erosion on the slopes into account.

#### MANAGEMENT RECOMMENDATIONS:

- Conduct a salvage and Timber Stand Improvement (TSI) harvest to improve safety along the recreational trails, while also thinning out some over-crowded areas of the stand to release oak and pine crowns for increased mast production and improved aesthetic values. Poorly formed trees that may be competing with the crop trees for crown space and soil resources should be marked for removal and harvested for use as firewood.

The benefits of TSI also include the increased production of understory plants and sprouting stumps that increase the availability of browse for wildlife.

Retention of certain “legacy” trees within the stand, such as the old pasture oaks that are present, will help illustrate to trail users the historic agricultural aspect of this land.

WESTERN PARCEL:

STAND: 5                      ACRES: 3                      COVER TYPE: White pines

MANAGEMENT OBJECTIVE(S): Provide an aesthetically valuable resource along the road frontage and in the zone between the open picnic area and the pond, as well as protecting the quality of the water in the riparian zone, bog, and pond area along the slope.

SITE QUALITY: Good. Gloucester/Hinckley very stony sandy loam soil is a somewhat excessively drained soil that has low productivity for Red oak and moderate productivity for White pine. Site index for Red oak ranges from 49 to 60 while that of White pine equals 60 - 61.

FOREST RESOURCE DATA:

STAND DENSITY: 110 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE:            78                      AVG. DIAMETER (DBH): 16"

STOCKING LEVEL: Under-stocked at 35% on White pine chart

STAND DESCRIPTION:

This stand occupies the west-facing slope along the western side of Battey Meetinghouse Road, between the open field and picnic area down to the edge of the stream, marsh, and pond of the central valley of the western parcel.

The northern portion of the stand is a narrow strip of pine and mixed hardwoods on the mid-slope area, with a partially-mowed understory that serves as a wooded backdrop to the open recreational areas of this parcel, with an added function of a wooded buffer to the pond and the water resources of that central valley. Some large diameter, open grown White pines and some Red maple, along with a few oaks, are present in this strip.

The southern portion of the stand is stocked with an overstory of White pine in the medium to large sawtimber size classes. These are relatively tall trees with good form, having grown up as a mixed stand with oaks. The oaks that are in the stand have mostly all died within the past few years as part of the drought and defoliation events. In addition to the stocking of the pines, there would have been an additional stocking of 55 sq. ft. of basal area in oaks, and there are some dead pines in there as well, partly from storm damages and blowdowns.

The understory of this are of the stand includes a flush of growth in response to the oak mortality and increased sunlight. The pre-existing pine saplings have responded with

new growth, and there are some Black cherry, Black oak, and Beech saplings present as well, along with thickets of ferns.

#### HABITAT & WILDLIFE USE:

This stand provides a pine-dominated food source (soft mast) and high crown nesting resource for certain bird and hawk species that prefer these habitat types. The flush of understory growth provides a developing ground level cover and nesting resource for ground-level birds and small mammals. Its adjacency to the open bog and water resource as well as the open fields must certainly provide valuable roosting sites for turkeys as well as perches for raptors.

The inventory of standing dead trees will provide a source of wildlife habitat for a number of years, although the presence of hazard trees adjacent to the road and the public recreational areas will need to be dealt with. There are ample numbers of dead snags to provide habitat.

#### RECREATIONAL OPPORTUNITIES:

The adjacency of this stand to the town road and the picnic area provides an aesthetically valuable resource. There are also a few open-grown oaks in the area of the picnic tables, with large spreading crowns, that are now dead and present an immediate public safety hazard.

#### WATER QUALITY ISSUES:

The stand's occupation of the slopes adjacent to the central stream and pond valley gives it an important water quality buffering function from the adjacent roadways and recreational sites.

#### MANAGEMENT RECOMMENDATIONS:

Consider conducting salvage harvesting in the pine-dominated area of the southern portion of the stand. Although there is no recreational trail running through this stand, its adjacency to the town road and public recreational sites may draw some people into it, and the current stocking of dead oaks may lead to future hazards.

STAND: 6                      ACRES: 10                      COVER TYPE: Mixed Hardwood/Pine

MANAGEMENT OBJECTIVE(S): Maintain and/or improve recreational trail access while protecting water quality values, and protecting native plant values by controlling non-native invasive plants.

SITE QUALITY: Fair. Soils are variable, with altered sites from past gravel and stone mining operations, and narrow ridges of Hinckley gravelly sandy loam. Where soil conditions haven't been completely altered by past mining, the site index is 60 for White pine and 49 for Red oak.

FOREST RESOURCE DATA:

STAND DENSITY: 100 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE: 115                      AVG. DIAMETER (DBH): 12"

STOCKING LEVEL: Under-stocked at 55% on Mixed Wood chart

STAND DESCRIPTION:

This stand occupies the southern portions of the western parcel, where past mining activities resulted in a variable landscape of pits, mounds, and narrow ridges.

The overstory in the eastern and northern portions of the stand is dominated by White and Pitch pines on the slopes of these narrow ridges, adjacent to the stream and the open bog area of the central valley. These pines are found in the medium to large sawtimber size classes, with some upland oaks found amongst them.

The western and southern areas of the stand, where the old gravel pits are found, include some lower slope sites along the southern boundary, with the stream flowing through that area. The overstory of this area is dominated by a mix of hardwoods, with a few larger pines present. The side slopes include oaks and Red maples, while the interiors of the old gravel pits are stocked with small diameter Birch and White pines.

Overall, the White and Pitch pines represent about 50% of the total stocking, although they are the dominant stems in the eastern and northern areas of the stand. Mixed oaks represent about 30% of the total stocking, with most of these stems in the upland areas of the southern and western areas of the stand. Other hardwoods include some Black birch and Hickory stems.

The access road into the southeast corner of the stand runs down towards the southern boundary, where there is a culverted crossing of the stream. This area includes some open-grown pines and maples, with a few standing dead oaks present. There is an old shed and foundation on the slope along the boundary.

Understory species in this portion of the stand include some non-native invasive plants, such as Glossy buckthorn. Saplings present in various areas of the stand include some White pine saplings, Black birch, and Black cherry. Shrubs include various species depending on slope position, with thickets of Highbush blueberry, green briars, and Sweet Pepperbush in the lower slope sites, along with grape vines, ferns, and Witch hazel.

#### HABITAT & WILDLIFE USE:

This stand provides some wetland wildlife habitat within the stream valley that cuts through it, the small wetland in the southwest corner, and at the bottom of a couple of the gravel mining pits, where seasonally wet conditions will be present. There are thickets of saplings and shrubs within the old mining pits that have developing vegetation that provides cover and nesting sites.

Patches and strips of mature pine and oak canopies provides a food resource with both hard and soft mast, while some standing dead oaks from the recent drought and defoliation events provides a snag resource for additional habitat values.

#### RECREATIONAL OPPORTUNITIES:

There are some footpaths and trails that run along the narrow ridges, with the main trail running in off the old paved access road in the southeast corner and then up towards the northwest, providing a connection to the well established trail that comes in from the recreational fields to the west.

These trails are not identified nor do they appear to be sanctioned or maintained by the SCC, although there is a potential for including them on a trail map and then providing some sort of maintenance to avoid any future water quality issues.

#### WATER QUALITY ISSUES:

The steep slopes found in various areas of the stand, surrounding the old gravel pits, have become an attraction to ATV riders. The existing trails that traverse the narrow ridges appear to be utilized by these ATV riders as well as pedestrians, likely coming in from the western access points. There were some freshly laid ATV tracks going straight up the steep slopes in previously undisturbed areas.

With the steep terrain and the adjacency to the water resources of the central valley, these ATV abuses may lead to erosion and sediment deposition in the drainages that cut through the stand to the stream valley and bog.

## MANAGEMENT RECOMMENDATIONS:

- Control Invasive Plants

There is a presence of non-native invasive plants in the southeast corner of the stand, where the access road descends to an old open area.

Control measures should involve a combination of mechanical and chemical control methods.

Mechanical methods include pulling of plants, cutting with saws and, in heavy infestations, removal by mowing and/or with heavy equipment. Any equipment access or soil disturbance activity in the vicinity of wetlands may require a review by the RI DEM Division of Freshwater Wetlands for applicability to exemptions and/or requirements for permitting.

Chemical control methods can include stump treatment with herbicide to minimize sprouting that involves the use of herbicidal concentrate painted on the freshly-cut stumps. Addition of a dye to the herbicide will facilitate tracking the application to improve control. For several years following the initial treatments, spot treat the sprouting and newly-established invasive plants with a diluted spray mixture of the chosen herbicide, according to the approved label directions.

