

## **1.0 INTRODUCTION**

This Land Management Plan for Island Pond in Harwich, Massachusetts was prepared by the BSC Group, Inc. at the request of and under contract to the Town of Harwich Conservation Commission. The evaluation is intended to be used by the Commission as a living guidance document for making management decisions at Island Pond and to assist the Commission in providing a safe multiuse passive recreation area while protecting wildlife habitat and natural resources.

a) **Purpose of Acquisition:**

The Island Pond property was acquired by the Town of Harwich to protect wetland resource areas as well as to provide open space for wildlife habitat and provide a public passive recreation area.

b) **Acquisition History:**

The Island Pond property was acquired by the Town of Harwich Conservation Commission by various deeds and other means between March 22, 1956 and September 27, 2005. See Title Information attachment for more information.

c) **Purpose of This Management Plan:**

The Island Pond Management Plan was commissioned by the Harwich Conservation Commission to evaluate historic information and prepare flora and fauna inventories, invasive species inventories, identification of wetland resource areas, wildlife habitat, public access and safety, and provide management alternatives and recommendations to identify short and long term management priorities for the property for the next five to fifteen years.

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## **2.0 SITE DESCRIPTION**

**a) Geographical Setting:**

The property is situated north, south, and west of Island Pond, north of Great Western Road, east of the Cape Cod Rail Trail, north of the Old Colony Rail Trail, and west of Route 124, and includes forested uplands, Atlantic White Cedar swamp, vernal pools, bordering vegetated wetlands, and freshwater ponds. It includes long since abandoned cranberry bogs and borrow pits and is bordered by intermittent and perennial streams, the Cape Cod Rail Trail Bikeway, Old Colony Rail Trail Bikeway, private residence, Town of Harwich Selectmen and Harwich Conservation Trust owned properties, Island Pond Cemetery, and the Cape Cod Lavender Farm (private residence).

**b) Property Boundaries & Adjacent Lands:**

The property is located west of Route 124, east of the Cape Cod Rail Trail Bikeway, and north of the Old Colony Rail Trail Bikeway (see Appendix 1, 2, & 3). The parcel is surrounded by single family homes, the two bikeways, the Cape Cod Lavender Farm, utility corridor, walking trails, cemetery, and freshwater wetlands. Access to Island Pond can be gained off Lonesomes Way, Main Street/Great Western Road and Weston Woods Road as well as the two bikeways.

**c) Geology, Soils, Climate, Hydrology:**

“The geologic history of Cape Cod involves the advance and retreat of the last continental ice sheet (named the Laurentide after the Laurentian region of Canada where it first formed) and the rise in sea level that followed the retreat of the ice sheet. On Cape Cod, these events occurred within the last 25,000 years” (source USGS, Glacial Cape Cod, Geologic History of Cape Cod by Robert N Oldale). The ice sheet advanced just south of the Cape and Islands where it began to retreat leaving moraine deposits forming the Cape and Islands. The site consists mostly of sandy soils, ponds and wetlands all created by the retreat and melt of the ice sheet.

Sandy soils allow for the fast movement of water through the soils and into the groundwater, ponds, rivers and streams. The site consists of a variety of soils but mostly of Carver Coarse Sands ranging in slopes of 0-35% (Source: Soil Survey of Barnstable County, Massachusetts, March 1993 and USDA Web Soil Science Website, see soil map in Appendix 4, and BSC’s field evaluations from 2011-2012). The rapid movement of water allows for chemicals and hazardous materials to quickly percolate through the soils and into the resource areas. This information is critical when managing the land, resource areas and wildlife habitat while promoting recreation. For example, a major problem area BSC identified is a material stockpiling and dumping area used at the Island Pond Cemetery located adjacent to a bordering vegetated wetland which runs into the Island Pond wetland system. Relocating/rearranging the storage area or placing a protective berm around it would potentially improve the water quality of runoff entering the Island Pond system. In addition, it is unclear what chemicals, if any, the lavender farm and neighboring cranberry farms are using adjacent to bordering vegetated wetland and what impact this use is having on the Island Pond ecosystem. Additional information may be available by talking to and working with the farms owners to increase protections, as needed. Also maintaining a wet meadow to a vernal pool within the Island Pond BVW is important. This hydrophilic meadow filters stormwater collecting in its vernal pool at the north eastern terminus of the Island Pond ecosystem

The climate and hydrology of Island Pond consists of an average rainfall of approximately 46" with average high temperature in the summers of upper 70's, low 80's and average lows in the winter in the 20's. Climate directly influences hydrology and the quality of the water within the resource areas. Extreme heat can increase the risk of eutrophication and algae blooms within the waterways which could lead to fish mortality and stress. It can also make the freshwater nonpotable (unhealthy) to animal and human consumption. Global warming and drought will play a major factor in climate and hydrologic influences on the resource areas. Stronger storms and heavier rains will increase erosion and sedimentation of streams, ponds, and lakes while droughts increase the potential of eutrophication and algae blooms. For example, draw down of water from neighboring farms, such as the cranberry farm across the Cape Cod Rail Trail Bikeway could put additional stress on the water level of the ponds, bordering vegetated wetlands, and streams. This Land Management Plan factors in potential climate changes over the next 15 to 25 years in the developing of the Island Pond Management Plan.

d) Historic and Archeological Resources:

While inventorying Island Pond resources, BSC interviewed Frank Cavanaugh of



Harwich who was using a metal detector along a trail east of Island Pond. When talking with Mr. Cavanaugh, BSC discovered he had found two musket balls dating back, in his opinion, to the late 18<sup>th</sup> Century<sup>1</sup>. To confirm, BSC photo-documented the musket ball and sent a scaled photo to the state archaeologist at the Massachusetts Historical Commission (see Historical Response Appendix 14 &15). After our conversation, Mr. Cavanaugh gave one musket ball to BSC

to be incorporated with this report and to be given to the Town of Harwich as a historic gift for preserving the Island Pond Conservation Area.