Foliar application of herbicide may be applicable for certain situations that are not near wetlands or water bodies.

There are several commercial herbicide products available for these purposes, including Round-up or Rodeo (glyphosate), Brush-B-Gone (triclopyr), and Frontline (2,4-D). A brush-on-stump application of Rodeo concentrate, which is formulated for use within wetland areas due to a lack of a sticker compound which is harmful to fish, may be an option within wetland areas or adjacent to the pond.

Any application of these chemicals should be carried out by a licensed applicator or a certified invasive plant manager.

STAND: 7                      ACRES: 5                      COVER TYPE: Upland Oaks

MANAGEMENT OBJECTIVE(S): Maintain recreation trail access while improving forest health and wildlife habitat conditions.

SITE QUALITY:      Fair. Soils are Hinckley gravelly sandy loam, which is an excessively drained soil that has low productivity for Red oak and moderate productivity for White pine. The site index = 49 for Red oak and 60 for White pine.

FOREST RESOURCE DATA:

STAND DENSITY: 53 SQ. FT. OF BASAL AREA/ACRE

# TREES/ACRE:            131                      AVG. DIAMETER (DBH): 8.5"

STOCKING LEVEL: Under-stocked at 48% on Upland Central Hardwood chart

STAND DESCRIPTION:

This stand occupies the northwest upland area of the western parcel, on relatively level terrain of a ridge that is located to the west of the pond and bog area of the central valley.

Most of the stand is stocked with small diameter oaks and maples, with most of the stems in the 4 to 10 inch dbh size classes, along with a few scattered old pasture oaks. This old-field site may have burned in the past, based upon the condition of the soils and the relatively small size of the upland oaks that are found here. The stand is in the exclusion phase of successional development, where small diameter stems are dying from competition by their more dominant neighbors.

The northern portion of the stand is a small knoll lying between the pond and a stream that flows north adjacent to the western boundary. This portion of the stand is stocked with some large diameter oaks, including White oak and Northern red oak, and a few large diameter White pines. There are several large diameter dead oaks in this area due to the past defoliation events.

Understory species in this include some Red maple, hickory, Black cherry, and white pine saplings, with some recently established Black oak seedlings resulting from the increase in sunlight. There is a moderate presence of non-native Japanese barberry shrubs in the northern area of the stand, along with a heath of Lowbush blueberry and Huckleberry, and old-field grasses, throughout much of the stand.

HABITAT & WILDLIFE USE:

The oak component of this stand provides a valuable source of acorns for hard mast, as do the hickories. The inventory of standing dead trees will provide a source of wildlife



habitat for a number of years, although the presence of hazard trees along the trail will need to be dealt with. There are ample numbers of dead snags to provide habitat.

#### RECREATIONAL OPPORTUNITIES:

The recreational trails that are present in this stand are well-travelled and loop in from the athletic fields to the west of the property. Incorporation of trails from the southeast and inclusion of these trails on the Esek Hopkins Park trail map would formalize their presence, and cooperation with the Recreation Department may be needed for their maintenance.

#### WATER QUALITY ISSUES:

The stand's occupation of the slopes adjacent to the central stream and pond valley gives it an important water quality buffering function from the adjacent recreational trails and fields.

The presence of the closed North Scituate Town Dump has resulted in a number of water quality testing measures over the years, with results available in various reports that are referenced in the Baseline Documentation Report for the Esek Hopkins Park. No impacts to surface water quality has been reported by Providence Water and the RI DEM. Groundwater monitoring wells have also been established, with one remaining well, and results have shown presence of Toluene and other volatile compounds from contaminants within the dump.

#### MANAGEMENT RECOMMENDATIONS:

- Control Invasive Plants

Control of the non-native Japanese barberry shrubs in the northern portion of the stand should be carried out to prevent their further spread into the property. Investigation of the seed source of these shrubs is also important to pursue their removal, if possible.

Control measures should involve a combination of mechanical and chemical control methods.

Mechanical methods include pulling of plants, cutting with saws and, in heavy infestations, removal by mowing and/or with heavy equipment. Any equipment access or soil disturbance activity in the vicinity of wetlands may require a review by the RI DEM Division of Freshwater Wetlands for applicability to exemptions and/or requirements for permitting.

Chemical control methods can include stump treatment with herbicide to minimize sprouting that involves the use of herbicidal concentrate painted on the freshly-cut stumps. Addition of a dye to the herbicide will facilitate tracking the application to improve control. For several years following the initial treatments, spot treat the

sprouting and newly-established invasive plants with a diluted spray mixture of the chosen herbicide, according to the approved label directions.

Foliar application of herbicide may be applicable for certain situations that are not near wetlands or water bodies.

There are several commercial herbicide products available for these purposes, including Round-up or Rodeo (glyphosate), Brush-B-Gone (triclopyr), and Frontline (2,4-D). A brush-on-stump application of Rodeo concentrate, which is formulated for use within wetland areas due to a lack of a sticker compound which is harmful to fish, may be an option within wetland areas or adjacent to the pond.

Any application of these chemicals should be carried out by a licensed applicator or a certified invasive plant manager.

- Maintain the recreational trail system to stabilize soils to protect water quality:

Although the stream crossing by the loop trail is not located on the Esek Hopkins Park property, it is adjacent to the western boundary and any use of this trail system will involve that crossing. Stabilization of the soils on the slopes of the approach to the crossing will help prevent any sediment transport into the stream.

## Esek Hopkins Park Recreational Use Management Plan

The purpose of this Management Plan component is to provide a set of guidelines for the public use of the Esek Hopkins Park with respect to the primary purpose of providing the both passive and active recreational uses, to include hunting as a traditional recreational use, in accordance with RI DEM guidelines.

In accordance with the guidelines provided by the RI DEM Natural Heritage Program for Management Plans, the following outline is utilized.

### 1. Public Use

*a. Public Access* is provided for both active and passive uses. The Scituate Recreation Commission manages a softball field (Dean Andrews Memorial Field), a playground, and a picnic area with access along Battey Meetinghouse Road, and provides turf management of the large open grass fields in the north-central portions of the property. Events are held within these open fields as authorized by the Recreation Commission. Playground maintenance is provided by the Scituate Rotary Club.

The Scituate Conservation Commission maintains access for passive recreational uses with a trail system in the upland forest of the eastern parcel. A loop trail is marked with painted blazes, and a trail map is available. An additional trail in the western area of the western parcel is present, and is accessed from the athletic fields associated with the Scituate middle and high school. This trail is utilized by the cross-country team.

Public access for the proposed Hunting Zone of the eastern parcel will require use of the woodland trails to gain access to that limited area.

*b. Vehicle Parking* is provided at a parking lot adjacent to the softball field and playground in the eastern parcel off of Battey Meetinghouse Road. Additional parking for a few vehicles is provided across the road from that site for access to the several tables at the Picnic area.

*c. Vehicle limitations.* Beyond the Parking Lot, no vehicles will be allowed on the property except for agricultural vehicles and emergency needs, or for events involving vehicles, such as Classic Car shows, in the open field along Danielson Pike, by authorization from the Recreation Commission only.

*d. Trails.* The existing trails in the woodland will be maintained by periodic clearing of fallen debris.

*e. Litter pick-up and trash removal* will be provided by the Town of Scituate Public Works Department on a weekly basis. In addition, during the early Spring an annual clean-up will be organized by the SCC to remove any materials that may have accumulated during the winter.

*f. Permitted uses.* Active recreation in designated areas. Events in open field by authorization only. Passive recreation, i.e. walking, cross-country skiing, nature observation, environmental education, on the woodland trails. Access for hunting within the designated zone according to RI DEM guidelines.

*g. General Surveillance.* The Town of Scituate Police Department will provide daily surveillance in addition to the weekly visits of the Public Works Department and the regular inspections of the SCC Property Stewards. A Property Inspection Checklist has been developed by the SCC as a monthly reporting form.

*h. Scheduling.* Any events that require scheduling, including use of the open fields and the use of the softball field, is coordinated by the Scituate Recreation Commission.

## **2. Environmental Education**

The natural resource values of the Esek Hopkins Park will provide a good educational resource for local school groups and as a study site for Natural Resource students at all levels. The SCC should invite and encourage this type of use, and coordinate or schedule its use by groups and for formal research to prevent conflicting activities.

The SCC from time to time conducts publicized walks at its properties for the public, and will have the opportunity to utilize the Esek Hopkins Park for this purpose.

## **3. Department of Environmental Management Requirements**

- a. A posting of property boundaries by signs or paint on the trees will be provided. Signs will identify the entrance, type of use, month and hours of use.
- b. Hunting – Despite the fact that the State of RI does not currently allow hunting on the Esek Hopkins Park (pls refer to Figure 8, RI DEM Trimtown Hunting Area Map that follows, indicating Esek Hopkins Park as State Land - No Hunting), proposed deed language includes a requirement for the Town of Scituate to open this land up for hunting. Allowing access for deer hunting will require that the SCC develop a program to regulate and control this activity in a populated area with a variety of active and passive recreational pursuits taking place nearby.

If deemed necessary, the development of a hunting program for the Esek Hopkins Park must take into account the following:

- i. RI DEM guidelines for hunting shall be followed with regard to hunting seasons and setbacks from houses and public facilities;
- ii. A hunting zone is delineated on a PWSB Trimtown Hunting Area Map (Figure 9) illustrating the limitation of the 200 foot archery setback and the 500 foot shotgun/muzzleloader setback. The area associated with the

200-foot archery setback provides about 38 acres of hunting access, while the area for the shotgun/muzzleloader setback provides only 14.5 acres of hunting access;

- iii. The limited space that can be hunted will limit the number of hunters that can be in that space on a daily basis;
- iv. The recreational trail that runs through the allowable hunting space must be posted with hunting seasons, and trail users will also need to wear orange-colored outer clothing for visibility;
- v. Unless the PWSB agrees to incorporate this small hunting area into its program, a town official must be designated to manage this hunting program, with responsibility for issuing permits and mitigation of conflicts between hunters and other users of the Park

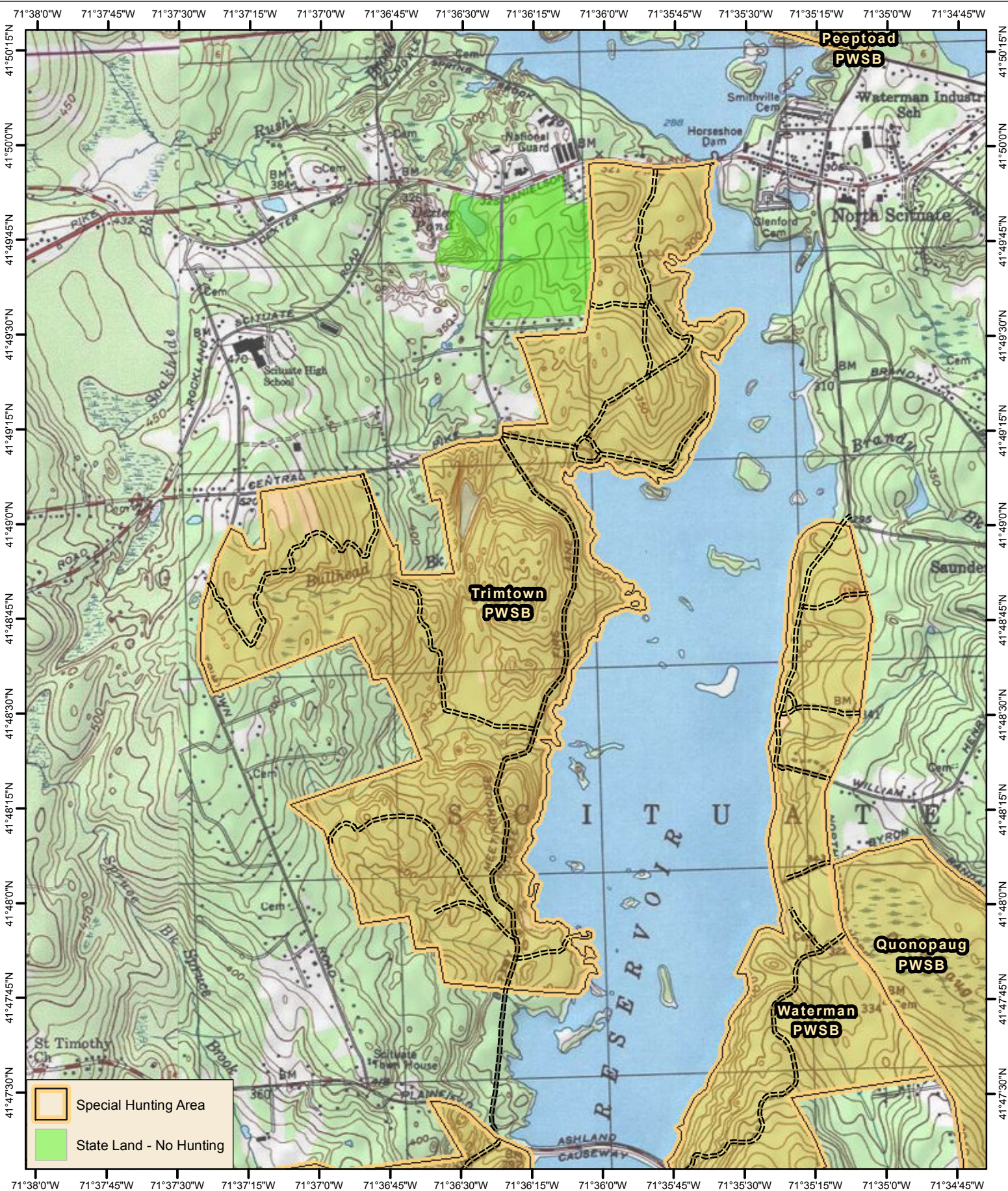
### **Recommendations:**

Maintain the recreation trails and facilities within the Park, as per assigned responsibilities amongst town departments and commissions and the volunteer efforts of the Scituate Rotary Club.

Coordinate group use of the Park, and offer the Park's natural resource values as an educational resource to the Town's public school system for outdoor classroom use. The SCC should include the Park in its program to offer publicized walks and outdoor events.

Due to the logistical difficulties of implementing a hunting program on a limited area with significant active recreational uses and abutting residential uses, the SCC and the Town of Scituate should pursue the removal of any deeded requirement to allow hunting on the Esek Hopkins Park.

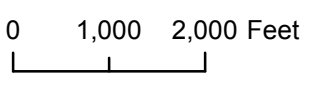
If required, an archery-only hunting area in coordination with the PWSB's Trimtown Hunting Area, along with their program management assistance would allow the town to implement hunting without having to develop their own program, which otherwise does not currently exist for any other town property. Appendix II includes PWSB guidelines.