The area surrounding Island Pond contained several historic cranberry bogs as detailed in "Topography of Island Pond Area, Harwich Center" written by Lee W. Baldwin. In his narrative, Mr. Baldwin states that Island Pond is a shallow pond in Harwich Center that is gradually evolving into a Sphagnum/Atlantic White Cedar/Red Maple swamp. In the mid-1800's the pond totaled 21 acres and had a small island in its midst. The pond along with other nearby ponds (Walkers and Abrams) and the surrounding natural swamps were altered by diking, ditching and filling for cranberry cultivation over a century ago. The extensive network of cultivated bogs changed the landscape. And now these bogs, long abandoned, are returning to a natural state (taken from the Cape Cod Museum of Natural History website [www.ccmnh.org](http://www.ccmnh.org)). Many of the hand dug borrow pits and old drainage ditches discussed by Lee W. Baldwin can be witnessed within the overgrown vegetation in the woods and uplands.

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<sup>1</sup> Mr. Cavanaugh stated that the musket ball was located by metal detector along a trail parallel to an old cranberry bog ditch and was one of two found that day and was down about 6" under the trail. The adjacent bog had a small pond with a perennial stream flowing out of it and evidence of past cranberry operation was evident, e.g. sluice and hand dug ditches.

### **3.0 HABITAT AND SPECIES DESCRIPTION**

Much of Island Pond is considered a resource area and or buffer zone to a resource area as defined by the Wetland Protection Act and Town of Harwich Wetland Protection By-law. These wetland resources are identified below. BSC's Senior Wildlife Biologist and Professional Wetland Scientist (PWS) Norman W. Hayes and Wetland Professional In Training (WPIT) Matthew Creighton visited the site during the fall and winter of 2011-2012 and spring 2012 to evaluate the site. Subsequent field evaluations continue to document flora and fauna.

Field observations identified the following flora and fauna at the site:

#### **FLORA AND FAUNA INVENTORY**

##### **Wildlife and Vegetation**

BSC's list of wildlife and vegetative species observed at Island Pond is broken down by common and scientific name, and location (vegetation) starting with the Land Under Water and transitioning landward through the BVW and uplands. Note species with an asterisk are invasive species as identified in *A Guide to Invasive Plants in Massachusetts* prepared by the Massachusetts Division of Fisheries and Wildlife.

##### **a. WILDLIFE OBSERVED AND THOSE THAT ARE FREQUENTLY FOUND WITHIN THE ISLAND POND HABITAT**

##### **3.1.1**

##### **Birds**

<b>Common Name</b>	<b>Scientific Name</b>
Tree Swallow	<i>Tachycineta bicolor</i>
Yellow Rumped Warbler	<i>Dendroica discolor</i>
House Finch	<i>Carpodacus mexicanus</i>
Purple Finch	<i>Carpodacus purpureus</i>
House Sparrow	<i>Passer domesticus</i>
American Gold Finch	<i>Carduelis tristis</i>
Song Sparrow	<i>Melospiza melodia</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Brown Headed Cow Bird	<i>Molothrus ater</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Grey Catbird	<i>Dumetella carolinensis</i>
Black Capped Chickadee	<i>Poecile atricapilla</i>
American Robin	<i>Turdus migratorius</i>
American Crow	<i>Corvus brachyhynchos</i>
Blue Jay	<i>Cyanocitta cristata</i>
Eastern Starling	<i>Sturnus vulgaris</i>
Red Winged Blackbird	<i>Agelaius phoeniceus</i>
Common Grackle	<i>Quiscalus guiscula</i>
Mourning Dove	<i>Zenaida macroura</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Marsh Wren	<i>Cistothorus palustris</i>
Red Tail Hawk	<i>Buteo jamaicensis</i>

Northern Harrier	<i>Circus cyaneus</i> (Flight)
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Killdeer	<i>Charadrius vociferus</i>
Herring Gull	<i>Larus argentatus</i>
Osprey	<i>Pandion haliaetus</i>
Laughing Gull	<i>Larus atricilla</i>
Ring Billed Gull	<i>Larus delawaensis</i>
Canada Goose	<i>Branta canadensis</i>
Mallard Duck	<i>Anas platyrhynchos</i>
Bufflehead	<i>Bucephala albeola</i>
Great Horned Owl	<i>Bubo virginianus</i>
Great Blue Heron	<i>Ardea herodias</i>
Wild Turkey	<i>Nycticorax nycticorax</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Woodcock	<i>Scolopax minor</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
White Throated Sparrow	<i>Zonotrichia albicollis</i>
Northern Oriole	<i>Icterus galbula</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Green Heron	<i>Butorides virescens</i>
Yellow Bellied Sapsucker	<i>Sphyrapicus yariius</i>
Ruby Throated Hummingbird	<i>Archilochus colubris</i>
White Breasted Nuthatch	<i>Sitta carolinensis</i>
Eastern Bluebird	<i>Sialia sialis</i>
Horned Grebe	<i>Podiceps nigriollis</i>
Broad-winged Hawk	<i>Buteo platypterus</i>
Red Breasted Merganser	<i>Mergus serrator</i>
Green Winged Teal	<i>Anas crecca</i>
Mute Swan	<i>Cygnus olor</i>
Black Crowned Night Heron	<i>Nycticorax nycticorax</i>
Double Crested Cormorant	<i>Phalacrocorax auritus</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Red Bellied Woodpecker	<i>Melanerpes carolinus</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Bank Swallow	<i>Riparia riparia</i>
Red Throated Loon	<i>Gavia stellata</i>
Northern Flicker	<i>Colaptes auratus</i>
Greater Yellowlegs	<i>Trin melanoleuca</i>
Greater Black Backed Gull	<i>Larus marinus</i>
Least Tern	<i>Sterna antillarum</i>
Common Tern	<i>Sterna hirundo</i>
Yellow Billed Cuckoo	<i>Coccyzus americanus</i>
Tufted Titmouse	<i>Parus bicolor</i>
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>
Chestnut Sided Warbler	<i>Setophaga pensylvanica</i>