Map # 45

Figure 8

**PWSB Trimtown  
Coop Hunting Area**  
Special Permit Required  
Contact RIDEM F&W (401)789-0281



RIDEM 2017  
paj

# PROVIDENCE WATER DEER MANAGEMENT PROGRAM

## Trimtown Hunting Area (H and I Blocks), Scituate, RI

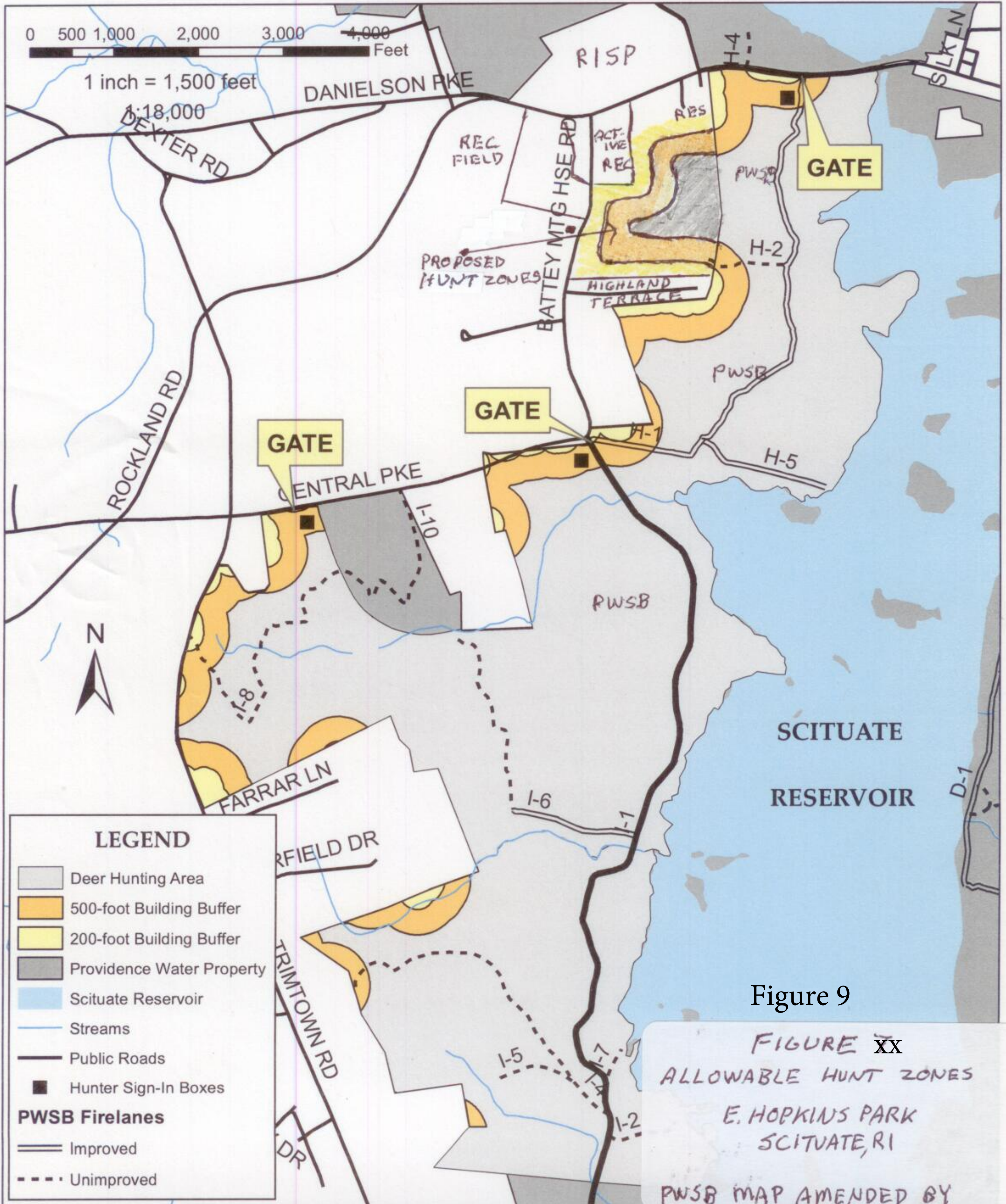


Figure 8

Figure 9

FIGURE XX  
 ALLOWABLE HUNT ZONES  
 E. HOPKINS PARK  
 SCITUATE, RI  
 PWSB MAP AMENDED BY  
 W. TREMBLAY, CF

# ESEK HOPKINS PARK LAND MANAGEMENT PLAN

## SUMMARY OF RECOMMENDATIONS

<u>STAND</u>	<u>TREATMENT</u>
2, 3, 4	Control salvage harvest of dead oaks to improve safety along trails
3, 4	Conduct TSI by harvesting poor quality trees to release food-bearing crop trees
6	Control invasive plants (see treatment recommendations on page 31)

### Recreational Access Management:

Close all trails in the central and southern areas of the eastern parcel for safety purposes until dead oak hazard trees can be safely felled and/or salvaged;

Provide maintenance of the trail system to improve public safety and increase their utilization;

### Hunting:

Due to the logistical difficulties of implementing a hunting program on a limited area with significant active recreational uses and abutting residential uses, the SCC and the Town of Scituate should pursue the removal of any deeded requirement to allow hunting on the Esek Hopkins Park.

If required, develop an archery-only hunting program, according to RI DEM season and setback guidelines, in coordination with the PWSB's Trimtown Hunting Area, along with their program management assistance. This would allow the town to implement hunting without having to develop their own program, which otherwise does not currently exist for any other town property. Appendix II includes PWSB guidelines.



# APPENDIX 1 - USDA SOIL SURVEY REPORT



United States  
Department of  
Agriculture

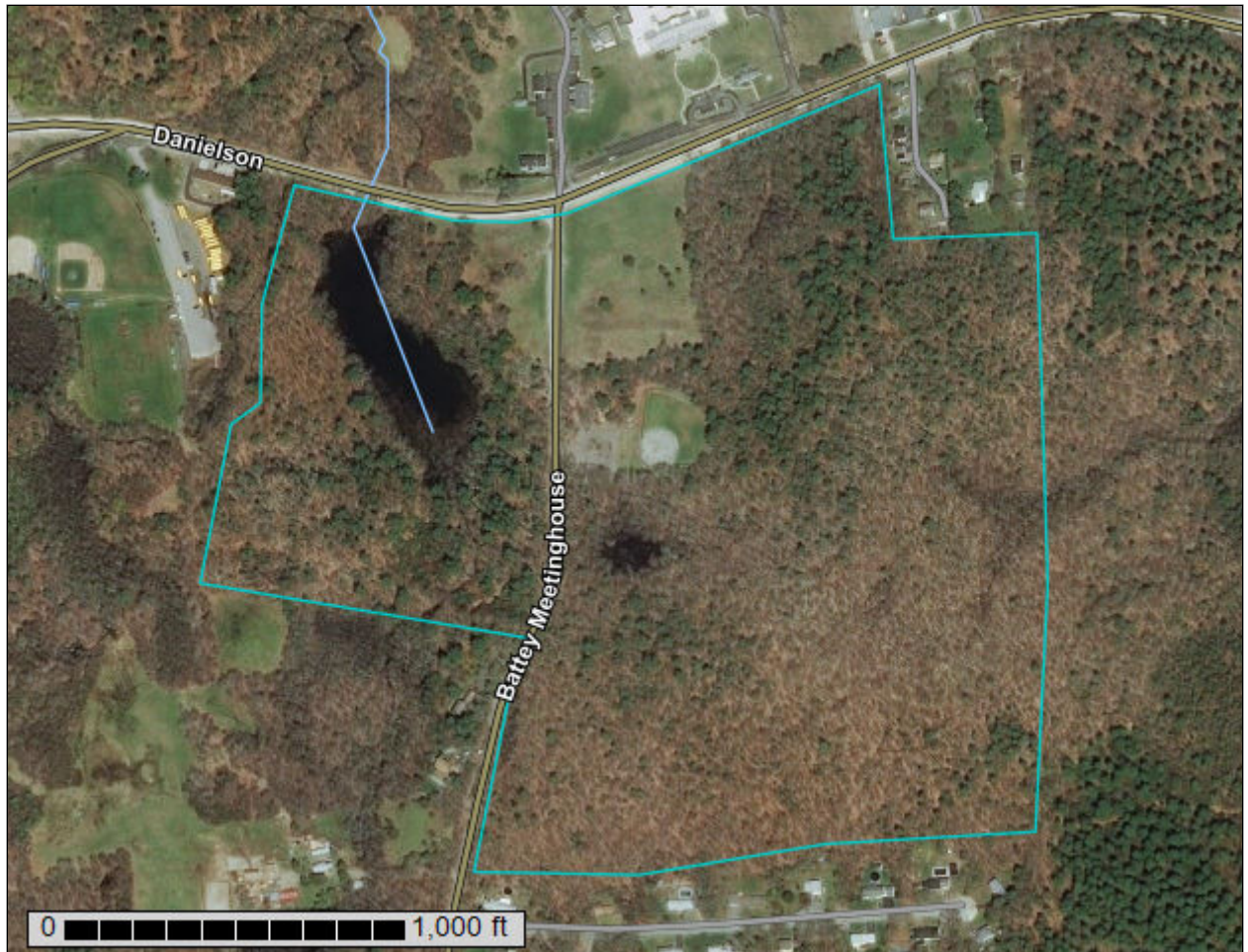
**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties

## Esek Hopkins Park, Scituate, RI



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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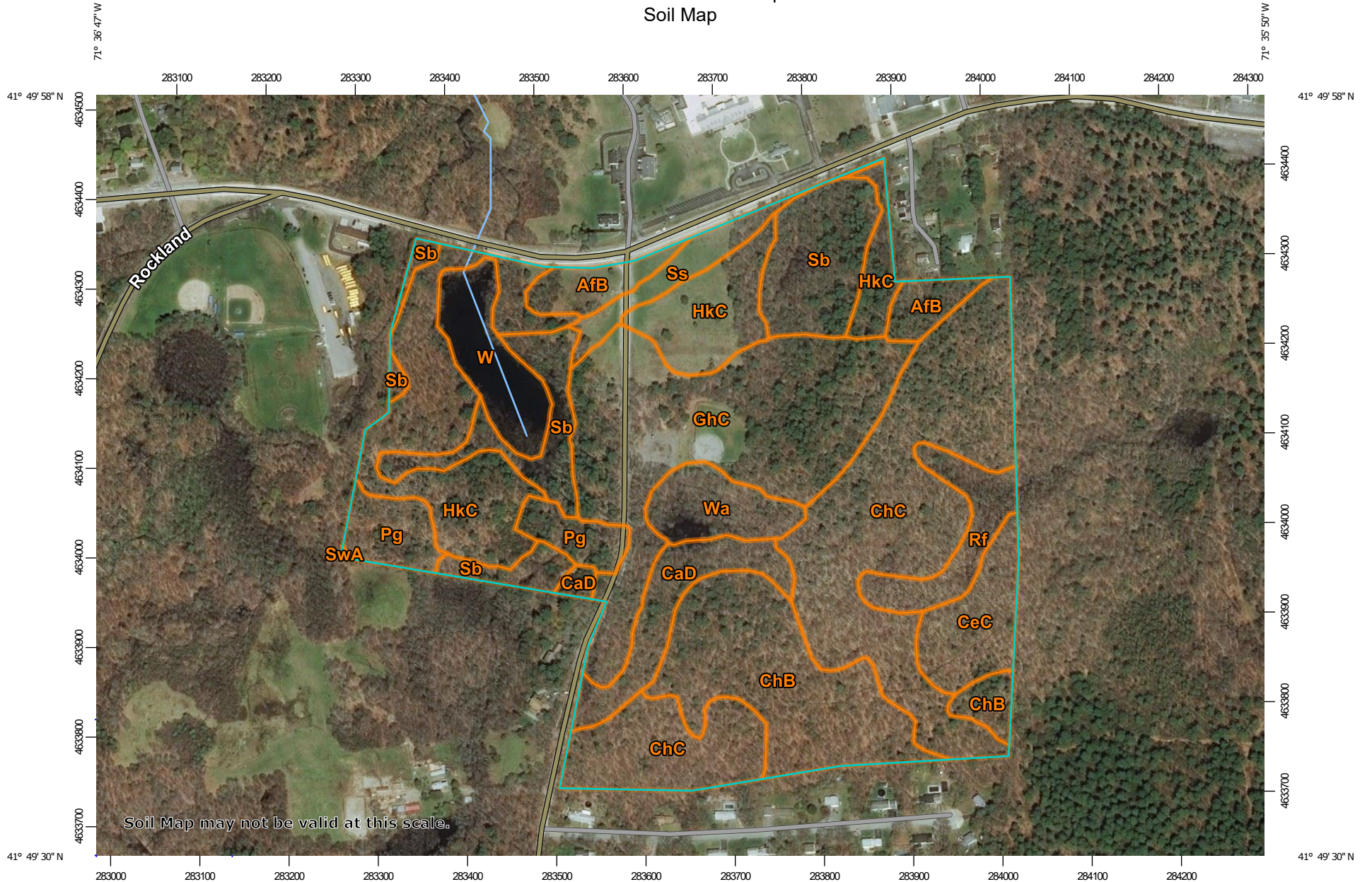
<b>Preface</b> .....	2
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<b>Soil Information for All Uses</b> .....	10
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# Soil Map

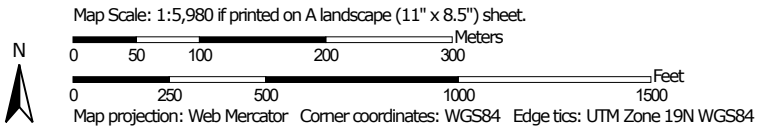
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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties  
 Survey Area Data: Version 18, Dec 6, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 3, 2019—Apr 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background



**MAP LEGEND**

**MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AfB	Agawam fine sandy loam, 3 to 8 percent slopes	2.8	3.0%
CaD	Canton-Charlton-Rock outcrop complex, 15 to 35 percent slopes, very stony	3.7	4.0%
CeC	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, very rocky	3.3	3.5%
ChB	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	10.2	10.9%
ChC	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	20.3	21.8%
GhC	Gloucester-Hinckley complex, 3 to 15 percent slopes, very stony	15.9	17.1%
HkC	Hinckley loamy sand, 8 to 15 percent slopes	13.6	14.6%
Pg	Pits, gravel	3.3	3.6%
Rf	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	2.8	3.0%
Sb	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	9.1	9.8%
Ss	Sudbury sandy loam	1.9	2.1%
SwA	Swansea muck, 0 to 1 percent slopes	0.0	0.0%
W	Water	3.4	3.7%
Wa	Walpole sandy loam, 0 to 3 percent slopes	2.7	2.9%
<b>Totals for Area of Interest</b>		<b>93.1</b>	<b>100.0%</b>

# Soil Information for All Uses

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## Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

## Vegetative Productivity

This folder contains a collection of tabular reports that present vegetative productivity data. The reports (tables) include all selected map units and components for each map unit. Vegetative productivity includes estimates of potential vegetative production for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture and rangeland. In the underlying database, some states maintain crop yield data by individual map unit component. Other states maintain the data at the map unit level. Attributes are included for both, although only one or the other is likely to contain data for any given geographic area. For other land uses, productivity data is shown only at the map unit component level. Examples include potential crop yields under irrigated and nonirrigated conditions, forest productivity, forest site index, and total rangeland production under of normal, favorable and unfavorable conditions.

## Forestland Productivity

This table can help forestland owners or managers plan the use of soils for wood crops. It shows the potential productivity of the soils for wood crops.

*Potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forestland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Custom Soil Resource Report

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

*Trees to manage* are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service, National Forestry Manual.

**Report—Forestland Productivity**

Forestland Productivity—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac/yr</i>	
AfB—Agawam fine sandy loam, 3 to 8 percent slopes				
Agawam	Bigtooth aspen	74	—	Bigtooth aspen, Black cherry, Black oak, Eastern white pine, Northern red oak, Paper birch, Pitch pine, Sugar maple, Sweet birch, White ash, White oak
	Black cherry	93	—	
	Black oak	60	—	
	Eastern white pine	70	129.00	
	Northern red oak	83	129.00	
	Paper birch	73	—	
	Sugar maple	65	—	
	Sweet birch	66	—	
	White ash	76	—	
CaD—Canton-Charlton-Rock outcrop complex, 15 to 35 percent slopes, very stony				
Canton, very stony	Eastern white pine	58	100.00	Eastern white pine, White spruce
	Northern red oak	52	29.00	
Charlton, very stony	Eastern white pine	65	114.00	Eastern hemlock, Eastern white pine, European larch, Northern red oak, Norway spruce, Red pine, Scarlet oak, Sugar maple, Tuliptree, White ash, White oak, White spruce
	Northern red oak	65	43.00	
	Red maple	55	29.00	
	Red pine	70	129.00	
	Red spruce	50	114.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
Rock outcrop	—	—	—	—

Custom Soil Resource Report

Forestland Productivity—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac/yr</i>	
CeC—Canton and Charlton fine sandy loams, 3 to 15 percent slopes, very rocky				
Canton, very stony	Eastern hemlock	—	—	Beech, Bitternut hickory, Black oak, Eastern hemlock, Eastern white pine, Gray birch, Mockernut hickory, Northern red oak, Pignut hickory, Red maple, Shagbark hickory, Sugar maple, White ash, White oak, Yellow birch
	Eastern white pine	58	100.00	
	Northern red oak	52	29.00	
	Red maple	55	29.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
	White oak	—	—	
Charlton, very stony	Eastern white pine	65	114.00	Eastern white pine, European larch, Northern red oak, Norway spruce, Red pine, Scarlet oak, Sugar maple, Tuliptree, White ash, White oak
	Northern red oak	65	43.00	
	Red maple	55	29.00	
	Red pine	70	129.00	
	Red spruce	50	114.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
ChB—Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony				
Canton, very stony	Eastern hemlock	—	—	Beech, Bitternut hickory, Black oak, Eastern hemlock, Eastern white pine, Gray birch, Mockernut hickory, Northern red oak, Pignut hickory, Red maple, Shagbark hickory, Sugar maple, White ash, White oak, Yellow birch
	Eastern white pine	58	100.00	
	Northern red oak	52	29.00	
	Red maple	55	29.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
	White oak	—	—	
Charlton, very stony	Eastern hemlock	—	—	Eastern white pine, European larch, Northern red oak, Norway spruce, Red pine, Scarlet oak, Sugar maple, Tuliptree, White ash, White oak
	Eastern white pine	65	114.00	
	Northern red oak	65	43.00	
	Red maple	55	29.00	
	Red pine	70	129.00	
	Red spruce	50	114.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
	White oak	—	—	

Custom Soil Resource Report

Forestland Productivity—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac/yr</i>	
ChC—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony				
Canton, very stony	Eastern hemlock	—	—	Beech, Bitternut hickory, Black oak, Eastern hemlock, Eastern white pine, Gray birch, Mockernut hickory, Northern red oak, Pignut hickory, Red maple, Shagbark hickory, Sugar maple, White ash, White oak, Yellow birch
	Eastern white pine	58	100.00	
	Northern red oak	52	29.00	
	Red maple	55	29.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
	White oak	—	—	
Charlton, very stony	Eastern hemlock	—	—	Eastern white pine, European larch, Northern red oak, Norway spruce, Red pine, Scarlet oak, Sugar maple, Tuliptree, White ash, White oak
	Eastern white pine	65	114.00	
	Northern red oak	65	43.00	
	Red maple	55	29.00	
	Red pine	70	129.00	
	Red spruce	50	114.00	
	Shagbark hickory	—	0.00	
	Sugar maple	55	29.00	
	White oak	—	—	
GhC—Gloucester-Hinckley complex, 3 to 15 percent slopes, very stony				
Gloucester, very stony	Eastern white pine	61	100.00	—
	Northern red oak	60	43.00	
	Red pine	49	57.00	
	Sugar maple	53	29.00	
	White oak	—	—	
Hinckley, very stony	Eastern white pine	61	100.00	Black oak, Eastern white pine, Pitch pine
	Northern red oak	49	29.00	
	Paper birch	60	54.00	
	Pitch pine	60	—	
	Red pine	54	92.00	
	Red spruce	39	86.00	
	Sugar maple	59	30.00	
	White spruce	52	114.00	

Custom Soil Resource Report

Forestland Productivity—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac/yr</i>	
HkC—Hinckley loamy sand, 8 to 15 percent slopes				
Hinckley	Eastern white pine	61	100.00	Black oak, Eastern white pine, Pitch pine
	Northern red oak	49	29.00	
	Paper birch	60	54.00	
	Pitch pine	60	—	
	Red pine	54	92.00	
	Red spruce	39	86.00	
	Sugar maple	59	30.00	
	White spruce	52	114.00	
Pg—Pits, gravel				
Pits	—	—	—	—
Rf—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony				
Ridgebury, extremely stony	Eastern white pine	63	114.00	American elm, Blackgum, Green ash, Pin oak, Red maple, Swamp white oak, Yellow birch
	Northern red oak	66	43.00	
	Red maple	62	—	
	Sugar maple	56	29.00	
	White ash	60	—	
Leicester, extremely stony	Eastern white pine	69	129.00	Green ash, Red maple, Tuliptree
	Northern red oak	56	43.00	
	Red maple	70	43.00	
	Yellow birch	—	—	
Whitman, extremely stony	Blackgum	52	—	—
	Eastern white pine	56	100.00	
	Northern red oak	70	—	
	Red maple	60	29.00	
	Red spruce	44	86.00	
	White oak	57	—	
Sb—Scarboro mucky fine sandy loam, 0 to 3 percent slopes				
Scarboro	Atlantic white cedar	45	—	Atlantic white cedar
	Red maple	55	29.00	

Custom Soil Resource Report

Forestland Productivity—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac/yr</i>	
Ss—Sudbury sandy loam				
Sudbury	Eastern white pine	60	100.00	Eastern white pine, European larch, Norway spruce, Red pine, White spruce
	Northern red oak	45	29.00	
	Red pine	60	86.00	
	Red spruce	47	100.00	
SwA—Swansea muck, 0 to 1 percent slopes				
Swansea	American elm	55	0.00	Balsam fir, Eastern hemlock, White spruce
	Atlantic white cedar	60	0.00	
	Balsam fir	45	86.00	
	Eastern hemlock	55	0.00	
	Green ash	35	29.00	
	Red maple	50	29.00	
	Red spruce	50	114.00	
W—Water				
Water	—	—	—	—
Wa—Walpole sandy loam, 0 to 3 percent slopes				
Walpole	Eastern hemlock	54	114.00	—
	Eastern white pine	68	114.00	
	Red maple	75	43.00	
	White ash	61	43.00	



## APPENDIX II - PWSB HUNTER REQUIREMENTS

# 2019 Providence Water Deer Management Program

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## HUNTING REQUIREMENTS – INDIVIDUAL PERMIT AREAS

**(Ashland, Hemlock Road, Joslin Farm, Riverview, Swamp Brook, Trimtown, Tunk Hill)**

Failure to obey any requirement described herein or any Rhode Island Department of Environmental Management Hunting Regulation will be grounds to have the permit immediately revoked.

1. Permit is not transferable.
2. Individual permit holder will be allowed to designate one hunting partner for the entire hunting season.
3. Permit holder and partner will only hunt in one assigned individual hunting area.
4. The hunting log issued by Providence Water will serve as proof of landowner permission and must be in hunters possession at all times while on the property. Each hunter must return the completed hunting log to Providence Water no later than **February 15, 2020**. Failure to return will render individual ineligible to participate in the next Lottery to hunt deer on Providence Water property.
5. Permit holder and partner must submit a copy of their 2019 RI Hunting License.
6. Permit holders will be on the property only for activities directly related to deer hunting and will not consume alcoholic beverages, start fires, or participate in any activities not related to deer hunting.
7. Hours allowed on the property are two (2) hours before sunrise to two (2) hours after sunset.
8. Permit holders will sign in and out on the entry log during every visit.
9. Only vehicles with proper registration and insurance are allowed on Providence Water property.
10. A colored placard provided by Providence Water will be placed on the vehicle's dash so it is visible through the windshield when on Providence Water property. The colored placard, not a photocopy, shall be used.
11. Travel on Providence Water access roads is at the permit holder's risk. Providence Water is not liable for any damages that may occur while on Providence Water land.
12. Permit holders will not utilize any other means of motorized transportation when on the property to include: motorcycles, dirt bikes, snowmobiles and ATVs.
13. Only stands that are properly labeled are allowed to be left on the property. The permit number must be clearly visible on the stand – if not properly identified, it may be removed by Providence Water personnel. All tree stands and other gear must be removed from the property by March 31, 2020.
14. The construction and use of permanent tree stands or the use of nails, spikes, bolts, or climbing devices that damage trees are prohibited.
15. By signing the Liability Release Form, the permit holder agrees to abide by all the above requirements and release Providence Water from all liability.

## APPENDIX III - INVASIVE PLANT FACT SHEETS



# MAINE INVASIVE PLANTS

## Japanese Honeysuckle

*Lonicera japonica*  
(Honeysuckle Family)

### Threats to Native Habitats

Japanese honeysuckle is most aggressive in partially shaded to open upland areas, such as forest edges, canopy gaps and stream corridors. It is most damaging where there is other vegetation it can climb over. Thick growth of Japanese honeysuckle blocks sunlight and gradually smothers other plants. Native shrubs and small trees can also be killed or stunted by girdling when honeysuckle vines wrap tightly around the stems, preventing water from moving through the plants. Japanese honeysuckle is most obvious when climbing high up and over plants along edges, but it also creeps along the ground in shadier areas where growth is moderated by low light levels. When disturbances occur causing the canopy to open, Japanese honeysuckle responds with dense growth.

### Description

Japanese honeysuckle is a trailing woody vine that may grow as much as 30 feet in length. Young stems are typically covered with fine hairs; older stems become hollow and have brown bark that peels off in shreds. Leaves are opposite, oval shaped, occasionally lobed, and about one to two inches long. Leaves may be evergreen to semi-evergreen depending on the severity of the winters where the plants are growing. Flowers are tubular or trumpet-shaped, creamy white to pink, and turn yellow with age. They occur in pairs from between the leaves, are fragrant, and bloom through most of the summer. The vines produce small, black berries with few seeds that mature in early autumn. Japanese honeysuckle is distinguished from Maine's two rare native vine honeysuckles (*Lonicera dioica* & *L. sempervirens*) by the leaves at the tip of the vine. On Japanese honeysuckle these leaves are separate, and on our native species they are fused or united, forming a single leaf surrounding the stem.



Japanese Honeysuckle (photo by John M. Randall, The Nature Conservancy)

### Habitat

Japanese honeysuckle colonizes disturbed areas including roadsides, open banks, old fields, forest edges, and managed forests. It is tolerant of a wide variety of soil conditions and is especially aggressive in disturbed bottomlands and floodplains. It invades native plant communities after natural or human disturbances such as windthrow, insect outbreaks, road building and logging.

### Distribution

Japanese honeysuckle was originally introduced to North America in the 1800s as a horticultural ground cover. It is native to eastern Asia. It is

currently found in most states in the south- and central-eastern parts of the U.S. As of 2003, this plant has been reported from only one island location in Maine. Severe winter temperatures may limit the spread of this species in northern latitudes.

## Control

Several effective mechanical and chemical methods of control are available. Selection of a control approach is determined by the extent of the infestation and available resources.

**Manual and mechanical:** For small patches, hand-pulling of vines and root systems may be effective. A hoe can be used to help free root systems. Hand-pulling is most effective on root systems when the soil is moist. Repeated removal may be necessary to prevent reestablishment.