## 3.1.2

**Mammals**

Common Name	Scientific Name
Red Fox	<i>Vulpes vulpes</i> * active den, Island Pond
Coyote	<i>Canis latrans</i>
White Tailed Deer	<i>Odocoileus virginianus</i>
Raccoon	<i>Procyon lotor</i>
White Footed Mouse	<i>Peromyscus leucopus</i>
Meadow Vole	<i>Microtus pennsylvanicus</i>
Striped Skunk	<i>Mephitis mephitis</i>
Virginia Opossum	<i>Didelphis virginiana</i>
Eastern Cottontail Rabbit	<i>Sylvilagus floridanus</i>
Muskrat	<i>Ondatra zibethicus</i>
Woodchuck	<i>Marmota monax</i>
Eastern Chipmunk	<i>Tamias striatus</i>

b. **VEGETATION - Wetlands**

## 3.1.3

**Land Under Water****Herbaceous**

Common Name	Scientific Name
Common Reed	<i>Phragmites australis</i> *
Common Cattail	<i>Typha latifolia</i>
Eastern Bur-reed	<i>Sparganium americanum</i>
Arrowhead	<i>Sagittaria latifolia</i>
Soft Rush	<i>Juncus effusus</i>
Bulrush	<i>Scirpus atrovirens</i>
Swamp Loosestrife	<i>Decodon verticillatus</i>
Pickeralweed	<i>Pontederia cordata</i>
Yellow Waterlily	<i>Nuphar luteum</i>

## 3.1.4

**Bordering Vegetated Wetlands****Trees**

Common Name	Scientific Name
Red Maple	<i>Acer rubrum</i>
Atlantic White Cedar	<i>Chamaecyparis thyoides</i>
Tupelo	<i>Nyssa sylvatica</i>
Grey Birch	<i>Betula populifolia</i>
Green Ash	<i>Fraxinus pennsylvanica</i>
American Elm	<i>Ulmus americana</i>

**Shrubs**

Common Name	Scientific Name
Buttonbush	<i>Decodon verticillatus</i>
Virginia Rose	<i>Rosa virginiana</i>
Rugosa Rose	<i>Rosa rugosa</i>
Morrows Honeysuckle	<i>Lonicera morrwii</i> *

Northern Arrowwood	<i>Viburnum recognitum</i>
Smooth Sumac	<i>Rhus glabra</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>
American Cranberry	<i>Viburnum opulus</i>
Inkberry	<i>Ilex glabra</i>
Black Alder	<i>Alnus glutinosa</i>
Witch Hazel	<i>Hamamelis virginiana</i>
Steeplebush	<i>Spiraea tomentosa</i>
Common Reed	<i>Phragmites communis*</i>
Summer Sweet	<i>Clethra alnifolia</i>
Swamp Azalea	<i>Rhododendron viscosum</i>
Spicebush	<i>Lindera biezoin</i>
Sweetgale	<i>Myrica gale</i>
Sheep Laurel	<i>Kalmia angustifolia</i>
Swamp Leucothoe	<i>Eubotrys racemosa</i>
Elderberry	<i>Sambucus canadensis.</i>
Speckled Alder	<i>Alnus incana</i>
Smooth Alder	<i>Alnus serrulata</i>

### Herbaceous

Common Name	Scientific Name
Greene's Rush	<i>Juncus greenei</i>
Sedge spp.	<i>Carex spp.</i>
Cinnamon Fern	<i>Osmunda cinnomomea</i>
Royal Fern	<i>Osmunda regalis</i>
Sphagnum Moss	<i>Sphagnum spp.</i>
Hydrophilic Grasses (Wetland)	<i>Gramincae spp.</i>
Sensitive Fern	<i>Onclea sensibilis</i>
Tussock Sedge	<i>Carex stricta</i>
Jewelweed	<i>Impatiens capensis</i>
Skunk Cabbage	<i>Symplocarpus foetidus</i>
Greenbrier	<i>Smilax rotundifolia</i>
Poison Ivy	<i>Toxicodendron radicans</i>
American Cranberry	<i>Viburnum opulus</i>
Spiked Loosestrife	<i>Lythrum salicaria</i>
Bonsett	<i>Eupatorium perfoliatum</i>
Woolgrass	<i>Scirpus cyperinus</i>
Blue Vervain	<i>Verbena hastata</i>
Joe-Pye Weed	<i>Eupatorium purpureum</i>
Cardinal Flower	<i>Lobelia cardinalis</i>
American Cranberry Vine	<i>Vaccinium macrocarpon</i>

3.1.5

### Uplands Trees

Pitch Pine	<i>Pinus rigida</i>
White Pine	<i>Pinus strobus</i>
Black Oak	<i>Quercus velutina</i>
White Oak	<i>Quercus alba</i>

Black Locust	<i>Robinia pseudoacacia*</i>
Apple species	<i>Malus spp.</i>
Choke Cherry	<i>Prunus virginiana</i>
Black Cherry	<i>Prunus serotina</i>
American Holly	<i>Ilex opaca</i>
Black Gum (Tupelo)	<i>Nyssa sylvantica</i>
Red Cedar	<i>Juniperus virginiana</i>
Eastern Hemlock	<i>Tsuga canadensis</i>
American Beech	<i>Fagus grandifolia</i>
American Elm	<i>Ulmus americana</i>
Norway Maple	<i>Acer platanoides*</i>
Sycamore Maple	<i>Acer pseudoplatanus*</i>
Pignut Hickory	<i>Carya glabra</i>
Green Ash	<i>Fraxinus pennsylvanica</i>
Bigtooth Aspen	<i>Populus grandidentata</i>
Norway Spruce	<i>Picea abies</i>
American Hornbeam	<i>Carpinus caroliniana</i>
Scarlet Oak	<i>Quercus coccinea</i>

### Shrub

Bebb Willow	<i>Salix bebbiana*</i>
Scrub Oak	<i>Quercus ilicifolia</i>
Winged Euonymus	<i>Euronymus alatus*</i>
Black Huckleberry	<i>Gaylussacia baccata</i>
Common Buckthorn	<i>Rhamnus cathartica</i>
Dangleberry	<i>Caylussacia fondusa</i>
Lowbush Blueberry	<i>Vaccinium angustifolium</i>

### Herbaceous

Common Dandelion	<i>Taraxacum officinale</i>
Path Rush	<i>Juncus tenuis</i>
English Plantain	<i>Plantago lanceolata</i>
Chicory (Blue Sailor)	<i>Cichorium intybus</i>
White Aster	<i>Aster spp.</i>
Cypress Spurge	<i>Euphorbia cyparissias*</i>
Common Tansey	<i>Tanacetum vulgare</i>
Common Mullien	<i>Verbascum thapsus*</i>
Yarrow	<i>Achillea millefolium</i>
Hair Cap Moss	<i>Ploytrichum commune</i>
Old Man's Beard	<i>Usnea</i>
Old-Field Toad Flax	<i>Linaria canadensis</i>
Sheep Fescue	<i>Festuca oyina*</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Prairie Switchgrass	<i>Panicum virgatum</i>
Panic Grass	<i>Dichanthelium acuminatum</i>
Common Evening Primrose	<i>Oenothera biennis</i>
Slender-Leaved Goldenrod	<i>Solidago tenuifolia</i>

Common Milkweed	<i>Asclepias syriaca</i>
Russian Olive	<i>Elaeagnus angustifolia</i> *
Multiflora rose	<i>Rosa multiflora</i> *
Common St. John's Wort	<i>Hypericum perforatum</i>
Queen Anne's Lace	<i>Daucus carota</i>
Pearly Everlasting	<i>Anaphalis margaritacea</i>
Canada Thistle	<i>Cirsium arvense</i>
Wavy-Leaved Dock	<i>Rumex crispus</i>
White Clover	<i>Trifolium repens</i>
Red Clover	<i>Trifolium pretense</i>
Hydrophobic Grasses (Upland)	<i>Gramincae spp.</i>
Hayscent Fern	<i>Dennstaedtia punctilobula</i>
Haircap Moss	<i>Polytrichum commune</i>
British Solider Moss	<i>Cladonia cristatella</i>
Canada Mayflower	<i>Maianthemum spp.</i>
Cypress Spurge	<i>Euphorbia cyparissias</i>
Lady Slippers	<i>Cypripedium spp.</i>
Sriped Wintergreen	<i>Chimaphila maculata</i>
Trailing Arbutus	<i>Epigaea repens</i>
Checkerberry	<i>Gaultheria procumbens</i>

Vine

Oriental Bittersweet	<i>Celastris orbiculatus</i> *
Poison Ivy	<i>Toxicodendron radicans</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>

Note: for a complete “working” list of plants and animals please see the attached and electronic excel workbook, which lists all Conservation Commission owned parcels associated with this project and can easily be updated as information from additional observations become available (see Appendix 12 for plant list).

**c. AQUATIC, RIPARIAN OR WETLAND FEATURES**

3.2.1 *Land Under Waterbodies and Waterways*

Land Under Waterbodies and Waterways is presumed to be significant to all the values in the act (310 CMR 10.56) and is defined as land under any creek, river, stream, pond, or lake. Island Pond and the associated perennial river are considered Land Under Waterbodies and Waterways. Streams are defined at 310 CMR 10.04 as a body of water which moves in a definite channel on the ground due to hydraulic gradient and which flows in, out or within areas subject to protection under the Act at 310 CMR 10.54(4(a)). Two small stands of *Phragmites* were noted one southwest



of the pond (see picture) growing within a floating bog along the edge of the pond and the second along the eastern shoreline and these *Phragmites* stands are listed as a top priority for removal and treatment. Maintaining water levels and pollution is necessary to protect the exceptional freshwater fish habitat within the pond. Also of note is that the Island Pond watershed drains into the Herring River via Coy Brook which is identified as one of the most important anadromous fisheries on Cape Cod for Alewife (*Alosa pseudoharengus*) and Blueback Herring (*Alosa aestivalis*).

### 3.2.2 Bordering Vegetated Wetlands (BVW)

BVW is defined in 310 CMR 10.55(2) as freshwater wetlands which border on creeks, rivers, streams, ponds, lakes, or on a coastal wetlands resource area touching a water body. Often BVW's are considered wet meadows, marshes, swamps, and bogs. BVW's provide, perhaps, the most important inland wildlife habitat, and as such are regulated strictly by the Act. Island Pond contains large expanses of BVW's associated with the pond and intermittent/perennial streams. Emerging Atlantic White Cedar swamps were noted within the BVW in the northeast and southeast corners of the property. A northeast Atlantic White Cedar swamp is also located in an area of historic borrow pits associated with abandoned cranberry operations. Also located within the BVW are small pockets of *Phragmites*, which are noted as a high priority for removal and treatment. These areas provide important wildlife habitat and an invasive species monitoring and a removal program should be prepared and implemented to prevent spreading of *Phragmites*. Also, trails constructed through the White Cedar swamp and clearing of the shrub BVW have diminished habitat value along the east and north sections of Island Pond.

### 3.2.3 Land Subject to Flooding & Vernal Pools

Isolated Vegetated Wetlands/Isolated Land Subject to Flooding is presumed to be significant to all the values in the act (310 CMR 10.57) and is defined as an isolated depression or a closed basin which serves as a ponding area for run-off or high ground water. According to the 2008 Natural Heritage and Endangered Species Atlas, 12<sup>th</sup> Edition, there is one vernal pool listed for the site (as of October 1, 2008) adjacent to Route 124 in the northeastern section of the property. However, the Mass GIS online viewer OLIVER, has two certified vernal pools and six additional pools listed as "potential" either on or adjacent to the site. Only one potential vernal pool is located on the Conservation Commission land with another one located on the Harwich Conservation Trust land to the north, one within the Island Pond Cemetery, one east of the cemetery near the corner of Route 124 and Main Street and two south of the cemetery directly across Main Street (see Appendix 9 & 10, Vernal Pool Certifications). The certified pools are



afforded additional protection under Wetlands Protection Act, Natural Heritage and Endangered Species Program and Army Corps of Engineers. However, the potential pools located on site or adjacent to the site do not carry these additional protections. Therefore, it is in the Town of Harwich's best interest to attempt to certify any potential vernal pools and to obtain adjacent land, if possible, that have potential vernal pools. These potential vernal pools should be considered high priority habitat, monitored and certified as vernal pools with the Natural Heritage and Endanger Species Program.