**Chemical:** Herbicide may be applied by spray to leaves or in higher concentrations to stems. Both glyphosate and triclopyr herbicides have been used effectively on Japanese honeysuckle.

Following product directions, apply a 2.5 percent mixture of a glyphosate-based herbicide to leaves any time between spring and fall. Repeat applications may be needed. Treatment in the fall may help avoid damaging desirable native plants. Cut stems can be treated with 25 percent glyphosate or triclopyr mixture any time of year as long as the ground is not frozen. Use herbicides responsibly and follow manufacturer's directions. Contact the Maine Department of Agriculture for information on restrictions that apply to the use of herbicides. Consult a licensed herbicide applicator before applying herbicides over large areas.

## References:

Smith, C.L. *Exotic Plant Guidelines*. Raleigh, North Carolina: Department of Environmental and Natural Resources, Division of Parks and Recreation, 1998.

Bravo, M.A. "Japanese Honeysuckle: *Lonicera japonica* Thunb." *Weeds Gone Wild: Alien Plant Invaders of Natural Areas*. Plant Conservation Alliance's Alien Plant Working Group, <http://www.nps.gov/plants/alien/fact/loja1.htm> (accessed May 2003).

Josselyn Botanical Society. *Checklist of the Vascular Plants of Maine, Third Revision*. Orono, ME: Maine Agricultural and Forest Experiment Station bulletin 844, 1995.

Gleason, H.A. and A. Cronquist. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition*. New York: New York Botanical Garden, 1991.

**For more information or for a more extensive list of references on invasive species contact:**

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# MAINE INVASIVE PLANTS

## Asiatic Bittersweet

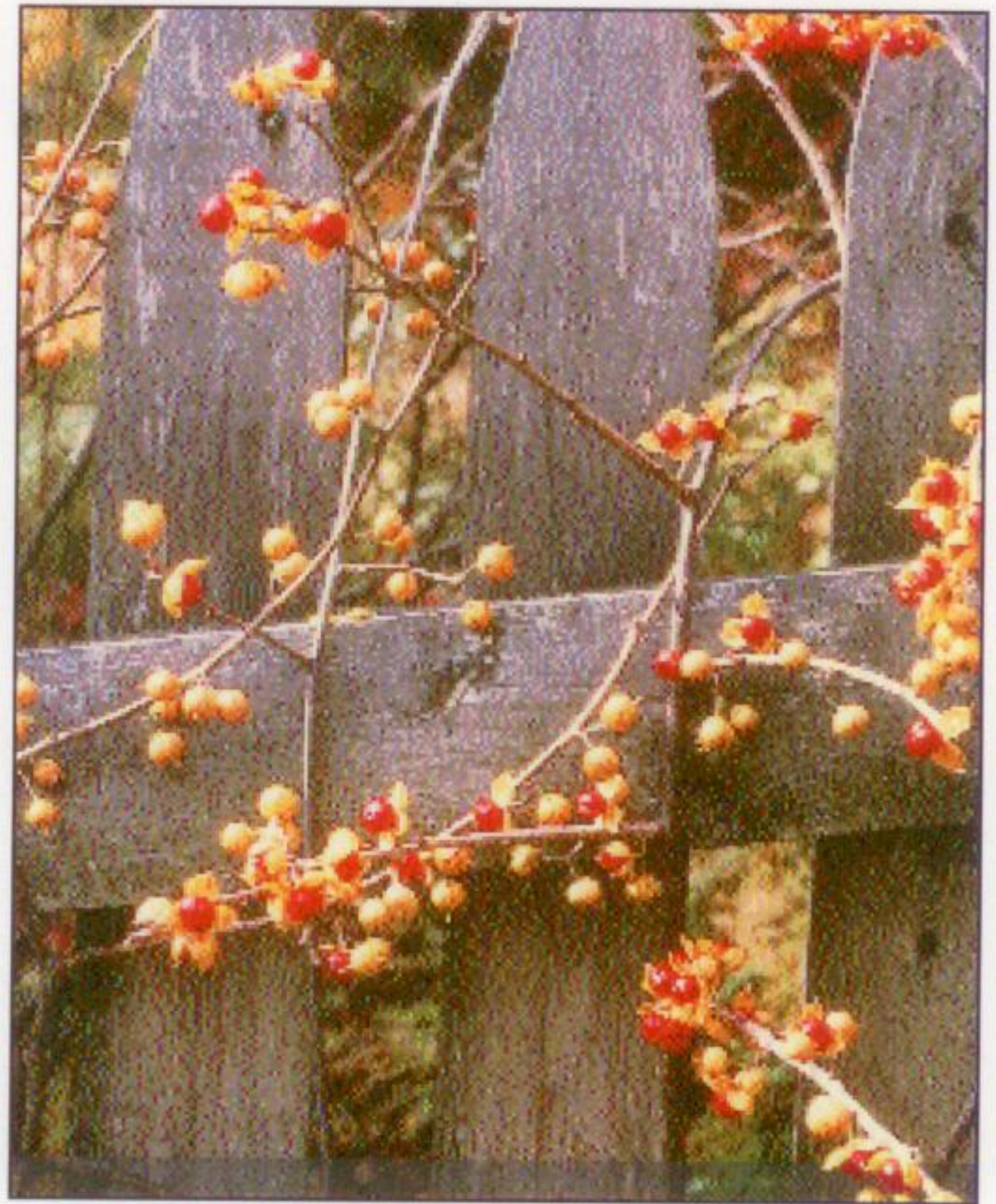
*Celastrus orbiculata*  
(Staff-tree Family)

### Threats to Native Habitats

Asiatic bittersweet poses a serious threat to other species and to whole habitats due to its aggressive habit of twining around and growing over other vegetation. This plant has a high reproductive rate, long-range dispersal mechanisms, and the ability to root-sucker. The vines can strangle tree and shrub stems. All types of plants, even entire plant communities, can be over-topped and shaded out by the vine's rapid growth. Nearly pure stands of this vine are sometimes found in affected areas. Recently it has been discovered colonizing sand dunes in Connecticut and Rhode Island.

### Description

Asiatic bittersweet is a deciduous vine that climbs by means of twining about a support. The branches are round, hairless, light to dark brown, and have noticeable lenticels (surface "bumps"). The outer surface of its roots is characteristically bright orange. Leaves are arranged alternately on the stems and vary in shape. They are typically oval with a pointed tip and range from one to five inches in length. Flowers are small, greenish-yellow, and grow in clusters from the joints between the leaves and the stems. The fruits are pea-sized capsules, which change in color from green to bright yellow as they mature. When the fruit is ripe the capsule splits open, revealing a bright orange-red berry within. Heights in excess of 50 feet have been recorded in the South. Asiatic bittersweet closely resembles our native American bittersweet (*Celastrus scandens*). The two can be distinguished by examining the locations of the clusters of flowers or fruits on the stems. American bittersweet's flowers and fruits are always found in clusters at the ends of stems, while Asiatic bittersweet's flowers are found in the joints where the leaves grow out of the stems. For accurate identification contact a natural resource professional.



*Asiatic Bittersweet* (photo by John A. Lynch, courtesy of the New England Wild Flower Society)

### Habitat

Asiatic bittersweet can grow in a variety of habitats ranging from floodplain forests to dry, rocky slopes. It has an affinity for forest edges where it has the greatest opportunity to twine around and grow over other plants while receiving lots of light. It is commonly found along fencerows, roadsides, power lines, and in abandoned fields. It is also successful in open woods, including tree plantations. It is dispersed by birds that eat the bright red fruits in winter. It is also dispersed by humans who use dry fruiting stems in flower arrangements, and then dispose of them on compost and brush piles.

## Distribution

Asiatic bittersweet is native to East Asia. It is thought to have been introduced to eastern North America in the mid-1800s for use as an ornamental. In some states it has been planted for highway landscaping as well as wildlife food and cover. It has escaped into the wild in the majority of the states where it is cultivated. In Maine, Asiatic bittersweet has been documented in five counties. It probably occurs in more, but has been under-collected due to a general lack of interest in weedy species.

## Control

Small patches can be hand-pulled. Take care to remove the entire root to prevent resprouting. Low patches have been successfully removed by cutting the vine and treating the regrowth with a triclopyr herbicide. Control is more successful in taller patches when cut stems are immediately painted with triclopyr or glyphosate. This plant has a substantial seedbank, and complete eradication may depend on repeating control methods for several years.

## References:

Josselyn Botanical Society of Maine. 1995. *Checklist of the Vascular Plants of Maine, Third Revision*. Orono, ME: Maine Agricultural and Forest Experiment Station.