Once protected and certified they become Commonwealth of Massachusetts outstanding resource waters, and as such, would require a Massachusetts Department of Environmental Protection Water Quality Certification if the pool or its 100' buffer is to be altered. Additional efforts to monitor water levels should also be considered as the hydrology of this area is manipulated by cranberry operations. These areas are also important in the protection of ground water and storm water run-off retention and infiltration. During BSC's inventory of the site in the Fall 2011 and again in the Spring 2012, two vernal pools were documented to meet the requirements to be certified as vernal pools.

#### 3.2.4 Banks (Naturally Occurring Banks and Beaches)

Banks are presumed to be significant to all the values in the act (310 CMR 10.54) and are defined as the portions of the land surface which normally abut and confine a water body. It occurs between a water body and an upland. A bank may be partially or totally vegetated or it may be comprised of exposed soil gravel or stone. The Island Pond area has several banks surrounding the bordering vegetated wetlands and streams which run through the resource areas. Several of the banks northeast of the pond have been manipulated and contain hand dug borrow pits, which were excavated out of the naturally occurring banks. Banks are very important to wildlife and provide breeding habitat, escape cover and food sources as well as containing surface water and flood waters and are important filters for surface water and groundwater. The soils at the site are primarily sand making the banks excellent turtle nesting habitat.

#### 3.2.5 Riverfront Area

Riverfront Area is presumed to be significant to all the values in the act (310 CMR 10.58) and is defined as the area between a river's mean annual high water line and a parallel line measured horizontally. A river is any naturally flowing body of water that empties to any ocean, lake, pond, or other river and which flows throughout the year. Rivers include streams (310 CMR 10.04: stream) that are perennial because surface water flows within them throughout the year. Intermittent streams are not rivers as defined herein because surface water does not flow within them throughout the year. The USGS map (Appendix 3) shows two perennial streams flowing into and/or out of the site. One southern stream flows out of Island Pond and crosses Main Street, while the second flows in from Route 124 (south of the Teixeira Property) and north of Island Pond, through a series of small ponds, and out to a series of cranberry bog along the Cape Cod Rail Trail bikeway turning into Coy Brook and draining into the Herring River. Sections of these streams have been manipulated to accommodate existing and historic cranberry bog operations.

#### 3.2.6 Estimated Habitat of Rare Wildlife

Estimated Habitat of Rare Wildlife is presumed to be significant to all the values in the act ( 310 CMR 10.59 (Inland)) and is defined as those vertebrate and invertebrate animal species officially listed as endangered, threatened, or special concern by the Massachusetts Division of Fisheries and Wildlife under 321 CMR 10.60. All of Island Pond is within mapped Estimated Habitat of Rare Wildlife, which should be considered when managing the areas network of trails, parking and access roads (see Appendix 9 & 10). A supplemental document requested from NHESP Program containing the endangered species will be provided to the Conservation Commission. Identification and endangered species habitat information will be kept separate from this public document in order to protect the listed species. Please note that when the Route 124 – Bike Path – Old Cemetery vernal pool is certified, the hydrophilic wet meadow with the vernal pool will be provided with the additional protection of a 150' buffer zone and the ORW designation.

**d. INVASIVE SPECIES AND NOXIOUS WEEDS, PRESENCE OR ABSENCE**

Please note all invasive species found are noted above with an asterisk in “Vegetation” (part b.) above. However, several invasive species were NOT noted within Island Pond and should be monitored and removed if introduced into the area. Common invasive species found and to look for are:

Multiflora Rose	<i>Rosa multiflora</i>	Found
Japanese Knotweed	<i>Fallopia japonica</i>	Found within the Cemetery storage area
Mile-A-Minute Vine	<i>Persicaria perfoliata</i>	Not Found
Glossy Buckthorn	<i>Frangula alnus</i>	Found
Norway Maple	<i>Acer platanoides</i>	Found
Common Reed	<i>Phragmites australis</i>	Found
Black Locust	<i>Robinia pseudoacacia</i>	Found
Russian Olive	<i>Elaeagnus angustifolia</i>	Found
Bittersweet Vine	<i>Celastrus scandens</i>	Found
Nightshade	<i>Solanum spp.</i>	Found
Morrows Honeysuckle	<i>Lonicera morrowii</i>	Found
Japanese Honeysuckle	<i>Lonicera japonica</i>	Found
Porcelain Berry	<i>Ampelopsis brevipedunculata</i>	Not Found
Bishops Weed	<i>Aegopodium podagraria</i>	Not Found
Purple Loosestrife	<i>Lythrum salicaria</i>	Found
Garlic Mustard	<i>Alliaria petiolata</i>	Found
Gypsy Moth	<i>Lymantria dispar</i>	Found
Sycamore Maple	<i>Acer Pseudoplatanus</i>	Found
Winged Euonymus	<i>Euonymus alata</i>	Found
Yellow Iris	<i>Iris pseudacorus</i>	Not Found
Pitch Pine Borer	<i>Synanthedon pini</i>	Found
Winter Moth	<i>Operophtera brumata</i>	Found
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Found
Asian Long Horned Beetle	<i>Anoplophora glabripennis</i>	Not Found

Some of the above listed invasive species that were not found in Island Pond were found within the Town of Harwich and/or the Commonwealth of Massachusetts and therefore should be monitored for. Currently the best treatment for invasive species within a resource area is Glyphosate herbicide solution (such as Rodeo Brand). This herbicide has a very short half life in Cape soils and can be used within and around wetland resource areas. Each species should be treated differently and as such only a knowledgeable professional specializing in invasive removal and certified as a Licensed Chemical Handler by the State of Massachusetts should remove and treat invasive species. Three basic types of treatment are cutting vegetation and wiping or spraying the chemical on the stumps or stems, using a foliar sprayer to spray foliage and stem injections.

Treatment and removal of invasive species should be directed to small new colonies of invasives (see Appendix 4, Management Activities Map). These areas should be eradicated and monitored to prevent spreading. Control should then shift to mid size areas that have the potential to spread but are small enough to control. Finally, large areas should be monitored and prevention should turn to stopping the spread of the invasive and not complete eradication. Currently there are two separate areas of *Phragmites* that should be immediately addressed. The first is on a small

shallow floating bog forming within Island Pond and the second is along the eastern shoreline of the pond. Both of these populations are small and should be treated and eradicated.

**e. THREATENED, RARE OR ENDANGERED SPECIES**

Please see Section 3.2.6 (Estimated Habitat of Rare Wildlife) above and the attached supplemental documentation obtained from Natural Heritage and Endangered Species Program. This information is not being provided in this public document as the location of types of rare and endangered species should be protected and remain unknown to the general public. By doing so, the Town of Harwich Conservation Commission can be assured that no one will go out looking for or collecting the protected species.

**4.0 PHYSICAL LAND USE, PUBLIC ACCESS**

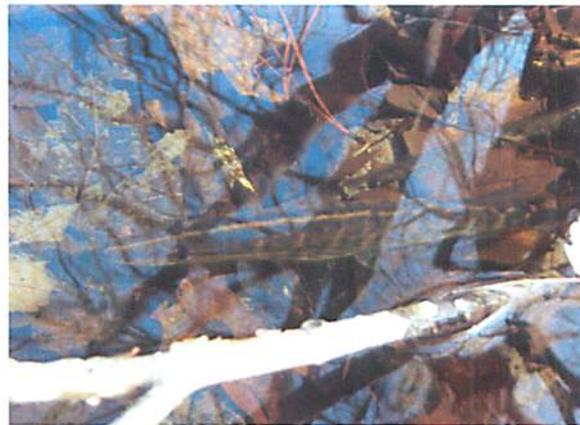
Island Pond has limited access points but many land uses. The land is used by hunters, fisherman, walkers, hikers, bike riders, wildlife observers, artists, people using metal detectors, and naturalists. Access to Island Pond can be gained off either the Cape Cod Rail Trail bikeway or the Old Colony Rail Trail bikeway west and south of Island Pond, (parking at the Town Hall or a bike lot off Route 124 and walking/riding west) and from a parking area on the south side of Queen Anne Road west of Route 124. Additional access can be gained north of Main Street off Lonesome Way, Guilford Drive, or Uncle Harrys Road and west of Route 124 off Weston Woods Road, Lexington Drive and an old cranberry bog turned blueberry patch off Dexter Avenue. Currently there is no parking at these areas.



shallows of one pond located to the northwest of Island Pond near the Cape Cod Rail Trail.

Additional parking should be considered to improve access to the existing trail network around Island Pond. This may be accomplished if space is available off Island Pond Road within or adjacent to the Island Pond Cemetery, off Lonesome Way or Uncle Harrys Road at the end of the dirt roadways or off Weston Woods

As an example of this varied land use, BSC spoke with two fishermen; the Verrill's, a father and son, fishing a secret fishing hole at Island Pond where the pair recorded catching ten trophy fish within the pond, including this Large Mouth Bass on 9/27/2011.<sup>2</sup> This footnote provided continues a valued father and son tradition; one that says everything you need to know about Island Pond. BSC was also able to spot a six inch Northern Chain Pickerel in the



<sup>2</sup> This photo was forwarded via email with the following exact caption, "Refound a path to island pond (sic) and caught this muskellunge on the first cast. A couple of big strikes later and then finished with a large big mouth bass, a bit bigger from the last. I out back the muskie, but kept the bass so mom can have it for dinner."

Road near the Lavender Farm. All of which lead to the existing trail network and/or Old Colony Rail Trail bikeway.

All parking areas should have signage describing the sensitivity of the resource areas and promote trash removal as well as staying on existing trails. Much of the trail network around Island Pond is in good condition with limited erosion from steep slopes and on side trails used to access the water for fishing. Trails located on steep slopes, which are eroding into the resource areas, should be stabilized with Oak chip mulch and waterbars or closed and planted as needed. This is mainly along the Old Colony Rail Trail abutting Island Pond. Exposed Pitch Pine roots along trails invite borers that prefer the Pitch Pine and are attracted to the resin. These well used trails could be covered with Oak chip mulch, which will protect the soils, roots, prevent erosion and reduce the borer damage to Pitch Pines. Finally, reducing/maintaining the width of trails to a single track walking trail will reduce the use of the trails by off road vehicles (ORV), cars and trucks and reduce erosion. As trails continue to widen more soils are lost and compacted and more roots are exposed damaging trees. A consideration for a new trail out to an emerging Atlantic White Cedar swamp should also be considered north of the pond. This area was heavily excavated (by hand) for cranberry operations and a section of it is converting back into Atlantic White Cedar Swamp. A trail with interpretative signage explaining the borrow pits and Cedars could be an educational tool to make people aware of this unique habitat and historic agricultural site. This trail may need to be raised by way of a walkover structure to cross wetlands here.

## **5.0 MANAGEMENT GOALS & ENVIRONMENTAL IMPACTS**

### **a) Biological Elements: Goals and Environmental Impacts:**

Primary goals for Island Pond and all of its parcels is to minimize impacts, maximize passive public usage and protect native habitat. This can be done in many ways and could be achieved by involving the Boy Scouts, local schools, Arbor Day projects, Americorps, volunteers, grants, non-profit organizations, etc. Impacts can be minimized by the following ways:

- *Reducing and maintaining the width of trails:* Reducing and maintaining the width of trails will reduce impacts to soils, reduce erosion, increase buffer zones to resource areas, help reduce ORV and vehicular traffic, reduce root impacts and maximize wildlife habitat.
- *Preventing ORV traffic on trails:* ORV and vehicular traffic creates erosion, impacts tree roots, widens trails, and is a danger to passive recreational users. They are often driven through wetlands, can tip over and leak fuel, oil or coolant which can endanger wildlife and waterways. Also they create visual noise and pollution, which disturbs wildlife and passive recreational use.
- *Improving buffer zones to resource areas:* This can be done by relocating walking trails away from the wetlands and re-creating a natural buffer zone. One area in particular, is a series of trails that bisect the bordering vegetated wetland east of the pond, which lead up to a large cleared area being used by local kids as a hangout (see Appendix 4, Management Activities Map). This area has several cut trees used to form a teepee, a fire ring and trash all located within the wetland resource area. By closing off some trails, you will regain buffer habitat. Although the trails being used in the resource area and the “hangout” area itself should be removed, one section of trail just off the dirt walking path/driveway off the Old Colony Rail Trail Bikeway contains a beautiful Atlantic White Cedar swamp and may be converted to a

boardwalk and viewing area with interpretative signage. The boardwalk would reduce impacts to soils and vegetation and keep visitors on track. This will be further discussed in Section C “Public Use Elements” below. Buffer zones are important for a variety of reasons and are protected by the Wetlands Protection Act and Town of Harwich Wetlands Protection By-law.