Dreyer, G.D. 1987. *Element Stewardship Abstract for Celastrus orbiculata*. Arlington, VA: The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. Natural Heritage Databases.

The Nature Conservancy of Vermont. 1998. *Invasive Exotic Fact Sheet: Asiatic Bittersweet*. Montpelier, VT.

Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. New York: New York Botanical Garden.

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# MAINE INVASIVE PLANTS

## Common Buckthorn and Glossy Buckthorn

*Rhamnus cathartica* and *Frangula alnus*  
(Buckthorn Family)

### Threats to Native Habitats

Although seedlings of both buckthorns invade apparently stable habitats, they grow most successfully where there is ample light and exposed soil. These buckthorns have long growing seasons and rapid growth rates, and resprout vigorously after being topped. In North America, both species leaf out prior to most woody deciduous plants, and can retain their leaves well into autumn. Buckthorns rapidly form dense, even-aged thickets. The large leaves and continuous canopy create dense shade. Even-aged thickets are common in both wetlands and in woodland understories. Common buckthorn invasion is greatest in thinned or grazed woods, along woodland edges, and in openings created by windfalls. Common buckthorn's tolerance of moist, dry, or heavy clay soils increases its success in many types of habitats. Glossy buckthorn sometimes invades similar woodland habitats but more often invades wetlands that are comparable to its European wetland habitats. North American wetlands invaded by glossy buckthorn include wet prairies, marshes, calcareous fens, sedge meadows, sphagnum bogs, and tamarack swamps. Natural community composition, especially of upland deciduous woods and of wetlands, may be altered due to invasion of common buckthorn and glossy buckthorn. These species can cause habitat degradation, shade out rare species, and give rise to declines in native species diversity. Both buckthorns have become widespread in North America due to various disturbances, such as drainage, lack of fire, and woodland grazing and cutting, which have created ideal habitat for seedling establishment. Dispersal is accelerated by the birds and mammals that feed on the fruit of these species.

### Description

Common buckthorn is a deciduous shrub or small tree that grows up to 20 feet in height. Dull green leaves are oval, edged with fine teeth, and one to



*Buckthorn (top) and Glossy Buckthorn (photos by Mary W. Walker and Chris Mattrick, courtesy of the New England Wild Flower Society)*

two inches long. The leaves have several pairs of distinct veins that are curved toward the leaf tip. Leaf arrangement on the stem is alternate to nearly opposite. Twigs may be tipped with sharp, stout thorns. Small clusters of fragrant greenish-yellow flowers, each with four petals, grow from among the leaves. Like common buckthorn, glossy buckthorn is a deciduous shrub or small tree. It can readily be distinguished from common buckthorn by several obvious characters. Glossy buckthorn has similarly shaped leaves, but they are glossy or shiny and lack teeth on their margins. Flowers are also similar, but have five petals on glossy buckthorn. Plants of both species reach seed-bearing age quickly, and both produce drupes (berries). Care should be taken not to mistake the native alder-leaved buckthorn for



these non-natives. Alder-leaved buckthorn can be distinguished from common buckthorn by the lack of thorns at the end of its twigs, and it can be distinguished from glossy buckthorn by the presence of small teeth on its leaves.

## Habitat

Potential habitats of common buckthorn are diverse and include open woods, thickets on exposed rocky sites, hedgerows, pastures, and roadsides. It grows in well-drained sand, clay, or poorly drained calcareous soils, but prefers neutral or alkaline soils. It is less vigorous in dense shade. Glossy buckthorn typically inhabits wetter, less shaded sites than common buckthorn. It grows in soils of any texture. Habitats include alder thickets and calcareous or limestone-influenced wetlands.

## Distribution

Common buckthorn is native to Europe and grows in West and North Asia. Glossy buckthorn is native to North Africa, Asia, and Europe. In North America, common buckthorn is naturalized from Nova Scotia to Saskatchewan, south to Missouri and east to Virginia. Glossy buckthorn occurs from Nova Scotia to Manitoba, south to Minnesota, Illinois, New Jersey and Tennessee. These species were probably introduced to North America before 1800, but did not become widespread and naturalized until the early 1900s. In the past they have been cultivated for hedges, forestry plantings, and wildlife habitat. In Maine, common buckthorn is documented in nearly every county, while glossy buckthorn has only been documented in four counties.

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## Control

Cultural controls that have been used for management include cutting, mowing, girdling, excavation, burning, and "underplanting." Repeated cutting reduces plant vigor. Mowing maintains open areas by preventing seedling establishment. Glossy buckthorn girdled with a two- to three-centimeter-wide saw-cut, completely through the bark at the base, does not resprout. Girdling may be done at any time of the year. A five-second flame torch application around the stem kills stems less than 4.5 centimeters in diameter. Seedlings or small plants may be hand-pulled or removed with a grubbing hoe. Larger plants may be pulled out with heavy equipment. Excavation often disturbs roots of adjacent plants, or creates open soil readily colonized by new seedlings. This technique may be most useful to control invasion at low densities, or along trails, roads and woodland edges.

## References:

- Josselyn Botanical Society of Maine. 1995. *Checklist of the Vascular Plants of Maine, Third Revision*. Orono, ME: Maine Agricultural and Forest Experiment Station.
- Eckardt, N. 1987. *Element Stewardship Abstract for Rosa multiflora*. Arlington, VA: The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. Natural Heritage Databases.
- Smith, C.L. 1998. *Exotic Plant Guidelines*. Raleigh, North Carolina: Department of Environmental and Natural Resources, Division of Parks and Recreation.
- Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. New York: New York Botanical Garden.

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## MAINE INVASIVE PLANTS

# Japanese Barberry

*Berberis thunbergii*  
(Barberry Family)

### Threats to Native Habitats

Japanese barberry has escaped from cultivation and is progressively invading natural areas. It is a particular threat to open and second-growth forests. An established colony can eventually grow thick enough to crowd out native understory plants. Traversing through dense patches of barberry can be difficult and even painful. Birds eat the red berries, thereby spreading the shrub into new areas.

### Description

Japanese barberry is a dense woody shrub with numerous arching spine-bearing branches. It usually grows about three feet high, but occasionally reaches up to six feet. A single spine grows off the stem beneath each cluster of small wedge-shaped leaves. Its small yellow flowers are four-parted and can occur alone or in small clusters. Flowers appear in May, and the fruits—red oblong berries—persist on the plant into the following winter. In the fall, the leaves of Japanese barberry turn attractive shades of red and orange. Fall foliage color is one of the reasons this plant has been widely planted as an ornamental.

### Habitat

Japanese barberry is found in old fields, in open woods, on floodplains, on ledges, along power lines, and on roadsides. In Maine it occurs in thickets, on roadsides, and in open areas. Plants are both sun- and shade-tolerant, and invasions of relatively undisturbed woodlands are becoming more common. It grows successfully in a variety of soil types.

### Distribution

Japanese barberry is native to Asia. It was brought to North America in the late nineteenth century and has been widely planted as an ornamental. It has



*Japanese Barberry* (photo by Leslie Mehrhoff, courtesy of the New England Wild Flower Society)

escaped and naturalized (is established and reproducing in the wild) as far north as Nova Scotia, south to North Carolina, and west to Montana. In Maine, Japanese barberry has been documented in five counties. It probably occurs in more, particularly the southern counties, but has been under-collected due to a general lack of interest in weedy species.

### Control

Mechanical removal is recommended because it is effective and may cause the least disturbance. Japanese barberry is one of the first plants to leaf out in spring and is therefore easy to distinguish from other shrubs. Whole shrubs may be removed with a hoe or weed wrench. Use of thick or sturdy

gloves is recommended to provide protection from the spines. Plants can resprout from roots, so remove as much of the roots as possible. Regular mowing can prevent barberry from returning once it has been removed. In areas where mechanical removal is not practical, such as rock piles or outcrops, a glyphosate herbicide can be used. Consult a licensed herbicide applicator before applying herbicides over large areas.

## References:

Josselyn Botanical Society of Maine. 1995. *Checklist of the Vascular Plants of Maine, Third Revision*. Orono, ME: Maine Agricultural and Forest Experiment Station.

Haines, A. and T.F. Vining. 1998. *Flora of Maine*. Bar Harbor, ME: V.F. Thomas Co.

The Nature Conservancy of Vermont. 1998. *Invasive Exotic Fact Sheet: Japanese Barberry*. Montpelier, VT.

Brunelle, H. and B. Lapin. 1996. *Invasive Plant Information Sheet: Japanese Barberry*. Middletown, CT: The Nature Conservancy of Connecticut.

Gleason, H.A. and Cronquist, A. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. New York: New York Botanical Garden.

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