- *Reducing erosion from trails and access roads:* This can be accomplished by narrowing trails, removing steep trails leading into the ponds, mulching trails with Oak mulch, to control Pitch Pine Borers and installing water bars in high volume fishing areas. Symbolic fencing and signage can be used to keep people out of these high erosion areas while they are stabilizing. Large trees, boulders, and gates maybe used across trails to prevent access and close areas off and prevent ORV use.
- *Locating trails to avoid wildlife habitat:* The attached supplemental information regarding rare and endangered species should be reviewed before considering trail work or relocating trails. Evidence of rare and endangered species through monitoring should be completed prior to trail work. Vegetated buffer zones and species diversity are critical in maintaining healthy ecosystems. Removing invasive species and maintaining buffer zones will promote wildlife habitat. Trails should be located to reduce impacts to endangered species habitat, nesting sites for turtle, otter runs and should not block or segment highly used wildlife corridors.
- *Controlling water impoundment:* The existing cranberry bog east of the Cape Cod Rail Trail is currently using the river running through the Island Pond Conservation Area to flood the bogs. During the spring when water levels are high boards are being used at a sluice on the west side of the Cape Cod Rail Trail to dam the river preventing the natural flood of the stream and creating a large reservoir of water on Conservation Land. It is unknown at this time how this impoundment of water and concurrent reduced stream flow is affecting the Island Pond bordering vegetated wetlands, pond water levels, fish passage, downstream groundwater recharge, water usage and discharge into Coy Brook and Herring River.

b) Invasive Species:

- Invasive species are plants or animals that are introduced or not native to an area and that have no natural biological controls. Invasive species typically spread rapidly and are prolific seeders/breeders that are difficult to remove once established in an area. Invasives create a monoculture and out compete and eradicate native species. Removal and management of invasives is an important part of any land management plan. A healthy ecosystem is a diverse habitat with the ability to provide for an array of wildlife and plants. Removal and management of invasives promotes bio-diversity and native plant and animal communities.
- Island Pond has two priority areas for invasive (Common Reed) removal (see Appendix 4):
- The most commonly used and safest treatment for invasive plants is a Glyphosate based herbicide solution like Rodeo Brand. Glyphosate is safe to use in and around wetlands and kills the root system of plants by absorption into the circulatory system of the plants via the leaves or fresh cut stumps and destroying the root system; thus eliminating the plant. Glyphosate is NOT listed as a chemical of concern that contaminates groundwater. The best time of year to use the herbicide is typically

during the summer months as plants use a great deal of energy to leaf out and flower. The treatments should always take place prior to a plant going to seed to reduce the potential of additional plants forming in following years and spreading invasives upon removal. Treatments should always be done by a licensed chemical handler who has experience treating and removing invasive species.

- Pitch Pine Borers were also noted along trails where Pitch Pine roots were exposed. The borers smell the resin from the damaged roots and attack the trees. This can be managed by reducing erosion, reducing the trail width and putting oak chips over exposed roots. This should be done in the spring and monitored through summer when resin flows are greatest. Once Pitch Pines are infested with Pine Borers, it is usually too late to control with systemic pesticides.

c) Public Use Elements: Goals and Environmental Impacts

*Public use recommendations:* Although the trails being used should be altered and “hangout” area removed, one section of trail just off the dirt walking path/driveway off the Old Colony Rail Trail Bikeway contains a beautiful Atlantic White Cedar Swamp and may be converted to a boardwalk and viewing area. The boardwalk would reduce impacts to soils and vegetation, keep visitors on track, and provide a passive and educational experience. Additional parking should be considered off Lonesomes Way or Uncle Harrys Road along the dirt driveway leading out to the lavender farm or within the utility corridor. A parking area here would provide additional access to the Old Colony Bikeway and access to the Atlantic White Cedar Swamp trail head listed above. ADA compliance may be met by using a pervious paver to provide access to the existing paved bikeways from the new parking area.

*Habitat fragmentation:* Habitat fragmentation is of highest concern within the 50-foot buffer zone to the wetlands. An undisturbed buffer zone allows wildlife movement along wetlands creating wildlife corridors. There are many finger trails off the main trail that lead around the Island Pond and out to Katies Pond. Many of these trails not only fragment buffer zone habitat, but are also located within wetland resource areas. Reducing the number of finger trails will greatly improve a buffer zone and BVW “habitat corridor” around and within the wetland resource areas. In addition, reducing trail widths will also increase the natural vegetated buffer zone while reducing animal exposure to predators when crossing or using trails (see Appendix 4).

## 6.0 FIVE YEAR MAINTENANCE SUMMARY

a) *Goals and Desired Future Considerations:*

The overall goal of this Land Management Report is to minimize impacts to the natural resource areas of Island Pond while still providing an acceptable level of access for recreational use. This can be accomplished in the following phases:

- Eliminate small (new) colonies of invasive species (Common Reed). This can be accomplished by hiring an outside consultant who is a Massachusetts Licensed Chemical Handler. The consultant should be knowledgeable in invasive species removal and have prior experience. Colonies should be managed and monitored within the first 3 years to prevent additional spreading and new colonization.

- Work with the Department of Public Works, Cemetery Division to increase the buffer zone around the certified and potential vernal pools/isolated vegetated wetlands. Currently one potential isolated vernal pool is being cut to the edge of the water. This pool is listed as a potential vernal pool and the buffer zone habitat should be allowed to regenerate the native Buttonbush Bordering Vegetated Wetland and hydrophilic grass meadow. Restore amphibian migration patterns adjacent to the trailhead at the old cemetery at Route 124. There is another vernal pool with a wet meadow supporting breeding Mole Salamanders and Wood frogs.

This pool was photodocumented during the Fall of 2011 and Spring 2012, and qualified for certification. Another larger pool, again supporting breeding Wood Frogs and Mole Salamanders, is located southwest of Island Pond, adjacent to a dirt trail connecting to the rail trail bike paths. Certification forms for these vernal pools should be prepared and submitted to the Natural



Heritage & Endangered Species Program, Division of Fisheries & Wildlife for certification. Also, the current stockpiling areas at the Cemetery are within the BVW associated with an intermittent stream, which floods into Island Pond. Improvements should be made to reduce impacts to the buffer zone and BVW in this area. Sediment containment and moving materials further upland would improve this buffer.

- Several small finger trails should be eliminated, starting with the trail system located within the BVW and buffer zone, starting off the access road past Uncle Harrys Road bikeway crossing. Here, proposed construction of a new Atlantic White Cedar Swamp elevated walkway within the trail system with interpretative signage could be installed. Fishing access points along the Old Colony Bikeway should be improved with water bars, grade changes, mulching (also used for Pitch Pine Borer Control) and a reduction in trail width. Trail work can be done by volunteers, Boy Scouts, Americorps, Appalachian Mountain Clubs Adopt A Trail Program, Arbor Day festivities, Town of Harwich DPW, Harwich Trails Committee, local arborist, etc. Costs will vary depending on volunteer time and how much equipment the town currently owns. Symbolic fencing and signs can be used with boulders and large downed trees to prevent access to closed trails. An educational program can be implemented in the public school system to create a website for the parcel and by talking with people who are using the trails. This educational program should address the goal for each user to be a steward of the land by leaving it cleaner than it was before entering and to provide continuous updates to the database.
- Purchasing the land with unnamed ownership around the parcels, especially within the areas along the streams and BVW's should be considered. Additional protection of BVW, streams and buffer zones will prevent future development and impacts to sensitive ecosystems. Connecting lands owned by the Conservation Commission and Harwich Conservation Trust adjacent to Katies

Pond will greatly increase habitat corridors along the connecting streams and between the kettle ponds and resource areas for animal migration. This should be considered as a priority.

- Increase buffer zones and reduce trail widths. Most of the trails in the Island Pond area are small single-track trails and that width should be monitored and maintained. Trails increase in size when associated with the dirt roads associated with the private residences as they provide access and increased ORV use. No ORVs should be permitted on walking trails.
  - Installation of a new parking area across from Lonesomes Way or Uncle Harrys Road or within the utility corridor should be considered to provide additional access to trail heads and proposed Atlantic White Cedar swamp walkway.
- b) Timing for the above projects should follow the order listed and be considered over the next five years with the final bullet being accomplished within the next 10 years. They should be accomplished as the funds become available and the volunteer labor can be organized. Trail maintenance/monitoring work should be ongoing annually.
- c) Costs for the above 6(a) will vary greatly depending on availability of outside consultants, permits required, and volunteers obtained, and by how much the Town can do in house. Here is an estimate based on past experience with and current pricing.
- Estimated cost for invasive species removal to include permitting, treatment, removal, monitoring, and retreating over a 3 year cycle: \$10,000.00
  - Removal of finger trails can be done in house and with volunteers and should only need some equipment, training, and organization efforts. Estimated costs: \$1,000.00-2,000.00 annually depending on existing Town equipment needs.
  - Trail work and trail maintenance should be done twice a year and by volunteers to the extent feasible. Again general equipment and training is needed as well as organization efforts. Estimated costs: \$1,500.00
  - New Parking Area across from Lonesomes Way or Uncle Harrys Road should be done by the Town of Harwich DPW. Other costs would include engineering, mitigation plantings, signage, fencing, pervious pavers and ADA access. Estimated costs: \$25,000.00; this would not include costs of permitting and materials.

Please note these are rough estimates only and all components for work may not be included. Funding for these projects can come from various non-profit organization, State and Federal Grants and local fundraising efforts. Additional funding could come from a change in the Town of Harwich by-law, which would allow Town Officials to issue non-criminal citations to anyone caught breaking the rules on Town of Harwich owned lands. The Town of Harwich Selectmen and Town Council working with the Conservation Commission should consider preparing wetland by-laws with non-criminal penalties to enforce the regulations in case of minor violations. The Town of Barnstable uses this system of non-criminal citations to collect revenues to support enforcement since 1980 when by-laws were passed at town Meeting and ratified by the Commonwealth of Massachusetts Attorney General. For instance, should a person take herring without a permit or out of season in Barnstable, they are subject to a citation for \$10.00 with a

time certain to pay. Dune-hopping (driving off marked trails on Sandy Neck Barrier Beach) carries a non-criminal fine of \$50.00. Failure to pay could result in a court appearance. Based on discussions with Town officials, most violations are paid versus individuals going to court<sup>3</sup>. Preparing and adopting environmental by-laws enforceable by non-criminal citations is considered a priority.

After you have had a chance to review this Land Management Report, please do not hesitate to call me with any questions you may have.

Sincerely Yours,  
**BSC GROUP, INC.**

  
Matthew Creighton, WPIT  
Project Manager  
Environmental Scientist

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<sup>3</sup> Norman W. Hayes, PWS and Senior Associate for the BSC Group, Inc. worked as a Conservation Officer, deputy Shellfish Warden, Sandy Neck Ranger, and Chief Ranger for the Town of Barnstable (1973-1987) and successfully assisted in the preparations, implementation, and prosecution of non-criminal citation system for the Sandy Neck Governing Board in the Town of Barnstable in the performance of his duties (1981-1987). For more information, please call Nina Colean, Chief Ranger at Sandy Neck Barrier Beach in Barnstable at 1-(508)-362-8800.